



Board of Clallam County Commissioners

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Jim Jones, Jr. County Administrator

File: A22.32

Clallam County Board of Commissioners
223 East 4th Street, Suite 4
Port Angeles, WA 98362

13 January 2017

Dear Commissioners:

The Trust Lands Advisory Committee (TLAC) was created in late 2015 in accordance with the Board of Commissioners Resolution 70, 2015. Stakeholders from the community submitted application for participating in the committee and twenty individuals were accepted. The TLAC has reviewed the issues and concerns expressed in the resolution and has produced the following report.

The committee met on the third Friday of every month with the exception of March, July and December where special meetings were scheduled rather than the regular meeting to accommodate the schedules of the participants and work load. The committee used the first three meetings organizing the work plan and defining the rules of engagement and their bylaws. The meetings from March through July were spent learning about how the Department of Natural Resources (DNR) manages the Clallam County Trust Lands and their legal obligations. From August through December the committee synthesized the information and prepared their recommendation to the County Commissioners.

The report consists of a list questions the committee answered by a roll call vote which shows the group's support for the various opportunities for the management of the trust lands. The appendices include a list of committee participants, meeting agendas, meeting minutes and minority reports. The minority reports consist of the following:

18 Nov 2016 – Special Meeting

1. On the Question Regarding Reconveyance - Minority Report submitted by Beauvais, joined by Bell, Murray, Lea, including Cross, Swanson, and Reaume who were absent at the time of the vote;
2. On Question No. 2 regarding maintain current relationship with DNR, Minority Report submitted by Sextro;
3. On Question No. 4 regarding a staffer/consultant – Minority Report submitted by Sextro, joined by Doherty, Thaler, Bork, Scott, and Byrnes;

18 Nov 2016 – Regular Meeting

4. On Question No. 3 regarding a trust accounting – Minority Report submitted by Sextro, joined by Doherty and Byrnes;
5. On Combined Questions No. 4, 5, 6 regarding new or additional revenues – Minority Report submitted by Sextro and joined by Bork;

16 Dec 2016 – Special Meeting

6. On Question No. 1 regarding an advisory committee, Minority Report submitted by Scott, joined by Beauvais, Murray, Fleck, including Reaume who was absent at the time of the vote;

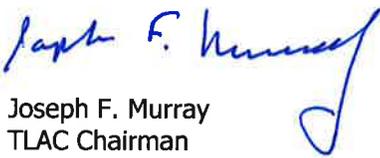
General

7. On the creation and operation of the TLAC, Minority Report submitted by Bork and Scott.

The information presented to the committee from DNR is on file in the commissioner's office and can be reviewed on the county's website at <http://www.clallam.net/bocc/trustlands.html>.

Please contact me if you need additional information or to schedule another committee meeting to review any issues that may arise.

Sincerely,



Joseph F. Murray
TLAC Chairman

TRUST LANDS ADVISORY COMMITTEE

List of questions

QUESTIONS VOTED ON AT THE:

NOVEMBER 18, 2016 – 9 A.M. MEETING

TLAC list of questions voted on at the November 18, 2016 - 9 a.m. meeting

Reconveyance:

- 1. Should the Board of County Commissioners seek the reconveyance of State Forest Lands (Clallam County State Forest Board Lands) managed by the Department of Natural Resources back to Clallam County to be managed by the County?**

Vote: Three for, nine against, none abstentions, and eight absent

For: Lea, Beauvais, Murray

Against: Reandeau, Pacheco, Scott, Doherty, Thaler, Fleck, Byrnes, Sextro (for Paul), Bork

Abstain: None

Absent: Bekkevar, Reaume, Blum, Kelly, Swanson, Cross, Merideth, Wolfe

If not reconveyance, then Recommendations to provide "guidance to ensure continual engagement with the Department of Natural Resources on how it's promptly and adequately fulfilling its Trust Land objectives to Clallam County, its taxing districts, and citizenry." CCBOC Res. No. 70-2015

- 2. Should Clallam County BOCC continue its current role with DNR management of Forest Board Transfer Lands, without any changes?**

Vote: One for, nine against, two abstentions, and eight absent

For: Sextro (for Paul)

Against: Lea, Reandeau, Beauvais, Pacheco, Murray, Scott, Doherty, Fleck, Byrnes,

Abstain: Thaler, Bork

Absent: Bekkevar, Reaume, Blum, Kelly, Swanson, Cross, Merideth, Wolfe

- 3. Should BOCC seek to establish via MOU or other means a collaborative means of managing with the DNR its management of FBTL?**

Vote: None for, ten against, two abstentions, and eight absent

For: None

Against: Lea, Reandeau, Beauvais, Pacheco, Scott, Doherty, Fleck, Byrnes, Sextro (for Paul), Bork

Abstain: Murray, Thaler

Absent: Bekkevar, Reaume, Blum, Kelly, Swanson, Cross, Merideth, Wolfe

4. Should the BOCC hire a staffer/consultant with forestry experience to act as a liaison with DNR in order to monitor, engage, respond, and question DNR management of FBTL?

Vote: Six for, five against, one abstention, and eight absent

For: Lea, Reandeau, Beauvais, Pacheco, Murray, Fleck

Against: Scott, Doherty, Thaler, Sextro (for Paul), Bork

Abstain: Byrnes

Absent: Bekkevar, Reaume, Blum, Kelly, Swanson, Cross, Merideth, Wolfe

5. Should the BOCC establish a representative advisory committee, with some level of staff support that would advise the BOCC regarding DNRs management of its FBTL?

Vote: Six for, seven against, none abstentions, and seven absent

For: Reandeau, Beauvais, Murray, Scott, Fleck, Bork

Against: Lea, Pacheco, Swanson, Doherty, Thaler, Byrnes, Sextro (for Paul)

Abstain: None

Absent: Bekkevar, Reaume, Blum, Kelly, Cross, Merideth, Wolfe

6. Should the BOCC as a minimum seek from the DNR an accurate and updated, maintained detailed resource inventory of its FBTL to include all resources with annual updates?

Vote: Twelve for, none against, one abstention, and seven absent.

For: Lea, Reandeau, Beauvais, Pacheco, Murray, Scott, Swanson, Doherty, Thaler, Fleck, Byrnes, Bork

Against: None

Abstain: Sextro (for Paul)

Absent: Bekkevar, Reaume, Blum, Kelly, Cross, Merideth, Wolfe

QUESTIONS VOTED ON AT THE:

NOVEMBER 18, 2016 – 12 P.M. MEETING

TLAC list of questions voted on at the November 18, 2016 – 12 p.m. meeting

(These were the Second Block – questions formulated by TLAC for consideration at November meeting per passed motion.)

1. Should the BOCC establish a means of coordinated, regular and meaningful outreach with the trust beneficiaries and the public regarding its FBTLs?

Vote: Fifteen for, one against, one abstention, and three absent

For: Bekkevar, Lea, Reandeau, Beauvais, Blum, Pacheco, Murray, Scott, Doherty, Cross, Fleck, Merideth, Byrnes, Sextro (for Paul), Bork

Against: Swanson

Abstain: Thaler

Absent: Reaume, Kelly, Wolfe

2. Should the BOCC establish a means of overseeing and monitoring the DNR's revenue generating methods regarding its FBTLs?

Vote: Three for, fourteen against, none abstentions, and three absent

For: Bekkevar, Beauvais, Murray

Against: Lea, Reandeau, Blum, Pacheco, Scott, Swanson, Doherty, Thaler, Cross, Fleck, Merideth, Byrnes, Sextro (for Paul), Bork

Abstain: None

Absent: Reaume, Kelly, Wolfe

3. Should the BOCC seek a trust accounting/performance audit of the DNR's management of its FBTLs?

Vote: Ten for, five against, two abstentions, and three absent

For: Bekkevar, Lea, Reandeau, Beauvais, Pacheco, Murray, Scott, Swanson, Cross, Fleck

Against: Doherty, Merideth, Byrnes, Sextro (for Paul), Bork

Abstain: Blum, Thaler

Absent: Reaume, Kelly, Wolfe

Trust Lands Advisory Committee

Proposed recommendation combining questions 4, 5 & 6:

4. Should the BOCC seek from the DNR ways to increase revenues from recreational uses on its FBTLs?
5. Should the BOCC seek from the DNR ways to increase fees from roads use, forest products, etc., on its FBTLs?
6. Should the BOCC seek from the DNR a means to secure reoccurring revenues from future established carbon sequestration markets?

Combined questions 4, 5 & 6:

Should the BOCC seek from the DNR ways to:

- a) increase revenues from recreational uses on its FBTLs;
- b) increase fees from road use, forest products, etc., on its FBTLs; and,
- c) secure reoccurring revenues from future established carbon sequestration markets on its FBTLs?

Vote: Ten for, six against, one abstention, and three absent

For: Reandeau, Beauvais, Murray, Scott, Swanson, Doherty, Thaler, Fleck, Byrnes, Bork

Against: Bekkevar, Lea, Pacheco, Cross, Merideth, Sextro (for Paul)

Abstain: Blum

Absent: Reaume, Kelly, Wolfe

7. Should the BOCC seek other revenue sources for county revenues such as increasing property taxes?

Vote: Two for, fourteenth against, one abstention, and three absent

For: Cross, Bork

Against: Bekkevar, Lea, Reandeau, Beauvais, Blum, Pacheco, Murray, Scott, Swanson, Doherty, Thaler, Fleck, Merideth, Sextro (for Paul)

Abstain: Byrnes

Absent: Reaume, Kelly, Wolfe

8. Should the BOCC seek a means of increasing revenue through advocating for a state income tax?

No Motion

9. Should the BOCC reduce county services associated with/tied to DNR revenues when DNR from its FBTLs decline?

No Motion

10. Should the BOCC, if a liaison is hired, expand the ability of that liaison to utilize ecosystem services values in reviewing the DNRs management of its FBTLs?

No motion

11. Should the BOCC seek an economic study discussing private and public forest lands that reviews such items as harvesting, milling, exports, and land conversions in Clallam County?

No motion

12. Should the BOCC seek from the federal government compensation for lost revenues associated with how the DNR's HCP applied to its FBTLs?

Vote: Two for, fifteen against, none abstentions, and three absent

For: Doherty, Cross

Against: Bekkevar, Lea, Reandeau, Beauvais, Blum, Pacheco, Murray, Scott, Swanson, Thaler, Fleck, Merideth, Byrnes, Sextro (for Paul), Bork

Abstain: None

Absent: Reaume, Kelly, Wolfe

13. Should the BOCC seek that its FBTLs be sold and the proceeds be reinvested?

Vote: None for, seventeen against, none abstentions, and three absent

For: None

Against: Bekkevar, Lea, Reandeau, Beauvais, Blum, Pacheco, Murray, Scott, Swanson, Doherty, Thaler, Cross, Fleck, Merideth, Byrnes, Sextro (for Paul), Bork

Abstain: None

Absent: Reaume, Kelly, Wolfe

QUESTIONS VOTED ON AT THE:

DECEMBER 16, 2016 – 9 A.M. MEETING

TLAC list of questions voted on at the December 16, 2016 – 9 a.m. meeting

- 1. *Should the BOCC establish an advisory committee composed of representatives of all entities ~~(needs clarification/defining)~~ (similar to the Trust Land Advisory Committee) and an at-large-position with an interest in Clallam County trust lands, to advise both the public and the staffer/consultant regarding DNR's management of Clallam County trust land?***

Vote: Five for, ten against, one abstention, and four absent

For: Beauvais, Murray, Kelly, Scott, Fleck

Against: Bell (for Bekkevar), Reandeau, Pacheco, Swanson, Grad (for Doherty), Thaler, Cross, Byrnes

Abstain: Lea

Absent: Reaume, Blum, Merideth, Wolfe

Amendment 1 to question 1:

Vote: Nine for, four against, three abstentions, and four absent

For: Bell (for Bekkevar), Beauvais, Pacheco, Murray, Scott, Swanson, Thaler, Fleck, Byrnes

Against: Reandeau, Kelly, Sextro (for Paul), Bork

Abstain: Lea, Grad (for Doherty), Cross

Absent: Reaume, Blum, Merideth, Wolfe

- 2. *Should the BOCC add integrated resource management to the definition of forestry experience in employing a staff/consultant?***

Vote: Ten for, five against, one abstention, and four absent

For: Reandeau, Beauvais, Pacheco, Scott, Grad (for Doherty), Thaler, Fleck, Byrnes, Sextro (for Paul), Bork

Against: Bell (for Bekkevar), Murray, Kelly, Swanson, Cross

Abstain: Lea

Absent: Reaume, Blum, Merideth, Wolfe

TRUST LANDS ADVISORY COMMITTEE

Minority reports

Minority Reports
18 Nov 2016 – Special Meeting

- 1. On the Question Regarding Reconveyance - Minority Report submitted by Beauvais, joined by Bell, Murray, Lea, including Cross, Swanson, and Reaume who were absent at the time of the vote;**
- 2. On Question No. 2 regarding maintain current relationship with DNR, Minority Report submitted by Sextro;**
- 3. On Question No. 4 regarding a staffer/consultant – Minority Report submitted by Sextro, joined by Doherty, Thaler, Bork, Scott, and Byrnes;**

Clallam County Commission
223 East 4th St
Suite 4
Port Angeles, WA 98362-3000

RE: Minority report on reconveyance of State Forest Board Transfer Lands back to Clallam County

Dear Commissioners:

The Trust Land Advisory Committee (TLAC) has spent 2016 discussing the Department of Natural Resources (DNR) and its management of timberlands in Washington: Trust Lands, which Congress deeded at statehood for the benefit of specific, enumerated institutions (e.g. schools, hospitals, prisons); and Forest Board Transfer Lands (FBTL), which were acquired later through tax-delinquency repossession, outright purchase, and other transactions, and are managed for the benefit of the county in which they reside. The TLAC considered whether to recommend that approximately 90,000 acres of FBTL lands should be reconveyed to Clallam County, to be managed by and for the County. Both Trust Lands and FBTL lands are managed according to DNR's Habitat Conservation Plan (HCP): a contract where DNR agrees to create and maintain habitat for a number of threatened and endangered species in exchange for an incidental take permit – issued by federal services – in the event that management activities result in the death of individual animals. The obligations to create and maintain habitat according to the terms of the HCP will follow FBTL lands should they be reconveyed.

Consider the following information delivered by DNR in the course of the February, March, and April TLAC meetings. One of the major elements of the HCP is management for the Northern Spotted Owl (NSO), whose habitat elements are described in detail in the Washington Administrative Code¹. In its Sustainable Harvest Calculation (SHC) – a 10-year harvest plan for the fiscal years 2005 through 2014 – DNR planned to create a large portion of NSO habitat through management of riparian zones within the Olympic Experimental State Forest (OESF) – roughly 273,000 acres of forest in western Clallam and Jefferson Counties that includes FBTL lands. Riparian zones occupy approximately 40% of the OESF land base. While yielding timber for sale, DNR's stated purpose was to create and maintain NSO habitat creation and maintenance over the life of the SHC. The result: only 10% of the planned action was implemented; that is, 90% of needed NSO habitat was not created or enhanced. Unfortunately, such a failure was not unpredictable, as DNR revealed reluctantly between the May and October meetings: DNR *does not* maintain an inventory that allows it to evaluate NSO habitat² according to its definition; further, DNR *does not* track harvested timber³. Stated Plainly, DNR is unable to measure success in achieving its goals and does not track its progress towards those goals. DNR's failure to manage these lands for habitat has had serious negative consequences for the species^{4,5}.

¹ §222.16.085, available online at: <http://apps.leg.wa.gov/WAC/default.aspx?cite=222-16-085>

² Motion 61, http://websrv7.clallam.net/forms/uploads/2016-12-05_085257_TLACMotionTable_11-16.pdf

³ Minutes, October 21st meeting

⁴ Ollikainen, Rob. 2012 "Federal plan to shoot barred owls weighed on Peninsula" Peninsula Daily News. Accessed 12/23/2016 online at: <http://archive.peninsuladailynews.com/article/20120304/news/303049985/federal-plan-to-shoot-barred-owls-weighed-on-peninsula>

⁵ Barnard, Jeff. 2011. "20-plus years of the northern spotted owl rules: Last-chance effort to save species starts this month" Peninsula Daily News. Accessed 12/23/2016 online at: <http://archive.peninsuladailynews.com/article/20110213/news/302139981/20-plus-years-of-the-northern-spotted-owl-rules-last-chance-effort>

Using the same example – active management of riparian zones in the OESF – now consider the economic consequences to Clallam County schools, hospitals, libraries, and fire departments. DNR promised 391 million board-feet (MMBF) of timber over the SHC period, of which only 39 MMBF (10%) was delivered. Of the 351 MMBF not harvested, the forgone timber represents \$140.4 million dollars in revenue over the SHC planning period⁶. After subtracting DNR's management fee, beneficiaries including Clallam County should have received \$10.2 million annually. Had the timber been harvested evenly over the 10-year period, the 35 million board-feet of timber would have provided 189 year-round, family-wage jobs⁷. Additionally, timber harvesters pay 5% of their receipts in the form of timber-excise taxes, four-fifths of which returns to the county. In this case, excise taxes would have remitted \$560,000 per year to Clallam and Jefferson Counties. Tax remittances carry a special importance for schools, as they are used exclusively for bond retirement; this allows local districts to approve bonds and pay them off early, allowing for new bonds to be issued. Districts could pass a bond for \$10 million, and tax payers would only pay for \$8 million, with timber excise tax remittances paying the balance. At the state level, timber harvested on Common School Trust Lands are used for new school construction: a critical element in implementing Initiative 1351 – the class size initiative requiring the hiring of an estimated 15,000 new teachers and constructing the classrooms to house them - approved by a majority of Washington voters in 2014. But due to DNR's failure to implement its SHC/HCO plans, none of the jobs, revenues, benefits to local taxpayers, or implementation of statewide initiatives have been realized.

Upon review of the TLAC meeting minutes and materials, the County Commission will see that reconveyance of FBTL lands to Clallam County is an affirmation of economic support for county institutions and of the ecologic goals in the HCP; the two are not mutually exclusive. Had the majority proposed a solution providing adequate funding of schools, hospitals, libraries, and fire departments that included no active management of FBTL lands, we, the undersigned, would have supported such a proposal; if there was a plan to fully fund institutions through sustainable management of FBTL lands alone, we would have supported that; if there had been a proposal for funding achieved through a combination of sustainable management of FBTL lands and other sources, we would have supported that, too. However, the majority offered no plan, and instead, some in the majority have leveraged fear, uncertainty, and doubt to dissuade the TLAC from supporting a proposal for reconveyance. The County Commission is well-advised to be wary of arguments made by parties that demonstrate little evidence of support for *any* action discussed here – creating habitat for endangered species, funding county institutions, partnering in economic development – but rather adopts any and every strategy that produces inaction, namely, stopping sustainable timber harvest. Inaction by the Commission on this issue will have continued negative ecologic and economic consequences on the species managed for under the HCP, on the hospitals, libraries, and fire departments in Clallam County, and on the citizens who rely on them.

HARRY BELL *Harry Bell*
for David Bekkerav

Respectfully,

Connie Beauvais
Connie Beauvais

Thomas L. Swanson

Thomas L. Swanson
(Absent but in support of re-compliance)

Jason Cross
JASON CROSS
Robert Lea
Robert Lea

Joseph F. Murray
JOSEPH F. MURRAY

⁶ Using a stumpage of \$400 per MBF

⁷ Every MMBF of timber harvested supports 5.4 FTE jobs in logging, trucking, milling, and pulp & paper. Source: Underwood, Dan, Cross, Jason. 2012. "Analysis of the Wild Olympics Wilderness and Wild and Scenic Rivers Act of 2012: economic impacts and opportunities." Report to the Port of Port Angeles. Accessed 12/23/2016 online at: <http://portofpa.com/DocumentCenter/View/20>.

Diana Reame
Diana Reame

MINORITY REPORT

Recommendation: Question #2—Special Meeting of 18 November 2016

Question #2: Should Clallam BOCC continue its current role with DNR management of State Forest Lands, without any changes?

Vote: Yes-1, Sextro

No-9, Lea, Reandeu, Beauvais, Pacheco, Murray, Scott, Doherty, Fleck, Byrnes

Abstain-2, Thaler, Bork

MINORITY OPINION:

Sierra Club believes that the Clallam BOCC should not change its current role with DNR regarding DNR's continued management of our Trust/Forest lands because of 2 primary factors—1) the TLAC was never formed because of a "mandate" from the public and 2) through the yearlong meetings of the TLAC, no evidence (only opinions) was presented — much less evaluated — to show that the DNR is improperly managing our trust lands for income, as Commissioner Mike Chapman (the longest serving of the current commissioners) has stated publically many times—the DNR has been a reasonable partner and the county has always received adequate revenue from them.

1) The outcome of the 2015 charter review commission (CRC) presented a false view of a citizen mandate in April 2015 with 14 form letters to the CRC signed by Clallam citizens recommending (or requesting) reconveyance. These petitions were the basis for the claim that the public was demanding reconveyance. CRC voted to send a letter to the BOCC recommending the formation of the TLAC. The 2015 BOCC readily agreed in a 2-1 vote (Chapman voting No). Resolution #70 passed by the BOCC that formed TLAC stated that this committee should focus on the question of reconveyance. The official TLAC vote on Question #1 asking the BOCC to seek reconveyance of the state forest lands was Yes-3 and No-9. Additionally, during the public comment period prior to that vote on 18 November 2016, 62 citizens expressed (either verbally or in writing) a No to reconveyance and only 2 commented Yes to reconveyance—**hardly a public mandate**.

2) Sierra Club believes that DNR has the expertise, management and legal resources to professionally manage our forest trust lands with generational equity for the benefit of our schools, fire districts, hospitals and other special tax beneficiaries (income mandate). Since no evidence (only opinions) was presented — much less evaluated — during TLAC meetings to show that the DNR is improperly managing our trust lands for income and since opinions do not equal facts, we heard no compelling reason to ask the BOCC to change their role and interactions with DNR. However, what we also learned from DNR is that their record of protecting our county's environment and listed species therein (implementing the Habitat Conservation Plan—their environmental mandate) is rather spotty. While DNR's spotty

environmental record is of concern to the Sierra Club it was not addressed and considered by TLAC so it was not part of the question voted on.

What we also learned from DNR testimony during the TLAC meetings was that there is NO net arrearage. We specifically asked DNR about the arrearage that was added to the current 10-year period from the previous 10-year period? DNR responded "that the arrearage carried forward from the previous 10-year period exceeded the negative arrearage", hence NO net arrearage rather a positive outcome. This was contrary to the misleading campaign by the timber industry that repeatedly claims that arrearage was/is the cause for the loss of jobs, tax revenue and economic vitality in our county. The real cause for economic malaise in Clallam county is exports of whole logs. All the local mills that closed down were the result of the export to Asia of raw logs off private timber lands. Clallam county's jobs went to China. Additional losses in timber-related employment were caused by over-harvesting in previous years, mechanization in the woods, short harvest rotations and modernization of mills.

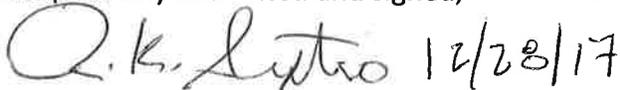
Finally, it is truly unfortunate that representatives from Grays Harbor county and Skagit county were not able to either attend a TLAC meeting or call into one to provide us with their insights and experiences on timber-lands management or DNR interactions (Skagit). These other county's officials might have had valuable information and facts regarding the pros and cons of differing management techniques for our forest lands or that different interactions with DNR could produce favorable outcomes to Clallam county and the various tax districts while maintaining consistency with the Habitat Conservation Plan. Since these interactions with other counties did not happen during the year-long TLAC meetings, again we heard no compelling reason to ask the BOCC to change their role and interactions with DNR.

Bibliography:

<http://portocallpublishing.com/2016/12/twice-told-timber-tales/>

<http://portocallpublishing.com/2016/10/timber-arrearage-the-real-story-by-john-woolley/>

Respectively submitted and signed,

 12/28/17

Robert Sextro, chair North Olympic Group (NOG) of the Sierra Club
Josey Paul, representative of NOG of the Sierra Club

MINORITY REPORT

Recommendation: Question #4—Special Meeting of 18 November 2016

Question #4: Should Clallam BOCC hire a staffer/consultant with forestry (December vote added "integrated resource management") experience to act as liaison with DNR in order to monitor, engage, respond and question DNR management of the State Trust Lands?

Vote: Yes-6, Lea, Reandeau, Beauvais, Pacheco, Murray, Fleck
No-5, Scott, Doherty, Thaler, Sextro, Bork
Abstain-1, Byrnes

Minority Opinion: Scant information and discussion occurred during TLAC meetings on the rationale to hire such a forestry liaison for Clallam county, including the advantages and disadvantages. Although the Skagit County model was mentioned, the details of their staff liaison and their interaction and impact on DNR timber harvest activities were never fully presented and discussed, and representatives of Skagit county were not invited to present their information, in person or on the phone. Although several members had opinions supporting a Yes-vote for this question—opinions do not equate to facts—therefore a NO vote is in the best interest of the public and is the only rational decision.

Members of TLAC learned at the monthly meetings that DNR employs a large, highly trained and specialized staff. It also operates advanced computer programs to track forest inventory and conditions and to manage forests for consistent, long-term income. We do not believe that a county forester could match the DNR's management expertise. Therefore, the hiring of a liaison is an unnecessary expense that further exacerbates the county's budget shortfall and has the potential to complicate management of the State trust timber lands by DNR.

Also discussed was that by law, the DNR is required to treat all generations of trust beneficiaries equally -- a concept called intergenerational equity. They do this through the Sustainable Harvest Calculation which sets the volume of timber to be scheduled for harvest for the next planning decade. Over time, if DNR increases sales from the sustained yield, it will illegally favor current generations over future generations. If it undercuts the sustained-yield harvest, it will illegally favor future generations over current generations.

The 10-year Sustainable Harvest Calculation is constantly balancing these forces. No county forester can force the DNR to log more or less than the Sustainable Harvest Calculation for the planning decade. To do so would be illegal. DNR's compliance with both its trust and public interest obligations using industry standard inventory and analysis methods would not be improved by county staff/consultant forester."

Bibliography: none

Respectively submitted and signed,

Robert Sextro 12/28/17
Robert Sextro, chair North Olympic Group (NOG) of the Sierra Club
Josey Paul, representative of NOG of the Sierra Club

W. Bork 12/29/2016

Shoanne C. Scott 12/29/16
Shoanne C. Scott

Mike Doherty, representative of Clallam Democratic Party
Brian Grad, alternate representative of Clallam County Democratic Party

Toby Thaler, representative of Olympic Forest Coalition (OFCO)

Coleman Byrnes Audubon 12/29/16

Minority Reports
18 Nov 2016 – Regular Meeting

- 4. On Question No. 3 regarding a trust accounting – Minority Report submitted by Sextro, joined by Doherty and Byrnes;**
- 5. On Combined Questions No. 4, 5, 6 regarding new or additional revenues – Minority Report submitted by Sextro and joined by Bork;**

MINORITY REPORT

Recommendation: Question #3—Regular Meeting of 18 November 2016

Question #3: Should Clallam BOCC seek a trust accounting/performance audit of the DNR's management of its forest board trust lands (FBTLs)?

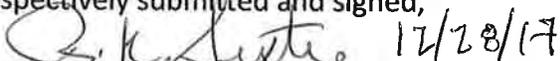
Vote: Yes-10, Bekkevar, Lea, Reandeau, Beauvais, Pacheco, Murray, Scott, Swanson, Cross, Fleck
No-5, Doherty, Merideth, Byrnes, Sextro, Bork
Abstain-2, Blum, Thaler

Minority Opinion: There was no evidence or detail presented or considered during TLAC meetings as to whether the DNR was managing our timber lands and performing its fiduciary responsibilities in an unsatisfactory manner (while there were lots of opinions on DNR's performance again there were no negative facts). Also, there was scant information and discussion during TLAC meetings regarding the cost of such an accounting/audit compared to the benefits or return-on-investment (ROI) from the outcome (see next paragraph). The discussion leading up to the vote on the question was fraught with uncertainty as to any real positive outcome to the county plus it was clearly stated that this type of evaluation was not commonly done or asked for. We are opposed to this because of the high cost to the county with no clear indication as to the ROI from the outcome and the lack of facts presented and discussed that could be used to judge DNR's accounting and performance. So a NO vote is in the best interest of the public and is the only rational decision.

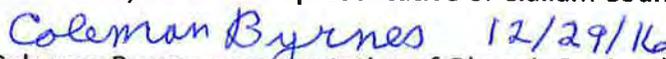
What was discussed was "inventory" and we learned that DNR tracks its vast tracts of forest using a computer model. That model predicts future forest conditions and projects habitat conditions into the future. The DNR spot checks the model by going to individual stands and doing a fine-grained analysis of forest conditions. The DNR testified that these spot checks have been consistent with the projections established by the computer model. Therefore, it doesn't need to do a more expensive, widespread and fine-grained analysis or accounting because it would be wasting the trust beneficiaries' money while providing no added value. Further, increased detail assists the private timber interests in their evaluation of additional timberland exchanges, such as that done in 2013 (Foothill Land Exchange between DNR and Green Crow) which in many aspects was not in the best interests of the public and Clallam county.

Bibliography: none

Respectively submitted and signed,

 12/28/17
Robert Sextro, chair of North Olympic Group (NOG) of the Sierra Club
Josey Paul, representative NOG of the Sierra Club

Mike Doherty, representative of Clallam County Democratic Party
Brian Grad, alternate representative of Clallam County Democratic Party

 12/29/16
Coleman Byrnes, representative of Olympic Peninsula Audubon Society (OPAS)
Robert Phreaner and Mary Porter-Solberg, co-chairs of Conservation Committee of OPAS
(OPAS ALTERNATE REP)

MINORITY REPORT

Recommendation: Questions #4, #5 and #6—Regular Meeting of 18 November 2016

Question #4: Should the BOCC seek from the DNR ways to increase revenues from recreational uses of its forest board trust lands (FBTLs)?

Question #5: Should the BOCC seek from the DNR ways to increase fees from road use, forest products, etc. on its FBTLs?

Question #6: Should the BOCC seek from the DNR a means to secure reoccurring revenues from future established carbon sequestration markets?

For voting purposes all these 3 questions were vote on once as a group.

Vote: Yes-10, Reandeau, Beauvais, Murray, Scott, Swanson, Doherty, Thaler, Fleck, Byrnes, Bork

No-6, Bekkevar, Lea, Pacheco, Cross, Merideth, Sextro

Minority Opinion: During the discussion on the motion being considered to vote on all 3 questions it was determined that for questions 4 and 5 any additional revenue would go into a DNR general account such that Clallam county would not be a direct beneficiary of any revenue increases as any increased revenue would be shared with all other timber counties. A No vote was the only logical conclusion for these questions.

Additionally, question #6 regarding securing reoccurring revenues from carbon sequestration was interpreted to mean the types of carbon sequestration outlined in the Consortium on Research of Renewable Industrial Materials (CORRIM) paper (wood building materials, shorter timber harvest rotations, etc.) which was the only information provided to TLAC via the timber-industry controlled TLAC executive committee. The information and conclusions from the CORRIM studies were just accepted as "fact" and not substantively discussed or analyzed.

Sierra Club voted NO on this type of "sequestration" postulated by the pseudo-science discussed in CORRIM. This pseudo-sequestration supposedly results from the young, fast growing trees that act as a "carbon pump" to sequester carbon out of the air and then this carbon is then stored in a pool of final consumer products, such as wood-built homes. This is not true, a 10 year old tree may grow faster than a 100 year old tree, but the 100 year old tree will pull much more carbon out of the air. The CORRIM work shows that tress cut on a 40-year rotation will have stored 60 tons of carbon per acre over 120 years. However, since over half of the carbon stored by standing timber is in the soil and biomass, which is quickly lost back to the air after trees are harvested, if we DID NOT cut the trees the carbon stored would be in excess of 200 tons per acre.

When a forest stand is clearcut, there is a loss of carbon in the harvested timber, in the other aboveground biomass and in the forest soils. Research shows that soils degraded by clearcut logging lose massive amounts of carbon, and those losses continue for years after the harvest.

According to recent studies in the Pacific Northwest, it takes 15 to 20 years before a replanted forest begins to store carbon on a net basis. The young trees can't store carbon fast enough to offset the continuing losses of carbon from the soil.

Additionally, the CORRIM work proposes an increase in carbon incentives/taxes to support their version of carbon sequestration, but all this does is further enrich the private timber owners and companies NOT OUR COMMUNITIES. Below is the better version of carbon sequestration that preserves our county trust lands as standing timber and critical habitat for birds, salmon and people while at the same time enriches our county and the communities therein.

The carbon sequestration park concept

The recent Paris climate accords, agreed to by virtually every nation on earth, set in motion plans to sharply reduce carbon dioxide emissions that are destabilizing the global climate, acidifying oceans, spreading droughts, sparking forest fires, raising sea levels, destroying crops, increasing storms and putting the survival of most species of higher life — including people — at risk.

The science backing the Paris accords acknowledges that reducing carbon dioxide emissions will not be enough. The United States and the world's governments have agreed that all nations — including developed nations — must also begin to set aside forests to absorb excess levels of carbon dioxide from the atmosphere.

These concerns open the path for Clallam County to redeploy our forests for a higher — and more profitable purpose — as carbon sinks. Acre for acre, no ecosystem on earth comes close to the carbon-storing potential of the giant conifer ecosystem that runs along the Pacific Coast from northern California to southern Alaska. Our forests, when fully mature, can store more than 1,000 tons of carbon per hectare (2.5 acres) — at least twice as much as any other ecosystem on earth.¹

The DNR's recent survey of Clallam County's 92,525 acres of transfer lands found 2.6 billion board feet of standing timber. Forest stands in this region with that much timber will store about 200,000 tons of carbon a year in trees, other plants and forest soils. That much carbon represents the removal of 734,000 tons of carbon dioxide from the atmosphere each year. And that amount of annual sequestration will increase for hundreds of years.

¹ See "Potential upper bounds of carbon stores in forests of the Pacific Northwest," Erica A. H. Smithwick, Mark E. Harmon, Suzanne M. Remillard, Steve A. Acker, and Jerry F. Franklin; submitted to Ecological Applications, Ecological Society of America, Ithaca, NY; accepted August 05, 2001. See also J. M Adams, "Estimates of preanthropogenic carbon storage in global ecosystem types." (2004).

The current corporate market for carbon credits is immature, fragmented and inconsistent, but generally it pays about \$12 a ton for sequestered carbon dioxide. The corporate markets count only the value of standing timber available for harvest; they do not give credit for storage of carbon in other biomass or in forest soils. These corporate carbon markets are not likely to match the timber income Clallam County currently gets, but the new world markets called for by the Paris accords will likely change the game by offering higher prices and giving credit for all the carbon a forest sequesters, not just the carbon sequestered in standing timber.

Forest soils typically store as much carbon as all the aboveground biomass. And marketable timber represents only half of the aboveground stored carbon in forests.

The US government has not yet established a program to use forests to sequester carbon dioxide from the atmosphere, but it has set a value for sequestered carbon dioxide at \$36 a ton (aka, the social cost of carbon). And it has agreed to use forests for that purpose, raising the potential for Clallam County to switch its public forests from timber income to carbon income.

If the federal government pays for the full carbon-sequestration potential of our forests — timber, soils and other biomass — Clallam County would earn more than \$26 million a year, which is a much greater return than the \$6 million we now receive.

Using this annual carbon sequestration revenue we could double the income to our schools, hospitals, libraries, fire districts and other junior taxing districts, and still have nearly \$15 million to offset potential timber job losses even using \$50,000 a year for a full-time timber job. That, plus this additional annual revenue to the county could also be used for a jobs and job-training program benefitting the entire county.

The carbon income would be steady, predictable and would rise each year as our forests mature and store more and more carbon. In addition, we'd diversify our economy and restore the health of our forests and wildlife. We'd have more clean and abundant water. Tourism and recreational jobs would increase. If the US congress repealed the right of private timber companies to export our mill jobs to Asia, local employment would climb even higher.

The federal government, under the obligations that it took on in the Paris climate accords, is one likely source to pay the \$36 a ton for sequestered carbon — and it would get good value for that investment. In addition to the carbon income that forests would provide, independent studies show that with each ton of sequestered carbon dioxide, our country would gain hundreds of dollars in benefits from the environmental services that intact, mature forests provide. In other words, a carbon park is an excellent investment for our future.

Because Clallam County is in the middle of the most productive carbon-storing ecosystem on earth and because the federal government has already committed itself to this approach, we have a good chance of winning federal approval — if we pursue this opportunity.

"OFCO voted "Yes" on this combined question and cannot join in the above minority report. However, we concur that the TLAC did not gather, consider, or discuss the best available science regarding the use of forests to sequester carbon. The presumption that forest products produced from short rotation industrial forestry can come close to the sequestration capacity of longer rotation forestry is based on numerous flawed assumptions, and is not supported by the credible weight of relevant peer reviewed scientific publications."

On behalf of Toby Thaler, representative of OFCO

Bibliography:

- https://www.nrs.fs.fed.us/pubs/gtr/gtr_wo059.pdf, Carbon Storage and Accumulation in US Forest Ecosystems, in forests roughly 50% of carbon stored in below ground soil and biomass.
- https://www.fs.fed.us/nrs/pubs/jrnl/2011/nrs_2011_heath_001.pdf, Carbon Stocks on Forest Lands of the US, in forests roughly 50% of carbon stored in below ground soil and biomass.
- <http://www.esd.ornl.gov/projects/gen/carbon3.html>, Estimates of Preanthropogenic Carbon Storage in Earths Ecosystems, shows our region has the highest carbon-storing potential of any biome on earth.
- <https://nepis.epa.gov/Exe/tiff2png.cgi/910206NF.PNG?-it-r+75+-g+7+D%3A%5CZYFILES%5CINDEX%20DATA%5C91THRU94%5CTIFF%5C00003037%5C910206NF.TIF>, shows graphically the distribution of carbon storage in US timberland, 31% in the living tree remainder in the forest soil, floor and biomass.
- <https://www.nature.nps.gov/socialscience/docs/CarbonSequestration.pdf>, Terrestrial Carbon Sequestration in National Parks, National Park Service publication 2014/880.
- <http://www.dec.ny.gov/lands/47481.html>, Trees, the Carbon Storage Experts.
- <http://www.nature.com/nature/journal/v455/n7210/full/nature07276.html>, Old Growth Forests as Global Carbon Sinks.
- <http://www.esd.ornl.gov/projects/gen/carbon2.html>, Estimates of Total Carbon Storage in Various Important Reservoirs.
- <http://www.esd.ornl.gov/projects/gen/carbon1.html>, An Inventory of Data, for Reconstructing Natural Steady State Carbon Storage in Terrestrial Ecosystems.
- Ingerson, Ann L. 2007. U.S. Forest Carbon and Climate Change. Washington, D.C.: The Wilderness Society.
- Ingerson, A. 2009 Wood Products and Carbon Storage: Can Increased Production Help Solve the Climate Crisis? Washington, D.C.: The Wilderness Society.

Respectively submitted and signed,

 12/28/17

Robert Sextro, chair North Olympic Group (NOG) of the Sierra Club
Josey Paul, representative of NOG of the Sierra Club

 12/29/16

Minority Report
16 Dec 2016 – Special Meeting

- 6. On Question No. 1 regarding an advisory committee, Minority Report submitted by Scott, joined by Beauvais, Murray, Fleck, including Reaume who was absent at the time of the vote;**

Gores, Alanna

From: Susanne Scott <infotectives@gmail.com>
Sent: Wednesday, December 28, 2016 5:32 PM
To: Gores, Alanna; Joseph F. Murray; Rod Fleck; Connie Beauvais; Diana Reaume; Cindy Kelly
Subject: Minority Report for TLAC

Hello Lonnie,

Here is one of the Minority Reports for inclusion in the final report from TLAC. The individuals listed on the email have all agreed and supported this report and are prepared to sign it tomorrow morning at our TLAC meeting.

Please include this for signature tomorrow.

Thank you,

Sue

Subject: Minority Report for 16 December 2016 Morning Meeting, Question 1, as follows: Should the BOCC establish an advisory committee composed of representatives of all entities (similar to the composition of TLAC Committee) and an at-large-position with an interest in Clallam County Trust Lands, to advise both the public and the staffer/consultant regarding DNR's management of Clallam County Trust Lands?

**Vote: For 5
Against 11
Abstain 1
Not Present 1**

The Charter Review Commission recognized the inadequacies of the DNR in completing its fiduciary responsibility to the trust beneficiaries and the ensuing detrimental economic effects and the lack of proper forest management to create healthy forests. It was this recognition that led to the Commission's recommendation to the Board of County Commissioners that the TLAC be established to study and make recommendations regarding the management of Clallam County's forest board trust lands.

Throughout the discussion about the County's trust lands, there was obvious interest in what the DNR was doing, should be doing, and how the County should engage with the DNR. An advisory board made up of various representative interests that are political, governmental and professional, could play a remarkable role in responding to questions from the BOCC, the Citizens, and even DNR regarding DNR's proposed harvest plans, silviculture practices, harvest calculations, general management and regulatory proposals. Further, if the County were to adopt the recommendation of

hiring an individual with forestry and integrated resource management experience; an advisory committee could be a good sounding board for that staffer to engage and weigh the various options and issues they are addressing.

Clallam County has an established practice of forming Advisory Committees to explore, fact-find and report back to the County Commissioners. The minutes from the Commissioner's meetings indicate a budget shortfall and several positions that are critical that need filling. This Minority Report would encourage the Commissioners to establish an advisory committee very similar to the TLAC for on-going engagement with DNR regarding the County Trust Lands. This committee represented the diversity in the County, conducted itself well, and had discussions with DNR and other experts sharing those discussions with the Commissioners and a very interested public based on the active participation. This Advisory Committee would be at minimal cost and provide a wealth of information for the Commissioners and County Residents.

It is important that the elected, trust beneficiaries and the public stay actively engaged in the status of the County's forest board trust land management. Establishing a committee/council with a makeup similar to that of the TLAC could serve as an important communication source to the trust beneficiaries, the public, the Board of County Commissioners and the recommended county forester position.

Dore Scott

"Can music stop a bullet?"

The Silk Road Ensemble

Connie Beauvais
Connie Beauvais

Diana Reaume
(Diana Reaume)

Joseph F. Murray
JOSEPH F. MURRAY

William R. Ford

**● Minority Report
General**

**7. On the creation and operation of
the TLAC, Minority Report
submitted by Bork.**

The Honorable Mark Ozias, Commissioner
Clallam County Board of Commissioners
223 E 4th St #4
Port Angeles, WA 98362

December 14, 2016

RECEIVED
CLALLAM CO. COMMISSIONERS
DEC 16 2016 TLAC

Dear Mr. Ozias:

Before my involvement with the TLAC, I was opposed to ~~re-conveyance~~^{1. 2. 3.} conveyance of the management of Clallam County Trust Lands from the Washington Department of Natural Resources (DNR) to the County itself. I believed that the proposed action would be expensive to taxpayers, reduce the quality of management, and result in a political scenario that would make forests even more vulnerable to extractive interests.

I still think re-conveyance is a bad idea. Changing the manager is not the solution to the economic pains felt by our junior taxing districts. We need to make more money from these lands, but not through timber harvests. There is no possible way we can harvest our way to an Economic Eden.

Forests are one of the Olympic Peninsula's finest assets. Forest conditions reflect the attitudes of the people who live in Clallam County. There is a clear and defining difference between intensively-managed and native forests. We all can see and feel this difference.

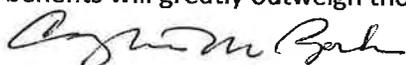
The DNR will strive to meet its fiduciary responsibilities to the County by providing Trustees with as many funds as possible through its primary means: timber harvest profits. Using this model, the harvesting actions will pre-empt all other possibilities for generating funds because NOBODY wants to visit an area that has lost its inherent, biological and aesthetic qualities.

Hence, I believe we can ask the WDNR to meet its fiduciary responsibilities to the County by refocusing efforts on carbon storage, tourism, scenic byways, visitor center development, recreation amenities, wildlife/fisheries showcases, special non-timber forest products, enhancing forest health and diversity, natural resource education centers, and community restoration programs.

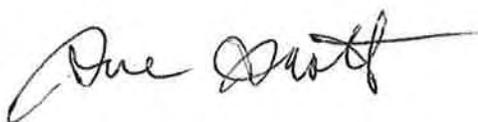
I quickly came to realize that the TLAC is heavily comprised of members appointed by the timber industry. It is difficult, if not impossible, for the TLAC to be a creative think tank for possible alternatives to the status quo management of trust lands. The TLAC must be guided by a neutral facilitator and will require a re-assembly of progressive, community-minded citizens with a long-term vision for our trust lands.

At present, the TLAC playing field is a passive-aggressive confrontation between environmentalists and the timber company representatives who have re-classified their affiliations. After a year of briefings about the status of trust lands and management by the DNR, meetings have devolved into chaos and confusion. Little progress made toward developing sound recommendations for the future sustainable management of trust lands by the Agency. Recent political elections have not helped the situation.

Trust land forest management will require a new approach to solving many of the physical, social, economic and biological needs of Clallam County. The DNR will do whatever is asked of them by the County, however, emphasizing and enhancing values other than timber will require more resource specialists, planners and organizers. This approach will cost more money. But, in the long run, the benefits will greatly outweigh those of today's narrow reliance upon harvesting trees for economic gain.



Cynthia Bork
1630 Ozette Street
Forks, Washington 98331



TRUST LANDS ADVISORY COMMITTEE

**Resolution 70 – Establishing an Ad Hoc
Trust Lands Advisory Committee**

And

Member list



RESOLUTION 70, 2015

ESTABLISHING AN AD HOC TRUST LANDS ADVISORY COMMITTEE

THE BOARD OF CLALLAM COUNTY COMMISSIONERS finds as follows:

1. The Washington State Department of Natural Resources manages some 90,000+ acres in trust for the benefit of Clallam County and the special purpose districts within the County.
2. Individuals reportedly testified before the Charter Review Commission about whether the management of these lands was such that the lands provided significant financial contributions to the County and special purpose districts.
3. The Charter Review Commission recommended that the Board of Commissioners establish a "Trust Lands Advisory Committee" to assess the management of those state forest board lands, sometimes called forest board transfer lands.
4. The Board of Commissioners reviewed the initial recommendation from the Charter Review Commission in work session on July 27. Subsequent work sessions were conducted on August 10, 17, 24, 31; and September 8 and 14 and included suggestions from an ad hoc committee of the Charter Review Commission on developing the proposed advisory committee.

NOW, THEREFORE, BE IT RESOLVED by the Board of Clallam County Commissioners, in consideration of the above findings of fact:

1. A Trust Lands Advisory Committee (TLAC) is created for the purposes found below and structured herein.
2. The TLAC will review and analyze the following:
 - a. The history, issues, benefits, challenges and advantages of re-conveyance of trust lands to Clallam County and if found to be in its best interest, to recommend such action as may be required to effect this change in the management of these properties.
 - b. If not in the greater interest of the County to seek re-conveyance, the Committee is tasked to provide guidance to ensure a continual engagement with the Department of Natural Resources on how it is promptly and adequately fulfilling its Trust Land objectives to Clallam County, its taxing districts, and its citizenry.
3. The Committee will address the following:
 - a. State Forest Board Lands (County Trust Lands): what they are, how they were obtained, where they are located, type of land, any restrictions.
 - b. Trust land management and duties.
 - c. Trust revenue: How it is generated, received by the County, and disbursed.
 - d. Habitat Conservation Plan: Its relevance to State Forest Board Lands and impacts on the question of re-conveyance; etc.
 - e. Re-conveyance: Requirements, likelihood, obligations County would assume, additional staff requirements
 - f. Next steps if reconveyance is not in the best interest of the County.
4. The Committee will provide an interim written report by February 15, 2016 and a final written report no later than December 31, 2016.
5. The membership shall be as follows:
 - One person appointed by each Commissioner from their District
 - A representative chosen by the Port of Port Angeles
 - A representative chosen by the School District Association

4a
9/15

- A representative chosen by the Department of Natural Resources
- A representative chosen by the junior taxing districts who is familiar with the Department of Natural Resources trust lands
- A representative chosen by the Society of American Foresters
- A representative chosen by the granges
- A representative chosen by the League of Women Voters
- A representative chosen by the Republican Party
- A representative chosen by the Democratic Party
- A representative chosen by the Olympic Forest Coalition
- A representative chosen by the North Olympic Timber Action Committee
- A representative chosen by the City of Forks
- A representative chosen by the environmental groups

6. County staff will issue a letter of invitation to each organization seeking their recommendation for appointment by the Board of Commissioners.

7. The Committee will operate under Clallam County Policy 952, Boards and Committees, supported by staff in the Commissioners' office, and serve until their report is complete and accepted by the Board not later than December 31, 2016.

PASSED AND ADOPTED this fifteenth day of September 2015

BOARD OF CLALLAM COUNTY COMMISSIONERS

Jim McEntire
Jim McEntire, Chair

voted no
Mike Chapman

ATTEST:

Trish Holden
Trish Holden, CMC, Clerk of the Board

Bill Peach
Bill Peach



Board of Clallam County Commissioners

223 East 4th Street, Suite 4
Port Angeles, WA 98362-3015
360.417.2233 Fax: 360.417.2493

Trust Lands Advisory Committee Members:

District I – David Bekkevar
District II – Robert Lea
District III – Kenneth Reandeau
Port of Port Angeles – Connie Beauvais
School Districts – Diana Reaume
Department of Natural Resources – Kyle Blum
Junior Taxing Districts – Ben Pacheco
Society of American Foresters – Joseph Murray
Granges – Cindy Kelly
League of Women Voters – Susanne Scott
Republican Party – Tom Swanson
Democratic Party – Mike Doherty
Olympic Forest Coalition – Toby Thaler
North Olympic Timber Action Committee – Jason Cross
City of Forks – Rod Fleck
City of Port Angeles – Michael Merideth
Olympic Peninsula Audubon Society – Coleman Byrnes
Olympic Medical Center – Darryl Wolfe
North Olympic Group of the Sierra Club – Josey Paul
Environmental Groups – Cynthia Bork

TRUST LANDS ADVISORY COMMITTEE

Meeting agendas for the following dates:

December 18, 2015 at 1:30 p.m.

January 15, 2016 at 12:00 p.m.

February 19, 2016 at 12:00 p.m.

March 25, 2016 at 12:00 p.m.

April 15, 2016 at 12:00 p.m.

May 20, 2016 at 12:00 p.m.

June 17, 2016 at 12:00 p.m.

July 8, 2016 at 12:00 p.m.

August 19, 2016 at 12:00 p.m.

September 16, 2016 at 8:30 a.m.

October 21, 2016 at 12:00 p.m.

November 18, 2016 at 9:00 a.m.

November 18, 2016 at 12:00 p.m.

December 16, 2016 at 9:00 a.m.

December 16, 2016 at 12:00 p.m.

December 29, 2016 at 9:00 a.m.

**MEETING AGENDA FOR:
December 18, 2015**



**CLALLAM COUNTY
TRUST LANDS ADVISORY COMMITTEE**

NOTICE OF MEETING – AGENDA

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

**December 18, 2015
1:30 pm**

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom, Main Level, Room 160**

- I **CALL TO ORDER**
- II **PLEDGE OF ALLEGIANCE**
- III **ROLL CALL**
- IV **PUBLIC COMMENT**
- V **NOMINATION AND APPOINTMENT OF OFFICERS**
 - A. Chair
 - B. Vice-Chair
 - C. Secretary
- VI **REVIEW / REPORTS / DISCUSSION**
 - A. Introduction of Board of Commissioners expectations.
 - B. Consideration of endorsement of additional committee members.
- VII **NEXT MEETING DATE / ITEMS**
 - A. Consideration of establishing a future meeting schedule / dates.
 - B. Consideration of topics / draft work plan for future meetings.
- VIII **PUBLIC COMMENT**
- IX **ADJOURNMENT**

Posted by: *Cindy Rolivas*

Date: *12-4-2015*

Attendees requiring assistance, please contact the Board of Commissioners Office at (360) 417-2233 prior to the meeting.

MEETING AGENDA FOR:

January 15, 2016



**CLALLAM COUNTY
TRUST LANDS ADVISORY COMMITTEE**

NOTICE OF MEETING – AGENDA

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

January 15, 2016 - 12:00 p.m., noon

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom. Main Level. Room 160**

- I **CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL**
- II **PUBLIC COMMENT** (2 minute limit)
- III Overview by the Clallam County Prosecuting Attorney's Office of the Washington State Open Public Meetings Act (OPMA) as applied to local government agencies, Washington State's ethics and conflict of interest laws that apply to municipal officers, and the Washington State Public Records Act (PRA) for local government agencies.
- IV Minutes of December 18, 2015
- V **PRESENTATION** – Kyle Blum, Dept. of Natural Resources
- VI **REVIEW - CLALLAM COUNTY TRUST LANDS**
 - A. Review Maps
 - B. Review Forest Inventory
 - C. Review Sustained Yield Harvest Levels
 - D. Review Different Land Classifications
 - E. Discussion
- VII **REVIEW - DNR TRUST MANAGEMENT**
 - A. Review Management Cost (fixed and variable)
 - B. Review Stumpage Values
 - C. Discussion
- VIII **NEXT MEETING DATE / ITEMS**
 - A. Next meeting: Friday, February 19, 2016, noon
 - B. Consideration of topics / draft work plan for February meeting
- IX **PUBLIC COMMENT** (2 minute limit)
- X **ADJOURNMENT**

Posted by: Cindy Solis Date: 1-8-16

Attendees requiring assistance, please contact the Board of Commissioners Office at (360) ~~447-2233~~ prior to the meeting.

MEETING AGENDA FOR:

February 19, 2016



**CLALLAM COUNTY
TRUST LANDS ADVISORY COMMITTEE**

NOTICE OF MEETING – AGENDA

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

February 19, 2016 - 12:00 p.m., noon

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom. Main Level. Room 160**

- I **CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL**
- II **PUBLIC COMMENT** (2 minute limit)
- III Minutes of January 15, 2016
- IV **REVIEW - CLALLAM COUNTY TRUST LANDS**
 - A. Environmental constraints associated with DNR management - SEPA, Forest Practices HCP, ESA/HCP, etc.
- V Bylaws and Rules
- VI **NEXT MEETING DATE / ITEMS**
 - A. Next meeting: Consider changing March meeting from March 18, 2016 to Friday, March 25, 2016, same time and place.
- VII **PUBLIC COMMENT** (2 minute limit)
- VIII **ADJOURNMENT**

Posted by: Cindy K. Lippold Date: 2-8-2016

Attendees requiring assistance, please contact the Board of Commissioners Office at (360) 417-2233 prior to the meeting.

MEETING AGENDA FOR:

March 25, 2016



NOTICE OF SPECIAL MEETING – AGENDA

CLALLAM COUNTY TRUST LANDS ADVISORY COMMITTEE

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a special meeting for the purposes and at the time and place as follows:

March 25, 2016 – 12 p.m.

**Clallam County Courthouse
223 East 4th Street, Room 160, Port Angeles WA**

- I **CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL** – Noon
- II **PUBLIC COMMENT** (2 minute limit) – 12:10 PM
- III **ADMINISTRATIVE** – 12:20 PM
 - A. Adopt Agenda – *See Note below*
 - B. Adopt the Minutes of February 19, 2016
- IV **REVIEW – CLALLAM COUNTY TRUST LANDS**
 - A. DNR Structure – Financial – Review – Kyle Blum, DNR
 - B. Sustainable Harvest Calculation & Arrearage as seen by DNR
 - C. Arrearage as seen by four attorneys (10 minutes per speaker, followed by 15 minutes for panel discussion, followed by 20 minutes for TLAC members Q&A)
 - i. Rod Fleck, City of Forks
 - ii. Toby Thaler, Olympic Forest Coalition
 - iii. Ann Forest Burns, American Forest Resource Council
 - iv. Wyatt Golding, Washington Forest Law Center
- BREAK
- V **FUTURE MEETING AGENDAS AND STRUCTURE**
 - A. Set agenda/focus for the next meeting on April 15, 2016 – possible items
 - i. Bylaws and rules
 - ii. Future agendas and overall direction
 - iii. HCP implications
 - B. May agenda suggestions
- VI **PUBLIC COMMENT** (2 minute limit)
- VII **ADJOURNMENT**

Posted by: _____ Date: _____

Attendees requiring assistance, please contact the Board of Commissioners Office at 360.417.2233 prior to the meeting.

NOTE: As this is a special meeting because it is not being held on the regularly established meeting date, only those items on the agenda can take place.

MEETING AGENDA FOR:

April 15, 2016



**CLALLAM COUNTY
TRUST LANDS ADVISORY COMMITTEE
NOTICE OF MEETING – AGENDA**

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

April 15, 2016 - 12:00 p.m., noon

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom. Main Level. Room 160**

- I **CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL**
- II **PUBLIC COMMENT** (2 minute limit)
- III Minutes of February 19, 2016 and March 25, 2016
- IV **REVIEW - CLALLAM COUNTY TRUST LANDS**
 - A. "A Review of the Endangered Species Act – Tim Romanski, USFWS"
- V Bylaws and Rules
- VI **NEXT MEETING DATE / ITEMS**
 - A. Next meeting:
- VII **PUBLIC COMMENT** (2 minute limit)
- VIII **ADJOURNMENT**

Posted by: _____

[Handwritten Signature]

Date: _____

4/10/16

Attendees requiring assistance, please contact the Board of Commissioners Office at (360) 417-2233 prior to the meeting.

MEETING AGENDA FOR:

May 20, 2016



**CLALLAM COUNTY
TRUST LANDS ADVISORY COMMITTEE**

NOTICE OF MEETING – AGENDA

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

May 20, 2016 - 12:00 p.m., noon

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom. Main Level. Room 160**

I CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL

A. Port of Port Angeles Request

II PUBLIC COMMENT (2 minute limit)

III Minutes of April 15, 2016 and March 25, 2016

IV REVIEW - CLALLAM COUNTY TRUST LANDS

A. "A Review of the Endangered Species Act – Tim Romanski, USFWS"

V Develop questions for Grays Harbor County

VI Update on Data Request from DNR

VII NEXT MEETING DATE / ITEMS

A. Next meeting:

VIII PUBLIC COMMENT (2 minute limit)

IX ADJOURNMENT

Posted by: _____

Date: _____

Attendees requiring assistance, please contact the Board of Commissioners Office at (360) 417-2233 prior to the meeting.

MEETING AGENDA FOR:

June 17, 2016



**CLALLAM COUNTY
TRUST LANDS ADVISORY COMMITTEE**

NOTICE OF MEETING – AGENDA

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

June 17, 2016 - 12:00 p.m., noon

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom. Main Level. Room 160**

- I CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL**
- II PUBLIC COMMENT** (2 minute limit)
- III Minutes of April 15, 2016 and March 25, 2016 and May 20, 2016**
- IV REVIEW - CLALLAM COUNTY TRUST LANDS**
 - A. "A Review of the DNR Presentations –Kyle Blum, Department of Natural Resources
- V Synthesis of Trust Lands Information**
- VI Update on Data Request from DNR**
- VII NEXT MEETING DATE / ITEMS**
 - A. Next meeting:
- VIII PUBLIC COMMENT** (2 minute limit)
- IX ADJOURNMENT**

Posted by: _____

Date: _____

Attendees requiring assistance, please contact the Board of Commissioners Office at (360) 417-2233 prior to the meeting.

MEETING AGENDA FOR:

July 8, 2016



NOTICE OF SPECIAL MEETING – AGENDA

CLALLAM COUNTY TRUST LANDS ADVISORY COMMITTEE

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a special meeting for the purposes and at the time and place as follows:

July 8, 2016 – 12 p.m.

**Clallam County Courthouse
223 East 4th Street, Room 160, Port Angeles WA**

- I **CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL**
- II **PUBLIC COMMENT** (2 minute limit)
- III Minutes of May 20, 2016
- IV **REVIEW - CLALLAM COUNTY TRUST LANDS**
 - A. Review the Olympic Experimental Forest
 - B. Plan a field trip for the committee
- V Discuss Alternatives to Reconveyance
- VI **NEXT MEETING DATE / ITEMS**
 - A. Next meeting:
- VII **PUBLIC COMMENT** (2 minute limit)
- VII **ADJOURNMENT**

Posted by: L. Gutes

Date: 6/29/2016

Attendees requiring assistance, please contact the Board of Commissioners Office at (360) 417-2233 prior to the meeting.

MEETING AGENDA FOR:

August 19, 2016



**CLALLAM COUNTY
TRUST LANDS ADVISORY COMMITTEE**

NOTICE OF MEETING – AGENDA

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

August 19, 2016 - 12:00 p.m., noon

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom. Main Level. Room 160**

- I **CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL**
- II **PUBLIC COMMENT** (2 minute limit)
- III Minutes of June 17, 2016
- IV **REVIEW - CLALLAM COUNTY TRUST LANDS**
 - A. Plan a field trip for the committee
- V Discuss Alternatives for Final Report
- VI **NEXT MEETING DATE / ITEMS**
 - A. Next meeting:
- VII **PUBLIC COMMENT** (2 minute limit)
- VIII **ADJOURNMENT**

Posted by: L. Gores

Date: 8-16-2016

Attendees requiring assistance, please contact the Board of Commissioners Office at (360) 417-2233 prior to the meeting.

MEETING AGENDA FOR:

September 16, 2016



**CLALLAM COUNTY
TRUST LANDS ADVISORY COMMITTEE**

NOTICE OF MEETING – AGENDA

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

September 16, 2016 8:30 AM

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom. Main Level. Room 160**

- I **Leave Clallam County Court House 8:30 AM**
- II **Pick-up Additional Committee Members and DNR Members at West-end of Lake Crescent 9:30 AM**
 - A. Safety Briefing by DNR
 - B. Public Comment
- III **Field Tour with DNR 9:45 AM to 3:00 PM**
 - A. Lunch in the Field
- IV **Return to West-end of Lake Crescent at 3:30 PM**
 - A. Public Comment
 - B. Next Meeting /Time
- V **Return to Clallam County Court House 4:30 PM**
- VI **ADJOURNMENT**

Posted by: Lon Gotes

Date: 9-13-16

Attendees requiring assistance, please contact the Board of Commissioners Office at (360) 417-2233 prior to the meeting.

MEETING AGENDA FOR:

October 21, 2016



**CLALLAM COUNTY
TRUST LANDS ADVISORY COMMITTEE**

NOTICE OF MEETING – AGENDA

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

October 21, 2016 - 12:00 p.m., noon

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom, Main Level, Room 160**

- I **CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL**
- II **PUBLIC COMMENT** (2 minute limit)
- III Minutes of June 17, 2016 and July 8, 2016
- IV **REVIEW - CLALLAM COUNTY TRUST LANDS**
 - A. Discussion of Field Trip
- V **Recommendation to the Board of Commissioners**
 - A. Recommendation to the Board of County Commissioners:

“Should the Board of County Commissioners seek the reconveyance of State Forest Lands managed by the Department of Natural Resources back to Clallam County to be managed by the County?”

 - i. Discussion
 - ii. Vote is scheduled for November
 - B. Develop List of Potential Recommendations to provide “guidance to ensure continual engagement with the Department of Natural Resources on how it’s promptly and adequately fulfilling its Trust Land objectives to Clallam County, its taxing districts, and citizenry.”
CCBOC Res. No. 70-2015
 - i. Discussion
 - ii. Vote is scheduled for November
 - C. [Develop a list of potential recommendations, each of which has to be noted for consideration in the November meeting per the TLAC Bylaws, that would be voted on in November. See *TLAC Bylaws, Article VII.*]
 - i. Discussion
 - ii. Vote is scheduled for November
- VI **NEXT MEETING DATE / ITEMS**
 - A. Next meeting:
- VII **PUBLIC COMMENT** (2 minute limit)
- VIII **ADJOURNMENT**

MEETING AGENDA FOR:

November 18, 2016

9:00 a.m.



NOTICE OF SPECIAL MEETING – AGENDA

CLALLAM COUNTY TRUST LANDS ADVISORY COMMITTEE

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

November 18, 2016 - 9:00 a.m. to 11:30 a.m.

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom, Main Level, Room 160**

- I **CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL**
- II **PUBLIC COMMENT** (2 minute limit)
- III Minutes of September 16, 2016
- IV **REVIEW - CLALLAM COUNTY TRUST LANDS**
- V **RECOMMENDATION TO THE BOARD OF COMMISSIONERS**
 - A. Recommendation to the Board of County Commissioners:

Vote on attached list of Questions
 - i. Discussion
 - ii. Roll Call Vote
- VI **PUBLIC COMMENT** (2 minute limit)
- VII **ADJOURNMENT**

TLAC List of Questions to be voted on at the November meeting

Reconveyance:

1. Should the Board of County Commissioners seek the reconveyance of State Forest Lands (Clallam County State Forest Board Lands) managed by the Department of Natural Resources back to Clallam County to be managed by the County?

If not reconveyance, then Recommendations to provide “guidance to ensure continual engagement with the Department of Natural Resources on how it’s promptly and adequately fulfilling its Trust Land objectives to Clallam County, its taxing districts, and citizenry.” CCBOC Res. No. 70-2015

2. Should Clallam County BOCC continue its current role with DNR management of Forest Board Transfer Lands, without any changes?
3. Should BOCC seek to establish via MOU or other means a collaborative means of managing with the DNR its management of FBTL?
4. Should the BOCC hire a staffer/consultant with forestry experience to act as a liaison with DNR in order to monitor, engage, respond, and question DNR management of FBTL?
5. Should the BOCC establish a representative advisory committee, with some level of staff support that would advise the BOCC regarding DNRs management of its FBTL?
6. Should the BOCC as a minimum seek from the DNR an accurate and updated, maintained detailed resource inventory of its FBTL to include all resources with annual updates?

MEETING AGENDA FOR:

November 18, 2016

12:00 p.m.



**CLALLAM COUNTY
TRUST LANDS ADVISORY COMMITTEE**

NOTICE OF MEETING – AGENDA

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

November 18, 2016 - 12:00 p.m. to 3:00 p.m.

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom, Main Level, Room 160**

- I **CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL**
- II **PUBLIC COMMENT** (2 minute limit)
- III **REVIEW QUESTIONS FOR FURTHER DEVELOPMENT (SEE ATTACHED LIST)**
 - A. Continue to Develop List of Potential Recommendations to provide “guidance to ensure continual engagement with the Department of Natural Resources on how it’s promptly and adequately fulfilling its Trust Land objectives to Clallam County, its taxing districts, and citizenry.” CCBOC Res. No. 70-2015
 - B. [Continue to Develop a list of potential recommendations, each of which has to be noted for consideration in the November December meeting per the TLAC Bylaws, that would be voted on in November. *See TLAC Bylaws, Article VII.*]
 - C. Discuss the outline and format of final report to the Board of Commissioners
- IV **NEXT MEETING DATE / ITEMS**
 - A. Next meeting:
- V **PUBLIC COMMENT** (2 minute limit)
- VI **ADJOURNMENT**

(These were the Second Block – questions formulated by TLAC for consideration at November meeting per passed motion.)

Here are the questions for development into “Block Two:”

1. Should the BOCC establish a means of coordinated, regular and meaningful outreach with the trust beneficiaries and the public regarding its FBTLs?
2. Should the BOCC establish a means of overseeing and monitoring the DNR’s revenue generating methods regarding its FBTLs?
3. Should the BOCC seek a trust accounting/performance audit of the DNR’s management of its FBTLs?
4. Should the BOCC seek from the DNR ways to increase revenues from recreational uses on its FBTLs?
5. Should the BOCC seek from the DNR ways to increase fees from roads use, forest products, etc., on its FBTLs?
6. Should the BOCC seek from the DNR a means to secure reoccurring revenues from future established carbon sequestration markets?
7. Should the BOCC seek other revenue sources for county revenues such as increasing property taxes?
8. Should the BOCC seek a means of increasing revenue through advocating for a state income tax?
9. Should the BOCC reduce county services associated with/tied to DNR revenues when DNR from its FBTLs decline?
10. Should the BOCC, if a liaison is hired, expand the ability of that liaison to utilize ecosystem services values in reviewing the DNRs management of its FBTLs?
11. Should the BOCC seek an economic study discussing private and public forest lands that reviews such items as harvesting, milling, exports, and land conversions in Clallam County?
12. Should the BOCC seek from the federal government compensation for lost revenues associated with how the DNR’s HCP applied to its FBTLs?
13. Should the BOCC seek that its FBTLs be sold and the proceeds be reinvested?

MEETING AGENDA FOR:

December 16, 2016

9:00 a.m.



NOTICE OF SPECIAL MEETING – AGENDA

CLALLAM COUNTY TRUST LANDS ADVISORY COMMITTEE

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

December 16, 2016 - 9:00 a.m. to 11:30 a.m.

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom, Main Level, Room 160**

- I **CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL**
- II **PUBLIC COMMENT** (2 minute limit)
- III Minutes of October 21, 2016
- IV **REVIEW - CLALLAM COUNTY TRUST LANDS**
- V **RECOMMENDATION TO THE BOARD OF COMMISSIONERS**
 - A. Recommendation to the Board of County Commissioners:
 - Vote on attached list of Questions
 - i. Discussion
 - ii. Roll Call Vote
- VI Final Report Discussion
- VII **PUBLIC COMMENT** (2 minute limit)
- VIII **ADJOURNMENT**

1. Should the BOCC establish an advisory committee composed of representatives of all entities (*needs clarification/defining*) and an at-large-position with an interest in Clallam County trust lands, to advise both the public and the staffer/consultant regarding DNR's management of Clallam County trust land?
2. Should the BOCC add *integrated resource management* to the definition of forestry experience in employing a staff/consultant?

MEETING AGENDA FOR:

December 16, 2016

12:00 p.m.



**CLALLAM COUNTY
TRUST LANDS ADVISORY COMMITTEE
NOTICE OF MEETING – AGENDA**

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

December 16, 2016 - 12:00 p.m. to 3:00 p.m.

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom, Main Level, Room 160**

- I **CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL**
- II **PUBLIC COMMENT** (2 minute limit)
- III **REVIEW QUESTIONS FOR FURTHER DEVELOPMENT**
 - A. Review decisions on questions and answers
 - B. Discuss the outline and format of final report to the Board of County Commissioners
- IV **NEXT MEETING DATE / ITEMS**
 - A. Next meeting:
- V **PUBLIC COMMENT** (2 minute limit)
- VI **ADJOURNMENT**

MEETING AGENDA FOR:

December 29, 2016



NOTICE OF SPECIAL MEETING – AGENDA

CLALLAM COUNTY TRUST LANDS ADVISORY COMMITTEE

PUBLIC NOTICE IS HEREBY GIVEN that the Trust Lands Advisory Committee will hold a meeting for the purposes and at the time and place as follows:

December 29, 2016 - 9:00 a.m.

**Clallam County Courthouse
223 East 4th Street, Port Angeles WA
Commissioners Boardroom, Main Level, Room 160**

- I **CALL TO ORDER / PLEDGE OF ALLEGIANCE / ROLL CALL**
- II **PUBLIC COMMENT** (2 minute limit)
- III Minutes of November 18, 2016 and December 16, 2016
- IV **REVIEW - CLALLAM COUNTY TRUST LANDS**
- V **RECOMMENDATION TO THE BOARD OF COMMISSIONERS**
 - A. Review Final Report and Sign Minority Reports
Discussion Report
- VI Review and Approve Letter to Presenters
- VII Reflection Session
- VIII **PUBLIC COMMENT** (2 minute limit)
- IX **ADJOURNMENT**

1. Should the BOCC establish an advisory committee composed of representatives of all entities and an at-large-position with an interest in Clallam County trust lands, to advise both the public and the staffer/consultant regarding DNR's management of Clallam County trust land?
2. Should the BOCC add *integrated resource management* to the definition of forestry experience in employing a staff/consultant?

TRUST LANDS ADVISORY COMMITTEE

Meeting minutes for the following dates:

December 18, 2015 at 1:30 p.m.

January 15, 2016 at 12:00 p.m.

February 19, 2016 at 12:00 p.m.

March 25, 2016 at 12:00 p.m.

April 15, 2016 at 12:00 p.m.

May 20, 2016 at 12:00 p.m.

June 17, 2016 at 12:00 p.m.

July 8, 2016 at 12:00 p.m.

August 19, 2016 at 12:00 p.m.

September 16, 2016 at 8:30 a.m.

October 21, 2016 at 12:00 p.m.

November 18, 2016 at 9:00 a.m.

November 18, 2016 at 12:00 p.m.

December 16, 2016 at 9:00 a.m.

December 16, 2016 at 12:00 p.m.

December 29, 2016 at 9:00 a.m.

MEETING MINUTES FOR:

December 18, 2015

**Clallam County Trust Land Advisory Committee
18 Dec 2015**

Meeting Minutes

[The following are action minutes – a summary of the two and half hour meeting. The meeting was recorded by the County in an audio format, and by a citizen in a video format that is viewable at: <https://www.youtube.com/watch?v=IP6-qvJsPxg>]

Meeting was called to order by County Commissioner Bill Peach. Flag salute was rendered. Roll call was taken, member Susanne Scott was absent as she had indicated to the group earlier via email. Peach explained that at this meeting that during the public comment period, anyone could comment.

Toby Thaler asked that the Agenda be reconsidered as he had problems with items on the agenda. He indicated that he felt that the selection of a chair and vice chair was too early in the process. He suggested that in moving the process forward that the group designate an interim chair and then develop the process for the group via email. He indicated that he felt that there should be co-chairs representing the divergent views.

Commissioner Peach asked for public comment.

Public Comment was received from:

Norma Turner, who indicated that she would comment later. But that at the outset she didn't know who was at the table, who they represented, what their affiliations were, etc. So introductions should be undertaken.

Connie Gallant, President of the Olympic Forest Coalition, asked whether the group would be considering addition of other organizations to address an imbalance her organization saw in the committee's (TLAC) membership.

Ken Reandeau, TLAC member, indicated his want to go around the table and have the members introduce themselves and their affiliations. Peach indicated that he would ask for introductions of the members.

Colin Beyerens asked about the inclusion of other organizations associated with fisheries as forests impact fisheries. He felt that there should be the inclusion of tribal representatives. Would like members to introduce themselves and state their affiliations.

Ann Seitzer noted that she is a neighboring property owner adjacent downslope to DNR lands and wants that voice heard as part of the TLAC's deliberations.

Carol Johnson, North Olympic Timber Action Committee, indicated that the make up of the committee was broader than some would think and the focus was County trust lands. She wanted the TLAC to look at past, present, and future management of DNR lands.

Bob Sextro, President of the Sierra Club Clallam County Chapter, noted that his group had 450 members w/i Clallam County and wanted to have the TLAC consider adding his organization to its membership.

Mike Doherty, TLAC member, indicated that the group needed to undertake introductions, that it needed to have bylaws considered at the next meeting and the County had a generic form of those, that telephonic attendance should also be considered. In addition alternates should be considered.

Following this the TLAC members introduced themselves and gave their affiliations. Joe Murray asked if individuals could also include if they lived in Clallam County. Peach encouraged those in attendance to read County Resolution No 70 as a means of learning more about the Committee.

- Diana Reaume, Superintendent of the Quillayute Valley School District. County resident for ten years and represents the school's trust lands.
- Kenneth Reandeau lifetime resident of Port Angeles. Educated at PenCol worked for Crown Zellerbach and then Nippon. Forest owner and interested in forests as more than monoculture and forests as diverse uses.
- Toby Thaler member of board of Olympic Forest Coalition. After law school worked for Skokomish Tribe and then others. Lives in Seattle and interested in sustainability for schools and local governments but not at expense of ecological values.
- Rod Fleck, City Attorney with City of Forks and representing City of Forks. Representing City, but also member of Green Crow Board of Directors and other organizations and history in issue from time w/ King County Democrats.
- Dave Bekkevar from East end of Clallam County and was born and raised in Clallam County. Family has been in the County for 150 years and owns a logging company and ranch.
- Jason Cross works for as a mathematician and silvaculturalist with the University of Washington, but not representing the UW in any capacity, rather asked to serve on behalf of the North Olympic Timber Action Committee
- Ben Pacheco, Commissioner of Fire District No. 4 and resident of Clallam County for twelve years and representing junior taxing district. Has a degree in wildlife biology and believes in the good for all. Also understands the importance of sale of county timber.
- Cindy Kelly, representing the Granges of Clallam County and member for 30+ years. Manager of Dry Creek Water Association and worked on WRIA processes. Has a history of employment with government entities. Serves on the Port Angeles School District and also on the State School Board Association.
- Kyle Blum, lives in Seattle, works for the DNR as the Executive for oversight responsibility for trust lands and the primary liaison to the Board of Natural Resources.
- Jesse Waknitz with the Port of Port Angeles and works as the environmental manager for the Port and has been with the Port for seven years. First
- Bob Lea, retired and not representing any entity. Appointed by Commissioner Chapman, and noted that his son was a graduate of the University of Montana. Has spent a lot of time with Ted Spoelstra and Curtis Winney and history with DNR timber sales. Noted

that a large segment does not trust government and is interested in seeing how committee will work.

- Mike Doherty appointed by the Democrats. Raised in Clallam County and raised family in Clallam County. Former instructor in business law and American Government in PenCol. County Commissioner and active on the timberlands commission with active letter writing on those issues. Active in lobbying legislature regarding alternative energy.
- Tom Swanson and Republic Part representative. Born and raised in Western NY, in PA since 1985 and worked for Green Crow since 1989. Deep belief in sustainable forest management and strong proponent of education.
- Cynthia Bork lives in Forks, Washington. Works for USFS, but does not represent them in this capacity. Work for USFS for 37 years, 18 of which as public affairs officer for Colville. Works for Chief Information Office which is the IT division of USFS. Lived in Forks for 10 years and graduate of University of Montana. Endorsed by Forest Employees for Environmental Ethics.
- Joe Murray lived in Clallam County since 1971 and working in forestry with background in silvaculture and forest policy. Pioneered silvaculture in red cedar. Interested in forest management of DNR trust lands.

Upon the conclusion of the introductions, the TLAC turned to the agenda items associated with the convening call.

Commissioner Peach opened the issue of nominations for officers.

Toby Thaler raised the issue of the officer structure. He reiterated his belief that there should be co-chairs to ensure a diversity of interests. He also felt that there was a need to increase the size of the Committee, but noted that that was on the agenda for later. He renewed his sense that the TLAC should have co-chairs rather than that which was proposed.

Commissioner Peach followed the agenda.

Election of TLAC Officers

For the position of Chair of the TLAC, Robert Lea and Joe Murray were nominated. In the voting for Chair, Murray received eight votes, Lea received six. Murray was elected Chair. Commissioner Peach turned the meeting over to Murray.

Murray called for nominations for Vice Chair and Robert Lea was nominated. He was unanimously elected.

Murray called for nominations for Secretary. Rod Fleck volunteered and was unanimously elected.

Commissioners Expectations

Commissioner Peach then shared the expectations of the Commissioners associated with the TLAC. He noted that there would be staff resources made available to help the Committee

with its operations. He emphasized the want for a transparent process with public access. He expected that the TLAC reports and documents could be available on the County's website. Further, that all meetings would be recorded and would be compliant with the Open Public Meetings Act (OPMA). He asked as to whether all were familiar with the OPMA and after some had indicated that they were not, he noted that there was a video from the Washington Attorney General's Office for that training online. The County Prosecutor would also be asked about such training. Finally, he noted that the Committee members' were to be reimbursed for their mileage in attending the meetings.

Murray indicated that folks would need to turn in mileage to Secretary. Fleck noted he would ask for forms and have them at the next meeting. Clarification was asked about whether that would include field meetings, and Peach noted that there could be county vehicles arranged for such activities.

Additional Committee Members

The TLAC turned its attention to the request by four groups to be included in its membership. These were the Sierra Club, Audubon Society, City of Port Angeles, and Olympic Medical Center (OMC).

Thaler suggested that the audience be asked about their interest. Fleck objected as the resolution created the membership and that he was only familiar with three groups requesting membership. Peach noted that the City of Port Angeles wanted to participate as well. Reandeau felt that the committee needed to be more inclusive of its membership.

Murray asked about the process to amend the membership and asked if that would require the Commissioners to take action to amend the resolution. Peach agreed with that.

Reandeau indicated that the positions of the Commissioners may have voiced positions that may indicate a decision on some issues.

Bork asked for a bit more background on the number of individuals on the Committee. Believed that the public would look at effort more favorably if more voices were included.

Cindy Kelly noted that the current membership was rather broad and representative of the whole county.

Fleck explained that the Charter Review Commission had made a recommendation to the Commissioners to create a committee of twelve representatives of organizations. Objective of Commission group that worked on the recommendation was to indicate groups that had been involved and engaged in DNR related issues. Environmental position was left open when groups did not respond. If adding the four was decided, need to end adding.

Diana Reaume noted that the resolution stated the number. It was noted that the committee would be making a recommendation to the Commissioners to amend the earlier resolution to

increase the membership if that was the decision. Motions would be needed to make such recommendations to the Commissioners.

Murray indicated that he felt that 16 people was a rather large body and inclusive.

Thaler asked why OMC and it was clarified that OMC is a public, special purpose/junior taxing district receiving DNR revenue.

Lea questioned whether Tribal nations such as the Hoh and Quileute should be included as there are issues of water quality associated with forestry. He noted that the Quileute and the United States Forest Service have done significant restoration and that the Quileute have a broad area.

Murray clarified that the issue before the TLAC was not to redo the structure. Nor was the TLAC convened to address water quality or forest practices. There are existing habitat conservation plans addressing management. Focus was on Clallam County trust lands and their management.

Thaler asked the TLAC if all of those interested should be included? He also asked if there would be interest in adding tribal representation and the City of Port Angeles.

Fleck made a motion, seconded by Blum, to recommend to the Commissioners that the Committee be increased to include the City of Port Angeles, OMC, Audubon, and the Sierra Club. Motion passed with eleven votes in favor, two against, and the Chair abstaining.

Question was raised to Commissioner Peach if a formal letter would be needed by the Commissioners to amend the resolution that created the TLAC? Peach felt that the discussion was part of the oral record and could take that to the Commissioners. He noted that the positions would require public notice, advertized and then be appointed. The organizations would be asked to appoint a representative and forward that to the Commissioners. It was hoped that all of this could occur before the next meeting of the TLAC.

Doherty asked about bylaws for the group. He recommended that Trish Holden had a generic version. Fleck noted that they could ask for those and circulate those as possibly for the next meeting. Thaler asked about a reference to an executive committee made by Doherty. Doherty explained that he assumed that an executive committee would develop a draft set of by-laws utilizing those for later consideration.

Executive Committee

Motion was made by Doherty, seconded by Lea, that the three elected officers be appointed as the executive committee responsible for the administration of the TLAC. Kyle Blum asked if it would be considered a friendly amendment to include himself as he expected the DNR to be asked for information that having advance notice could be beneficial. This was

considered a friendly amendment and accepted as an amendment to the motion. Thaler asked about the Executive Committee setting agenda for future meetings. Murray indicated that the agendas should be developed by the Committee as a whole with involvement from executive committee. Thaler asked that beginning of each meeting include a review of the agenda. Fleck noted that with the Charter Review Commission, the agenda went out a week prior to the meeting. During the meeting, a list was created for items on the next agenda. Adding to that list was by a majority. Thaler withdrew his interest on being on the committee, however, maintained a desire to be engaged in the creation of the agendas.

Reaume suggested that an opportunity be made to request agenda topics through the chair and to include this into the bylaws. Lea noted that discussion should focus on the drafting of agendas and materials for the TLAC. The motion to form an executive committee consisting of the three elected officers and Blum passed on a vote of 14-0.

Meeting dates and time

Fleck explained the explanation for dates for meetings. The third Friday was one of the dates that the Commissioners' Board room was available. Blum did agree that starting earlier could easily be accommodated. Motion to hold the meetings on the Third Friday of each month was made by Reaume and seconded by Thaler. The motion passed by a vote of 13-0 with one abstention (Kelly as the date may conflict with another state board she serves on). It was noted that the Commissioner's Chambers allowed for telephone participation and is the best for audience participation and recording. Murray inquired as to whether participation by various technological means were available and it was explained that some means were available.

Motion was made to allow alternates to be designated by the members of the TLAC. Motion was made by Thaler, seconded by Kelly, that TLAC members could designate an alternate provided that the designation occurred in writing to the Chair, prior to the absence, with the same individual being the alternate. Motion carried.

Time for the meetings was considered next. A motion was made by Reandeau, seconded by Thaler, to start the meetings at noon. This carried on a vote of 13-1.

TLAC Work Plan

Murray asked the TLAC to consider the draft work plan. Fleck explained that he had offered to develop some type of starting point document for the TLAC as part of the effort associated with the creation of the TLAC. He indicated that this was an attempt to address the six things in Resolution No.70, assuming monthly meetings, to address the requirement for an interim report in February, and then a final report in the Fall. The draft attempted to address specific topics or elements for a report, potential needed participations, outcome from each such meeting, and work product from that meeting. He noted that if reconveyance was the decided recommendation, the draft did not project how to proceed.

Blum asked about the expectation regarding the February 2016 intermediate report to the Commissioner? Peach indicated that there was flexibility regarding that report. If reconveyance was the recommendation, the Commissioners would need time to discuss that topic and the process of putting that question on the ballot.

Thaler asked what issue could be a ballot issue? Peach noted that the original request to the Charter Review Commission was to put the question to the voters. The voters could undertake a county advisory vote, but that the issue would be one for the State Legislature to consider. Peach noted that the Charter Review Commission recommended that this be taken to an advisory committee. Thaler affirmed that such a decision would need to be determined by August to be placed on a general election ballot.

Thaler noted that there were issues missing. Cross asked about the need for a motion and the utilization of the spreadsheet and its boxes. Murray noted that this was more of a format for a schedule for meetings. A schedule similar to this would be beneficial to the group. Motion by Cross, seconded by Thaler, to use as a concept the elements and components within the draft work plan without agreeing to any specific element.

Doherty raised significant concerns with the TLAC's purpose and formation. He asked that the work plan needed to be delayed for at least a month. He noted that there was by the forest products industry to rush the question of conveyance without a broad base of support through the use of form letters and emails. He felt that this was a manufactured form of public support. He felt that an optional field trip should be added to get out into the timber stands. There is also a need to discuss things such as arrearage, and hear more about that from DNR. He expressed the concerns about rushing to reconveyance, this indicated a manufactured effort about this point. He also raised concerns with subcommittee of the Charter Review Commission that met. In addition, he raised his concerns with the fact that Fleck sits on the Board of Directors for a timber company and that Fleck had produced much of the materials associate with this committee. He also was concerned about Fleck stating that he briefed two commissioners outside of any public meeting. He also felt that an optional field trip with the USFS and the DNR may be helpful.

Fleck responded regarding Doherty's insinuation regarding Green Crow and this issue. Fleck noted that he felt Doherty was wrong and his approach was incorrect. Fleck noted that he had prepared documents that were reviewed and that are clearly labeled draft. Fleck noted the many steps needed to even get to reconveyance. He clarified that the subcommittee actually didn't agree to place this on the ballot, but rather create a means of studying and educating the public on this. He refuted the concept of a rush to reconveyance. Fleck did talk to two of the commissioners over time, in a manner similar to what Doherty had done and did as a Commissioner. The details of even the topic of reconveyance were laid out in various forms.

Murray asked all members to return to the issue at hand which is the topic of the motion before the Committee. Cross felt that the background that Doherty raised probably should be the part of the agenda for the next meeting that would have to be decided to have. Cross

noted that at best the duty of the Committee was to make a report to the Commissioners in about a year.

Thaler felt that the vote was simply on the framework for a work plan. The motion passed without dissent.

Murray turned members attention to what is in the boxes. Thaler suggested that the issues be thrown out and that the Executive Committee work on developing the topics. Thaler noted that a key, missing piece and that the work plan should include a sustainable income flow discussion as there was a need for a reliable flow of wood for the local economy. He felt that issues should include the source of timber for value added products, revenue data, alternative sources of revenue discussed, and the issue of arrearage should be included. Arrearage is a complaint about not enough timber flowing and that this raises the discussions about alternative forms of revenue to address some of those issues.

Lea asked if the discussion would include how land were obtained from the federal government. It was clarified that only the lands associated with the County trust lands, associated with forfeiture in lieu of taxes, were being discussed by the TLAC.

Cross made a motion, with affirmation by Reandeau, that the January meeting needed to focus on the trust lands associated with the Clallam County, history on how we got those and those associated with the federally granted lands, etc.

Swanson noted that the issue was looking at a public policy business case and it would be nice to have a short course on DNR trust land management to present to the group a level playing field to start from.

Cynthia Beck felt that the discussion needed to include an understanding of the whole range of values to include values at risk, transportation issues, wildlife issues, recreational, restoration and associated investments, and ecological values. Blum agreed to help bring information and individuals to aid and discuss some of these issues.

Murray felt that to have an education on the forest trust lands managed by DNR for the January meeting would be a significant focus of discussion. He indicated his want to have inventory data and maps of the lands being discussed.

Doherty indicated that some may want a deeper background than others in these matters. He felt that the materials prepared by Phil Kitchel should be made available, as well as other information such as a 1999 study on trust lands. He also felt that the TLAC needed to have a longer period to review materials, as the deadlines were way too rigorous, and that there was a rush, a sense of a big hurry to review this issue by some.

Peach spoke up and noted that the information gathered could be made available and set up as part of the County's website. He noted that what was known should be posted. He said that the County could post what was known and what had been collected, but warned that it was a lot of information. He also indicated that he had undertaken a calculation of the

arrears by junior taxing district that he created in response to a fire district asking him why their revenue was no longer arriving. It was noted that the DNR Trust Lands annual reports could be of value as well.

Thaler noted that he felt that the arrears statute was ambiguous and not as clear as some might think. He felt that it might be good to get DNR's position on the statute.

Cross asked if the motion was to have January focus on the topic of trust lands? He also noted that he had specific data requests for DNR.

Murray asked that the discussion be finished on the motion regarding the January meeting topic.

Doherty stated that indicating what the problems were in the minds of the people. He felt that a relatively small minority manufactured a record that others on the Charter Review Commission had this issue manufactured and that that was a fundamental flaw to the TLAC.

Murray asked that the TLAC return to the motion at hand.

Reandeau asked that the motion be voted on.

Blum noted that he felt that the January and February suggested topics in the work plan were the right thing to discuss and critical to many of the other questions being considered.

Bork felt that since these lands do not exist isolated alone, she felt that the continuum of the land base should be understood as those lands may be connected with the DNR lands. She felt that the TLAC could not just focus on those lands.

Motion passed 13 – 0, one abstention.

Reandeau asked if DNR could provide a map of the DNR lands. Blum affirmed that that could be provided

Thaler noted that other benefits needed to be considered that could be monetized such things as carbon benefits for revenue.

Cross made a data request to Blum. He asked that DNR provide the TLAC with a map; volume of timber harvests promised by the sustainable harvest calculation by trust and polygon; the OESF and Clallam County harvest projects and realized volumes; sales bid packets to include sales delayed and not sold. He also asked for FPA numbers of sales sold and also documents as to why sales designed were not sold. He gave examples of reasons for sales not realized – road washout, events. Finally, he asked for the volumes promised, harvested, and volume removed by buyer.

Doherty asked for an optional field trip that would explain the limitations and restrictions within the field to illustrate what is on base or what is taken off base (steep slopes, etc.). Blum noted that such a trip would have to be in March or April.

Murray asked Blum for additional data to include:

1. Complete set of maps for the trust lands in question;
2. Shape/polygon files;
3. Inventory by stand;
4. Summary of Age class;
5. Acreages in non forest activities such as roads, commercial forests, non-forests (rivers, set asides, etc.);
6. Estimate of discount from the federal HCP which causes a certain amount of BF to left on acreage. He gave an example of a harvest unit on 112 where a significant amount of timber was retained to address rules. Blum noted that polygons were 100a or so in size and that the discussion of set asides and stream acres could be provided.
7. Clarification on how the data is accumulated was it field data? Extrapolated? Inventory based? Any particular sale plot has been cruised at that time and then after. Murray indicated that he would like the actual inventory information, which Blum noted could be provided.
8. Sustainable Harvest Calculation data related to County trust lands.

Fleck suggested that February's meeting be focused on the Habitat Conservation Plan, the environmental regulations, SEPA, etc., on DNR as their restraints are different from others. Thaler asked if this could include arrearage as it is a driver for much of what is happening. Blum asked that that be the next meeting. Fleck noted that there were three or four attorneys have positions on this topic that could be asked to give their perspectives in a meeting. Doherty asked that such power points could be added to the website as a means of providing additional information. Cross noted that the February meeting should focus on restraints, and March should be focused on what issues would arise if the County did manage their lands. Motion made by Cross, seconded by Blum to focus the February meeting on the constraints on trust lands with the March meeting being focused on legal and trust parameters with some inclusion of Grays Harbor's approach. Reaume agreed understanding the Grays Harbor model was important to this discussion. Blum also noted in the March meeting he would include issues regarding approaches to management that are different from the HCP. Motion passed.

Doherty asked that the discussion of reconveyance also include economic impacts to Forks, management requirements of the County, charge for improvements and investments made, costs for reconveyance, and addressing wildfire response. Cross felt asking Grays Harbor how these are addressed would also be worth discussing. Murray noted that the management fees addressed the investment questions.

Motion regarding February and March passed without dissent.

It was suggested that in future meetings that each member have a name "tent" identifying who they are as it would help everyone.

Blum noted that the first three meetings were significant in weight and that there be no additional work on the draft work plan. Kelly felt that the Committee needed to ask the County now that there would need to be more time before rendering an interim report. Swanson agreed that the 15 February requirement was too soon. Swanson made a motion to inform the County Commissioners that the interim report be moved to 15 April which was seconded by Reaume. Motion carried.

Public Comment

Stephenie Noblin. Clallam County Public Eye, Kitchel report and discussion by Board of Commissioners is available on line and is at the end of 12/14 Board Session. That video is time stamped with links to specific agenda items. She asked that TLAC members speak up to ensure they are being heard by people sitting in the back. In addition, members should speak to the camera for emphasis and spell out acronyms.

Norma Turner stated that she had three issues: Charter Review Commission, Kitchel Report, and Grays Harbor County. She felt, as one of the four no votes against this recommendation, the Charter Review Commission had little substantive discussion about the topic before the TLAC. She was amazed at the quotes that the Commission said X or Y. She had a private discussion with one of the members that worked on the Charter on this and that woman said that the Charter was used to create a non-partisan basis. She asked that folks take with a grain of salt what the Charter Commission did or did not say. She noted that the argument for reconveyance was to improve economics and that comparison to Grays Harbor is often made. She shared economic data she found. For example, the populations of the two counties were almost equal. That Grays Harbor had a negative population growth of 2.7% and Clallam County had a 1% growth. People living in poverty was 19% in Grays Harbor and Clallam County was less. 2014 unemployment numbers for Grays Harbor was 7.5% and for Clallam County 7%. These numbers indicate that the management of the timber lands was not the economic boon that many said it would be. So the TLAC needs to look at both counties. Further, Board of Commissioners did receive Kitchel's report. She was dismayed though as there were a large amount of numbers but no overlay, and Chapman took Kitchel to task on this point. The default argument in Kitchel's explanation was that the decisions were political. The DNR elected land commissioners agreed to set aside old growth and no reason other than political rather than give detailed reasons. She urged diligence in reviewing that report a she was disappointed in that report.

Coleman Burns, Joyce, noted that he was interested in the subject. He asked if maps and information obtained by the TLAC would be available to public. He asked how the presenters could be asked questions. It was noted that those questions should be raised in the public comment period, Thaler indicated that notes could be passed to TLAC members. Fleck noted that the notes would be a public record.

Tim McNulty felt that the TLAC should consider Doherty's request that it proceed very slowly. He noted that the Elwha Citizens Advisory Committee changed its approach over time and found that it was worth taking that issue slowly.

Bob Sextro, Sequim, appreciated the openness to expand the TLAC to 20 members and asked Peach the schedule for inclusion. Peach noted that he hoped to discuss it at the next Board meeting on Tuesday and have the members be in place by January meeting.

Gabe Rygaard appreciated the Boards attention to the matters and felt that it did represent the people within Clallam County. That the issue could address the lack of funds for school districts and hospitals in Clallam County. He reminded folks that the County designated the DNR as the manager of those lands trust lands for the people of Clallam County.

Commissioner Peach thanked everyone for their time and participation.

Motion by Thaler, seconded by Kelly, to adjourn. Passed unanimously, and the meeting adjourned at 3:58 p.m.

Approved: January 15, 2016

new 1.txt

12/18/2015

Request for DNR data RE: Clallam Co. TLAC

1. Location of Clallam County FBTP ('Trust') lands.
2. Volume of timber promised in previous DNR SHC by location in (1), or by most appropriate management unit/polygon (i.e. RIU/FMU)
3. For the volume of timber promised and not harvested ('arrearage'), the bid packages / FPA numbers corresponding to sales that were developed but not implemented, by location described in (2).
4. For the arrearage volume without FPA numbers, any documentation as to why nothing happened in those locations.
5. For the volume of timber promised and harvested, the FPA numbers associated with those sales and locations; and the actual volume removed by the buyer, by sale.

MEETING MINUTES FOR:

January 15, 2016

Clallam County Trust Land Advisory Committee

15 Jan 2016

Meeting Minutes

I. Call to Order

Meeting called to order by Chairman Joe Murray. Pledge of Allegiance was followed by Secretary Fleck calling the roll. It was noted that Cindy Kelly was absent, as she indicated the previous month, Mike Doherty was participating by conference call. Darryl Wolfe was absent, but his alternate Bobby Beeman was in attendance. Mayor Patrick Downie was in attendance for the City of Port Angeles.

Agenda modified to allow the new Trust Land Advisory Committee (TLAC) members to introduce themselves to the participants. Agenda items VI. and VII. were clarified by Blum. Mileage form was sent around to members.

II. Public Comment

Carol Johnson, NOTAC – provided a copy of DNR timber sales by the Olympic Region (attached) that she found in her materials and provided it to the members. Asked if DNR could update this. This raised a discussion issue amongst TLAC about how audience could ask questions of presenters. Murray noted that the audience could not ask questions during regular meeting, but could during public comment. Blum noted his intent to have DNR fulfill Johnson request.

III. Overview of Open Public Meetings Act and Public Records Act

Christina Nelson-Gross provided a brief overview of the Open Public Meetings Act and Public Records Act as they apply to the TLAC. Staff provided the following handouts courtesy of Municipal Research Services Center (MRSC):

- a. Open Public Meetings Act (OPMA);
- b. Ethics and Conflicts of Interest; and,
- c. Public Records Act (PRA).

TLAC communications, including documents on personal phones and computers are public records. Under the PRA, there a strict liability standard that does not take into account inadvertent mistakes which can result in fines and costs. Under the OPMA, a majority of the members together constitutes a meeting. The PRA applies to each individual within the TLAC and to the TLAC as a whole. Records have a retention requirement as well, and the County can provide more information on that point if needed. When a request for records is made, the County would reach out to the members asking for records that after a good faith effort should be provided to the County regarding the request. A question was raised about notes taken by the members, and while those would be relevant to a request, the members can take notes and take the notes with them. How long those records should be retained depends upon their type. Clarification was provided about the difference between documents associated with TLAC, the items that people might review and look at, and then ones brought into meetings. When data is analyzed with proprietary software, the

report would be disclosable, the software coding may be, but one would not have to provide access and use of the software utilized. For example, DNR provides shapefiles, but not the ARCGis software that may be needed to utilize those files. Formulas in a spreadsheet would be disclosable, but the program used to create the formula may not.

Regarding TLAC needs for legal advice/opinions, if a majority of the Committee makes a request that is forwarded from staff to County Prosecutor, those will be answered in a reasonable period of time.

IV. Minutes

Fleck introduced minutes for consideration and explained process used to generate them. Susanne Scott asked for her name to be corrected. Thaler also asked that the minutes clarify that he did intend for his want to be involved with the setting of the agenda.

Motion by Kyle Blum, seconded by Diana Reaume to adopt the minutes as amended. Motion passed.

Discussion ensued about the format of future minutes. Ken Reandeau suggested that the a list of motions made and passed be created to help find decision points. Fleck noted he would try to create it. The discussion centered on the use of a summary form of meeting minutes, unless a greater deal of detail is asked for during the meeting. With an audio recording, and a private video recording (www.youtube.com Clallam Public Eye), it was felt that a summary was more efficient and effective.

V. Presentation (12:46¹)

Blum presented information on the DNR's state forest board lands within Clallam County. A copy of the corrected presentation was made available to participants, along with a handout of the maps from that 20 page presentation.

DNR manages 160,702 acres of state trust lands located within Clallam County. As a manager of trust lands, DNR has a legal fiduciary responsibility to the beneficiaries of the trust with specific obligations and duties. These include, but are not limited to:

- Duty to generate revenue and other benefits for each trust in perpetuity;
- Duty to preserve the corpus of the trust;
- Duty to exercise reasonable care and skill in the management of the trust;
- Duty to maintain undivided loyalty to the beneficiaries;
- Duty to act impartially with respect to current and future beneficiaries.

These obligations were reviewed by both the State Supreme Court, *Skamania v. State* (102 Wn. 2d 27, (1984)), and the Attorney General's Office in AGO 1996, No. 11.

There are numerous beneficiaries associated with the lands managed by the DNR. Blum noted that when the DNR is reviewing management decisions, if there were 21 beneficiaries, and one of those would be harmed, the DNR may not be able to proceed with that decision impacting that one

¹ This reflects the actual time, not the time on the recording.

beneficiary. Some of the guiding policies associated with DNR's management can be found within the DNR's Policy for Sustainable Forestry.

The lands located in Clallam County fall within two trust classifications. State Lands are those lands received by the State from the Federal government at the time of statehood through the Enabling Act primarily for the funding of colleges and schools. State Forest Lands (CC-SFL) are lands that were acquired by the county through tax foreclosures and then transferred to the State to be managed.

DNR's management includes addressing needs for salmonids, environmental requirements, etc. DNR utilizes the sustainable harvest calculation to determine how to maximize volume while meeting these requirements. Both the PSF and the sustainable harvest calculation modeling process are used to review and determine management actions. The sustainable harvest calculation model provides information to the Department on how to meet its trust obligations. Thaler noted that there was a difference in the DNR trusts as they are to maximize net present value versus value of the balance of the trust.

DNR also has to manage the trust in accordance with statutes, regulations, environmental policies and agreements, such as the DNR's Habitat Conservation Plan (HCP). These requirements are factored into the development of the harvest model. Jason Cross shared how the state forest lands came to the county through tax foreclosures arising out of industry responses at the time to statutory requirements. He asked if both sets of lands were managed under the same set of trust duties? Blum stated that they were.

The Skamania court case addressed a situation where numerous sales were under contract at a high value, but the market price had dropped, so companies asked the legislature to adjust the contract price or forgive the contracts in the best interest of the state and its industries. However, Skamania challenged this and the Court affirmed the trust obligations overturning the legislature's actions. The 1996 AGO was requested by the Legislature in association with the development of the HCP. That AGO undertook a detailed review of the trust obligations and duties associated with the lands.

1:07 – Slide 6

There are two sets of lands that make up the 160,720 acres in Clallam County. 68,195 acres are those obtained from the federal government at the time of statehood. 92,525 acres were obtained from the County to be managed by the predecessor to the DNR. These were lands associated with tax foreclosure. Timber harvested from these lands are what creates revenues for the numerous beneficiaries who receive a share of the sale revenue in the same manner that property taxes are distributed. A portion of the sales price is retained by DNR for management purposes. This is currently set at 25% of the sale value. In 2014, \$7,736,877.37 in timber revenue was distributed to the various special purpose districts in Clallam County. (Slide 10) It was noted that regarding schools, the M&O funds were received by the applicable districts, but then deducted by the State. Revenue is received by districts for school capital construction projects only if a bond is passed for such projects. There are other sources of revenue including agriculture, special forest products, communication sites, etc.

Slide 12 showed the relationship between volume harvested on CC-SFLs and revenue realized from those harvests. It was noted that the past five years had seen a decline in value that reflected a harvest restriction arising out of a settlement agreement on the OESF requiring equal harvest by thinning per acre to regeneration harvests.

Cynthia Bork asked if there was any equalization factor for all trustees across the entire managed acres. Blum noted that that was not a requirement.

Slide 14 – 1:50

Blum turned the discussion to the DNR's management fees. These are the fees obtained by DNR from the gross sale price of a timber sale. The fee differed depending upon the type of trust lands. For the state lands associated with the Enabling Act, these are associated with the Resource Management Cost Account (RMCA) and the DNR retains 27% of the sales price realized. For the CC-SFL, the DNR retains 25% of the sales price realized in the Forest Development Account (FDA). These management fees are used to fund DNR timber management operations across the state. In developing timber sales, the DNR may require the purchaser to make improvements as part of the sale. These improvements are paid for by the purchaser and are not paid for from the management fees. Nor are these improvements paid for from the Access Road Revolving Fund which is used to repair some of the 10,000 miles of roads on DNR lands. The ARRF is allocated via a planning basis with focus on prioritized projects.

Slide 15 – 2:05

Examples of the uses for the DNR management fees were given and cover everything from growing seedlings to pre-commercial thinning to timber sales management. In addition, DNR pays into a fires suppression/response fund. It was noted that the DNR's management costs were different from the private sector as DNR has to also comply with SEPA, the PRA, a higher public engagement, recreation use, and those costs are all part of the management fee. The management fee is an "all in" fee addressing nearly all costs associated with the DNR's management of trust lands. Scott asked if a list could be made of what would be required of the County if the County were to take these lands for management? It was thought that this was needed information.

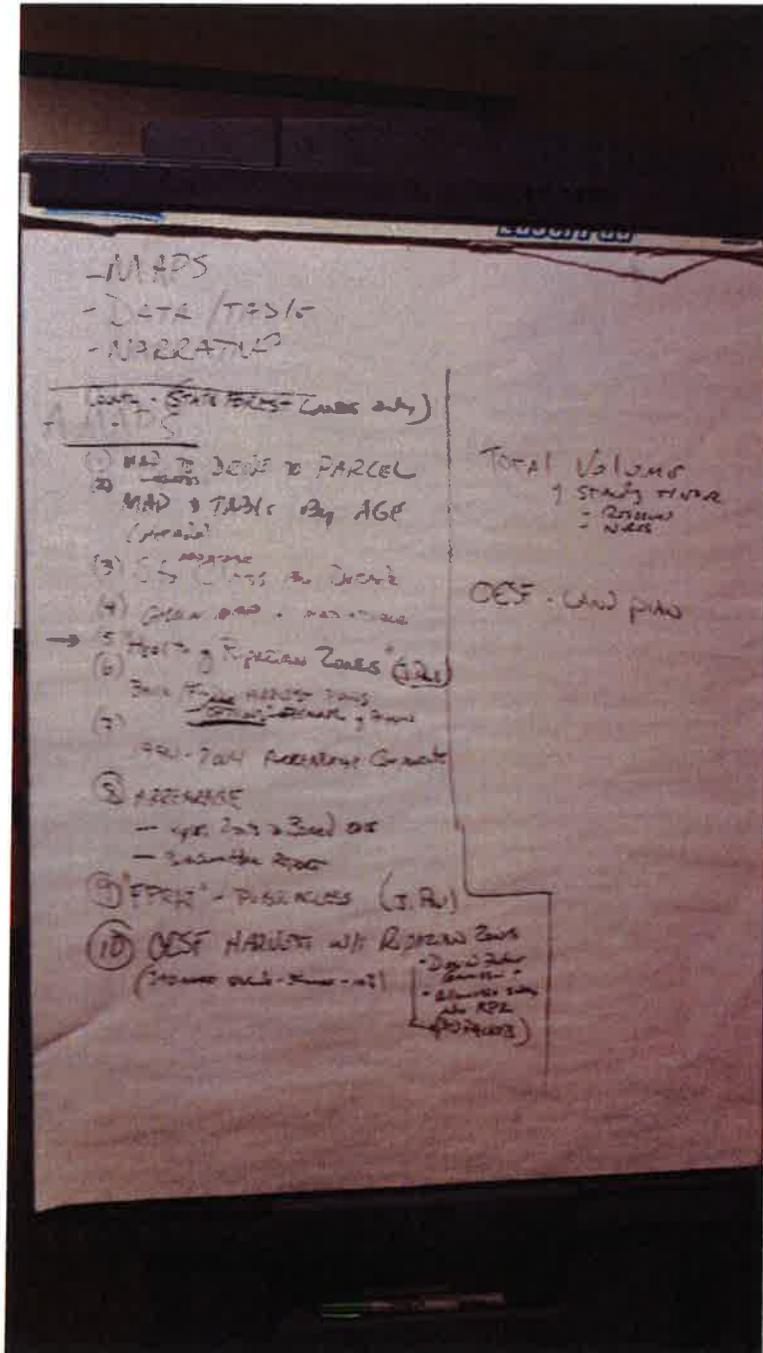
The Forest Development Account (FDA) has changed over time in the past eight years. However, the obligations remained the same. A discussion on the need for pre-commercial thinning (PCT), in relationship to future sales value, occurred. It was noted that the PCT was a treatment responding to the manner of planting harvested units.

Slide 17 - 2:25

46% of the CC-SFL are located within the Olympic Experimental State Forest (OESF). The OESF utilizes different set of management rules and objectives. It is to "integrate revenue production and ecological values across state trust lands." *Slide 18*. The idea for the OESF arose in the 1980s out of the Old Growth Commission that recommended the creation of both the OESF and the Olympic Natural Resources Center. The idea was to have an unzoned forest that balanced habitat with production. This was codified in the HCP. This was also the origins for the deferment of 15,000 acres of old growth.

2:42

At his conclusion, Blum asked for questions. All complemented him on his presentation and information provided. Coleman Byrnes asked for additional information regarding fish habitat, unstable slopes, etc. Blum noted that those issues would be the topic in next month's meeting. Discussion also included a request for information about harvest levels in relationship to the chart provided by Johnson of NOTAC.



a. Kyle Presents to Board in 2015;
b. Subcommittee Report;

The TLAC then discussed the agenda items VI, VII to clarify the type of information or data wanted. Blum noted that he would bring this data back to the TLAC in the next few meetings. Fleck recorded the clarifications and requests and a copy of that is provided:

First Column

Under
Maps/Data/Table/Narratives
County (State Forest Lands Only)

1. Map to drive to parcels or areas;
2. Map and table showing stand age (detailed);
3. Site Class by decade;
4. Green Up Map – map & table (The green up map showing areas deferred by deferment type by OESF, Non OESF for SFLs)
5. “Health of Riparian Zones” map that Josey Paul noted had exited;
6. Back/Fwd Harvest Plans – in relationship to “options removal of polygons.”
7. 1994-2004 Arrearage Components as related to County;
8. Arrearage

9. FPRAT – Public Access (J. Paul)²
10. OESF Harvest within Riparian Zones:
 - Desired future condition?
 - Allowable entry into RPZ (bid packets)?
 - (Statewide 390mmbf available, only harvested 35mmbf)

2nd Column

Total Volume of Standing Timber – reserve and n-res

OESF – Land Plan

Other request made to Kyle included:

Thaler asked if information could be provided regarding the stumpage values over time of Douglas fir and Hemlock that could be shown over time. He inquired if there was a relationship between values and harvest.

February would address the restrictions/constraints that DNR operates under. Bork asked if it would be possible to have also a brief overview of the DNR investments, assets (buildings, vehicles, engines, etc.), and professional staff (specialists, numbers, etc.) as part of the next DNR presentation. Blum thought he could give out expenditure break downs. Blum indicated he would need to also discuss with staff the level of detail for this request. Swanson also asked if the presentation could also include what DNR does, how it is organized, etc. Robert Lea asked if the NOTAC chart update could also be correlated to the Federal Reserve's interest rate as he felt there was a clear connection.

March's meeting would be focused on the sustainable harvest, how it is developed, what it was, and that would address the arrearage questions. This meeting would also include the legal panel on the different perspectives.

VII. Next Meeting Date/Items

- A. February Meeting. In addition to the above, Murray noted that the proposed bylaws would be a discussion/action item at the next meeting. Fleck explained that these were created from the Charter Review Commission's bylaws. Comments were request by 29 Jan 2015 and to be sent to staff (Cindy). Thaler asked if it could be sent out as a MS Word document. Meeting was 19 Feb

² **From:** Josey Paul [<mailto:thegreatstream@gmail.com>]

Sent: Friday, January 15, 2016 5:37 PM

To: LoPiccolo, Lucinda

Subject: Re: FW: Jan. 15 Clallam TLAC

Hey Cindy:

Could you forward this to Kyle Blum? I don't have his email.

He was not tracking my request for access to the DNR's FPRAT.

FPRAT is the DNR's Forest Practices Risk Assessment Mapping Tool (FPRAT)

Thanks,

Josey

2015 at noon. Blum included that DNR will address organization and how DNR operates under the Forest Practices Act, various environmental rules, HCP's role, F&W would then present on how to comply with the ESA if HCP was not to be followed.

- B. Paul asked if a fishery biologist from the trip should be included, Murray noted that this committee was not addressing regulations. Kitchel documents on line were raised as advocating reconveyance by Paul. There was some discussion that while Kitchel may have advocated a position, the TLAC was not at the point of making a decision. ~~Also noted that Kitchel was not part of the TLAC process.~~ Kitchel's materials are available and relevant to the TLAC, but he is not a member of the committee. Reandeanu noted that in Kitchel's report there was advocacy for increased logging and logging in old growth.

IX. Public Comment

There was no public comment

X. Adjournment

At 3:44 p.m., a motion by Cross, seconded by Scott to adjourn was adopted without dissent. Meeting was adjourned.

MEETING MINUTES FOR:

February 19, 2016

Clallam County Trust Land Advisory Committee

19 Feb 2016

Meeting Minutes

<https://www.youtube.com/watch?v=tnfvtSnwo8s>

Times that appear next to items reflect the actual time and are provided as a guide for those utilizing the Clallam Public Eye video.

I. Call to Order

Meeting was called to order by Chairman Joe Murray. The meeting started with the Pledge of Allegiance and was followed by introductions in lieu of the roll call. Absent were: David Bekkevar, Kyle Blum, Ben Pacheco, and Darryl Wolfe. All had indicated their absence in advance. Angus Brodie was present for Kyle Blum. Donna Buck was present for Ben Pacheco.

II. Public Comment

Ann Seiter - Port Angeles - Address bylaws and provided a copy of her recommendation regarding minority report. Her recommendation is as follows:

Proposed addition to the Bylaws:

Article IX: Adoption of Recommendations to the Board by the TLAC

Section 2: [Regarding the adoption of formal recommendation]

New Section regarding the inclusion of a minority report:

- c. The minority of the TLAC, consisting of those voting against a formal recommendation that was been adopted by the TLAC, shall have the opportunity to submit a minority report on each recommendation. The TLAC's final set of recommendations to the county commissioners shall include the minority report for each contested recommendation within the main body of the document.

She noted that she felt that the minority report should be integrated into the body of the final report and not made an appendix to that report.

Ed Bowen - Clallam Bay - County Treasurer's report provided to the TLAC is a very dynamic report. What he felt was missing was the "cumulative effects of timber harvest" such as the impact of USFS, PILT, Secure Rural Schools, it doesn't address the loss of timber harvest from the USFS and does not reflect the impact of the loss of timber harvest on the County.

He also noted that he had come before the Charter Review Commission asking that the Commission put to a vote to return all resources to the County. As a compromise, the TLAC was what was agreed to. He asked that the TLAC consider the issue of sustainability of the county and at not putting the burden of the County on the taxpayers and property owners all of the time in the form of levies. He asked that the TLAC also consider the direct effect of fiduciary interests of the junior taxing districts. He noted that if that was not done, he was going to demand that the voters of the County take up this.

III. Meeting Minutes

Toby Thaler raised concern with page 7 at the top regarding the Kitchel documents. Thaler noted that there was a contract with Phil Kitchel that was done for the Commissioners. This should be clarified. Fleck noted that the statement was that Kitchel was involved as the chair or staff to the committee, and he was not.

Josey Paul noted that he was raising an issue with regard to the impacts of logging and its impacts. He noted that the Chair had indicated that the TLAC was not going to be addressing environmental regulations. He noted that Kitchel filed his initial report at the end of the December. He also felt that there were a lot of documents filed by Kitchel with the Commissioners that did indicate a change to environmental policies. Paul noted that Kitchel's contract was to assist the committee. He felt that some of the issues raised by Kitchel in Kitchel's report should be discussed by the TLAC. He felt that if there was a change in the management of the lands that could be outside of the HCP and that would result in changes to the environmental regulations applicable to the lands.

Thaler raised the issue that the County hired Kitchel to work on issues regarding the County trust lands. Paul noted that Kitchel's report was submitted to the County in relationship to this process. Fleck noted that the minutes as worded were technically correct in that Kitchel is no different than any other member of the public. Murray noted that Kitchel was not a member of the Committee.

Thaler and Fleck developed the following amendment to VII B, fourth sentence which would be replaced with the following:

Kitchel's materials are relevant to the TLAC, but he is not a member of the committee.

Jose Paul raised concerns with the Chair ruling Paul out of order regarding the issues of environmental regulations not being discussed by the TLAC. He felt that was another issue in error in the minutes.

Cross noted that the TLAC was not changing any of the laws relegated to forest practices. The management may be different, but that the regulations of the state would not be changed or altered by anything the TLAC could recommend.

Paul disagreed. He felt that the change in management possibly could result in changes in regulations. Cross disagreed with this by saying that the TLAC has no power to change the laws of the State. Paul noted by moving the management of the trust lands, that probably would change to a more lax set of rules and regulations that would have consequences to the community.¹

Tom Swanson responded that he agreed with Cross, yet understood the concern being expressed by Paul. Swanson noted, however, that there was no proposal discussed to remove the lands from the HCP. He noted that it was unclear whether these lands, if reconveyed, would or would not be removed from the HCP.

Cross also argued against Paul's use of the word "lax" regarding the regulations in relationship to and the implication that those rules were detrimental to fish stocks. Cross noted that the rules that govern harvest around and in riparian zones have been determined by law, by the legislature, to be sufficient to protect fish. While Paul may feel differently, Cross felt that changing management would not change the law.

Kelly asked that the TLAC members return to the resolution by the Commissioners that was adopted. She felt that this would ensure that the TLAC remain focused on those issues.

¹ See email from Josey Paul dated 28 Apr 2016.

Paul reiterated that the regulations regarding the HCP and the Forest & Fish laws are very different management regimes especially regarding type 4 and 5 streams. He felt that the issue of reconveyance needs to address how that change in management would impact environmental regulations.

Murray noted at this point, with no decision as to whether a change in management would or would not be under the HCP.

Thaler noted that there was a need to discuss the distinction of the impacts associated with the change in management. Murray noted that the TLAC was to make a recommendation as to the best means of managing these lands.

Thaler asked about the Table of Motions/Actions provided by Rod Fleck and if those were going to be part of the minutes. Fleck said that these are based upon the minutes, and also noted that Paul did not make a motion to address this.

Thaler asked that everyone should acknowledge the impacts associated with change in management. Fleck quoted aloud the Commissioner's resolution, specifically Paragraph 3d (Resolution 70-2015), which reads:

"Habitat Conservation Plan: Its relevance to State Forest Board Lands and impacts on the question of reconveyance, etc."

Fleck felt that "d" puts some bookends on the discussion regarding the management. Paul asked Fleck as to whether the TLAC could discuss the increasing of harvest, the movement of trust lands into a different regulatory environment, but that the TLAC cannot discuss environmental matters that would flow out of those. Fleck disagreed with that statement as not being what he said, rather he noted the resolution discussed the HCP and reconveyance without assuming an outcome from any reconveyance. Thaler suggested that the issue of the HCP needed to be addressed at a future date.

The amendment to minutes noted above was read again.

Page 7, VII, B strike the sentence that starts "Also noted... "The Kitchel materials are relevant to the discussion of the committee, but Mr. Kitchel is not part of the committee."

Paul then raised his concern that the minutes codified the Chair's ruling that the TLAC could not discuss environmental regulations. He did not agree with this. He felt that the HCP was just one set of regulations and the private timber companies do not follow that.

Fleck objected to that statement, and specifically the assumption that reconveyance would somehow be conveyed to private companies. Paul noted that he thought that this was a likely thing. Fleck noted that the minutes reflect what was said. Paul did not dispute the minutes being accurate. Fleck raised the issue of what happened versus Paul's want to have the minutes reflect what he wanted to happen. Clarification between issues occurred. Fleck pointed out that the HCP was on the draft work plan as a specific issue. Thaler noted that the work plan was not adopted.

Ken Reandeau indicated that the assessment of the rules that would come into effect if there was a change of management was part of what the TLAC needed to review. Cynthia Bork indicated her feeling that the Chairman was remiss in not calling for a specific action when Paul raised his concern. She would like to see all comments needing a motion be made at the time and not after that time. Paul raised issues with the originally proposed draft work plan as only one meeting was associated with the environmental regulations. He wanted to ensure a fish biologist talk about what occurred in the 1970s. Murray had said that they were not to discuss regulations.

Fleck clarified that the TLAC did not adopt the work plan, but did set up agenda topics. The HCP discussion had not been scheduled, but Fleck suggested that April may be a valid time to discuss this. Paul indicated he felt that a fisheries biologist would be needed as part of that discussion.

Thaler noted that the agenda had not been adopted and that there should be an item regarding dates and items for future meetings.

Paul then raised a question about the adoption of the December minutes as amended. But, they were not amended regarding Commissioner Peach's chairing of the meeting and the motion regarding the co-chair to ensure a balance. Peach ruled this out of order, but without any reference to authority and Paul asked that those minutes be amended to show that. Fleck and Kelly noted that they were adopted. Fleck noted that the minutes reflect what happened. Paul wanted this discussion reflected in the minutes.

Thaler moved the adoption of the amended minutes from January, Byrnes seconded. Motion passed 18-1.

IV. Agenda

Thaler noted that the March agenda was developed. But that there was no schedule for April. He felt that that should be an agenda item.

Reandean raised the issue of an April report and when that was due. A motion had been at the prior meeting, and Commissioner Peach accepted the fact that the report could be TLAC is still working on these issues, and that they were still be worked, with a copy of the minutes. Fleck asked for clarification. Kelly noted that the resolution was not practical. The motion was made and adopted.

Cross recalled that by the end of the March meeting, the TLAC would indicate what paths were being pursued regarding a recommendation to the Commissioners. From that position, the remaining meetings could be scheduled. Susanne Scott indicated that one of the choices could also be that the TLAC was not ready to indicate any choice. There was agreement that that was also an option.

Diana Reaume asked that the agenda carve out time to determine what the topics would be for future agenda items.

IV. Review of Clallam County Trust Lands

A. Stephen Bernath - DNR Deputy Supervisor for Forest Practices

(12:34)

The following is a summary of the presentation by Mr. Bernath regarding Forest Practices in the state [see presentation materials provided and shared with the TLAC]

Laws apply to all non-federal/non-tribal land owners harvest timber. Laws originate as early as the 1920s, but the forest practices act was enacted in 1974. This created the Forest Practices Board with its 13 members representing a wide spectrum of interests. Members are appointed by the Governor, in most cases. They are responsible for the adoption of rules, and developing guidance, found in the Washington Administrative Code (WAC Title 222). DNR implements those rules, with appeals being handled by another body, Pollution Control Hearings Board - created as a consolidated body.

The main goal of the Act is to protect public resources: Water, Fish, Wildlife, and Capital Improvements while maintaining a viable timber industry in Washington.

(12:40)

Forest and Fish

This arose out of the Timber, Fish and Wildlife Agreement and a collaborative effort between the timber industry, state agencies, environmental organizations, and the tribes. It created a means of utilizing adaptive management and collaboration for timber management. Out of this came the Forest and Fish Agreement in 1999, HB 2091 in 1999, that was adopted by the State Legislature.

Emergency rules were adopted in 2000, and permanent rules in 2001. The rules were adopted in light of fish listings, water quality concerns, watershed analysis indicated challenges in riparian and steep slope areas. In addition, 10,000 points of data from tribal governments was provided regarding fish upstream protections. This was originally part of the Governor's Salmon Recovery Plan, called the Forestry Module, that became the Forest and Fish Report. This changed rules and created the basis for the Forest Practices HCP that covers ~9m acres across the whole state. It is less than the original 12m acres as there are other HCPs covering those other acres.

The whole premise is if you follow the rules, especially around aquatic resources, you will not be in violation of the Endangered Species Act or the Clean Water Act.

(12:44)

DNR operates out of six regions across the state. The DNR website provides the rules and a lot of information.

A Forest Practice is "any activity conducted on or directly pertaining to forest land and relating to growing, harvesting, processing timber, or removing forest biomass..." The latter was added recently to address owners removing slash off of the land for use in cogen plants.

Forest land is "...all land which is capable of supporting a merchantable stand of timber and is not being actively used for a use which is incompatible with timber growing." Harvesting timber to convert land into houses is a conversion that is regulated by the DNR, but that is a change in land use and triggers a SEPA review. That allows the local government review.

Rules apply to State, Private, Local Government, and non-federal tribal lands. What is covered? Timber harvest, precommercial thinning to encourage remainders to grow faster and taller, road construction and this is important regarding water quality and is associated with culvert installation/replacement. Under the HCP, the land owners were required to bring their roads and culverts up to date by 2016. Also, covered is pesticide applications. In addition, tree replanting is not only required, but regulated.

Forest Practices are classified into four different classes. Class I does not require any permit as there is no direct potential damage to a public resource. Class II requires five days notification to the DNR, but this is small activities without any significant road needs, and flat simple ground.

Class IV Special is a harvest that involves sensitive activities. It could involve steep slopes, riparian areas, habitat for sensitive species, etc. and this harvest activity requires compliance with the Act, as well as the State Environmental Policy Act (SEPA).

Class IV General are those conversions of forest lands.

Class III - Non-SEPA, but may involve proximity to water features, etc. These are the majority of applications. It could involve buffers for riparian and wetlands.

(12:50)

Most of the rules focus on the protection of water, particularly under the Forest Practices HCP. This is different than the way DNR state lands handles things under its HCP. Stream typing is important and sets the standards for proscriptions in buffers for streams and fish bearing streams.

Riparian zones in fish bearing streams has an inner zone, and then a core zone. A landowner could harvest in the inner zone, but they have to do a 100% inventory and then undertake a desired future condition analysis to determine if it is fully stocked. Only then can things be removed. The outer zone requires the owner to leave 20 trees per acre and the zones can range in size and width.

Examples of non-fish bearing stream and fish-bearing stream were reviewed. Sensitive areas were explained with specific definitions noted.

Unstable slopes is a major issue. After the OSO land slide of March 2014, this raised focus on harvesting near or on unstable slopes.

The goal of the rule is to not increase any risk arising from the action that would contribute to a landslide. They cannot be stopped, but want to ensure that actions do not contribute.

Further, DNR wants to ensure that actions do not impact the public safety. Most landowners choose to avoid unstable slopes as this requires SEPA compliance, including a geotech report, to show that the action will not result in additional impacts. This application has a significant amount of review by DNR and the public.

Forest chemical rules is also regulated. Goal are to eliminate indirect entry of chemicals into the water. Also, goal is to minimize the amount of chemical entry into riparian zones, wetlands, etc. These areas are associated with tribal cultural resources and want to reduce interactions.

(1:00)

Spotted owl discussion. The Hoh Clear Water Spotted Owl Special Emphasis Area (SOSEA) was discussed. Management started with circles around spotted owl sites. The permanent rules for spotted owls identified SOSEA for management of habitat within those areas.

What was important to support owl habitat? What lands needed to support the federal owl objectives. This SOSEA is in western Clallam and Jefferson counties, but discussion focused on the County's state forest lands. Harvest of timber in these areas limits triggers a Class IV Special if involving habitat. There is not a lot of opportunity to harvest in these areas. Outside of SOSEAs, there are restrictions as well. Under the Forest Practices HCP, there is no permitted ESA take allowed.

Swanson - do you know the population of owls that occupy those SOSEAs? That is known by DFW. Thaler noted that there was a status review in October 2015 of the Northern Spotted Owl, it may be in there. NSO population is still in decline.

(1:07)

Murrelet protections are triggered by suitable habitat standards. It is much more wide ranging and covers all of Clallam County. Bigger trees with big limbs, landing platforms for the murrelet, within a contiguous

stand that is seven acres in size is considered occupied, unless surveyed. A survey takes two to three years and must meet specific standards. Regulations require disturbance avoidance within 1/4 mile of an occupied site and limits activities during nesting periods.

Questions

Byrnes - If one does the three year survey does not find murrelets is the site loggable? Yes, if the survey does not find any presence or occupation then there is a reason to classify it as occupied, the site may be loggable.

Byrnes - How do you create future habitat then?

Swanson responded that the site is presumed to be habitat and occupied if a bird flies over it. So the vast majority of occupied habitat is on public land. Specific aspects of what is considered occupied was discussed.

Reandean - What is the percent of forest that is associated with conversion? There are quite a few acres that are being converted and the DNR is concerned about the conversion of working forest lands to other uses. Murray noted that across all uses (Ag, Forestry, etc.) that he has heard the number 50,000 acres a year are converted.

Paul - A bird flying over would have to exhibit a specific type of behavior right? Yes, circling, flying over and entering the stand, calling, etc.

Paul - how many acres are treated every year? In responding to a Senate report, in the last five years 1,540 permits have been issued for chemical spraying in the last five years. However, unsure how many acres associated with that. Seven violations were issued in the past five years. Pesticide applications are highly regulated. DNR regulations buffers, RMZs, water sites, and incorporates operational constraints. State Ag registers all of the chemicals in the state and licenses all of the applicators.

Applicators have to track the use of chemicals. Dept of Health looks at the workers and the public. L&1 also regulates the impacts to workers. Improper use will result in a large level of oversight. Most of the complaints arise with the public.

Cross - So for lands in Clallam County, do all lands meet murrelet habitat? It depends upon having all of the components for habitat and if you do it is presumed to be occupied.

Thaler - How many Class IV S permits were filed, clarified to be non-DNR lands, last year? Don't have with me, but it is very small.

Thaler - Clean Water Act issues?

Robert Lea - What does the tax payer pay for these regulations? FP divisions has 125+ staff working on these regulations. Budget numbers coming in the future.

Thaler - Clean Water Act? FP HCP is unique in that if you follow the rules, you addressed ESA and the Clean Water Act. FPA is intended to meet all federal and state requirements. Clean Water is address in various ways. DOE Director sits on the board [*Forest Practices Board*], and DOE must agree to the rule. Forest and Fish Report obtained agreement that this was the way to address water quality impaired streams across the state. Clean water assurances were built into rules. TMDLs arise when a stream is listed as impaired. Total Maximum Daily Load is set by DOE and would trigger a water clean up plan. This

process assumes that the rule was implemented, and then the adaptive management approach would update the rule. This created a statewide plan to address water quality.

Thaler - was there any change since the 2009 document? Adaptive management system would have ten years to show if the rules were effective. When we got to 2009, not all of those studies were underway. So a 2009, Mark Hicks document signed by DOE Director, identified a list of things that would have to be addressed to ensure compliance. It also triggered the science studies to get underway.

Thaler - how much money is being spent on those studies? There was \$6m appropriated in the last biennium for water quality work.

Paul - regarding pesticides, what is the monitoring program associated with pesticides entry into the water table? Since this is so highly regulated, this is not an area of DNR research. Paul noted that in his area, the spraying of roadsides is common, but does this require permits? No, this is not required for roadside spraying and so that would not be included in the number of issued of permits.

Paul - On the issue of landslides, how common is that? This winter was pretty active, with the significant rainfall. When we hear about these, we send a geologist out to inspect and to determine if the slide is associated with forest management. Paul noted that he had called DNR about a landslide with impacts to road and river, but DNR didn't respond. He was told to call the regional office.

Break was taken.

B. Angus Brodie, DNR , Presented on Trust Land Management in Clallam County (1:38)

Division Manager of the Forest Resources provided an overview of some of the policy areas that affect DNR's land management. Any detailed questions on silviculture would need to be another presentation, as this is to be on the "constraints of management." Brodie's presentation consisted of 12 pages with 11 maps.

Focus will be on two documents:

Policy for Sustainable Forests (PSF), a guiding document for all State Lands regarding forest management across the state. Adopted by BNR in 2006 that was a continuation of a series of policy documents adopted as early as the 1950s. The first sustainable harvest was run in the 1960s and involved Chuck Chambers at that time. The Forest Land Management Plan process arose in the 1980s, and two were adopted in response to challenges to timber sales.

This gave rise to land management planning, as well as the DNR undertaking SEPA on all of its timber sales. Prior to the PSF, was the 1992 Forest Resource Plan and the PSF replaced that document. Blum will discuss issues within the PSF regarding sustainable harvest, planning, etc.

Habitat Conservation Plan (HCP) was adopted by the BNR in 1997. This is the contractual agreement with the US Fish and Wildlife Service and NOAA that allows for an incidental take permit under the Endangered Species Act. This was created to address multiple species under the ESA. The strategies within the HCP have a nexus with the earlier presentation. If not associated with the HCP, then the DNR follows the FPA. The HCP covers the range of the Northern Spotted Owl, which is some 1.6m acres of land managed by the DNR, situated in all of Western Washington and some lands in Eastern Washington.

(1:44)

Returning to the PSF, the policies that affect the DNR's on the ground management. There are four main ones that affect land management:

1. Old Growth. DNR adopted a policy in 2006 that said the DNR would not harvest Old Growth as defined by stand size (5 acres or more) and age - natural originating prior to 1850. They were then identified. There are two processes to screen their inventory: model index, Old Growth Index; and, trained staff who are trained to review on the ground to determine if the stand is old growth or not. When found and meet the definition, those are set aside. When larger acreage is found, the land is then proposed for the State's trust land transfer program and those lands are moved out of trust land management and into other programs.
2. Special Ecological Features. Protect state or globally rare species or habitats using the natural heritage protocols to score and assess. These are then transferred out of timber management. A nexus exists with this and forest certification programs. DNR is part of both of those, SFI is the one applied to all lands. This policy helps meet the SFI certification requirements.
3. Gene Pool Reserves. Natural stands that are in situ genetic conservation for seed program. With harvesting 20-24,000 acres a year, DNR collects and produces its own seedlings. These reserves, as well as others, are used to develop the seedlings. These stands are about 3,000 acres and are not available for harvest.
4. Research Plots. DNR engages in research and these stands are used to test thinning regimes, as well as other topics, and these are deferred from general management to protect the research efforts.

In relationship to State Forest Board Lands, some 8,000 acres are associated with these policies. Some of the old growth stands are noted, but have not been reviewed by staff.

Paul - gene pool locations appear to be from higher elevations and may not be as adaptive to lower elevations? Brodie noted that the collection strategy is very locally specific with set protocols. Seeds collected could also be exchanged within a seed cooperative, and there are also seed orchards that are utilized.

Paul - do you try to match the microclimates associated with the seed needed? Yes.

Reandeu - percentage left in old growth stands? Did not break it down as to percentage of SFLs in each of these categories, but can provide that at a later date. Cross noted that it appears that 8% of the lands are associated with these categories.

(1:53) HCP

An HCP is permitted under Section 10 of the ESA that allows a land owner to submit a plan to the federal services as a means to request an incidental take permit. By seeking such a permit, the DNR requested to undertake its management in an agreed upon manner that addresses mitigation of take. The DNR's State Trust Lands HCP is a multi-species plan, built around four main concepts/strategies:

1. Riparian/Salmonid Strategy;
2. Northern Spotted Owl;

3. Marbled Murrelet Strategy that was interim, with a long term strategy under development now;
4. Other species or habitats such as caves, etc.

Two other elements: An adaptive management clause, that if learning that strategies are or are not effect, new science can change strategies during the 70 year period. No surprises clause, in that the Services are not able to come back to add to requirements beyond the HCP.

Riparian, Unstable Slopes - 28,080 acres associated. Unstable slopes are managed pursuant to the FPA. Licensed geologists on staff are experts under the FPA who provide review and guidance of all timber sales. Review can be either remote or field, or both. Sales boundaries are adjusted according to reports of geologists.

Riparian is similar to the FPA in the big picture, but the type of buffers established are under the HCP using the older characteristic designations (1-5, 1-3 designations buffers are based upon site specific tree heights, 4s have 100'). OESF has a different set of strategies. East county SFLs buffers have slightly different widths, but have a heightened level of management to meet desired future conditions proscribed as late successional or old growth forests. These stands may have one or two entries to get stands moving on the trajectories to reach those conditions. Thinning activities have to put riparian stand on projection.

Murphy - only one entry into the stand? Yes, possibly, two entries. But once entered and treated, those lands come off of management, but for the OESF portions.

Cross on the Type 4 or 5 streams, do you have an estimate on the proportion of those that would be similar to the NP, or NPS type streams. Type 5 streams in the HCP do not have specific buffer protections, however, many aspects of the Type 5 may have protections under other strategies.

Lea - out of the 28,080 acres how many of these acres will not be entered or managed at any time? Brodie, in 50 or more years, all 28,080 of these lands would not be available for harvest in the future.

Murray - buffers are on each side, so number given is for one side, right? Yes. Regarding the OESF, the riparian strategy is based upon physical conditions and biological conditions of the watershed. A watershed analysis is used to determine the condition and how that condition would or would not be affected by actions within that watershed.

The buffers are then developed for that watershed. In effect, each watershed has its conditions set by the modeling process. Most of the types 1 and 2 will have a 100' buffers, and the 3 and 4 will have buffers between 100-150'. Level of management within those is different than non-OESF areas. The focus is on the health of the watershed.

Murray - do you consider all lands within the watershed or just DNR lands? Just DNR lands. This is a different approach to conservation as agreed upon within the HCP.

Cross - how often are you taking riparian actions within the OESF? Don't know but will be provided. When HCP was adopted there was no riparian strategy, so that was adopted in 2006/7, whereas the OESF had riparian activities since the implementation of the HCP.

(2:07)

The second strategy is the NSO and there needs to be a discussion of the two sections - eastern Clallam County, and then the OESF. Map showed 7,589 acres associated with the NSO. Under the HCP, areas

determined to be in the range of the NSO would be subject to conservation. Prior to the HCP, there were designated owl circles across Western Washington, and the DNR developed a mitigation strategy to not continue management per circles or 4d Rules and so developed a strategy for NSO conservation on the foothills of the Cascades. The strategy on the Olympic would be focused on the OESF, and then there are no specific strategies within the eastern portion of Clallam County. However, portions of habitat that were Status 1 Reproductive Owl circles are being protected pursuant to a settlement agreement arising from a lawsuit post the 2004 sustainable harvest calculation. This agreement maintains these protections until such time as the BNR adopts a new sustainable harvest. Everything within the OESF remains.

Cross - does the definition for NSO differ, or how do they differ, from the WAC definition for other forest land owners? The definitions are similar. Two types - higher quality known as old forest, and the lower known as young forest marginal. There is a third definition known as suitable habitat, but it is also similar to DNR's. These stands designated in Eastern Clallam would fit with the young forest marginal definition.

Cross - do you use the six criteria and then the stand number? DNR HCP definitions are very similar and use similar criteria.

Paul - How do these islands of habitat remain genetically viable? This is habitat, not necessarily where owls are actually at, but rather stands that meet the definition of habitat of young forest marginal. These at one time were within a circle. Cross noted that the strategy does not require owls to be present, but rather if you build the habitat the owls will come. Swanson noted that the DNR is part of the landscape and that the DNR lands should not be looked at in isolation. DNR's role is demographic support to the Services providing lands for owls.

Within the OESF, there are landscapes (11) that would have 40% of the DNR land base would be in a habitat condition, and then half of that would be targeted to get to an older forest condition. Cross so if you have 20% of each of the habitat, then that would have a weighted old growth score, then those would be moved permanently off base? NO, those would not have originated in stands naturally prior to 1850. The deferral policy must have that origination requirement.

The next strategy is for marbled murrelets. This strategy is in development and there is an interim strategy in place. 15,211 acres are identified as being marbled murrelet habitat.

When the HCP was agreed upon there was not enough information about murrelets. So, it was agreed to develop a process to identify the habitat and research the relationship to what the bird were using.

Then DNR would survey those lands across its ownership. The Straits and the OESF are the two units with two different habitat models that were applied against the inventory. Those stands that had a low probability of being habitat were released for management. Those that may indicate habitat were surveyed using the Pacific Seabird group's protocols. Where evidence was found, habitat was designated. In the Straits, surveys were finished. In the OESF they were not.

Swanson, were these occupied sights? Not necessarily, but a commitment was made to protect half of the sites until the long term strategy was established. This arose out of an agreement to not foreclose future options while a long term strategy was developed. Services asked for this and it was agreed to by DNR.

Byrnes do the colored units represent the habitat being protected? Yes, until a long term agreement with a new strategy is in place.

Fleck - so you said that it has taken twenty years to develop that strategy, but didn't you just start about three years ago this long term strategy? Yes. Wasn't there some determination by the services that the Straits did not need to provide support for owls or murrelets? There is none for the NSO, but for the murrelets, this is still being assessed and reviewed. Under the murrelet proposals there are two areas along the straits that are being reviewed.

Reaume - In the OESF surveys were not completed? They were not completed, so there was no opportunity to release any of those lands. All of that habitat was released. There is no plan to finish the survey, per an agreement with the services, that there is enough information to develop the long term strategy. Once complete, these lands will be included for murrelet conservation or will not.

Murray - your inclusion or exclusion is based upon modeling and not surveying? Yes, surveying was used to develop the models.

Lea noted that he works within this area, and area around Sappho is one with steep terrain, so are there areas that will never be harvested and have they been identified? Yes.

Paul - is this just murrelet habitat on state forest lands, not all lands? Yes, only the murrelet habitat on state forest lands within Clallam County.

Fleck - isn't the state's murrelet population a very small portion of the total population - state's habitat is 9-10% of the total habitat. The population is smaller than that. Presentations to the BNR will be made available.

Fleck - where on the Straits side when surveyed, and release occurred, half of that was kept though for long term strategy. In the OESF, the lands were identified and kept that way for 20 years, for a generation. Surveys were never completed in this area.

Swanson - is it fair to ask why those surveys were never completed? Two reasons - three planning units - OESF, North Puget, and South Puget. In the OESF, a lot of effort spent on surveying and most of the stands identified were found to be occupied. So with the high success of the survey affirming the occupation of modeled stands, it was determined that many met the criteria. North Puget and South Puget, there were fewer areas where a model could be built.

Murray - did you do a comparison between the costs of surveys in relationship to the acres being released? Do not believe that DNR did that.

(2:30)

Uncommon habitat, species of concerns. There are very few areas in this category. Most of these are related to a butterfly, not listed but because of its unique nature this is about to be petitioned to be added to the HCP.

Fleck - 8.5% is old growth, 30.4% riparian/unstable, 8.2% NSO, 16.4% is murrelet - but are these overlapped with each other? Yes, which is explained in the land classification system DNR uses, which is next part of presentation.

Murray - about a third is set aside? There is a level of overlap in these various strategies. Some though are set aside and could not be logged. So DNR developed an internal classification that is used within the modeling used.

(2:36)

Land Classifications

Deferrals - areas where management is not likely to be done. Short term and long term. Long term would be an old growth stand. Short term may be a stand where an easement is not readily available.

Riparian - while focused on the riparian needs of salmonids, it is combined with other protections that gave the ability for the HCP to cover multi-species.

Uplands with Specific Objectives - unstable slopes. NSO habitat, eventually some NSO habitat could be replaced with that grown later.

General Ecological Management - leave trees, and other aspects of harvest.

Pie chart. Overlaps addressed. 60% of SFLs are open to General Ecological Management; 12% Riparian - but portions of the riparian fall within the deferrals for unstable slopes, habitat. 29% deferred.

Cross - what proportion of the riparian and deferrals are off base due to DNR internal policy instead of FPA requirements? DNR would have to do an analysis of that question. How much is not known.

Scott - Is there an overlap between deferrals and riparian? Yes, there is. A deferral is the highest priority for conservation, then riparian. Chance of the 58% getting bigger is slim or none? Yes.

Fleck - in the OESF that may not be the case. The OESF allows flexibility that is not being managed with that flexibility in practice? DNR may not be able to move some areas from deferrals to other classifications.

Brodie noted that a map does show some of the levels of overlap between classifications?

Reaume - does the pie chart apply to OESF? Half of the general management probably is associated with the 20/40 rule.

Murray - how do you address the leave tree which are trees of a higher value in the pie chart? No those are not factored into the land classifications. Within the general category there are things that do affect the overall yield that Kyle Blum will be sharing.

Swanson - so with an RPZ and a buffer that is 200' wide, and you can do some management in those areas, where is that in the pie chart? The 12% captures those, but eventually those will be meeting the desired future condition and then be deferred.

Cross - the cost for DNR to achieve objectives within the HCP are those lands are being sacrificed for the larger state objectives? Land that could be managed actively if it were not part of the DNR's HCP, some of the deferrals are self-imposed under HCP that would not be required of any other land owner.

Scott - seems that the overlap is such that there is probably not much that could be added to the general management provisions that are not a pot of gold to solve budget problems.

Bork - is the State being asked to assess its lands regarding climatic changes such as carbon storage as well as other things being developed in the form of revenue? DNR is always looking at means of increasing revenue and the return of investment.

Thaler - What has been the impact of Commissioner's legislative authorization for the sale of biomass? Swanson noted that this was *de minimus*, about \$1/ton with residual for cogen use. Brodie acknowledged that it was small. Fleck noted that biomass would be a sort that would be paid for by the harvester and those dollars would be realized in the value of the stumpage. Swanson reemphasized the *de minimus* value realized from this. DNR noted that antidotal information indicated approximately \$1/ton for residual harvest materials within the working zone of the biomass facility.

Thaler- Regarding the reallocation of the land classifications, has the DNR not been sued over time regarding such things? Wasn't that what gave rise to the HCP.

Paul - Regarding the species of concern, are there success stories regarding how these strategies have saved species or addressed the decline. DNR noted that it is not the task of the HCP, nor the DNR, to recover the species, but rather to meet the obligations within the plan and in doing so support the federal services obligations.

Murray - there is monitoring on the HCP? Yes, three levels. HCP implementation monitoring which looks at whether DNR is doing what it said it was doing. HCP effectiveness monitoring that looks at how things like habitat thinning and whether they are creating the habitat that was intended. Validation monitoring that is associated with the OESF and this has been started looking at salmonid response to DNR strategy. WDFW and tribes, as well as services, also do monitoring.

Byrnes - There has been conversations outside of these meetings that seem to indicate a belief that if the properties were to go back to the County, those properties would not be restrained by the ESA and the HCP, is that true? No, that is not the case, nor does there seem to be and hidden pot of gold.

Bork - Is there any way to find out the bottom line, what is the cost to the state for the management of these lands in all facets in the level of quality, being high, and what would it take to duplicate that at this level? Who would bear the burden of that cost and would it be the tax payer? Clarification was asked for what would be rebuilt as it is currently paid for by the public.

Scott asked for clarification as some of the information was priority. Cross noted that the DNR would share that with the public and has done so. Would there be additional information on the harvest schedules and queried information that would be shared?

Bork asked for clarification on the assumption that the "data is right there?" Cross explained that the SFL and the information is available. Bork questioned about the skills and management skills necessary to manage the lands? Cross articulated that Clallam has ample number of professionals that can provide those skills. Bork asked about how that would be paid for since those costs are born by all of the tax payers in the state. Cross and Murray disagreed and noted that those costs are actually paid for from the management fees retained from timber sales. Forest Practices compliance would remain and that is part of DNR's obligations as they handle other land owners.

Swanson reminded the TLAC that 25% of the timber sale revenue is retained by DNR for the management, overhead, expenses, fixed and variable costs, etc. If lands were managed by the county, the county would have a budgetary process to forecast timber sales activities and determine overhead costs not too different from what a private sector manager would have to do for the management of 92,500 acres.

Thaler did note that Blum indicated that the division of some functions of DNR was difficult to split out, so the 25% needs further review. Murray noted that the management process would be managing these

lands to meet the rules and regulations while meeting the obligations of the trust. Murray believed that understanding those costs could be developed relatively easily and in a short period of time.

Fleck - Couldn't the total harvest values received on SFLs in any given year, the 25% being a set management fee, couldn't that amount be reviewed to determine whether the management of these 92,000 acres on the 1.5-2.5m/yr? Fleck noted that either the State HCP, or the FPA HCP, would have to apply. But, the unknown is whether you can use those funds to manage these 92,000 acres?

Scott also asked about whether there would be local jobs created or lost? In addition, Scott raised a question as to whether the funds received from the harvest, by DNR or the County, would have to be distributed to the junior taxing districts in a set manner? Fleck adamantly disagreed with the fact that there was a perception that the funds from the sale are subject to different distribution mechanisms. He noted that statutorily the funds have to be distributed in the same manner as property taxes received are and that the myth that counties could do otherwise was a false one former Commissioner Belcher repeatedly stated.

Thaler aren't you potentially opening up the statute with the request to reconveyance that could in effect change all of this? Fleck noted it was an interesting question. Murray noted that the TLAC needed to focus on questions for DNR.

Vice Chair Lea thanked both DNR speakers for their excellent presentations which the TLAC and audience echoed with applause.

Fleck asked for that percent of the 92,500 that is constrained? There is no final number that was given. Brodie noted that this is data that is coming with Blum in the next month.

Doherty asked for a brief summary of the Oso Litigation and since there are projects for a much warmer and wetter winter would this result in additional problems. Doherty objected to Murray's statement that the question was not associated with these issues. DNR would not comment on the on-going litigation and suggested that Doherty look at articles available on that topic. It was noted again by DNR that landslides are a natural phenomena that DNR manages for. DNR referenced the Chehalis Flood in 2006/7 when the state had a 300 year flood that weekend, and when there is a record precipitation there will be a record flood. That then has you look at activities in relationship to those types of events. That resulted in landslides where they were not expected. DNR initiated an adaptive management review of unstable slopes and rules.

Reandeanu noted that the 25% management fee moved over time, could DNR discuss this with the TLAC as that fee has not been fixed and it has varied over time.

(3:12)

Bylaws and Rules

Thaler raised a point of order regarding the agenda and noted that the next item to be discussed was the bylaws and rules. Therein is a proposed rule that the meetings shall not exceed three hours. He wanted that noted, it was also noted that those had not been adopted yet.

Murray and Brodie noted that sets of DNR maps are available for folks. Digital versions are also available.

Murray asked about the bylaws and rules. Fleck pointed out that the draft was created using the Charter Review Commission's draft that also had a host of members. There were new additions such as the

position of secretary. In the comments received by Bork, it was asked if we were incorporating a public comment. In addition, there was in Article 4 in italics regarding parliamentarian, Charter had one and it is highlighted here to ask if that was needed here. Counsel and research staff was also highlighted for review. Recommendation proposal was highlighted as this is slightly different than what the Charter had. No other changes were received, then one was received today from the public.

Thaler noted that he had a list of comments that he had hoped to print off and did not. It was asked if he could go through quickly.

Cindy Kelly made a motion to table this to the next meeting. Cross seconded that motion. Discussion noted that these could take a considerable amount of time and we may need to adjust the next meeting accordingly in light of Blum and the attorney presentations. Comments are to be sent to Fleck, who noted that Scott also provided a comment that she didn't have comments.

Motion passed unanimously.

Next Meeting and Topics

Next meeting is to be 25 March 2016 and this would be a special meeting to accommodate DNR staff. Motion by Thaler to set the next meeting for 25 Mar 2016, seconded by Scott, passed unanimously.

The March meeting was discussed. Blum will be discussing the harvest calculation, values, volumes and lands on base. This will also be when Blum brings some of the data request. Brodie affirmed that Blum will be discussing the sustainable harvest, what portion of the land will be available for harvest. Paul asked if things could be available earlier, Fleck noted that everyone was trying to get things out a week prior. The remainder of the March meeting will be discussing arrearage and trust obligations from four different perspectives from four different lawyers.

Bylaws would also be discussed in March. There was a want to try to get these done in March, and if those were not addressed, then they could be continued.

April meeting was discussed. The discussion focused on having the HCP and the FPA to be reviewed in relationship to reconveyance.

Further, if reconveyance were to occur what would be the impact upon the incidental take permit, the remaining corpus of the DNR's lands, and what would be the expectations of the Services. The incidental take permit had an assumption regarding the land base.

Fleck and Thaler agreed that they would work to develop a series of questions that would need to be asked and involved.

Swanson noted that the HCP provides long term assurances regarding flora, fauna, and species as such has an intrinsic value that needs to be discussed. Murray noted that there were two questions that need to be assessed: What would be done if the HCP does come into play with reconveyance; what are the legal issues that do come into play?

Fleck said if reconveyance were to occur the question is the HCP and the impact of removing 92,000 acres from DNR management in relationship with that agreement? If reconveyance were to occur, and the acreage fell within the FPA HCP, what would be the impact of that change on the DNR's remaining land and management? The FPA or the HCP are the two options that apply to lands reconveyed. DNR would need to understand what would reconveyance of 92,500 acres from their management do to the DNR

incidental take permit? Fleck and Thaler agreed to work on a list of questions for further review and discussion at the April meeting.

The issue of the Resolution's requirement for an April report to the Commissioners was discussed. Commissioner Peach, being in attendance, was asked for clarification regarding the final report. Peach noted that the Commissioners are interested in a response that is reasonable and would like a report that is appropriate.

The Commissioners would like to be briefed on the issues and where the TLAC is at, and then clarification where the TLAC will be at the end of the year. He noted that a briefing on the issues being worked on and how they are being reviewed would be helpful.

For the April meeting, it was noted that Blum would be asked to invite the applicable services experts on the HCP for the April meeting. Motion by Kelly, seconded by Scott, that Blum be asked to make those invites passed unanimously.

Public Comment

Phil Kitchel - Sequim - After three hours of meeting, he thanked everyone for participating in this effort.

First, he responded to issues by Paul on the scope of work of his contract with the County. He noted that his contracted ended on 31 Dec 2015. The contract did have a line in it that stated he was to "provide information and support to the TLAC as directed by the Clallam County Board of Commissioners." Contract ended on 31 Dec and he had not been directed to so provide. He did provide materials to the Board of Commissioners on 14 Dec and that presentation was recorded by Clallam Public Eye.

Second, he asked about the presentation by Angus Brodie and referenced the DNR annual reports. He noted that in those reports for 2006, the County had ~24,000a in long term deferrals while Grays Harbor had 46 acres; in 2014, 25,967a were reported; and, using the math presented today with 58% on base, that leaves some 38,000a listed in long term deferrals. The County has gone from 24,000 to 38,000a and there is a troubling trend when looking at revenue to the trust beneficiaries and the County.

Third, regarding the questions on the management fee, he shared that in response to SB 5574 in 1996 (reconveyance authorization), there was a JLARC (Joint Legislative Audit and Review Committee) Study - 96-5 - that compared management costs between DNR, unnamed timber, and Grays Harbor County. That study found that Grays Harbor's costs were \$26/acre compared to DNRs \$30/acre. There is a lot of pertinent information in that study and he recommended its review to the TLAC.

Fourth, regarding the BNR's ability to impact these issues, he had asked the BNR if it would be worth considering removing all of the County's state forest lands (43,000a) from the OESF and put into one consistent management regime. There would be pros and cons, but worth discussing.

Fifth, regarding arrearage, there was an informal AG's opinion letter done in 2000. He noted that Fleck had a copy that he could make available (Fleck would provide for next meeting). It included duties of the DNR and also the Legislature.

Ed Bowen - Clallam Bay - He noted that he was videotaping the meeting and was doing so as part of Stephanie's Clallam Public Eye youtube.com efforts.

He made one observation about Class IV Special and he wanted to draw attention to the accumulative effects of DNR doing this and his belief that it could lead to federal jurisdiction expansion. Specifically, Class IV-S became a big issue with in relationship to the accumulative affect

upon all in the county.

Regarding the 25% take from DNR, he recalls that from three or four quarters back in DNR's reporting, there was discussion with the legislature to raise this. So it may go up higher than 25%.

Finally, he wanted to share that when the report goes to the Commissioners, he is going to be asking the Commissioners is, "what are you going to be doing with it?" He would like to have the TLAC address is the litigation issue, and he is overwhelmed by the litigation issue and would like to see this as part of the report.

Murray noted that Ann Seiter had passed a recommendation to the TLAC regarding the bylaws and asked Fleck if he had received that. Fleck noted that he had a copy of what she provided and would try not to lose it.

Adjournment

Motion to adjourn by Kelly, seconded by Swanson. Passed unanimously.

From: Josey Paul [mailto:thegreatstream@gmail.com]

Sent: Thursday, April 28, 2016 9:06 AM

To: Rod Fleck <rodf.forks@forkswashington.org>

Subject: Minutes

Hey Rod:

I did look at the video from the February 19, 2016 meeting.

On page 2 of the minutes, there are references that I said reconveyance "would" change environmental regulations.

I had asked you to say that I said reconveyance "could" change environmental regulations. And you had Jason "refuting" my comment, which means he proved me wrong.

On the tape, which is difficult to hear, I said reconveyance "possibly could" and "probably would" change regulations. This is at 9:00 on the CPE tape.

At the last meeting, we established that reconveyance could indeed change environmental regulations under which the trust lands are managed, which is what I had said in February. So Jason could not have "refuted" what I say, although he could disagree.

Josey

MEETING MINUTES FOR:

March 25, 2016

Clallam County Trust Land Advisory Committee

25 Mar 2016

Meeting Minutes

https://www.youtube.com/watch?v=P_azR8oJowk

Times that appear next to items reflect the actual time and are provided as a guide for those utilizing the Clallam Public Eye video. Please note that the video started shortly after Ann Seiter's comments. It appears that there is about a four or five minute difference between the times below and the video. Further, this meeting went four hours and twenty minutes.

I. Call to Order (12:02)

Meeting called to order by Chair Joe Murray and opened with the Pledge of Allegiance. Roll was called. David Bekkevar was absent. Councilwoman Sissi Bruch was attending for Councilmember Michael Merideth.

II. Public Comment

Bill Peach – Commissioner Peach noted that he had a conversation with his fellow commissioners regarding the Committee's requirement to deliver a report at this point. He noted that the Chair would be asked to participate in a work session and provide a quarterly update regarding the Committee's process. He also noted that with regard to member's mileage, the County was working through it. It was expected that members would receive mileage for meetings up to June in late June or July, and then the remaining mileage owed following the end of the Committee's term. He also noted that alternates/subs need to be designated to the Chair.

Ann Seiter – Palo Alto First, she asked that all members of the Committee publicly disclose all affiliations particularly those associated with the timber industry, an agency, or beneficiary and to have those be part of the final report. Second, who was the east end at large representative. She believed it was Bekkevar, she noted that he had been absent for two meetings and if he was not hearing the presentations, he should not be voting.

Joe Murray – Stepped to the podium and provided a comment in response to the letter received by the Committee from Thaler, *et. al* (attached), and noted that he felt that the suggestions would obstruct and not facilitate the desired effort. He provided a personal, written response that was distributed to the members (also attached).

Mike Doherty asked how inquires would be handled like Ms. Seiter's. Murray noted that as a special meeting the issues could not be addressed as agenda items. Doherty felt that based upon the information by the County Prosecutor, there should be some response.

III. Administrative

A. Adoption of the Agenda

On a motion by Cindy Kelly, seconded by Kyle Blum, the agenda was adopted unanimously.

B. Adoption of Meeting Minutes

Fleck introduced the meeting minutes from the February meeting. He noted that the length was an effort to address the concerns and issues raised by Josey Paul. Fleck made a motion to approve. Request to correct the minutes by Ken Reandeau on page 3 regarding best means of management. He asked that this be clarified as to the assessment of the management by Resolution No. 70.

Josey Paul asked if it was possible to send in his comments due to the time they arrived. It was noted that the Committee could continue the adoption of these minutes. Comments could be sent in advance.

Thaler moved that the meeting minutes be considered on the second month following the meeting. Seconded by Bork. Cross asked for clarification as to whether the motion would mean that there would be a two month delay between the meeting and the acceptance of the minutes. Motion passed 11 – 5.

(12:16)

IV. Review – Clallam County Trust Lands

A. DNR Structure – Financial – Review – Kyle Blum, DNR

Blum's presentation was provided. He noted that he was presenting information to explain where funds are allocated within the DNR for the management of state forest lands. The second part of his presentation would address the sustainable harvest levels and DNR's performance. He would leave up to the visiting lawyers the issues of arrearage beyond the materials presented in his materials.

He noted that there were four division managers within his division. He has three peers responsible for the following divisions: (1) Aquatics & Geology; (2) Wildfire & Administration; and, (3) Forest Practices. In addition, there are six regional offices and the Olympic Region is managed by Sue Trettevik with offices in Forks and Port Angeles.

(12:22) DNR expenditures on State Uplands were provided in Slide 5 which shows the categories for FY 13-15. Of that \$67.8m, 83% from is associated with management, while 17% represents expenditures from the Access Revolving Road Fund. Fleck asked about the \$67.8m in relationship to acres. Cross asked for an explanation about "other programs?" Blum noted that Slides 6 & 7 provides a list of those other items. Murray asked about the legal affairs portion as to whether that covers all legal issues? Blum noted that the AGO staff assigned are covered by the funds from those trust lands for that budget. This includes litigation, lease review, and other legal services. Paul asked if aquatics was just salt water? Blum noted that it was both tidelands and bedlands below high water. Paul asked who monitors the affects on these lands? Blum noted that DNR for activities, but it is another division. Derelict vessels were overseen by DNR, and stormwater issues were addressed by DOE. Blum noted that the additional programs including things like the Natural Heritage program that also ensures that DNR meet its SFI certification requirements regarding rare

plants/ecosystems. Murray asked about the IT portion noted on Slide 7 as to whether it covers GIS, cell phones, radios? Blum confirmed that it did.

Fleck asked about the economies of scale and as to whether the total of \$66m/2.1ma is applicable for \$31.40/a in management costs? Cross asked whether Access Revolving Road Fund (ARRF) should be pulled out thereby resulting in a number between \$25-32/a? Murray asked if the \$66m/2.1ma really should reflect that 58% of the land is being managed, so really the per acre cost for management should be higher? Susanne Scott noted that those other lands would still need to be accessed and managed. Blum noted that this line of discussion was applicable but cautioned about going down too far into that

(12:40) Blum then provided information on the Sustainable Harvest Calculation (SHC) as a means to avoid aggressive management and to prevent overharvesting to the degree that expected volume and review would not be there. In Western WA, the SHC is associated with the 1.4m acres west of the Cascade crest. The ~700,000 acres associated with Eastern WA falls within a different SHC program. The SHC is associated with four main statutes provided in Slide 10 (RCW 79.10.310-340). Paul asked if the sustainable harvest and yield are associated with different rotations, and what was the basis for the period utilized? Blum noted that Slide 11 provided further explanation as to the role of the Policy for Sustainable Forests (PSF) that provided the definition for sustainability and how the SHC was to be done. He noted that the PSF designated the harvest units; flow controls; fluctuation over time; addressed the maximization between value and volume; etc.

Murray asked about the 20 units. Blum noted that each county has trust lands and those a SHC is developed for each trust unit with an even flow condition. In the past, these lands were treated as one big unit which resulted in large fluctuations. The OESF's 270,000 acres is done as one unit and contains both State Forest Lands (SFLs/Counties) and Federal Grant Lands (FGLs/Common School; UW; Prison; State Capital). Murray asked if the OESF SHC would include both, Blum noted that it would and compared it to the Capital Forest. Fleck noted the difference between the Capital Forest and the Capital FGLs which provide money to the State Capital. Blum noted that the FGLs provide funding for K-12; UW & WSU; Normal Schools; etc., and can have wide variations within those holdings.

Bruch asked which provided funding for Port Angeles High School? Blum noted that those would be the SFLs; however, in the following discussion by Kelly, Cross, and Reaume, it was noted that funding only comes to districts that have levies or bonds outstanding. At Scott's request, Blum clarified the identified lands on the map. Common school lands generate revenue that is distributed by the Superintendent of Public Lands based upon construction needs, student populations, and complex distribution formula.

(12:55) Blum noted that the SHC could be recalculated at any time now, but the BNR has determined to wait until the murrelet issues have been addressed. Slide 15 provided information on the location of the 20 units associated with the SHC: 17 counties, OESF, Capital Forest, and the FGLs. Thaler asked about FGL land exchanges and whether the trust status follows those lands? Blum noted that they did. There are also constraints on how land is bought, sold, traded, swapped. However, the land that is sold/exchanged is tracked with the proceeds used to acquire new lands for that trust associated with the sale/exchange. The PFS does not have guidelines, but there are underlying trust obligations.

This requires tracking of the proceeds and how those proceeds are utilized in acquiring new lands for the original trust. Such sales must be approved by the BNR. Land exchanges involving SFL fall under a different statutory provision and more information can be provided.

Bork asked about what was included in the term sustainable forest and whether that included species, site index, age class, and if those were going to be briefed by Blum to the group? Blum noted that there were major constraints within the model made up of such pieces Bork mentioned that are highly relevant and found within the model. In addition, the BNR has a policy that there cannot be a fluctuation of more than 25% from the adopted number. Also, as noted in Slide 17, the policy is to optimize the value of the forest stands and timber production over time.

Bork asked if the trend line shows age classes increasing? Blum noted that age classes are really scattered across the spectrum. Fluctuation has more to do with age class variation. Cross asked if that SHC includes assumptions to meet all constraints including the 20/40 rule? The SHC includes that and if that is achieved at a later date, more land becomes available for harvest. Bruch asked if the model addresses acreage over time and the quality of the forest on those acres? The model will know the number of acres, site class, and site class is used to indicate quality. Changes in acreage are addressed in the DNR's annual reports.

Murray asked Blum to explain site index. Cross provided a explanation regarding this. Site index is used to address quality with a higher site number having more resources for trees to grow faster; a site with a lower site index will take longer for the trees to grow. The maps, including a Site Class Map, that can provide further explanation with a 1 being the best number, etc. Murray asked about the site age used, Murray noted that the industry utilizes a 50 year site age. Kelly asked about how changes are addressed in the case of forest fires. Blum noted that an inventory team, or local knowledge will reassign characteristics to that impacted polygon and that then changes the model.

Bork asked about whether these costs are part of the silviculture costs. Blum noted that those costs for that work is associated with the infomatics costs shared earlier. Silviculture costs are associated with planting, thinning, etc. The five percent of costs associated with infomatics is where these costs are paid for by DNR.

(1:05) The PSF notes that the SHC can fluctuate +/- 25% over the previous decade number versus a true even flow constraint. This allows more fluctuation, but the model is able to make more choices and is allowed to maximize over time. A more constrained model would result in less performance. The constrained model helps to provide predictability to revenue recipients.

Thaler asked about the discount rate being used within the model. Blum noted that a 4.5% and that it will choose different stands as it is all about time value of money over time. Blum noted that optimizing value does not mean that additional harvest occurs if the value of the timber declines. Bruch asked if other uses, such as a zip line that produces more money, are part of the equation. These are not part of the SHC, but are part of the economic decisions made by the BNR. Fleck noted that the require is to address volume,

and value, and Blum noted that this constrains the actions of the model. The flow constraint is a volume constraint. Cross noted that folks should keep in mind that the BNR adopts the decisions associated with the model. He noted that all models are bad, some are useful. But, the purpose of the model is to help the BNR adopt a decision.

(1:12) Arrearage is defined by statute (RCW 79.10.300; and, RCW 79.10.330). Slide 21 shows the SHC performance based upon a decadal harvest of 5.5 bbf (2005-2014) with 550 mmbf/yr target. The slide denotes the overage (blue) and arrearage (red). Murray asked if the Clallam County number is for the lands outside of the OESF, and Blum confirmed that and noted a slide later on would explain that. As noted in Slide 22, there are then two possible numbers for the arrearage: 702mmbf versus 462mmbf. The question is whether the overage reduces the arrearage. In the Olympic Region, regarding SFLs, there is a 92mmbf arrearage with 27mmbf for lands outside the OESF, and 65mmbf for SFLs within the OESF. Revenue is distributed to the trust associated with the lands. Revenue could not be sent to someone else, but the SFLs within the OESF will have a greater potential for fluctuations. Blum noted that there were a lot of different opinions on this issue, but that he was presenting the DNR's position on these issues.

Cross noted that 10 years ago the Department adopted a number to provide that amount of volume to Clallam County. Is that amount promised and not delivered associated with timber sales that were withdrawn; the model over predicting volume; how is that arrearage accounted for? Scott asked if in the potential transfer of management would the transfer include the lands within the OESF? Blum noted they would. Swanson asked what the harvest amount was in relationship to the 568mmbf target? Blum noted that the number was reached was 58% of that goal.

Reaume commented on the number and noted that this number was for the last decade, and the previous decade there was a similar pattern. This causes challenges for developing budgets for taxpayers. Further, if the harvest is not reached that results in the loss of families and the loss of mills that causes additional challenges. Fleck noted that there was some number associated with the SFLs within the OESF which was about 20mmbf/year, and the City did track that closely and during the decade the DNR averaged around 12mmbf/yr. Swanson noted that in the BNR's subcommittee work, there is a slide that highlights the arrearage in relationship from 1990s to present is closer to 2+ bbf and the decade show is just a fraction. Brynes asked if economic ups and downs affect the arrearage? Blum noted that they do noting that the recession that started in 2008 saw a significant drop in the value of hemlock in relationship to logging costs resulting in sales that barely penciled. So staff moved into Douglas Fir stands near I-5 corridor to focus on those higher paying markets. Blum did not believe that the recession was the highest contributor to the arrearage in the Olympic Region.

Bruch asked if there was a silver lining in the arrearage – could there be a higher value obtained when sold? Blum noted that it would depend upon the nature of the arrearage. If the reason was market, then yes. If it was a model noting that there was not a riparian area, but in fact there was, then no. Cross noted that there was a want to sell the volume when there are mills, because if the mills are gone, the value of the timber decreases as the costs to bring to market increase. Paul asked for clarification on the actual numbers in the slides including Slide 23. Blum noted that it was 92mmbf for the County's SFLs.

(1:32) Blum continued after an inquiry by Murray regarding the need for a break. Blum then turned to the slide regarding the causes for arrearage on Clallam County SFLs. Three issues: Marbled Murrelet; Riparian; Staffing levels.

Murrelet strategy used in the SHC for the past decade assumed that half way through the decade the DNR would complete the long term murrelet strategy with an occupied sites only approach. This would protect murrelets at sites and then buffer those sites with all of the other conservation strategies would be sufficient for the murrelet. However, at about the same time, Commissioner Sutherland conveyed a science team to develop a report that in Sep 2008 released its report and its draft recommendations. That team recommended large swaths of land within SW Washington and in the OESF as the primary conservation tool for murrelets. DNR then continued to protect the interim strategy sites, but also the other sites. While harvests continued in those large swaths of land, but since 2011 in response to letters of concern from USFWS regarding harvests in those areas, the department has only had a few sales, all litigated, that occurred in those identified swaths of lands (marbled murrelet management areas). The DNR made a choice to avoid these lands until the murrelet strategy is adopted. Scott asked if the model has been rerun with those constraints to determine the target? Blum noted that it had not been done, but that there have been numerous discussions regarding this factor within and without the DNR about this. The question is very valid. Such a recalculation would have readjusted assumptions and expectations, she noted.

Riparian areas. The model made assumptions about volume. There was no approved riparian strategies and so the model assumed that roughly 8% (393mmbf) of the total volume would come out of these areas over the course of the decade with a substantial portion from the OESF. The OESF HCP permits a different approach within the riparian areas. Lea asked for an explanation. Blum noted that the other five areas, non-OESF, have a very fixed buffer strategy. The OESF has a far less restrictive approach, as it focused on eco systems. Cross offered a further explanation for the difference noting that the OESF was to provide a place for intentional learning which would argue against constraints on the experiments that could be conducted within the OESF. Fleck also explained the site based explanation within the OESF portion of the HCP allows for a customization of buffers relating to the stream's habitat/function and management activities. Blum noted that there were a lot of different explanations for what occurred within the riparian harvest issues. With the OESF complications, the foresters are choosing to focus on the uplands to avoid the extensive additional staff working on these issues. Fleck noted that antidotal information exists about sale issues in riparian areas, but at no time did the DNR signal to the beneficiaries the nature of this problem in the OESF to the beneficiaries until very late.

(1:45) Murray asked if there was no riparian harvest, and focus was on the uplands, was the riparian harvest then just bypassed. Blum indicated that that was the case with a few exceptions.

Thaler noted that a data point was needed that showed the SHC from the first time it was established. Blum thought that this information may be in chart Swanson showed that was from the BNR Arrearage Subcommittee. (See Attached).

Scott asked if the OESF was a research project? Blum noted that there were two things associated with the OESF. One was the learning to occur there and then export that learning elsewhere. The other was the forest is an experiment to not zone a forest. Scott asked if the benefit of the research was everyone, why was only Clallam County paying for it? Blum noted that the same advisory board that recommended the OESF also created the Olympic Natural Resource Center and deferred the harvest of old growth. The OESF and the deferral were codified in 1997 in the HCP. Blum noted that this is a great question.

Reaume asked for additional information regarding the sales not sold due to staffing. Blum noted that there were some sales that were developed by foresters that DNR leadership determined not to offer for sale due to murrelet issues. There are sales that get offered but do not get bids, but those are evaluated, repackaged and usually sell. He was unaware of a sale that was offered, no bids, and then DNR didn't do anything with the sale. There was a salvage sale outside of the OESF that did not get reworked due to the nature of the wood.

Murray asked if the DNR used a minimum bid in their offerings. Blum noted that they did based upon a DNR cruise. This sets a minimum appraised bid value and the highest qualified bidder above the minimum sale obtains the sale.

Scott asked if there were sales outside of the OESF that lacked staff support? Blum clarified that if the question was were there was a lack of people on the ground to put up sales. Outside of Clallam County there were sales that were not put forward. In Clallam County where there sales that did not occur due to a lack of staff. When asked if those could be quantified, Blum noted that those could be quantified.

Cross asked if there was any work on the issue of the amount of volume removed, over cruise estimate, in relationship with arrearage. How does DNR interpret the agency's ability to use models to establish targets? He noted that based upon past practice it was a question as to how the agency would meet their future goals and action plans. Bruch noted that the models do create a perception of expectations. So wouldn't it have been better for the DNR to update the model? Blum noted that changes require compliance with SEPA and those changes result in litigation and challenges.

Paul asked about the arrearage in the SW part of the state was in part due to murrelet issues. Would the arrearage be reduced in the future? Blum said only if the target number was lowered. If the target is adjusted, then the arrearage would be smaller, but the volume offered would be roughly the same. Blum noted that the amount harvested would remain relatively consistent. Three things affect volume: (1) number of staff putting up the sales; (2) efficiency of those staff; and, (3) lands available for harvest. These do not change if the manager changes. DNR has had challenges, and also opportunities, in all three of these areas.

Doherty asked if there were any written materials associated with the ancillary values? For example, in a drier climate you may log those areas left, but there are other values regarding the volume left that provided sanctuary from litigation. But, there could be a way to quantify the values about this. Is there some independent group determining the values? In addition, the issue of exports results in jobs being exported out of our area. The discussion of exports needs to be brought to the table as well. The discussion of

sustainability is one that is needed to be discussed for the long term benefit of the County. But, there are needs to discuss within the public the consideration of a bigger picture associated with delays in harvest, longer rotations, litigation protection.

Blum discussed staffing levels in the Olympic Region (Slide 25). He explained the categories used. He noted that in 2011-2012 there was an increase in staffing. This corresponded to the issue of noted arrearage within the OESF, and the Region raised the concern that they were not adequately staffed to meet the harvest level. Swanson articulated that the chart seems to indicate a problem with management. Fleck noted that issues were raised by a host of people, but HQ never sought full funding of the needed staff.

(2:07) Arrearage options addressed by Blum. BNR created a subcommittee to review this issue. Former County Commission McIntire and UW's Tom Deluca looked at four options to address the arrearage. These were, in addition to the new harvest calculation:

1. 702mmbf harvested during the first five years;
2. 462mmbf harvested over the next ten years with a particular focus on ecological treatments in the uplands;
3. 462mmbf is rolled into the inventory and let the model to determine when it would optimize the harvesting of this volume; and,
4. 462mmbf would be harvested in the first year of a new decadal harvest, and then harvest the base calculation in the following nine years.

Bruch asked if the number would go down? Blum noted that the number would not go down. That the resolution of some issues would bring land on base; the riparian approach needs to be reviewed and redrafted; and, staff experience is an issue. 83% of the field foresters have less than three years of experience. More experienced staff equates to a more efficient staff.

Murray asked about the land base's growth rate and the permanent restrictions are the first key points of a SHC. Staff can be adjusted by DNR. Blum noted there are some lands where staff is needed to address thinning sales, etc.

Swanson asked if the PCT costs are part of the management fee?

Doherty asked if there was enough experience from a collaborative model that brings about extra sales without staff? If both sides could agree to this, and if there is experience that it works, then would that help? Legislature could create a fund to help with this? Blum noted that there were three legislators that really understand the trust obligations, with one retiring. Doherty asked if a project collaborative could be a means of attracting temporary assistance or as a strategy?

Cross asked if there was any indication of the staff that would cost of \$1/acre? Blum noted that he figured that it would be 21 people with fully loaded salaries, benefits, taxes, etc. The DNR's challenge is that the work their foresters do is directly transferable to the private sector. DNR has staff recruited away after two or three years by the private sector which can pay more and offer more in benefits.

Lea noted that some of the consequences are associated with the loss of big money and companies such as ITT, Crown Zellerbach, Bohemia, etc. When asked why they closed their operations, he was told that they could make more money doing something else with their investment with a greater return on investment. Thaler noted that in Seattle there is significant investment in construction in the down towns of major locations. Swanson noted that there is a flight of capital, but there is a segment of the investment community willing to accept a lower rate of return. However, with the County trust lands those will not go away.

Scott asked if volunteers could be used? Or interns? Blum noted that an internship program is being implemented, in part for recruiting, with twenty slots.

Bork asked if there was any preferred alternative? Blum noted that there was not such a preference, rather the analysis would be done on all four in relationship to the SHC and the Murrelet efforts.

Break ended at 2:45

B. Arrearage Presentations

1. Fleck (presentation materials provided to members)

Noted his presentation was part of a larger presentation available if anyone wanted it. His presentation would focus on the statutes which Blum discussed. An arrearage is the timber authorized to be sold, that should have been sold by the DNR, and was not sold. There is a JLARC report that provides a similar definition. Default sales are extremely rare due to the impacts upon that company's inability in the future to buy timber. DNR manages a trust with specific obligations to produce revenue to specific beneficiaries within an environmental requirements. It is a different entity and operation from the USFS, for example.

Fleck provided the legislative history of the arrearage statute. The events associated with the legislature taking specific action to adopt the language. Included were the DNR's response in 1986 to the legislature asking for information on how to address arrearage. In 1987, the arrearage statute is adopted and DNR is told to sell the arrearage, but changes arose where DNR was required to analyze the economic and environmental impacts. Final bill adopted the language in law today that was to try to address issues of flexibility. In the mid 1990s, DNR was going to redo the SHC, and the issue of arrearage was going to be reviewed later. DNR said it would come back to BNR, legislature said you need to do the analysis. However, DNR didn't do that due to a perception that the arrearage is a figment of the planning process per an email shared with the Arrearage Subcommittee. In the 2004-2007 period, City of Forks, NOTAC, and others raised the issue again. However, no analysis was not done.

The numbers – 702mmb or 462 mmbf is the arrearage number of which 247 mmbf is in the Olympic Region and of that there is 92mmbf in arrears on Clallam County. This volume represents jobs, revenue to the beneficiaries roughly \$65m in total, and an obligation. DNR OLY only hit their budget target of 100mmbf, average was about 85mmbf. Their SHC was 120mmbf. Quarterly meetings in the West end focus on

volume, the money, and delivery. Distribution of funds is contingent upon the statutes that address distribution of general taxes. Fleck noted that Commissioner Belcher created a mythology about the Counties having the discretion to distribute the funds received from DNR. Instead, the statute determines the distribution in a manner identical to distribution of property taxes.

Looking at the four options, the 702mmbf option is probably the one that could withstand challenge. The challenge would be that it takes some 15-18 months to bring sales forwards. The 462mmbf lacks a legal authority and policy in light of management. The ability to offset the arrearage by the overage of harvest in other counties does not comport with various practices and other statutes. Treating all of the counties' lands as one giant trust after the fact, is problematic. Statutory issues with distribution of proceeds also exist. Blum noted that looking at the two different numbers, the BNR was looking at the resolution that established the original number was the "one rolled up number of all of the units" and that is the logic for the 462mmbf. Fleck went forward with the other options proposed by DNR and issues he saw regarding each of those.

Lea asked about the issue of litigation regarding options. Fleck noted that in the 1986 report it was noted that "folding arrearage" into inventory, or just raising the percentage, would be in violation of the law. Fleck saw both of these options, then or now, would be challenged in court. Intergenerational equity issues still remain.

2. Thaler (Presentation provided to participants)

Thaler noted that the lawyer presentations were not shared beforehand. While a lot of agreement, there area of differences are in the conclusions. Arrearage is linked to the SHC and cannot be separated from that effort. The SHC arose out of a series of timber sales and litigation on those including *Classic U* sale on Whidbey Island which then established a requirement to comply with SEPA. In 1979, in response to this suit, the DNR adopted its first plan. There was the *2.1m acres v. Cole* that then arose from the DNR's first plan. This litigation resulted in a harvest number that started this SHC process in 1983. In 1992, another plan is adopted. Four years later the DNR adopts a number, with some odd responses from the AGO about the role of the statute.

Legislature had intervened earlier. This arose out of the report to the legislature in 1986 and that report noted that the revenue then was unable to meet the funding needs of the recipients. In addition, the staffing was not sufficient to meet the harvest level associated with the arrearage. Further, the report noted environmental concerns from harvesting the arrearage at that time. The statute then was adopted by the Legislature.

The issues noted in the current arrearage are the same issues raised in the original, pre statute report. As a side note, regarding *Skamania*, the beneficiaries and the timber purchasers do not have the same interests. The Court was outraged at the actions of the legislature for letting the mills off of the hook on the default sales at the time. The Court was adamant about its position that that was a violation.

Thaler noted that the arrearage statute really should be looked at as an analysis on what is the best long term interest of the trusts. This would include rotation age, discount

rate, the issues of sustainability, etc. The best interests are really a decision by the BNR, that would then be reviewed by the Court as to what that in fact may actually be. He noted that the requirements should be highlighted regarding the need for the analysis. This was one of the most important, up front requirements.

He then passed out Wyatt's Golding's letter, attorney with the Washington Forest Law Center, who could not be in attendance due to a death in the family. He summarized the letter, attached at the end of these minutes, as noting that: (1) the statute has ambiguities, (2) it is difficult to interpret subject to litigation, (3) the analysis requires economic and environmental aspects that include the murrelet plans, the OESF plans, etc. Thaler concluded that the bottom line was that it is not unreasonable to expect an increase in staffing, but until the economic and environmental impact analysis are completed, the ability to sell more timber has to wait.

Bruch asked if the current trust lands are able to do what they are supposed to do? Thaler noted it depends upon what you think they are supposed to do. The Legislature noted that purpose of the lands was to generate revenue. The theories behind the lands revenue have decreased over time. In King County, the impacts are smaller, while in rural areas they are much higher. He felt that the forests are not capable to meet all of the financial needs. Blum noted that in the 1970s, the harvests provided about 50% of the funds, while today less than 20%. Thaler noted that there is a lobbyist proposing to undertake a bond issue of the state to purchase more land. Bruch noted that the original purpose was to use these lands and their revenue to support schools. Thaler noted of the many Western states, Washington is lucky in that it has kept more of these lands, while many other states sold these off. Thaler noted that there was a unity of interest to have land in industrial forestry than have it subdivided. Swanson, Fleck, and others noted their appreciation of this statement.

Cross noted that the lands were never envisioned as the source of funding, but rather a source of funding. He noted that the needs would outstrip any scheme to provide revenue. There is an ever increasing demand for funding. The UW has a large 26,000 acre block within the OESF, and the UW has never been concerned about the return of these lands, due to their land holdings in downtown Seattle. As the need for money increases, they would be interested.

Lea asked, in light of statements about the condition of Port Angeles High School, how it was going to be replaced? The discussion included ideas of diverting more urban funds to rural areas. Lea noted that the needs of the high school for replacement is a significant issue.

Kelly noted as a school board director, Fairview needs to be sold, and should be sold at the amount it is appraised. However, the bigger issue is that many folks are under a misconception that timber and other things pay for schools. Schools are funded in part by bonds and levies. Bonds build things, levies provide for operations. They are very different and many people do not understand that. Grant trust lands were provided by Congress 3m acres of trust lands for revenue to various institutions. The State Forest Lands 620,000 acres were provided to the State to provide revenue for the operations of counties and other operations. She offered a document called the History of Federal

Lands to Provide Public Schools. She also noted that the age of the buildings within the various districts, and their significant use, all play on the need to replace buildings. Bruch reiterated the need for revenue to address the need for buildings. Fleck noted that in order to get revenue from the DNR timber lands, you have to have a passed levy or passed bond to obtain funds. Fleck noted that in the distant past, there was an investment trust associated with timber revenue. Those revenues were placed into this account, the interest was then paid out from that account for school construction. Fleck noted in a meeting he and others had years ago with former Governor Dan Evans on this subject, Evans noted that he had one major regret which was the change in the law in the 70s to distribute the corpus of the trust for school construction. The lands also provide revenues for hospitals, fire trucks, etc. If those revenues are not there, then the tax payer will be asked to for the full authorized levy/bond amount. Further, lack of meeting standards by fire and school districts, impact us all.

3. Wyatt letter from Forest Law Center (attached).

4. Ann Forest Burns, American Forest Resource Council (presentation provided) (3:15)

“Cut the arrearage, it’s the law” was the intro to her presentation. The statute requires that the first issue is a determination if there is an arrearage. As noted today, all agree there is one, there is a dispute about what that number is. The statute then requires an analysis of alternatives to determine a course of action. The DNR is a couple of years behind on the requirement of taking an action. The goal is to provide the greatest return to the trusts based upon economic conditions, existing and forecasted, as well as the impact to the environment of harvesting the arrearage.

There is an informal AGO, given out in the packet, regarding the language in the statute. Does this statute impose an obligation on DNR if there is an arrearage? Yes, DNR has to perform an analysis to determine if it was in the best interest to the trusts to sell all or part of the arrearage.

So the trust? Go back to Skamania, and she noted she was on the losing side of that case as she represented mill owners, the Court said that these are real trusts. They are not public trusts, the public trust doctrine is not what is being discussed, and these are common law trusts. The restatement of trusts, consisting of four volumes, apply to these lands. These are long developed common law regarding the management of trusts. Sitting at the TLAC table are experts hired by trusts to determine how to best utilize such assets to maximize the return on the trust assets for the beneficiaries. She noted that in her opinion, there was no where in the state where there was more expertise on how to properly manage forest lands for the benefit of the beneficiaries. It is an art, DNR needs help.

Certain duties of note. DNR, as a trust manager with the Legislature as the trustee, has a duty of undivided loyalty to the beneficiaries. In Skamania, the trustee/legislature attempted to aid the timber purchasers and mills relief for a sudden change in the market conditions. They argued that having mills was in the best interest of the trusts

to have purchasers so provide relief. Court said that the duty of undivided loyalty required the striking down of the relief statute. The trustee is to manage the assets as if they were dealing with his or her own property. In 1996, the AGO also addressed issues that also addressed impartiality amongst the trusts, could prevent the crediting of one county against another.

DNR, when looking at arrearage, needs to look at things like the price of timber, projected prices, market impacts, calculate long term revenue, environmental affects, and combinations of those factors. Other ideas could be species, volumes, timing impacts, economic needs of beneficiaries, riparian needs, risk aversion of the DNR, need of funds for the managers. If the manager needs more money, beneficiaries need to know about this, and really understand the implications of that. Would you rather get 75 cents of one dollar, or 50% of two dollars? There could be situations where spending more money, could return more money and that needs to be reviewed. She noted that Thaler was right, the beneficiaries are the ones that need to raise these issues not the purchasers. The purchasers buy timber, make lumber, create jobs. The beneficiaries need to be engaged in the DNR's needs.

The statute also talks about the impacts upon the environment for harvesting the additional harvest. She noted that these have been thoroughly examined. The SHC was reviewed at a much higher harvest level under SEPA, and if the impact of harvesting additional timber must be analyzed, those were done in the original SHC. What has not been asked is what is the impact of not harvest the designated timber? Bruch asked if the new information regarding murrelets is not taken into account in the 2004 SEPA assessment. Burns noted that the EIS on the SHC is for a much larger harvest level. In addition, what is the need for the frequency of analysis/reanalysis goes to an issue of continuity and predictability. To obtain investment in infrastructure, and municipalities need information, you need that SHC number. The information within the environment has not changed drastically. Blum noted that the 2008 science team report is not a new environmental impact, but rather the team articulated a different perspective on how much DNR would have to conserve to achieve their murrelet objectives. Bruch asked if that report should have changed the SHC analysis?

Scott asked if this should have been part of a new assessment. Burns and Blum noted that these are decadal efforts and there should be one in 2014. Scott asked how long does it take to do an SHC? Burns noted that it took two years to do the 2004 SHC. Burns noted that in 2013, DNR announced that there was a proposal to do a new decadal harvest in six to nine months. Blum noted that the BNR took a different approach, as a result this increased transparency and interaction.

Lea asked about the earlier DNR presentation and the Clean Water Act's role in DNR's environmental regulations. Blum noted that the CWA was taken into account within the HCPs (DNRs and Forest Practices). Washington State's Forest Practices Act, including DNR, addresses the CWA. Murray noted that the DOE has enforcement provisions

under the CWA. Fleck noted that regarding the 2008 report, the DNR noted that the Science Team never looked at the trust obligations. The team ignored, and clearly stated that in their report, those trust obligations. The report was a recommendation outside of the framework outside of the DNR's other legal obligations. Fleck noted that in 2009, there was a collective argument by many to ask the DNR to address the murrelet strategy. DNR then froze the lands noted within the science report thinking that the DNR would have completed the long term strategy sooner. Blum noted that USFWS provided some additional efforts to provide relief with an amended conservation strategy, but DNR got sued on that approach and lost.

Thaler raised an issue with Skamnia from his perspective. He felt that the description of a private, fiduciary trust language has been eroded to a public trust. AGO 96-11 clearly articulates that the environmental obligations do apply. Unlike a private trust, DNR has to utilize SEPA and other aspects. Thaler argued that in the Superior Court decision of 2006, the decision was made not to pursue an appeal and so the various participants negotiated a settlement. Blum noted that DNR had received a notice of intent to sue the DNR by the Law Center under the CWA.

Cross noted that it took two years to develop a plan that missed the harvest level by 40% in this region with wildly different interpretations on what DNR should do to achieve its objectives. TLAC has to determine what is best to determine what is in the County's best interests, but with such wildly different perspectives on trusts, how is that in the best interest of the County.

Lea asked if there is anyone proud of County management? City Council? Port Commission? Lea noted those are questions to ask.

Swanson put things into perspective about purchasing more lands for timber or environmental needs. Swanson noted that 92,000 acres are worth some \$300m, or one building in Seattle. With \$300m you could purchase a bond that provides some 3% that would return \$9m/year. However, here the DNR's return is \$3-7m/year, but they provide revenue to taxing districts.

Fleck noted that there was only two ways to resolve these disagreements: Court or AGO. Thaler argued that a third result was a negotiated solution on how to interpret this statute. Fleck noted that this would require a broader group of participants, particularly on the side of the beneficiaries.

IV. Meeting Agendas and Structure

Fleck reminded the TLAC that there had been discussion to have April's meeting be about the HCP and the ESA. In addition, there was to be discussion about the bylaws. The executive committee realized that the bylaws discussion would take much longer than allotted. With April being focused on the HCP, there were questions about how this impacts the HCP. Thaler and Fleck have to develop just a list of questions about the HCP reconveyance. The questions would

be shared with the TLAC in advance of that meeting. Blum noted that he has asked the Washington Field Office of the USFWS to provide a broader perspective of the ESA in relationship with forest management. The idea would be what are the other choices of the 92,000 acres outside of the DNR HCP. What would the world of take avoidance, safe harbors, etc. would look like if reconveyance occurred? Blum would also try to develop the discussion about the impact upon DNR as well. Blum also noted that there would be a need to discuss the statute of reconveyance having to be amended and the process to do that. Fleck noted that this was a proposed topic in the proposed work schedule. This could include lobbyist from the schools, counties, etc., to talk about how the political realities have changed since the 1990-s issue on reconveyance. This could result in the TLAC having to focus on the second question in the TLACs charter from the County.

Paul noted that he felt that there was a need to have a broader discussion about the views of the timber industry, economics, social aspects. This would include the discussion about the export of timber out of the Port that has created a third world structure. He felt that these issues need to be addressed.

Bruch noted that in the April meeting that the discussion of full disclosure of interests raised by the public should be included. Murray noted that everyone had to share this. However, it was suggested that maybe this could be done at the start of each meeting. Also the issue of the East End representative. Fleck noted that Bekkavar noted that he was going to be traveling for some time and would miss a set of meetings. He did not think Bekkavar appointed an alternate.

Fleck suggested that April could be ESA compliance and bylaws. May would be HCP compliance and Bill Change issues. Fleck noted that there is a new county staffer and it has really taken a lot of work to put together the meeting with a new staff and volunteers. Blum noted that there is a need to know about the ESA. In addition, there is the need to have a practical discussion about how to actually achieve the idea of reconveyance. A meeting needs to be to on the synthesis of information, general discussions, as well as what is missing from the information presented so far. It was felt that this discussion needed its own meeting. Developing a list of advantages, disadvantages, and impacts. Kelly noted that the TLAC really needed to keep focused on the County's resolution developing the TLAC.

Doherty thought that the TLAC needed to look beyond the resolution. For example, the issues of climate change and the impacts upon timber. Doherty also asked about the repayment of the infrastructure investment and how those issues would be addressed. He raised issues with Murray's response to the Thaler et al letter. In addition, there are issues raised in OSO and how the liability of such things would flow to Counties. There are issues also about exports and the large number of jobs going overseas. All of his life there has been this issue of sustainability for decades ahead for the use of those lands. In a bad economy, there is a want to export, in a good economy there is a need to get more timber from public lands.

Doherty stated that there has been a rush to get the issue of reconveyance brought forward. That the manner in which the TLAC was created needed to be addressed, as it arose out of certain interests put in draft membership lists, rules, letters outside of the public arena. He felt these were conflicts and violations that needed to be discussed, but there are certain people pushing this agenda of reconveyance. When asked about who those people were, Doherty

stated to look at who was holding meetings, including at Green Crow, and Fleck was on a corporate board that was not disclosed.

Fleck noted that Doherty was wrong on that fact. Fleck's PDC disclosed his involvement and that there was a separate hearing on one aspect of his PDC disclosure that was also public.

Doherty then noted that there were briefings of commissioners on these issues. He noted that he did not have all the facts, but had suspicions about these issues. In addition, there was climate change issues, exports, etc.

Murray asked Doherty to write up his concerns and submit them to the committee like Murray had done in response to Thaler et al's letter. Murray stated he wrote his letter as his response to Thaler's letter. Others could respond to that letter.

Lea complemented the DNR and Blum on the excellent presentations. He noted that Fleck made a comment about people on the committee making a statement of where people were on. Fleck noted that he kept trying to lay out an administrative process where if a meeting was held, what is the purpose, who needs to be there, what needs to be talked about, what is the outcome. The executive committee keeps trying to do this. April – EDC and bylaws. May – ESA and how the law is changed. June could be a meeting to discuss issues. Lea asked about tribal involvement and the issues of water quality, and the CWA. He felt that the issues with the CWA and the issues being addressed by the TLAC. Blum noted that whoever manages the land, compliance with the CWA will remain the same. Thaler noted that there is always a way for lawyers to bring up issues.

Bork stated that there was really never a choice between either DNR or Clallam County, but rather there should be a way to work together. She praised the DNR for its work and that there has to be a way to design a different approach to these issues. DNR needs to be actively involved with its skills, abilities and history. Instead of disassembling, we need to build up what the DNR is doing.

Paul asked that the next meeting needs to address bylaws and also these underlying issues. He asked that an open meeting be scheduled on where we are, where we are going, and how we got there. Murray noted that an invitation was extended to USFWS and that that was part of the fact finding. Murray suggested that the general discussion be held after the USFWS. Paul made a motion to set the April meeting as an open meeting to discuss where the TLAC as, where it was going, and how it got there. Seconded by Lea. Scott asked for clarification as to the date, and this would be in April and USFWS be cancelled. Fleck noted that he was going to vote no. He felt that there was a need to have USFWS there as part of the puzzle, and that the bylaws need to be adopted. If the resolution adopted by the Commissioners need to be talked about as needing a change, that should be a separate discussion. He felt that the charter did not have a lot of flexibility as it created an advisory committee with a specific charge. Paul noted that nothing in his motion changes the resolution.

Byrnes noted that meeting schedule should be contingent upon the USFWS visit. Discussion followed about the fact that there was an outstanding invitation. Reandean noted that the bylaw discussion would need to be addressed as soon as possible in light of the issues raised in

the letters received. Thaler noted that the delay consideration from February and March is what caused he and others to bring forward the letter. TLAC is operating without any formal structure. Cross disagreed as at the first meeting there was an election for the group which created the structure. Thaler specifically suggested a co-chair structure to accommodate the needs of the interests that was dismissed outright as if tossed out the door by a chair that would not accommodate that discussion. Murray noted he was not the chair. Vote on Paul motion was 6 in favor, 8 against, and 3 abstentions.

Fleck made a motion that the April meeting consist of the USFWS ESA compliance and the bylaws ; the May meeting being on the issues of County management under what conditions and process of amending the statute; and, June meeting be on a discussion on synthesis and open discussion. A friendly amendment offered by Blum that the April meeting be on ESA compliance, and the May meeting be on HCP related issues. Seconded by Lea. Motion passed 14 for, 1 against, and 1 abstain.

Thaler raised a point of information. Doing that agenda means we will be here until 4:30 p.m.? It was noted it could, but if the bylaws were adopted then a time limit on the meeting would exist. Murray noted that the meeting cost about \$2,000/hour when all of the participants time and efforts were valued. There was some discussion about how he reached this number.

V. Public Comment

Rod Fleck – Forks. Ann Seiter raised the issue of association and noted he had disclosed every association he was associated. This was at the first meeting in response to a comment by Doherty. He noted that the same standard had not been applied to the members of the TLAC's environmental caucus which has three members that are all members of one of the groups represented, with two of those three serving on its board of directors. In addition, one or two individuals have not disclosed their past involvement in these issues. He noted that folks listen to the testimony of Ed Bowen from the last meeting and how in that testimony Bowne noted he was the first to testify at the Charter Review Commission about the issue of arrearage. Fleck noted that he had challenged this presumption at the same meeting that he refuted this. Fleck challenged the statement of a "rush to conveyance." He encouraged Doherty to read the resolution and particularly the second question in the resolution.

Carol Johnson – NOTAC. Today was one of the best, most informative agendas that the committee has had so far absent the last 45 minutes. Arrearage started us in this direction. This is not to attack the DNR, or anyone else, albeit a kindergarten class could offer the volume that the USFS offers. The resolution is what should be used to evaluate and make recommendations to the Commissioners. Private timber lands and federal timber lands are not part of the discussion. The federal timber lands are in worse shape from not harvesting lands unlike the DNR. Arrearage has been around for thirty years. When the SHC was put in place 12-13 years ago, there was an arrearage that was folded in at that time. This is affecting the funds coming to our community. Our schools were always funding by our communities. Clallam County has lost a lot of jobs and that should be considered.

Toby Thaler – Disclosure issue is legitimate on all sides. He was happy to list all of the board he sits on. His suggestion was to make a suggested edit to the bylaws. Having that as a link on the website could be another way. As to the federal lands, they are taking the brunt for the ESA listings. If it wasn't for the federal lands, one could not imagine the litigation

Tom Swanson – Noted he had lived in Clallam County since 1985, worked for Green Crow since 1989, and that the company had not purchased public timber since 1991. The company owned Green Creek Timber on the ridge, that purchased larger, higher quality timber and it was barred from purchasing public, federal timber as it would conflict with export issues. Interest on being on the board is the community's interest, it is not interest for Green Crow or any quarterly profits for that company. Interests based upon his family's connection to schools, community. Proud of community. He has worked with folks on the west end and is interested in doing the best with the asset under question and doing what is in best interest of community. Swanson noted that the export issue was not germane to the charter from the Commissioners. The work he does with the private company is very involved in exports and that market shifts. The issue has been around for some time.

Gabe Rygaard – Local business here, family owned logging company that has been on tv. A couple of things, he worked directly with the state and brokered state timber. 60% of his work comes from state managed lands. A lot of times statements about timber being advertised, a lot of time they are unable to match the cruise level in the state's advertisement of a sale. He felt that there was not a number that would offset the arrearage. 92mmbf of arrearage in Clallam County, ask this question, if we had had that arrearage would we have had those jobs that we lost. Skip all of those other concerns, environmental and otherwise, and realize that there are a lot of folks out of jobs. Think about this, it is hard to survive in an industry with a noose wrapped around its neck.

Coleman Byrnes – noted that he is involved in many organizations and sits on the board of two environmental organizations. He is representing the Audubon Society and is not representing any other organization.

Connie Beauvais – Served on the last Charter Review Commission. She thanked everyone for the work they were doing on this topic. There were over thirty issues brought to the Charter. Enlightened that this was a huge subject that really affects the County. Much larger an issue than the Subcommittee could address, so made a recommendation that the Commissioners created a committee to study this topic. In this period of openness, it is wonderful getting this out to the public so a lot of people can learn about this issue. She noted that we may not need to take the lands back ourselves, but that we needed to understand how they are managed and that the way they are managed affects our county. She thanked everyone for keeping an open mind and reviewing this issue in the best interest of the County.

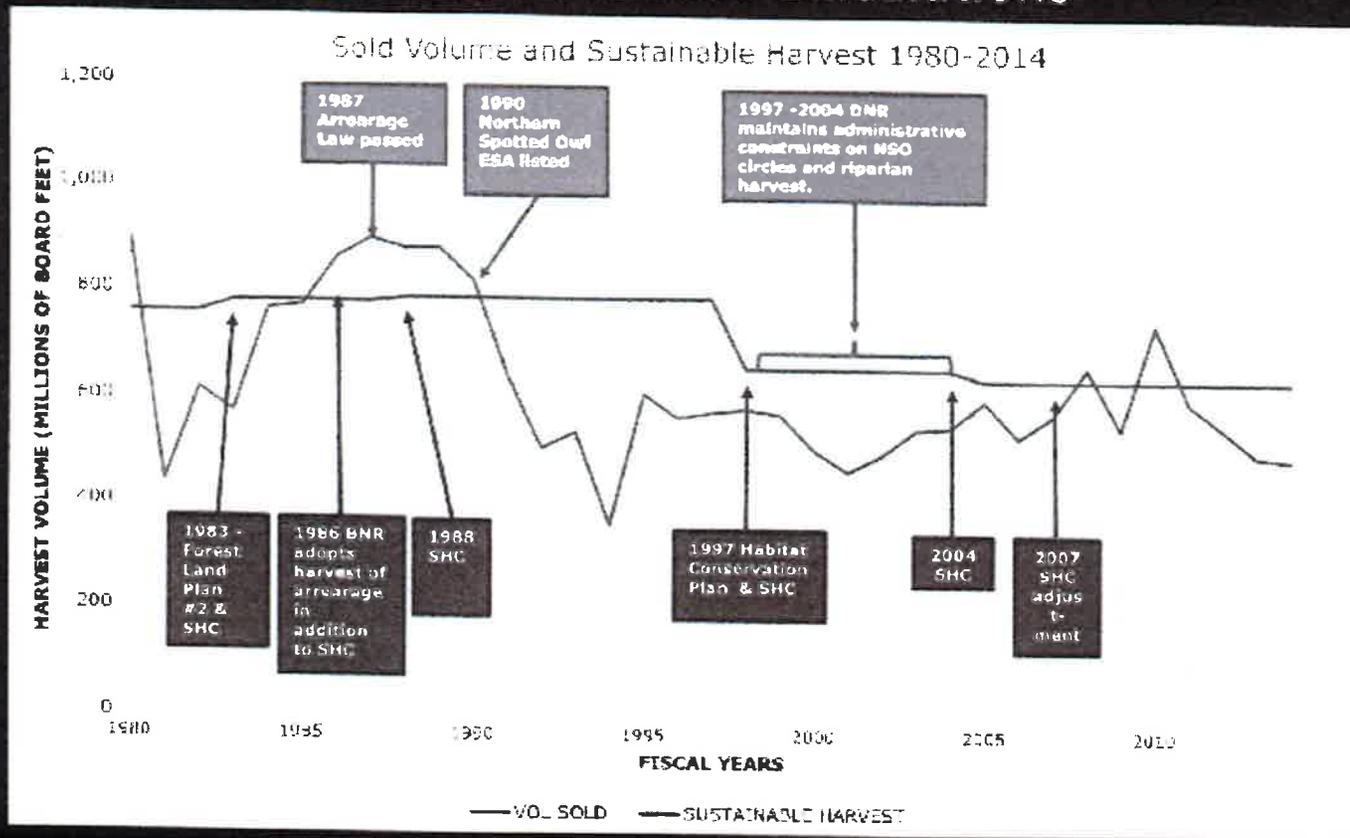
Bill Peach – He thanked everyone very much for working on a very tough issue. He reminded the Committee that the resolution created the standing committee and if looking at issues to do so in relationship to the resolution. The committee's life is finite ending in December. He sees that there are some areas that could limit the committee being where they want to be by the end of the year.

Kelly noted she was going to be absent at the next meeting.

Motion by Kelly, seconded by Blum to adjourn. Passed unanimously.

5.

Arrearage Subcommittee Previous Sustainable Harvest Calculations





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Draft Memorandum on Arrearage: Legal Analysis

To: Clallam County Trust Lands Advisory Committee
From: Wyatt Golding, Washington Forest Law Center
RE: The Department of Natural Resources' Arrearage Responsibilities

This memo briefly provides my legal analysis of the Department of Natural Resources' statutory obligations when arrearage occurs. The views expressed in this memo are draft analysis, subject to change, and do not represent the legal positions of any client organizations. This memo does not analyze the interplay between DNR's common law trust obligations and the agency's statutory mandates.

Under the Public Lands Act, the Department of Natural Resources must prepare a sustainable harvest calculation every ten years. RCW 79.10.320; RCW 79.10.300(5). The Public Lands Act defines arrearage as "the summation of the annual sustainable harvest timber volume since July 1, 1979, less the sum of state timber sales contract default volume and the state timber sales volume deficit since July 1, 1979." RCW 79.10.300(1). Default refers to purchased sales that went unlogged due to the purchaser's failure to complete the contract, and deficit means "the summation of the difference between the department's annual planned sales program volume and the actual timber volume sold." RCW 79.10.300(3). The State Legislature passed the arrearage statute in the context of an economic recession, the result of which was that timber that was available for logging in a planning decade went unlogged.

The arrearage definition references a planning decade starting in 1979 and does not apply by its plain terms in the year 2016. However, the Public Lands Act also states that "[i]f an arrearage exists at the end of any planning decade, the department shall conduct an analysis of alternatives to determine the course of action regarding the arrearage which provides the greatest return to the trusts based upon economic conditions then existing and forecast, as well as impacts on the environment of harvesting the additional timber." RCW 79.10.330 (emphasis added). Read together, the two statutes appear to envision DNR calculating arrearage every decade. However, the nature of that calculation is ambiguous. For example, the definitions in RCW 79.10.300 are not clear on whether, in order to be calculated in the arrearage, volume must actually be planned for sale or merely part of the past decade's SHC. That ambiguity makes a big difference for matters such as marbled murrelet management, where areas projected to be available for logging in the SHC were never included in any planned sales, because the anticipated development of a "long-term conservation strategy" never occurred. Another ambiguity is that the arrearage statute specifically requires considering environmental impacts when determining how to calculate the

arrearage, but is not clear on how those impacts might be taken into account when determining a course of action.

DNR does not have any implementing regulations that further explain or define arrearage. The statute merely directs that “[t]he department shall offer for sale the arrearage in addition to the sustainable harvest level adopted by the board of natural resources for the next planning decade if the analysis determined doing so will provide the greatest return to the trusts.” RCW 79.10.330.

The ambiguity in the definition of arrearage and how it must be calculated gives DNR discretion in its interpretation and application of the statute. However, the text does give at least three directions that should shape DNR’s discretion. First, the arrearage statute references the “trusts” as a collective, implying that the arrearage calculation is on a total basis, rather than on a trust by trust basis. The repeated collective reference counsels in favor of a reading that takes into account both overages and deficits, for a true net calculation.

Second, the text and legislative history of RCW 79.10.300 and RCW 79.10.330 strongly suggest that the arrearage is intended to capture planned sales that are available for logging but did not go forward, rather than all potential timber volume modeled in the SHC. DNR therefore should not count trust land transfers, modeling errors, and shortcomings resulting from regulatory changes into the arrearage. All of those categories are volume that was not actually available for logging, rather than sales that DNR could have auctioned but chose not to. A reading of the statute that does not allow consideration of volume that is not truly available for harvest is supported by the requirement that the arrearage is included in the next decade’s sustainable harvest calculation. RCW 79.10.330. If a given volume was modeled but is not truly accessible for practical or regulatory reasons (ie, volume in riparian buffers or volume in marbled murrelet areas), it would not make sense to simply add that volume in other areas in addition to the SHC, because doing so would either again rely upon unavailable timber or exceed what the department has already calculated to be the maximum sustainable yield.

Third, by referencing both economic and environmental impacts, the arrearage statutes make clear that the “greatest return to the trusts” is not exclusively a financial calculation. The specific requirement to consider environmental impacts demonstrates that DNR has discretion to make a holistic determination of what alternative will provide the greatest return to the trusts.

In sum, the arrearage statute is ambiguous. However, given the legislative history and text, the best reading is that DNR should correct for modeling errors, incorrect assumptions about regulatory changes, and alternative revenue generation, and should not include timber that was not available for logging into the arrearage. That reading matches the legislative context, in which the Legislature sought to require sale of defaults and deficits that could have been logged absent unusual economic conditions. The statutory demand that the arrearage be included in the SHC for the next planning decade further supports the conclusion that the arrearage must consist solely of actually available timber that went unsold or unharvested.

Wyatt Golding
Staff Attorney, Washington Forest Law Center

MEETING MINUTES FOR:

April 15, 2016

Clallam County Trust Land Advisory Committee

15 Apr 2016

Meeting Minutes

<https://www.youtube.com/watch?v=tAF9cyeQh1o>

Times that appear next to items reflect the actual time and are provided as a guide for those utilizing the Clallam Public Eye video.

I. Call to Order

Meeting called to order by Chair Joe Murray and opened with the Pledge of Allegiance. Roll was called. Cindy Kelly, Ben Pacheco were absent. Darryl Wolfe arrived later and Diana Reaume had indicated she would be late due to a personal matter, however she did not attend the meeting.

II. Public Comment

Ann Seiter – Palo Alto. First, she asked that the TLAC include a minority report as part of the final report. She asked that this be on a recommendation by recommendation in fairness to the people participating. Her second point was regarding interest and affiliations of people on the committee should review those affiliations and be part of the final report. Her third point was regarding where the TLAC was doing estimates regarding costs for management if the County were to take on management of the trust lands. She noted her experience as a natural resource management in natural management gave her the experience with budgets and finding funding was not easy. The costs associated with enforcement was one are of difficulty finding money. The costs were more than just foresters and the need would include hydrologists, geologists, GIS specialists, legal, enforcement. She asked that somewhere in the deliberations that these expenses also be laid out.

Norma Turner – First, she provided four copies of things for the records. First of those was a presentation of a December presentation comparing Grays Harbor and Clallam County. Second, as Grays Harbor was repeatedly mentioned during the Charter Review discussion, and there has been a permeation within the local culture of this belief that Grays Harbor's approach is such a good thing that it even came up following the defeat of the Sequim School Bond. In looking at actual numbers, she noted that Grays Harbor did receive more money per student but education results not positive. Grays Harbor has the lowest graduation rate, lowest reading rate, lowest math proficiency, highest free and reduced lunch rate, lowest percent of population over 25 with high school education, poverty rate is higher, growth rate was in the negative. She felt that there are all types of numbers that seem to indicate that Grays Harbor is not as good. There are two other things for TLAC review including the County profile. The fourth piece was from the US Census and submitted. In addition, she noted that two minutes was not a long time and three minutes would be better. Materials were submitted to Rod Fleck and he would ask that Ms. Gores distribute those to the TLAC members (done by email).

III. Minutes (8:55)

A. Adoption of 19 Feb 2016 minutes

Proposed amendments were provided by Reandeau and Thaler. Discussion followed. Motion by Blum, seconded by Scott, to adopt the 19 Feb 2015 minutes as amended. Motion passed.

B. 25 Mar 2016

(12:35)

Fleck noted these minutes were still needing to be developed. Discussion followed regarding the choices of words used in the minutes, possibility of utilizing a court reporter, and the want to further explain aspects of topics found within the minutes. Also discussed were how to integrate public comments raised at the start of the meeting, the letter from Thaler et al., and the response by Murray.

IV. Review – Clallam County Trust Lands

- A. Presentation by Tim Romanski**, USFWS did not occur due to his having to respond to time sensitive demands. Questions about the ESA and the HCP developed by Fleck and Thaler would be shared with the Committee once they were finished with their homework assignment. (done by email, comments added to it by members).

B. DNR materials provided

In the absence of a presentation, Blum having provided copies of an "Overview of Forest Practices (Statewide), about which Thaler asked for an explanation. Blume noted that this was his effort to respond to the data requests from the Committee. He provided the forest practices biennial budget for 2015-2017 to the TLAC and highlighted the DNR's incredible commitment to research (\$15m) as an unusually high number. He noted that started in late 2011 when the DNR received a notice of intent to litigate on the HCP and as part of the settlement of that matter, there was an agreement to accelerate the adaptive management program. He indicated that he expected the investment amount to remain for one more biennium at that level, and that it could decline after that. Discussion on this topic included issues regarding the focus on finishing research projects and project types: basal area (trees per acre), monitoring buffers, shade, large woody debris, and unstable slopes. Blum explained that the \$15m, while it had four staff associated with it, most of the funds were paid out in contracts to researchers, in addition to a significant amount of volunteer work as well. Thaler reminded the TLAC that in thinking of the structure associated with its issues, it was important to remember that the Forest Practices HCP is not the same as the 1997 DNR HCP. The issue of reconveyance raises a complexity of issues that could be added.

Blum then noted that implementation of the HCP consists of staff on the ground. Compliance efforts continue two to three years after harvest. This occurs after a permit is sought for the harvest that undergoes a full review to ensure compliance with forest practice rules. Murray commented that many forest practice applications (FPAs) are looked at by DNR before formally submitted for a permit, so in many cases the activity is looked at twice. Blum noted that there was additional resources also available for small forest landowners.

Regarding riparian treatments between 2004-2016, the material provided list the name, acres, presumptions regarding percentage of expected removals. Acres noted were those proposed for activities within the riparian management zones. Swanson asked for clarification regarding the fact that some 500 acres are covered in this chart, and only 55mmbg was reported as being harvested. Blum noted that the SHC had a target of 390mmbf for riparian related harvests and only 35mmbf was realized with most of that unrealized amount in the OESF.

Regarding aerial spraying in Clallam County, Blum provided additional information on the number of FPAs issues for aerial spray both fertilizer and pesticides and the acreage covered by both. Paul raised a question about the numbers as he indicated he was aware of three applications associated with some 15,000 acres in Clallam and Jefferson Counties. Blum asked Paul to follow up with him about that information so he could review it with his staff.

Regarding the issue of landslides in Clallam County, the ones reported were not deep seeded land slides. Fleck noted that such a deep seeded, natural slide is developing in the upper portions of the Calawah. Swanson noted that these were reported ones. Some happen and go unreported or noticed.

Regarding riparian management, an explanation about the strategies in the OESF and the Straits was provided. Thaler noted that the narrative is limited by what is referred to as riparian, headwaters are not treated the same. Blum noted that the State Lands HCP uses different approaches; fish streams are called Type 1-3, and Type 5 are non-fish waters and include headwaters.

Paul asked about the rotation length and if it was still 60 years? Blum noted that the rotation length was about 62 years, however, there is not an established policy on that. Cross commented that regarding protections on Type 4 and 5 waters, that these many times are associated with areas protected for slides, so protections for geological needs exist.

Blum also shared with the TLAC the news that Commissioner Peter Goldmark would not be running for reelection. As a result, there will be a tremendous leadership change in the Department in 2017. He expected that he would keep his tenure with the TLAC, but wanted to point out that a leadership transition would be coming over the next year.

Cross reiterated his request for tax reports from the Department and the Department of Revenue for state lands for the last two years of the previous 10 year SHC period. Murray also reminded Blum of his request for inventory information. Blum indicated he would follow up with his staff. Doherty asked for a 10 year record for exports, and Blum noted that that was in materials provided to the BNR. Others suggested that numbers from the Port would be helpful and Waknitz indicated he would send those to the TLAC.¹ Fleck asked if the TLAC could get any outstanding data requests to him and Blum so they could work on them to ensure those were being worked on, or determine if they may have already been fulfilled.

Doherty asked about information associated with the sustainability of the industry regarding conversions within Clallam County. Cross noted that this information is available from the UW. It was clarified that that information was part of the UW's Rural Technology Initiative. Cross directed folks to search for "Washington State Forest Lands Data Base and that people at the UW could be reached about this program. Fleck noted that since SEPA was required for such conversions, the County's DCD should also have information about this and might be easier place to obtain that information. Doherty asked about the conversion of lands to the National Forest/National Park where working forests were converted to non-working forests. DNR would

¹ Waknitz did send out a chart via email that is attached to these minutes. Members of the TLAC then responded all to that information and began to discuss the document provided. That discussion was ended to comport the TLAC's activities with the OPMA. Those emails are attached to this set of minutes.

only have information on what DNR had bought, sold, or exchanged. Doherty reiterated the importance to look at the conversion of lands to the National Forest/National Park. '= (1:07 – 1:12 Break)

V. Bylaws and Rules

After the distribution of copies of the suggested amendment by Ann Seiter, Murray asked if the group was wanting to address the bylaws as a whole or article by article. Scott asked if some questions could be addressed first. Thaler noted that he had a line by line review of the bylaws that he could share, however, technical challenges arose that did not allow for its distribution.

Paul stated that the issue of a facilitator versus a chairperson was one that needed to be addressed. If the group determined to have a facilitator, that would change the proposed bylaws. Cross asked what authority the TLAC had regarding that proposal. Fleck noted that hiring a facilitator would probably take six weeks under contracting requirements and have budgetary costs. Thaler suggested that maybe the County could use the hearing examiner structure, but he realized that the County was still under consultation on that position. Doherty and Thaler indicated that such costs could be upwards of \$1,000/meeting. Murray indicated that that would have to be something that the TLAC would have to request. At the request of Blum, Murray returned the discussion to the bylaws and indicated that the TLAC would address each article one at a time. Fleck asked that the amendments received prior to the meeting should be considered first.

- A. Motion to amend Article IX, Sec 2, adding paragraph C, as proposed by Ann Seiter regarding minority reports was made by Fleck, seconded by Blum. Discussion on the motion noted that there was nothing that prohibited this from already occurring, but that it wasn't required either. Clarification of issues regarding the wording of minority reports was discussed. Also the realization of the different opinions regarding aspects of the report could lead to individuals indicating their agreement or disagreement. Motion passed unanimously.
- B. Question by Scott and discussion by Paul regarding the place to utilize a facilitator.
- C. Motion to adopt Article I as written without "marks was made by Cross, seconded by Blum, and passed unanimously.
- D. Thaler asked about the make-up of the executive committee. His concern was regarding a balance of interests to include the environmental caucus. Motion to amend Article II, Sec 2, paragraphs describing duties be added as follows: "b. Oversee the activities of assigned county staff; and, d. create meeting agendas" was made by Thaler, seconded by Scott, and was passed unanimously.
- E. Fleck made a motion to amend Article II, Sec 2 to read .."an Executive Committee shall be made up of the Chair, Vice Chair, Secretary, the DNR representative to the TLAC, and an additional member approved by a majority of the TLAC." This was by Thaler. It was clarified that the words "appointed by the chair" were being stricken as part of this proposed amendment. Scott asked about someone not being able to attend whether an alternate could be appointed. It was explained that the Executive Committee had not met other than by email.

Lea noted that he wanted to note that the presentations made by the DNR have been as good as

he had ever seen. Why were people talking about the bylaws rather than presentations? The motion was adopted unanimously.

Paul raised a concern about the independence of the committee in relationship to dispensing with a major asset to the County. This process has been dominated from the start with individuals involved having financial interests and with a particular expected outcome. There should be a group of independent, well-balanced set of people working on this with an independent facilitator. He did not see getting to a point of making an educated, well-informed opinion on reconveyance. There should be someone independent to run these meetings, establish the agendas, and come up with a final report.

Swanson replied that he had a lot better things to do on Fridays than sit and rehash the same accusations month after month. He stated he resented having a financial interest, and his interest was that of Clallam County. He noted that there was no discussion of dispensing of the asset, but a discussion on a change in management. He felt people needed to see beyond the level of distrust being raised. Dave Bekkevar stated that he did not appreciate being slapped in the face. He has been in business for 40 years and run a successful business. People in the room can get this done. Paul asked for a clarification as to what was the slap in the face, and Bekkevar said it was Paul's statement that there were not adequate people to deal with this. Paul felt that there was an appearance of a conflict of interest that could be dispensed with if independent, unbiased people were running the committee. Cross noted that Paul had asserted values into people's hearts for being here. If there was a financial interest that someone would benefit from the County managing these lands, Paul needs to say who and what he meant. Cross noted that Paul asserted that there was a cabal that had organized this effort. Cross noted that Paul's organization, the Sierra Club, had an annual budget that was triple Clallam County's and so it could be raised that Paul had the most vested interest at the table since he had a single interest in mind.

- F. Motion to adopt Article II, Sec 1 as written in its entirety was made by Fleck. Scott raised the issue of moving forward, and noted that there were not the resources to choose an alternative structure. If there are not resources to change the structure, then we need to move forward. Cross seconded the motion. Fleck also raised the issue about the accusation about bias, and bias in the agenda as those are set based upon the decision of the members. Further, a couple of members keep raising the issues outside of the resolution. Fleck felt it was wrong to state that there was not a diverse interests in the TLAC. Thaler noted that in his group's letter it was trying to make clear the objectives of concern. Things overlap. Thaler suggest that the interests of the members be raised in a later article. Lea asked if this was an amendment, Thaler said it was not. Blum asked for clarification on the motion. Bork asked for additional information regarding the discussion of minutes, their distribution, etc. She suggested a separate section be added for minutes. It was clarified that the motion was only Article II, Section 1 was the subject of the motion. The motion was passed by a vote of 14-2-0.
- G. Motion to adopt Article II as amended was made by Cross, seconded by Blum and the motion was adopted by a vote of 15-1.
- H. Motion to adopt Article III as proposed was made by Fleck, seconded by Cross. After the motions found in I and J below, the TLAC returned to the main motion which was passed unanimously.

- I. Motion to amend the original motion by amending it with regard to Article III, Sec 7 to read: "if a need arises, after giving notice to the Chair, ..." was made by Thaler. Thaler noted that the ability to attend by phone needed to be something that didn't require asking the chair. Fleck accepted it as a friendly amendment, but Cross did not accept this as a friendly motion to (H) above. Cross noted that he felt that the visual nature of the materials lent themselves to in person. Fleck then seconded Thaler's motion. Alternates can attend. Bork disagreed with Cross' presentation as she has significant experience with on-line meetings. Attending by phone can be satisfactory as an alternative. Thaler noted his amendment would create a self-regulating manner for TLAC meetings. Fleck noted that County staff assist the TLAC with distribution of materials, equipment, etc. This amendment to the main motion passed by a vote of 15-1.

A question about meeting locations associated with field visits or site visits in relationship to public attendance. Efforts would be made to accommodate the public's attendance/participation in such meetings.

- J. Motion to amend the main motion by adding a new section to Article III regarding meeting minutes by Bork, seconded by Thaler. The motion was to specifically add a new section to Article III regarding: Meeting Minutes.
 - a. Will be created by the Secretary through a review of recordings of the meeting;
 - b. A draft will be sent to the TLAC via email no less than three weeks prior to consideration by the TLAC; and,
 - c. Minutes will be reviewed and addressed two months after the occurrence of the meeting for which the minutes were created.

Murray explained that to date minutes have been distributed, corrections made, and then the minutes are posted. Cross noted that in the past Fleck had brought the minutes to the group in advance of the meeting, then were considered there. Fleck noted that the goal is to have these done three weeks prior. Discussion occurred on the preferences to distribute minutes regarding electronic or paper copies. Scott asked if with the recordings a word by word discussion was needed for the minutes. Fleck noted he would like to get to action minutes, but a few members want to have their perspectives adequately reflected. After a discussion of meeting logistics, the TLAC determined that this motion was considered friendly and incorporated into the motion H above.

Doherty raised the issue of referencing the state statutes regarding the Open Public Meeting Act, ethics, laws, rules that he felt could be addressed with issues that had been raised as to the compliance with those rules. He noted that these were raised by never discussed. As these have not been resolved, and as a serious aspect of the creation of this group. He noted that he felt that there were subgroup meetings, briefings and activities that questioned to him the foundation of how this group was created. This foundation issue could be raised, in his opinion, as a means of challenging the work of the TLAC. He felt that there should be references.

- K. Motion to remove the sentence regarding a parliamentarian in Article IV and adopt said article as amended was made by Cross, seconded by Fleck. The motion was made without regard to the parliamentarian, Thaler asked that this be removed. This was considered as a friendly amendment by Cross and Fleck. This motion passed unanimously.

- L. Blum made a motion to adopt Article V, with a proposed amendment to Section 4 allowing TLAC members may designate an alternate in writing and advise the Chair and the committee. The alternate shall be the same for all meetings that the member cannot attend. This was seconded by Lea. Murray raised a question about the alternate needing to be the same member, and the motion was clarified by Blum as intending that. The motion passed unanimously.
- M. Motion to strike Article VI was made by Thaler, seconded by Cross. Fleck noted that this was a legacy from the template being used. Scott noted that the Prosecutor's Office did indicate their willingness to help. Motion to strike was made by Thaler, seconded by Cross, and passed unanimously.
- N. Fleck made a motion to adopt Article VII that was seconded by Blum with only the first sentence of the proposed Article being that which would be adopted. The second sentence was a remnant from the template used for the draft bylaws. It was agreed that the numbers proposed would be used for amendments and adoption with those being changed in the final document. The motion passed unanimously.
- O. Fleck moved the adoption of Article VIII as written, this was seconded by Scott with a needed period. Motion passed unanimously.
- P. Motion to adopt Article IX, as amended with "Section 2" being removed in paragraph one, earlier amendments also included, and to include a new paragraph d in Article IX, Sec 2, regarding adding affiliations to the TLAC report to read:

The final recommendation/report of the TLAC to the County Commissioners shall include a list of all voting members of the TLAC, the organizations that they were appointed to represent, and any additional affiliations of the members relevant to the work of the TLAC.

The motion was proposed by Blum, seconded by Thaler, and adopted unanimously.

- Q. A motion was made by Blum, seconded by Fleck, to adopt Article X-XIV, with Article XV being removed. Lea asked about clarification about public statements and how long does that apply to the TLAC members? It was understood that members could, after the end of the TLAC term, make statements regarding the TLAC. Paul asked about the comment made by Lea. Blum noted that the public statements about TLAC actions are those from the TLAC, but individual positions could be stated without being a spokesperson for the TLAC. Individuals cannot speak for the TLAC, unless the TLAC.
- R. Blum made a motion to adopt the proposed bylaws as amended in their entirety that was seconded by Fleck. Motion passed on a vote of 14-1. Murray asked for clarification as to Doherty's nay, and Doherty noted he was voting no as the issues regarding the ethics, meeting compliance issues have not been addressed again.

(2:43)

Regarding the issue of rules, those needed to be copied. Blum asked Doherty's concerns about abiding by the State and County rules and his allegations regarding the non-compliance with those. The issue of the OPMA has been referenced. Thaler raised a question about the proposed rules and

if they were actually needed? Thaler made a motion to table the rules indefinitely, Fleck seconded the motion. After clarifying the issues of public comment, the motion carried.

Scott asked for clarification on two items. First, there are some who keep arguing that the issue before the TLAC is only reconveyance or not. The County's resolution has additional requirements and those are going to be discussed. Second, when Commissioner Peach was visiting earlier, there was a discussion about what is going to be reported to the Commissioners. She had heard that the Chair was going to come and give an oral report. However, the report should be in writing, and the presentation by the Chair would be ephemeral. Murray noted that he had been asked to come to the meeting on Monday. He planned to recap what was done: (1) bylaws; (2) DNR explaining their management, the type of trusts, etc.; (3) collecting information on the issues; and, (4) no path has been developed to go forward at this point as that was still occurring. Cross raised concerns about the expectation of within the Resolution, and asked that Murray ask the Commissioners if they would allow the presentation to meet the resolution requirement. Thaler asked if it is possible for Murray to email to the group his notes for his presentation.

VI. Agenda

Commissioner Peach had requested a moment to speak to the TLAC. Murray yielded the floor to the Commissioner. He had stopped by the Assessor's Office regarding the data generating the information on land conversions. There is a person, Daniel Childress, could be asked to help. The data set that would be accessed goes to 2009, earlier data sets would be available from IT through Jan Weiss who can access the AS 400 system. If someone is interested in working with the Commissioner, they could try to find that information through the Assessor's Office. Blum asked for clarification and the issue was associated with conversion in the type of tax assessments would indicate ownership changes as well. Doherty volunteered to work with Peach on this matter.

Thaler noted that with regard to the USFWS presentation, questions would be sent out to everyone. Additional questions would/could be added by members of the Committee. He also felt that there was a need to have people from Grays Harbor be present to discuss their budget, revenue, FTE, compliance, etc. Cross noted that Ft. Lewis operates 55,000 acres of timber, not the same, but it could be a similar set of questions. Bangor NB could be another similar organization, if Grays Harbor could not come to present. Blum noted that neither of these operate under the FPA HCP. Thaler raised the issue regarding the Clean Water Act, the FPA, and considering having a DOE/NOAA fisheries discussion. Blum asked if there really was an expected difference between: (1) DNR and County compliance; (2) HCP v. FPA regarding CWA assurances. Thaler felt that there was a potential area of litigation with differences and liability exposures different from ESA.

Cross asked that May be focused on ESA, with June being focused on Grays Harbor the manner in which those lands are operated and revenue/costs shared. Bork agreed with this approach and suggested that June be used to look at other options that could exist. Cross and Scott added to the outline ideas for the meetings. Murray noted that the TLAC may have to generalize in some of these areas, as there are many details that could not be fully developed and explored. Thaler also asked about NOAA's engagement and possible presentation before the TLAC, but with the Ozette Sockeye they may not be as critical to have at the table.

A. May

ESA discussions with USFWS. Two individual from the Lacey Office, plus the Acting Manager.

The purpose would be looking at the Act, its structure, compliance requirements. Address issues of take avoidance, safe harbors, HCPs, etc.

Blum noted that this would not be a conversation addressing the biology of the various species. Presenters will not be addressing the big question of whether to manage under the State HCP, or under the FPA HCP? This is an issue that would have to be addressed elsewhere. Swanson felt that the TLAC should consider assuming that the State HCP would run with the land, as it would be unlikely that the Services could provide a definitive answer as to all of the issues associated with switching HCPs. Conservative approach with this assumption then is built into the analysis. Cross asked would the presentation be able to address whether there is any critical habitat existing within the SFLs 92,500 acres. Blum said that would have to be reviewed. Paul asked for a fisheries expert knowledgeable about the effects of large landscape changes on landscapes. Specifically, with the challenges on the chinook, coho, steelhead, etc., populations and extremely low run sizes that he attributed to logging. Bekkevar also asked about the role of tribal netting. Blum asked that ESA would be the topic, he would reach out to NOAA to see if there would be anything beyond the fisheries addressed within the HCP. If group assumes that State HCP runs with the land, that addresses all listed species beyond NSO, Murrelet, etc. Blum offered to assist Paul in accessing an expert to address his concerns. Thaler asked about the legal question about the State HCP running with the land and how would that be addressed. A variation of this question was provided with USFWS, but it is highly unlikely that this would be answered by Washington Office field staff.

B. June

- * Grays Harbor discussion: budget, revenue, FTE, compliance, etc.
- * Other alternatives within, regarding, or associated with reconveyance. How the management aspects are addressed, staffing needs, etc.

C. July

- * Work session on fewest costs, most benefits;
- * Expand embroidery on how to use unique assets with the OESF and see if this could come up with an alternative to reconveyance. OESF being unique, could that be used to benefit the County.

VII. Public Comment

Carol Johnson – NOTC. Reminded the TLAC members to read County Resolution No. 70 and particularly items two and three therein. She felt that the issue raised about logging exports needs to be connected to the relevance to public lands. She also questioned the efforts by earlier commentator to connect Grays Harbor's timber management with the socio-economic issues. Those are not related to any particular timber harvest, but rather to the overall socio-economic aspects of the community. If there were more jobs, that would improve the socio-economic aspects. However, the harvest by Grays Harbor should not be connected. The more jobs, the better the income, and the better the socio-economic situation.

Ed Bown – Clallam Bay. Today's meeting answered a lot of his questions. Stated his interest is based within the State's Constitution. He has not consented to the state's creation of an arrearage on these trust lands. As noted within the Declaration of Independence, if government

is not functioning, then the people need to take actions to change that. He wants the County to be sustainable. He was wanting additional information on how the Committee was going to have the Chair do regarding the meeting with the Commissioners. He was comfortable with the information about the Committee that will be presented on Monday/Tuesday.

Bill Peach – Beaver. Next Monday, at 10 a.m., the Commissioners have on the agenda during its work session an update from the TLAC. This is less formal, and members are welcome to participate. He has reached out to Grays Harbor Commissioner Frank Gordon, District 2, and inquired about their participating in a future meeting. There is some possibility to utilize a new on-line meeting function within the room to facilitate that presence. He expressed his gratitude to the members as this is a messy process, but thanked folks for sharing their views.

Norma Turner – Port Angeles. There should be an approval of the agenda as this ensures all to buy into the agenda. Please make that a pro forma part. Missed an opportunity on the minutes as to what the group wants. The group accepting these two months afterwards, may be a reason to give Fleck guidance on what he should produce. She encouraged the TLAC to adopt those every month as the public does not see those until they are approved. Focus on this issue at your next meeting. As to the raw emotion about who represents what, she suggested that everyone look at signing specific conflict of interest statements or ethics forms used by the local nonprofits. This could stop the accusations being made as they would be part of the record. She appreciated the time spent on this complex issue.

VIII. Adjournment

Motion by Blum, seconded by Thaler to adjourn. This was passed unanimously.

(Email exchange is attached)

Rod Fleck

From: Wendt, Brian <bwendt@co.clallam.wa.us>
Sent: Friday, April 22, 2016 3:24 PM
To: Rod Fleck; Susanne Scott
Cc: Gores, Alanna
Subject: RE: Port of PA

Ms. Scott,

While I have been monitoring the email traffic on the periphery, I agree with Mr. Fleck's cautions. It is important that any discussion that the group may have comply with the Open Public Meetings Act, chapter 42.30. Thus, committee discussion must occur in a public sphere, where the public can attend and observe (unless there is a reason to convene an "executive session" per a specific statutory basis (which I do not see at this time)). In the past, courts have found that email discussions have violated the OPMA. Thus, Mr. Fleck's cautions are on the mark. This would be true regardless of whether the county provided county-emails to the TLAC members.

Sincerely,
Brian Wendt

Brian Wendt
Deputy Prosecuting Attorney
Clallam County Prosecuting Attorney
223 East 4th Street, Suite 11
Port Angeles, WA 98362-3015

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From: Rod Fleck [mailto:rodf.forks@forkswashington.org]
Sent: Friday, April 22, 2016 11:54 AM
To: Susanne Scott
Cc: Gores, Alanna; Wendt, Brian
Subject: RE: Port of PA

Sue,

I wanted to answer this and I have to say I am avoiding sending this to the entire group because of the real underlying issue...

We were having a meeting – the entire committee was included, there was a discussion between members about a substantive issue, and that discussion was relevant to the purpose and focus of the committee. When we have a meeting, even an electronic discussion, we have to give the public notice and the ability to participate which would mean listen and see in some public manner. So, with that in mind, and not being legal counsel for the County – but I have included one that is – let me turn to your questions:

1. Yes, the TLAC probably could be given County emails for county business
2. No, those could not be used then to continue on the discussion because that would still be a public meeting that would require compliance with the notice and public opportunity to be involved.

I am hoping that this clear. I am trying to do a few different things today to play catch up. So, if there is something not making sense, give me a call here at the office.

Take care and enjoy the weekend.

Rod

William R. Fleck
City Attorney/Planner
500 East Division Street
Forks, WA 98331
rod.forks@forkswashington.org
360/374-5412
"Fortes Fortuna Juvat"

From: Susanne Scott [<mailto:infotectives@gmail.com>]
Sent: Tuesday, April 19, 2016 12:10 PM
To: Rod Fleck <rod.forks@forkswashington.org>
Cc: Josey Paul <thegreatstream@gmail.com>; bwendt@co.clallam.wa.us; Joseph F. Murray <abies@olympen.com>; Jesse Waknitz <jessew@portofpa.com>; Gores, Alanna <agores@co.clallam.wa.us>; Ben Pacheco <pachecoclallam4@olympen.com>; station1@clallamfire4.org; Cindy Kelly <ctkelly@olympen.com>; Coleman Byrnes <swampdog@olympus.net>; Cynthia Bork <cbork@fs.fed.us>; Darryl Wolfe <dwolfe@olympicmedical.org>; David Bekkevar <bltrish@olympen.com>; Diana Reaume <diana.reaume@qvschools.org>; Jason Cross <crossco@gmail.com>; Kenneth Reandeau <kreandeau@gmail.com>; Kyle Blum <kyle.blum@dnr.wa.gov>; Michael Merideth <mmeridet@cityofpa.us>; Mike Doherty <doherty_mike@yahoo.com>; Robert Lea <roberwlea@yahoo.com>; Toby Thaler <toby@louplop.net>; Tom Swanson <tom@greencrow.com>; Peach, Bill <hpeach@co.clallam.wa.us>
Subject: Re: Port of PA

My apologies, I asked the initial question. Rod you are absolutely right. I do, however, have a request as a result of this. Could each of us have a County email address and conduct this conversation through the County website where the public could follow along?
Thanks,
Sue

On Tue, Apr 19, 2016 at 9:50 AM, Rod Fleck <rod.forks@forkswashington.org> wrote:

<http://mrsc.org/Home/Explore-Topics/Governance/Legal-Issues/Open-Public-Meetings-Act.aspx>

Good morning. I would ask if we could please refrain from the continued discuss of this matter at this point. Please read the above link for an explanation as to my cautionary concern. Thanks.

Take care,

William R. Fleck

City Attorney/Planner

500 East Division Street

Forks, WA 98331

rod.forks@forkswashington.org

360/374-5412

"Fortes Fortuna Juvat"

From: Susanne Scott [mailto:infotectives@gmail.com]

Sent: Tuesday, April 19, 2016 9:39 AM

To: Josey Paul <thegreatstream@gmail.com>

Cc: Joseph F. Murray <abies@olympen.com>; Jesse Waknitz <jessew@portofpa.com>; Gores, Alanna <agores@co.clallam.wa.us>; Ben Pacheco <pachecoclallam4@olympen.com>; station1@clallamfire4.org; Cindy Kelly <ctkelly@olympen.com>; Coleman Byrnes <swampdog@olympus.net>; Cynthia Bork <cbork@fs.fed.us>; Darryl Wolfe <dwolfe@olympicmedical.org>; David Bekkevar <bltrish@olympen.com>; Diana Reaume <diana.reaume@qvschools.org>; Jason Cross <crossco@gmail.com>; Kenneth Reandeau <kreandeau@gmail.com>; Kyle Blum <kyle.blum@dnr.wa.gov>; Michael Merideth <mmeridet@cityofpa.us>; Mike Doherty <doherty_mike@yahoo.com>; Robert Lea <roberwlea@yahoo.com>; Rod Fleck <rod.forks@forkswashington.org>; Toby Thaler <toby@louplop.net>; Tom Swanson <tom@greencrow.com>; Peach, Bill <bpeach@co.clallam.wa.us>

Subject: Re: Port of PA

That might be beyond the scope of our committee

On Tue, Apr 19, 2016 at 9:36 AM, Josey Paul <thegreatstream@gmail.com> wrote:

Congress passed a law in 1990 that gave private companies the right to export raw logs, but denied that same right to public timberlands. Even if a private company took over management of our trust lands, our logs could not be exported. They would have to be sold at the lower domestic price.

To save mill jobs and create more income for schools and other taxing districts, we'd need to repeal the export law and require all logs to be processed here. Wood processing is where most of the timber jobs are created, not logging. If we repealed the export law, we could sell finished lumber and other wood products to foreign markets, with both public and private timberlands competing on an even playing field and being able to take advantage of export prices.

Joscy

On Tue, Apr 19, 2016 at 9:28 AM, Susanne Scott <infotectives@gmail.com> wrote:

So if a private company managed the public Trust Lands would there be more sustainable income for the schools etc.? Or would the rule that this lumber could not be exported still be in place? Could it be stated in a management contract that these logs must be milled locally? Is there a way to make this work for a logging community?

What opportunities are there for employment and benefit to the logging community as a whole? - no holds barred in that question.

Thanks,

Sue

On Tue, Apr 19, 2016 at 9:19 AM, Josey Paul <thegreatstream@gmail.com> wrote:

I didn't actually request the port data, but I do think it is important to our mission.

The TLAC grew out of a lobbying effort led by Green Crow. There was a regular speaking campaign to persuade community and business groups that arrearage was the cause of declining employment at mills and the loss of tax receipts for schools and other taxing districts.

Through its officers and proxies, Green Crow took the arrearage issue to the Charter Review Commission, where it was turned into a recommendation to form the TLAC, under conditions and membership drafted by the company.

But in reality, it is exports, not arrearage, that cost the community jobs and money to support schools, hospitals and other public institutions. With the export of raw logs, timber companies gain. Timber communities lose.

Timber companies are not the same as timber communities. Timber companies, especially as reorganized as Timberland Investment Management Organizations (TIMOs) or Real Estate Investment Trusts (REITs), have been earning high rates of returns for the last couple decades. Between 1987 and 2009, a dollar invested in timber grew to nearly three times the amount of a dollar invested in the average stock of the S&P 500, all while taking less risk:

A dollar invested in the National Council of Real Estate Investment Fiduciaries' Timberland Index then [1987] was worth nearly \$21 at the end of 2009, a compounded annual return of more than 14%. That same dollar invested in the Standard & Poor's 500-stock index was, with dividends included, worth \$7.83, a return of about 9.4% a year. Wall Street Journal, May 1, 2010

But timber communities have not done as well. Employment is down and mills are closing. The principle causes are:

- 1 Exports
- 2 Over-cutting in the '70s, '80s and '90s.
- 3 Mechanization and modernization

As a result, employment has fallen even when harvest levels have risen.

The big problem today for timber communities is exports of raw logs. Those logs are heading mostly to Asia -- China, Japan and Korea, where they provide employment for workers in Asian mills and raw materials for finished goods made by Asian companies.

By comparison, arrearage is relatively small, and the trees that are not cut are not lost, they just grow larger and more valuable. The annual arrearage in western Washington averaged 42 MMBF from 2005 to 2014. That's for all of western Washington. In Clallam County, the average annual arrearage is 9 MMBF. But in 2014, the Port of Port Angeles alone exported more than 94 MMBF of raw logs to Asia [DNR estimate, the port's estimate is even higher]. Those logs went to mills in China, Korea and Japan, where they provided employment and a source of raw materials for goods shipped back to the US at a profit.

Statewide, annual raw-log exports have risen from 570 MMBF in 2005 to 1,150 MMBF in 2014.

Meanwhile, logging no longer provides the same job support as it once did. An Oregon study by the Oregon Dept. of Forestry found employment in the timber industry was more than 12 jobs per MMBF in the late '90s. It's now just above 6 jobs per MMBF and falling.

The US Bureau of Labor Statistics projects overall employment in all occupations to rise by 7 percent from 2014 to 2024; but during that same period, logging jobs will decline by 4 percent.

Worse, for local communities, is that exports unfairly reduce income to schools, hospitals and other public institutions. Congress, in 1990, in response to the heavy loss of jobs being exported to Asia by the timber industry, banned the export of raw logs from public lands. After 1990, only private companies had the right to export raw logs. Schools could not export their logs and thus were required by law to earn less money. The export market varies with market conditions, but it typically pays 25 to 50 percent more for raw logs than local mills.

As a result, exports have cut local jobs, driven local mills out of business and reduced tax income for schools and other public institutions. This is obviously unfair. Timber companies gain while timber communities suffer.

One local timber company that mostly manages timberland for private investors, boasts of making 20 percent annual returns for those investors. A 20 percent return means investors double their money every 3.5 years.

The big profits from timber activities are increasingly sent to investors back east, while local communities suffer with lost jobs, lost revenue and a damaged environment.

Josey

On Tue, Apr 19, 2016 at 8:57 AM, Susanne Scott <infotectives@gmail.com> wrote:

Thank you Jesse,

Would the person who requested the information please share how they see this connected to our decision?

Thanks,

Sue

On Tue, Apr 19, 2016 at 4:08 AM, Joseph F. Murray <abics@olympen.com> wrote:

Thank You.

J Murray FORESTRY

Growing Value Through Innovative Forestry

abies@olympen.com / www.jmurrayforestry.com / 360.460.4928

From: Jesse Waknitz [mailto:jessew@portofpa.com]

Sent: Monday, April 18, 2016 2:51 PM

To: Gores, Alanna <agores@co.clallam.wa.us>; Ben Pacheco <pachecoclallam4@olympen.com>; station1@clallamfire4.org; Cindy Kelly <ctkelly@olympen.com>; Coleman Byrnes <swampdog@olympus.net>; Cynthia Bork <cbork@fs.fed.us>; Darryl Wolfe <dwolfe@olympicmedical.org>; David Bekkvar <bltrish@olympen.com>; Diana Reaume <diana.reaume@qvschools.org>; Jason Cross <crossco@gmail.com>; Joseph Murray <abies@olympen.com>; Josey Paul <thegreatstream@gmail.com>; Kenneth Reandeau <kreandcau@gmail.com>; Kyle Blum <kyle.blum@dnr.wa.gov>; Michael Merideth <mmeridet@cityofpa.us>; Mike Doherty <doherty_mike@yahoo.com>; Robert Lea <roberwlea@yahoo.com>; Rod Fleck <rod.forks@forkswashington.org>; Susanne Scott <infotectives@gmail.com>; Toby Thaler <toby@loup-loup.net>; Tom Swanson <tom@greencrow.com>

Cc: Peach, Bill <bpeach@co.clallam.wa.us>

Subject: Port of PA

Fellow Committee Members,

At last Fridays TLAC meeting the volume of logs exported across the Port of Port Angeles terminal was requested. Below is that data per year. It should be noted this is only a tally of logs that moved across the Port's terminal.

Port of Port Angeles Log Ship Volumes

Year	Volume (BF)
2009*	0
2010	19,493,750
2011	78,871,920
2012	65,899,800
2013	81,654,040
2014	107,805,650
2015	69,705,700
2016**	15,642,010

Notes: * No log export at POPA from 2001 to 2009

** 2016 data is through March, Budget estimate for 2016 is 72 million board feet of log exports

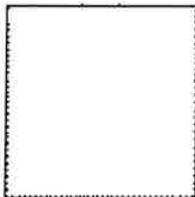
Jesse Waknitz

Port of Port Angeles

(T) 360-417-3452

(Cell) 360-460-1364

(Fax) 360-452-3959



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www.avast.com

Sue Scott

Being Wholehearted is about being Real:

"You become. It takes a long time. That's why it doesn't often happen to people who have sharp edges, or who have to be carefully kept. Generally, by the time you are Real, most of your hair has been loved off, and your eyes drop out, and you get loose in the joints and very shabby. But these things don't matter at all, because once you are Real, you can't be ugly, except to people who don't understand."
"The Velveteen Rabbit" by Marjorie Williams

"When you wake up in the morning, tell yourself: The people I deal with today will be meddling, ungrateful, arrogant, dishonest, jealous, and surly. They are like this because they can't tell good from evil. But I have seen the beauty of good, and the ugliness of evil, and have recognized that the wrongdoer has a nature related to my own -- not of the same blood or birth, but of the same mind, and possessing a share of the divine. And so none of them can hurt me. No one can implicate me in ugliness. Nor can I feel angry at my relative, or hate him. We were born to work together like feet, hands, and eyes, like the two rows of teeth, upper and lower. To obstruct each other is unnatural. To feel anger at someone, to turn your back on him: these are obstructions." Marcus Aurelius

Sue Scott

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Sue Scott

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MEETING MINUTES FOR:

May 20, 2016

Clallam County Trust Land Advisory Committee

20 May 2016

Meeting Minutes

<https://www.youtube.com/watch?v=HSxKkhrU3TI>

Times that appear next to items reflect the actual time and are provided as a guide for those utilizing the Clallam Public Eye video.

I. Call to Order /Pledge of Allegiance/Roll Call

Chairman Joe Murray called the meeting to order and asked Secretary Rod Fleck to call the roll. Ken Reandeau asked if the new member could include information on their affiliations. Connie Beauvais noted that she was the new representative for the Port of Port Angeles due to staff being strained with other tasks. She noted that she was: a former member of the Charter Review Commission; on the subcommittee that made the recommendation to create the TLAC; manager of the Crescent Valley Water Association, and a Port of Port Angeles Commissioner. All members were in attendance, except for Jesse Waknitz who was replaced by Beauvais, Michael Merideth, and Tom Swanson.

II. Public Comment

There was no one signed up for public comment. Guests from the USFWS were introduced to include Eric Rickersand and Tim Romanski.

III. Minutes of April and March

Fleck noted that the TLAC will have to wait until June per the bylaws adopted at the last meeting. He provided a copy of Action Minutes for April and noted that their length reflected the many motions passed by the TLAC. He also asked for corrections from members.

IV. Review – Clallam County Trust Lands – Presentation by USFWS

(See the presentation for specifics within the slides provided by USFWS staff)

Tim introduced himself and Eric Rickersand with both having decades with the USFWS. He noted that there are 22 habitat conservation plans (HCPs) in place. These HCPs arise out of the Endangered Species Act (ESA). The ESA was adopted in 1973 arising from the impacts of economic growth and issues with that growth on the environment. A simple summary of the ESA is that it prohibits the take of listed species and empowers the USFWS and the National Marine Fisheries Services (NMFS). "Take" is defined in such a way as to include harm, harass, wound, kill, etc. (slide 4). Originally, the focus was only on federal agencies who had an obligation to consult with USFWS and NMFS to ensure their projects would not adversely impact listed species. Prior to 1982, there was no way for private landowners having projects with a federal nexus to comply other than to avoid take. Further, without a federal nexus, there was no consultation process available and the agencies could not issue to private individuals incidental take permits.

In 1982, the ESA was amended to provide for a pathway to comply with the act while permitting incidental take in exchange for implementing mitigating conservation measures. Proponents

could create a (HCP). The applicant creates the HCP and there are specific steps required by the Services on the applicant, including a requirement that the applicant comply with all other statutes, regulations, etc. HCPs are authorized within ESA 10(a)(2)(A) which allows the Secretary to permit incidental takes when the impact is addressed. There is a five-point policy that must have each aspect addressed in a proposed HCP. These include:

1. Biological goals and objectives;
2. Monitoring;
3. Adaptive management;
4. Permit duration; and,
5. Public participation.

These policies, and the applicant's adequate addressing these components, then are used to justify the length of the term associated with the HCP. More recently efforts are being made to address uncertainty, for example with climate change, by shortening the length of the take permit. Fleck asked about how do you address the HCPs that were in place, and then there are new issues regarding uncertainty and climate change? This will be addressed later.

Under ESA 10(a)(2)(B), the Secretary has to find that the take being permitted would be incidental and that the applicant has to the maximum extent possible reduced and mitigated their impacts. If the Secretary can make that finding, they are required to issue the incidental take permit on the accepted HCP.

Murray asked what is a "federal nexus?" A federal nexus is where there is involvement from a federal agency in the funding, permitting, construction, ownership, etc. If the NPS or NFS were to undertake an activity that would have a clear federal nexus and it would require the acting agency to consult with the Services. That consultation would create a biological opinion regarding the proposed action. The National Environmental Policy Act (NEPA) ensures that the federal agency analyzes and describes its impacts upon the human and environmental condition.

Toby Thaler noted that the State Environmental Policy Act (SEPA) was more substantive, whereas NEPA was more procedural in nature. Murray asked how this would play out in the case of thinning cut on USFS property. Section 7 consultation would be required, however, if the the USFS determined through NEPA that there was no effect, they would document that through NEPA and move forward with the harvest. If there would be an impact, the USFS would consult with the Services and then the Services would issue a biological opinion (bio op) regarding the proposed activity. Activities could be batched together. Further, an agency could develop various HCPs, but DNR for example decided it was better to develop one HCP for all of their managed lands.

Susanne Scott asked if a best and worst case scenario about what would occur if the County were to take back its trust lands. It suggested to table that question.

Robert Lea asked who enforces on a daily basis? For example, say there is a bridge on Dickey Lake, and the Dickey River then turns muddy. Does that trigger the ESA if species are threatened? If there was a federal agency involved, the Services would have analyzed those effects and would have issued an opinion at the time of the agency's involvement. If what occurred is what is expected, then no enforcement action. If exceeded, then the applicant may have to come back and address issues. Lea followed up asking what would be the case in an unusual event, say a three inch rain and this was during the construction period? DOE or USACE would have to

address, not necessarily an ESA issue. If not addressed, a third party could sue under the theory that the bio op standards were not followed, or the agency did not response.

Cross mentioned that the DNR would not come to the Services on a harvest level unit, but on larger decisions what is the turnaround period on a Biop and HCPs amendment? Length of the time to complete an HCP? This isn't something one would want to do every month, rather you would want to scale your approach to the need? There are mandatory comment periods, scoping, cooling off periods, etc. It is best to measure this process in months. A medium complex HCP might take 12-18 months for the Services portion of that from the applicant's engagement with a well-developed plan. Some applicants have taken 3-5 years. It is probably that it would take no less than two years.

Blum noted that the state's acreage has taken close to five years to address murrelet issues and that is still not done.

Services would meet with an applicant and explain the time, costs, consultants needed to undertake an HCP. They would also work with the applicant to make it really clear about what is needed by the applicant to address in their HCP application. This process also requires compliance with NEPA and that includes comment periods ranging from 60-150 days. Also compliance with the National Historic Preservation Act is required, and this involves a level of consultation with the State Historic Preservation Office and the affected tribes. In addition, the Services need to provide a BiOp and make the necessary findings associated with this process. There is also other levels of coordination required as the HCP has to comply with all other state and local laws, and that requirement could require additional analysis and time.

(12:40)

The benefit of the HCP is the "no surprises" assurances. This means that if the applicant properly manage their actions, the agencies will not intervene if a decline in the species continues. This means the agencies cannot ask for more mitigation or additional requirements from the applicant.

Fleck asked for a clarification with the DNR situation regarding the marbled murrelet. Blum explained that the DNR HCP did include the no surprises assurances and that the situation with the murrelet was not to be a work around of those assurances. Rather, this a reflection of everyone not knowing much about murrelets and the 70 years of HCP coverage. DNR did not know enough and so the Services and DNR committed to the interim strategy with DNR undertaking studies and monitoring. The Long Term strategy pegged from the Interim strategy is not appropriate and the LTS is not intended to be benched off of the short term strategy.

Coleman Byrnes asked if the "No Surprises" and "Adaptive Management" were at odds? It was noted that yes, to some degree, knowledge may not be enough to issue the incidental take and so adaptive management is the way to address uncertainties.

Thaler asked if there was a way to avoid the no surprises assurances. The species is jeopardized with extinction and all other resources have to be expended before the Services could come back to the Applicant. However, the activity of the Applicant at that point had to be jeopardizing the species. Thaler followed up and asked then how the Services deal with programmatic HCPs for forest lands if problem of jeopardy arises, and how is that dealt with? The Services would first go

to the federal agencies and then look the nexus and risks of ESA violations. In addition, there would be a jeopardy analysis looking at how is the action impacting the species as a whole? In addition, they would look at the project area and look at the allowable take.

Cross asked that with the northern spotted owl at the local level at jeopardy, but across the area of the North West Forest Plan doing ok how is that looked at. So, the Services would look at this issue when the USFS undertakes an update of the forest plan, then consultation will arise.

Lea asked about the PDN articles on river closures, would that affect permits from the Services? If the land manager is operating under an HCP, the Services cannot go back and ask for addition concessions from the manager.

Scott asked if an HCP proposal was not what the Services wanted, could the Services ask for more response from the applicant? Yes, there are ways to address uncertainties: (1) shorter time periods; (2) incremental changes; (3) build ways to address information. The more information that is known allows the Services to address in the HCP process.

Bork asked for a clarifying how the Services address cumulative effects of the ITA over time? This addressed through NEPA, the BiOp and talking about the species at various levels within the BiOp.

Paul asked that with salmonids declining, and getting worse, and DNR is locked into a 70 year HPC, what is done if nothing is helping salmon? In the HCP, the Services proscribed riparian buffers under BAS for buffer management to address sediment, shade, wood in streams. Over time this will address large woody debris, spawning gravels, etc. This will not address other impacts fishing; ocean; culverts (but this was done within the Washington HCP). Services do not expect an instant response, and they attempt to schedule and address things within the applicant's control.

Paul followed up that in his opinion heaving logging has resulted in heavy reduction in salmon populations. So, how do we get salmon back? F&F HCP addresses fish and amphibians for riparian responses which has only been in place for ten years. This will take time, and it was expected by the Services to take time. Paul then asked about a case where 1-2m pounds of large woody debris was put in place, but as soon as the DNR lands were logged up stream, the placed debris was blown out, removing the work, the runs, etc. No fish found at all but for chum. So, can these logging practices be sanctioned under the HCP? Cross asked Paul for peer reviewed research that links harvests to the drop in salmon populations? Cross indicated that this has not been done. Paul stated that this is why he felt the TLAC should bring a fisheries biologist into the discussion. Murray asked to return to the presentation.

Romanski reviewed the concept diagrams in the presentation (HCP Concept) noting that the Services look at the issues of the species listed, the projected decline, and the impact of the proposed action on that decline +/- . The objective is to protect and avoid the decline, to minimize the impacts as best as can be done to avoid impacts to the species. This could mean a change in the project's timing, change in the design, etc. Fleck asked if in such cases would the mitigation remain similar or look the same? This would trigger an EIS with a public comment period and the trades would have already been worked out in preparing the EIS.

(1:05)

Blum noted that the question was more of where the emphasis is to be made. So in that case, the mitigation would address the project's impacts and look at the project decline of the species and look at means of raising it. The goal is to protect and preserve to the point of recovery.

Bork asked if the movement could only be made by habitat improvement, then what? Or, if the project with mitigation will not improve the decline, so does the applicant have to make improvements and expend those costs? Yes, the issue then is looking at the scale of the impact and determine what can be done to avoid impacts and mitigate them.

Cross asked regarding the protect and preserve – how does doing nothing or doing something impact the decision? Doing nothing on the West Olympic Peninsula will not do anything for the NSO? 20 years of evidence that is clear and convincing that doing nothing will do nothing for the NSO. In response, it was noted that there is a constant tension between the Services and property owners wanting to do something.

Fleck asked if in a subsequent application, could the conditions become more restrictive? Yes, for example riparian areas with 100' no cut buffers could be increased in a subsequent application. Murray asked if the argument was that a bigger buffer was a better buffer? It was noted that this was what the science requirement in the F&F HCP was tasked with reviewing.

USFWS does not care about who the ownership of the land subject to an HCP. Agencies, local communities, private owners, develop HCPs to look at a larger scale approach for a greater benefit. This approach incorporates efficiency and addresses a collective approach to the species. It also provides long term certainty to operate, if operating under an HCP.

HCPs in Washington over the last 20 years cover some 12m acres:

- F&F – 9.1m
- State DNR – 1.4m (1.8 for NSO)
- Private Companies
- Municipalities

A question was asked about the issue associated with the transfer of lands subject to an HCP. Plum Creek is an example where its HCP conditions followed with the lands as Weyerhaeuser purchased all of the lands associated with that HCP. Another example is where Sierra Pacific purchased a whole block of land covered by an HCP.

Bork asked with some 71m acres in Washington, how are the rest addressed? If there are listed species, then the ESA may apply to any action that would impact that species. An HCP is inherently flexible as it is applicant driven, voluntary that creates a durable legal certainty under ESA.

(1:20)

Safe Harbors usually are front loaded, and the take occurs at the end of the period. The idea is to increase habitat while reducing threat, thereby promoting recovery. So, one looks at the "net conservation benefit." This requires a different level of findings and also terms. The Services would look at how the actions affect the baseline projection of the species of concern. What is not covered in this approach are new activities or changes? The goal is to utilize the cumulative

benefits of the SHA activities to increase the species numbers and population. Look at how does the approach change the trend line.

A few of these have been done with about 130,000 acres covered mainly in relationship to spotted owls, and murrelets. Blum noted that the SHA could permit cutting of trees at 35 years, otherwise that stand would be allowed to grow and become habitat creating a level of mutual benefit.

(Break – 1:42 back in session)

One of the main questions is the what would occur with the reconveyance of the lands from the state to the county? Couple avenues to different results. For example if reconveyance occurs, the permit could transfer with those lands if it was set that the lands would be managed under the HCP with the same measures. Transfers before with Sierra Pacific and Plum Creek were different in that all of the lands. Scott noted that with Clallam County, however, it has not managed lands like these so would the Services be looking at a detailed plan? Yes, but this was speculating as to what they would do, with public comment and assurances that the County would and could implement the HCP. Commissioners would need to do that. Would there be a need for a new HCP? No.

The other option is if the 92,500 acres is withdrawn from the 1.8m HCP. However, this has not really been thought of by the Services. The DNR HCP did envision smaller transactions that would result in land exchanges. The question would be are these 92,500 acres significant? This level of a w/d was not contemplated at the time of the DNR HCP, so it would be a significant change. It was questioned how that would be significant in that the lands would shift from the DNR HCP to the F&F HCP. One of the big areas of difference would be with the coverage. The DNR HCP is more comprehensive, covers more species, including ones that could be added at a later date. However, the F&F HCP was primarily aimed at mature fish, stream amphibians, etc.

In this situation, the work would be analyzing the differential of the that change and the impact upon the species. That would include: (a) the impact upon the DNR HCP; and, (2) the County meeting the requirements within the F&F. This would trigger a degree of negotiation and would also require how it would comply with the F&FA, address Class 4 Special harvests, and also the change would clearly lose the ITA coverage. One of the biggest questions associated with this scenario is *what is the impact of untangling these 92,000+ acres from the other DNR managed acres?*

Murray asked how the issue of undivided loyalty was addressed with offsetting issues? Blum responded that one had to look at the issues from a mid 1990s perspective. Then it was determined that the certainty gained was worth the various trade offs with each beneficiary benefiting from that certainty. The HCP affects the land base, and the land base affects the SHC. While that is the case, millions were being spent on owl surveys, sales were being litigated and challenged, so the certainty was seen as valuable. Fleck asked what would the DNR provided regarding the murrelet discussions and the trade offs therein? Blum noted that the DNR would be providing a detailed analysis with the economic aspects showing those.

Lea asked about the HCP and the transfer of the permit, how would that impact the OESF? That was seen as one of the unknowns in such a discussion as there were objectives for research and monitoring that were to be carried out by the DNR and FS.

(2:00)

Thaler noted that with the Plum Creek transfer the conditions followed. Here though the language allowed for transfers that were considered to be minor. This would be a large transfer so there would be a need to meet and talk about that. It could be considered a major amendment requiring NEPA on the action. There would be a need to check the trigger within the HCP. Unforeseen circumstances would be triggered with the change of the lands from DNR management into County's management under the terms of the existing HCP. There would be a need to discuss the impacts and issues within the HCP. Blum agreed with the unforeseen circumstance if the acres were withdrawn from the DNR. There would be a need to analyze the impacts of the County management within the State HCP, but that that analysis would not be the same as the w/d analysis which .

Scott asked then if there is an opportunity to work with the DNR in a more active role? Blum noted that the TLAC resolution's second part drives at this question.

Cross raised the question of whether come November the practice reality of some of these issues would change. Yes was the response.

Thaler asked for clarification on the unforeseen circumstances and whether that is seen within Washington or the Nation? Not sure as the issue is relevance and this was something brought into later HCPs.

Fleck asked if there are issues not being addressed what is done then? The services work to bring the applicant back into compliance. Look at the models for the strategy and then other approaches regarding letters requesting a delay of additional actions.

Murray asked about the compliance with all laws/rules? This is the responsibility of DNR to address, not on the services regarding not affecting take.

Scott asked if the DNR was quizzed by the County about the lack of management on the OESF? Blum noted that it was primarily the City of Forks raising issues regarding the OESF.

Bork asked if there were incentives for the permittee if they do not maximize their take? No, there is no such incentives. Rather there is an analysis of the level of take, and if the applicant does not maximize their take, the Services will not intervene. An example is the City of Tacoma who has lands where they could cut 40 acres and thin 120 acres, but they did not cut any of it. Bork then asked if the species benefited, how is that incentivized?

Beauvais asked if the species continues to decline as a result of no action of the owner and the agency, can you return to the base line? Yes, that is what the no surprises provisions of the HCP provide.

Byrnes raised a question about the no surprises clause in cases where the species are headed towards extinction, isn't that a surprise? He further asked if the salmon could disappear on DNR lands and would that mean that there was no recourse under the ESA? It was raised that it would be hard to say that DNR's proscriptions caused the lack of salmon

Doherty asked how climate change was incorporated with the institutional anticipation of impacts from that? Services use shorter HCP times, undertake or require science team analysis, and have legal counsel look at this in the BiOps. Specifically what are the legal cases that apply. Doherty asked about how is better enforcement of compliance obtained? If the applicant is out of compliance, the applicant has to address enforcement and compliance. The Services are not the first source of enforcement. Local citizenry or 3rd party raises issues and then there is a need to determine is the non-compliance accidental, mapping related, egregious, or intentional? In such a situation, where is the liability for over cut? That remains with the permit holder. DNR responds with permit holder being penalized and having to offset the damage. OFCO has complained about a gray area in the riparian areas being overcut. It was noted that the DNR and the Services disagree with that position/compliant.

Scott asked for additional information on the OESF with regard to the current status, the agreements, and projected activities that might be focused on the deficits within the OESF? Blum noted that this was something that the DNR could present on at a future date and there was an interest in that information. This is by agreement, and has a concurrent status in that both state forest lands and federal forest lands managed by DNR are intermingled. It could be worth DNR considering what would be needed to address reconveyance questions within the OESF.

Byrnes asked if the no surprises clauses have been challenged in court? Yes, they have been challenged and upheld. So while not unchallengeable, the precedent is that they will be upheld. Regarding the Safe Harbor Agreements are these patches of land looked at for their effectiveness of providing for the species? Yes, and what is looked at is how they complement other habitat.

Byrnes asked about efforts by the DNR to try to obtain conservations easements on other lands in that the DNR has patches of lands. There are efforts to enhance or complement that habitat. Blum noted that there were efforts to address the NSO and this is associated with the FPA rules as well.

(2:35)

V. Develop Questions for Grays Harbor County

Focused turned to developing questions for a prospective presentation by Grays Harbor representatives who may come to one of the upcoming TLAC meetings. There was not confirmation as to which meeting, but the idea was to prepare questions beforehand for their use. It was noted that Grays Harbor manages about 40,000 acres of trust lands. So the list of questions developed in the course of the discussion included:

- a) Total acres;
- b) Staffing;
- c) HPAs
- d) % of set asides/off base
- e) Regulations used, including potential county regulations used
- f) Rotation lengths? Specific management plans? How are those developed by the county and then how are those plans used by Grays Harbor? How are is the rotation decided? What documents associated with this?
- g) Acreages

- h) Budget – costs, cost per acre/year
- i) How do they deal with issues of NSO, MM, and fish habitat
- j) Harvest volume
- k) Roads and road usage
- l) Fire – services are done by DNR? What agreements do they have with other entities?
- m) Markets – mills and the bidding climate for volume?
- n) Recreation costs, land acquisition and rights of way
- o) Planning processes used
- p) Reports created
- q) Silvicultural Inventory information developed and used

A summary of this list was reviewed by Murray. During the discussion of these questions, there were a few comments raised. Those were:

Lea raised a concern that the DNR lands are not managed the same as the Grays Harbor lands. Cross noted that these were the same type of lands as the Clallam County state forest lands, but that Grays Harbor kept those lands and did not remit them to the State. Fleck explained about the history associated with the acquiring of trust lands for the benefit of the County occurred. Grays Harbor did not convey their lands, had not signed over the lands to the State, and they manage some 40,000 acres of such land. Lea felt that if they were being managed differently, he did not think you could compare them.

Thaler noted that the GH lands are scattered and not blocked like Clallam County. He suggested that people take a look at the maps associated with those lands.

Lea asked who and what qualifications are associated with the manager of the Grays Harbor lands and their permits.

(2:50)

VI. Update on Data Requests

Murray noted that he got some of the data on the Wednesday prior to the TLAC meeting. This was modeled data. He had not had a significant time to analyze that data set, but did note a few things of concern:

- a) The age seemed to be off by five (5) years;
- b) Volume given was high;
- c) Does not have volume by species, trees per acre, or heights that the stand tables used by private industry would have for modeling;

Cross noted that it did not have where the volume went when harvested. So how do you answer the question of where does the public timber go? DNR does not track the cut out to cruise difference. Scott asked if that could be obtained? Yes, under a FOIA/PRA request to the Department of Revenue. Aggregate volume stand data would be useful, if there is not one that would be useful to know as well. Cross also asked how many inventory plots had actually been visited by a cruiser that is associated with the 92,000+ acres.

Paul asked if the data Murray received would be shared with the group. It can be, however, a person needs to have the program and capacity to manipulate and use the data sets. Murray noted that a summation of the data will be time consuming and it would have to be divided out regarding the zones versus stands.

Blum noted that there may be a way with the data request to refine it to permit general sharing. Blum would send the data to Loni and then it can be distributed wider. Murray asked if we should include a section on the agenda to address data requests. Blum agreed that this could be a standing agenda item.

VII. Next Meeting Topics

Next meeting would be 17 Jun. Fleck noted that people should turn to page 5 of the April meeting and suggested a review of previous meeting suggestions. June was to be alternatives, July was looked at being about the OESF and the alternatives to reconveyance. Bork thought that alternatives in general need to be discussed. Discussion turned to setting up agendas for June or July, with the understanding that the Grays Harbor discussion would dominate what meeting they are able to attend.

Murray asked about moving the date of the July meeting and if it could be moved to the 8th? Cross asked if it could be moved later. Murray noted he was going to be out of town after the 14th. Fleck noted that if the meeting date was changed, that would be a special meeting, and as such the agenda is restricted to what is published. There may not be enough time to approve the meeting minutes in such a case. Murray noted that there could be benefit to have a whole meeting to discuss what we know and what the data gaps are before discussing the issues of reconveyance. June meeting would be either the Grays Harbor presentation, or the group's summary of what it knows. Then the July meeting would be the other.

Bork raised a concern about overlap discussions between meetings and asked if short, concise, elaborate descriptions could be defined and presented in the July meeting. These are needed and should be presented by the appropriate individuals. Blum thought that the June meeting would be devoted to the Grays Harbor presentation, and the July would be about what we have learned and what we know.

August would be the meeting to discuss the issues regarding alternatives to reconveyance. Blum noted that there were really only three options: (1) CC takes lands back and take outside of the State HCP; (2) CC takes lands back and manages under State HCP; and, (3) DNR continues to manage the lands. The latter then raises the issues within the second question of the resolution. This would not be status quo, as this would require a different level of interaction. Bork refined this as a question as to whether this is "business as usual" or different "focus on forest health" or such things. She noted that most hoped for better returns and that that would require a change in focus and emphasis. Also, are there ways to make more money from doing things differently such as carbon credits, recreation usage, etc. Fleck questioned whether it was realistic to expect presentations, and suggested that the group develop a collective "pros v. cons" on each of the three areas noted above.

Swanson asked about where arrearage would come in under these three options under DNR management? Fleck noted that option one was current DNR, option two DNR do more, and

then DNR more creative. Cross questioned about what that really meant with regard to DNR and its operations. Thaler questioned whether one could say, just maximize the revenue. Cross felt that the DNR needed to meet their obligations. Bork felt that there could be creative means of raising revenue and those should be included. Cross felt that those were things that DNR should be doing. Fleck noted that there seemed to be an assumption that Clallam County was at the table demanding that DNR meet their obligation. Rather, he would argue that the County was relatively silent during that period. County could under the second question create a set of policies or practices to address the revenue issues, how DNR is meeting sales targets, etc. This would be a different model from what things have occurred. Also there probably is a need to look at the way DNR reports information and how that is used.

Thaler indicate that his caucus would be willing to present details about alternative ways of producing incoming and issues associated with off base lands. Thaler noted that there was a linkage between shorter rotations and increased harvest. This will have more environmental impacts and this needs to be presented. This would be of help for the discussion of reconveyance. Fleck asked if they could have this paper done in advance of the meeting in August? Bork noted that this paper was a paradigm shift but it was not the TLACs duty to tell the DNR how to manage the resources. Rather, it was the TLAC's duty to articulate what the desired outcomes are of the County.

Lea raised the issue of subcommittees. As there are different opinions within the groups. Have some of the groups prepare options for review within August. This would require subcommittees maybe on industrial and environmental groups. This question is a bit of a Pandora's box with it not being a simple thing. Murray noted that he thought there was some benefit to functioning as a whole. Blum noted that individuals could share ideas offline and prepare for full group discussions at a later date. Date of the Grays Harbor presentation would shift the dates for some of these discussions.

If Grays Harbor is not there in June, Blum thought there should be a continuation of the alternatives being discussed. Murray felt that the synthesis was needed prior to discussing alternatives. Blum offered a synopsis of everything presented, and then the remainder of the meeting could be focused on what we have learned, and what we still need to know. Fleck asked for Blum to include the changes that they have been making for the last 18 months that have shifted the working approach of the DNR. Also, what were some of the drivers to make these adjustments?

Bork noted that the USFS stopped using targets and changed to areas of focus. She felt that there were other ways to look at benefits. Thaler noted that issues on the limits and benefits needed to be addressed as well, in addition to looking at new revenue ideas for example with carbon credits. He agreed that the environmental caucus would work on a paper for the TLAC on these issues.

Kelly raised concern with members wanting information where everyone should be doing their homework. There is a lot of information on the website about what was presented. She didn't think people should ask Blum to redo everything. One area where additional information was deemed warranted was the costs, and the details associated with those.

Lea asked how population was being addressed by Thaler's paper. Thaler asked in what sense? The discussion focused on the fact that the State and region were projected to see significant increases in population. With that growing population there are going to be recreation wants. Urban area looks at the Peninsula differently than we do. How that cultural change is addressed is part of the revenue picture. It could be seen as being beyond the purview of the Committee.

Doherty noted that a change in the operating resolution can be changed with two County Commissioners. They may request a much larger review of than the resolution that was used to create this. Doherty noted that there were selective people working on this, meetings held in secret, etc. With the change of just one person in the Commission, this all could be changed to include a bigger view.

VIII. Public Comment

Rod Fleck testified about the history of the TLAC and provided "cut and pasted" copies of the Charter Review Commission's meeting minutes. Fleck said that these refuted Doherty's constant statements about a few people controlled by one timber company pushing the issue of reconveyance. Fleck also noted that in a summary of his position, the issue of "rushing to reconveyance" was misleading, false, and not supported by the record. Finally, Fleck noted that it appeared to him that Doherty purposely made efforts to discredit individuals and entities that have expertise in these areas in an effort to avoid a few simple questions. One of which is how did the largest portion of the DNR's total arrearage arise in the former District 3 Commissioner's district during his tenure in office?

Cindy Kelly shared a note about the resolution and adopting under policies under County Policy 952. As such, she serves on many boards and that includes the Port Angeles School District and the WSSD Association's task force. The Chimacum SB is watching this issue and is concerned about the issues of timber within Clallam County. A subcommittee is meeting and looking at the issues of school finance and would like to dovetail its actions with the WSSDA task force. It developed a resolution on these issues. WSSDA Board, nor the Task Force, has taken any position on these issues. The resolution from Chimacum was provided to the TLAC.

Ed Bowen noted that he is very interested in the upcoming Grays Harbor presentation. He would like Grays Harbor to bring to the table what are the issues associated with the land use? What arises with multi-use issues? How do those lands interact with their municipal watersheds?

Phil Kitchel thanked everyone for their attention to all of these things which are complex. He noted that he had over twenty years of engagement in these issues. He raised a discrepancy between the DNR annual reports that showed that there were 23-24,000 acres in long term deferrals and then in the most presentation by Angus Brodie this number is 38,000 acres. Was this a discrepancy? Was this an error and if so how does it affect all of the 1.8m acres being managed? Is there more off base, or in long term deferrals than what is listed in the annual report. He also noted that the drop off in revenue currently was very real. In the mid to late 1990s, when he was County Commissioner pushing these issues the revenues were \$13m, \$21m, \$9.8m, \$13m to the Count and happened to be during his term as commissioner. However, in the past four years the revenues to the County were \$5.6m (2012), \$5m (2013), \$7.7m (2014), and \$3.7 in 2015. He also expressed, as he went over time, that in 1998 there

was a lawsuit involving Lewis and Clallam County against the DNR that was suspended focusing on the issues of revenues and the impact to the counties by the HCP.

Toby Thaler noted that he lives in the populated heart of the most gentrified urban core of the state that is the most left voting. As such, the issues being raised here really emphasize the need for a state wide progressive tax system. In addition, McCleary will not be solved by harvesting timber. Only a change to the tax structure will address those issues.

Meeting was adjourned by unanimous consent at 3:54 p.m.

IX. Adjournment

MEETING MINUTES FOR:

June 17, 2016

Clallam County Trust Land Advisory Committee

17 Jun2016

Meeting Minutes

<https://www.youtube.com/watch?v=B1xKBxM6sUM>

Times that appear next to items reflect the actual time and are provided as a guide for those utilizing the Clallam Public Eye video.

I. Call to Order /Pledge of Allegiance/Roll Call

Chairman Joe Murray called the meeting to order, and following the Pledge of Allegiance, and asked Secretary Rod Fleck to call the roll. Absent from the meeting were Darryl Wolfe; Michael Merideth; and Connie Beauvais. (Three members arrived late).

Murry noted Grays Harbor he would give an update on what he had learned from Grays Harbor. He had received notice that Beauvais was participating in the interviews and it was clarified this was for Port Director.

II. Public Comment

Ann Seider – small forest landowner from Sequim, not Port Angeles as noted in earlier minutes. Raised procedural questions/concerns. She obtained a copy of a hand out that Rod Fleck distributed at the last TLAC meeting. She felt that the website should post the handouts individually and provide the information regarding the author, who it was addressed to, and the date it was provided so public could follow along. She also asked about the process and how it could include the public asking questions in light of the public comment periods at the beginning and at the end of the meeting. Those don't allow for the public to ask questions. For the agenda for the next meeting, there is a need for a substantive discussion of many issues. At the next meeting there are issues to be discussed that include regarding the HCP and the substantive question whether it is directly transferrable. Also other questions, who will manage these acres if not DNR? Is the County planning to build the infrastructure for forest management? Would it be private contractors? Would it be one of the contractors on the Committee? Where would the expertise come from for soils, slopes, etc.? Who would be liable for damages? What are the costs in relationship to the gains from the transfer?

III. Minutes of April and March

Fleck noted that the May minutes were distributed recently, but only the March and April meeting minutes were the ones that could be adopted. Motion by Kyle Blum, seconded by Ben Pacheco to adopt the meeting minutes for March and April.

IV. Review – Clallam County Trust Lands – Presentation by Kyle Blum

(See the presentation for specifics within the slides provided by Blum – 12 slides)

Blum noted that none of these slides were new. These were picked out of the hundred slides or so that were presented earlier by DNR.

DNR manages 92,525 acres in Clallam County that are state forest lands (e.g., County trust lands) 46% (42,457) of those acres are located within the Olympic Experimental State Forest (OESF). The management units are the OESF and the Straits.

These lands came to the County in the 1920s and 1930s and were transferred to the state to be managed per a legislative mandate. The lands are managed as a statutory trust versus the federal grant lands trust, but the management approach is the same for both trusts. There are numerous trust law mandates and one is the duty to act prudently to reduce the "risk of loss" and that may include managing to avoid future listing of species to avoid impacts. This would be argued to be prudent management.

They are managed for a collection of beneficiaries with the distribution of funds done per statute. Lea asked when those funds were distributed. Blum noted that budgeting is done differently by the different types of beneficiaries. Some rely upon those monies as a part of the operating budgets and others use the funds for special projects. Bob Lea asked about the comparison between 2015 in volume versus 2016. DNR finished above the 100mmbf target for the region. Tom Swanson cautioned about the difference between stumpage and volume. There were three no sales, and the last set of sales had thinning operations that had a larger volume that was below \$200/m. The fact that there were no bids for some sales was discussed regarding the appraisal, minimum bid and timing issues. The commercial thinning volume has been a significant portion of the last few years. Ken Reandeanu noted that he has attended the bid openings and the discussion reflects the thinning issue. Discussion then took place regarding the thinning requirements that the Olympic Region has had to operate under as part of market conditions, legal obligations, and need to catch up. Blum noted that the recession (2009-2012) played a significant role in the DNR now having to offer those sales to meet that required ratio.

Susanne Scott asked if the problem regarding thinning was due to a lack of previous management, or would this be on-going? Blum noted that there were two types of thinning. Pre-commercial thinning that has a very tight window to do that work, and if missed you cannot go back and do those without exposing the stand to windfall. Blum noted that the discussion here was about commercial thinning that is done at a later age 30-40 years, though occasionally done in older stands that are 60-75 yrs old, and are done to open the stand and reduce competition for nutrients thereby encouraging growth. The need to catch up to that required number was the driver.

Scott asked if this way was the best way to do this. Blum noted that the 1:1 requirement in the OESF was not a law, rather it arose out of litigation from the Sustainable Harvest Calculation and the DNR committed to a 1:1 ratio in the settlement of that litigation. This is required to be met until the new SHC is completed. A new SHC will result in this no longer being required. A draft plan with draft alternatives and a DEIS should be out at the end of this calendar year. Toby Thaler emphasized that the 1:1 was not a law and arose solely out of the settlement agreement. Swanson, was this met? Blum noted that the DNR is now caught up and the issues associated sales really focuses on the DNR's ecological, financial and aesthetic requirements.

Scott asked if there was a fiduciary duty to undertake thinning, and Blum noted it was done to ensure the quality of trees for future harvest and sale. When asked why the SHC was not done, he noted that it was a question of staffing resources with the same people working on that project who are also working on the OESF plan and the Long Term Marbled Murrelet (LTMM) strategy.

Lea asked if there was a market for commercial thinned logs. Blum noted that there was, but that market is subject to price fluctuations and that CT logs are lower scale products within the stand. Cross commented that with an objective of improving habitat which is having larger trees, the prescription is used to try to enhance growth. Thinning is not guaranteed, so if you cannot sell it, you cannot meet your other objectives. Further, there is a loss in revenue and a loss in future habitat. Murray noted that while you may be able to do a later age thinning, the trees are less responsive than prescription.

Blum returned to the presentation and noted that the various planning efforts (OESF, SHC, LTMM, etc.) are large documents that have to be written with the assumption that they are going to be litigated which doubles or triples the time commitment needed to complete those types of documents. This also increases the costs. These documents require analysis and resources to be allocated to them. In addition, the response to the State Environmental Policy Act (SEPA) comments which could be a thousand pages is also very time consuming. There is a collective frustration with the time needed to complete these efforts.

Cynthia Bork asked if across the state with small dbh timber are there any aggressive efforts by industry to retool to meet product coming from the forests? Swanson noted that private capital goes to where returns are the highest. So, Sierra Pacific in Shelton is an example of a mill being constructed to take advantage of wood that is coming or will come on line. So, is the issue an inability to sell such timber? Timber policies have been a source for the flight of capital from mill infrastructure as it requires an available, reliable supply of competitively priced timber. The SPI mill will have a potential to be there for decades with new tech to use small dia. wood if the supply is there. Further, on the Peninsula the amalgamation of policy conflicts has resulted in capital not being available. Bork asked if there were some grants for the construction of the mill infrastructure.

Fleck noted that regarding grants these mills cost between \$8-20m and there is no grant available for that. There are ways to offset the sales tax on mill construction, tax deferrals, etc. Usually these do not make the decision, but what we are repeatedly hearing from mill owners, former mill owners, industry bankers, is what is the stable supply stream for the mill that you are wanting? What also is the market for the products being made? If the supply is costing more than the market would pay for the product then there is no basis for making the investment. In the midst of the Spotted Owl crisis there were some grants that did help with the construction of the InterFor mill in Forks. However, those funds are no longer available.

Murray noted that there needs to be a vested interest in the mill and its operation. Investment ensures that. Swanson noted that transportation is also a huge factor and there are no rail sits within Clallam County.

Blum returned to the presentation and the slide regarding the various policy documents associated with the DNR's management. These include the Policy for Sustainable Forests and the HCP. The lands themselves fall within three types of categories: 58% GEM; 29% deferred; and, 12% riparian.

Blum noted that the lands are subject to a sustainable harvest calculation and from that the issue of arrearage arises. Thaler noted that he felt that the arrearage was a result of the process that

set the number too high. Murray stated that he did not think it was too high. Josey Paul asked about what happened with the arrearage from the prior decade? Blum noted that it was all put into the inventory so there was no carry over in the last decade. Paul then asked how did the DNR know what the real or actual arrearage was then? Scott also asked how do you distribute the faulty estimate of the arrearage? Is that done equally? Thaler felt that the larger number was a bit hard to get accurate. Blum noted that the DNR did numbers for the 20 planning units and those were rolled up into the number used. Yet, environmental issues, law suits, and a confluence of factors to include the recession and the hemlock market collapse play roles in the development of the arrearage. In addition, there were shifts in transportation costs and the DNR focused during the recession on Douglas fir sales along the I-5 corridor. Scott asked then how was that managing equally to the benefit of the various beneficiaries with regard to costs, benefits, etc. She questioned if this was achieving the trust mandate. Blum noted that Lewis County was upset with the fact that the DNR was harvesting and selling timber in a down market. So, the DNR finds itself many times between a rock and hard place. He noted that the picture also does not describe the issues as there is a narrow view regarding the age, and over time there are other pictures that explain some of these issues. For example, during the Bert Cole administration the area of the OESF in the 1950s and 1960s produced significant portions of the state's volume.

Swanson noted that if this was explained, the issue would also be a focus on cutting budgets to address market issues. But, in the end, the DNR was only cutting about 30% of the growth in the same time period.

Paul noted that the 92mmbf over the past decade, however, we don't know how much was folded in, so there may have been a gain more than before? Blum explained that if a manager had a total of 100a to cut each year, but only cut 90 acres, then the next decade they could proceed with 110a in annual harvests (100a + 10a in arrears). Legally, there is an obligation to go get if it is available for harvest. The issue requires a review of the stand inventory. Paul asked if the arrearage was then offset in the previous decade? Blum noted that it was not. The previous SHC was for the period of 1995-2004, and then the recently completed one was for the 2005-2014 period. In the recently completed SHC, the BNR at the time adopting the SHC did not deal with the issue of arrearage. It said it was going to do so, but did not.

Scott asked if the SHC then is something like a guess? Cross said that yes it was a projection based upon a model to create a number and then model is tweaked.

(1:06)

Lea asked about the statutory demand regarding the arrearage and whether the arrearage must be sold or not? Blum noted that historically, the arrearage was just folded in and not highlighted or differentiated. Commissioner Goldmark has worked with the BNR and many others to make this a better calculation and review process.

Murray noted that if each year the harvest was the same, but not all the same age class, wouldn't this reset the age class? Coleman noted that with the arrearage trees not sold would increase over ten years. So you would have more volume. However, others cautioned that there were issues of lost opportunity costs, lost opportunity to purchase equipment, needed operations of the beneficiaries. Arrearage calculated in volume not money. As a result there are multipliers associated with that volume such as trucking, jobs, and agencies making plans with those funds.

Cross noted that there were issues with assuming that arrearage volume would be available in future generations. There are budgeting issues created with the arrearage that impacts the junior taxing districts. Reaume noted that those funds could be used to address bonded debts and many times this is a guessing game. Fleck noted that Commissioner Goldmark and staff deserve a huge amount of praise of undertaking the analysis of arrearage. This has not been done by any other Commissioner. What has been revealed is that the DNR's volume is short. He used the example of giving \$100k to a trust manager, and being told that we are going to get \$110k at the end of the decade. If there are issues that arise along that decade, and that is shared, then you can make adjustments. But, only a few folks in Clallam County have been engaged in these conversations. Sales numbers were dropping, volume numbers were dropping too, and Forks raised issues. But, now we are looking at the potential of having a SHC for the next decade plus the arrearage available. The arrearage and its sale addresses issues of intergenerational equity and shifting that arrearage volume to some future period benefits the future at the expense of the current generation.

Murray raised a process of how these volumes are addressed. He asked that Kyle finish and the discussion continue after that. Blum noted that the BNR set up an arrearage subcommittee and it reviewed the various aspects of the arrearage creating four options for the Department to analyze. Murray noted that when the markets are poor, the private sector will cut back on harvesting, but regardless of that, the issue of when to cut will not go away.

BREAK (1:30)

Thaler asked for a clarification regarding the arrearage as it relates to proportion of the total. Paul noted that at the last meeting it was said that the DNR increased harvest as relative to political process. Blum noted that the increase was in thinning harvest that did impact volume. This was to affirm the 1:1 commitment which was less likely to allow the DNR to meet their volume target; and, there would be a need to increase staff within the OESF to put up additional sales. Staff was also low during the recession and the demands to meet the 1:1 in the settlement agreement took additional time. Blum noted that there has been an effort across the board to increase staff performance across all regions and not just in the Olympic Region.

Lea asked for further clarification of Slide 12 and its chart. He noted that in 2009 interest rates were down and prior to that there were higher interest rates, and lower stumpage. Cost of borrowing money is as low as it has ever been and usually there is a correlation between low interest rates and increased demand for wood products. Swanson noted that while that was the case for 50 years, this recession saw wage stagnation, wealth concentration, and globalization. Add to that the changes in household debt, student loan debt, and housing stock there was not the expected demand. Lea noted that the forest did not stand within a vacuum and that things such as the Columbus Day Storm, fires, etc., could all affect the market and are beyond control.

Murray noted that less wood is used in our day to day lives than 50 years ago. First Federal's staff had shared with him that first time home loans are going for want of people due to lack of living wages. Further, school grads are not making what was mind in the 1980s. Doherty noted that the highest employment growth was in the tech sector with higher wages and highest employment. Lea noted that in the past monetary and fiscal policy worked within the system of availability, but obviously there have been changes in investment. Byrnes asked about the trust land transfer numbers as that was part of the data request. Scott also asked about the OESF and having

additional information on that. What was the different relationship it has with the DNR? Reandeau noted that the staffing reflected major changes. Blum explained that shift. Murray started the discussion and noted that he had made a list of various aspects of what was learned, alternatives, reconveyance, and even the idea of selling the lands. He felt that the options really are in these categories:

- Do Nothing;
- DNR management with County Forester more engaged with DNR;
- Reconveyance; or
- Seek the sale of the lands.

Bork felt that the public interest was such that there were significant issues remaining. First, reconveyance would have the County manage the lands. While there had been a great deal of time studying the DNR, there was not any time looking at who in the County would be responsible if reconveyance were to occur. Second, there is really no other place doing this at this magnitude. Scott asked how reconveyance could work without a plan? Cross felt that the committee would be making a recommendation, then the County would have to marshal the support seeking reconveyance. He also felt that with the number of people in the Region, and the number that would possibly be lost in the reconveyance from the Region that those 25 people would be available to undertake the work for the County. He noted that Green Crow had no interest in managing these lands. Scott felt that there was no information, no qualifications, simply speculation as to how the County could proceed. One of the key questions not answered is, County are you going to be able to do this?

Swanson felt that that was underselling human adaptability. There are people who do this every day in this specific industry dealing with difficult, complex issues. People will want to manage these lands. Scott felt that the question was whether such people would manage them better than the DNR. Cross felt that it could be done starting with a plan and that it could be done for less money. Problems would be solved and folks could do that.

Murray questioned if there would be a need for that plan as all that was being changed was the management, the County could adopt the available plans. Paul felt that there was no evidence for reconveyance and making that recommendation was a mistake,

Thaler raised three points. First, add a fifth option to Murray's list which was find other revenue solutions and streams. Second, Paul is correct in that there was no evidence regarding making such a recommendation. If you would take 25 people out of DNR, change the management of 92,000a then you would shift costs from the state to the County while potentially impacting other beneficiaries. This would have political fallout and economic impacts. The resolution does not spell out what problems are being addressed? What is the problem being solved? Not getting even flow of money. Not getting certainty. But would the recommendation solve this problem. Third, what are the alternatives to reconveyance? Industry under global stressers not able to bring in the money needed by the beneficiaries. Less and less likely over time to be providing revenue needs that you may want. Carbon market may be an option to monetize growth. Inslee tried to make this happen and there could be ways to get greater support. The 40% growth is not being monetarized over time of the SHC planning period. Rural communities could push for tax reform, while aspirational, this could change the political discussions. Grange in 1932 pushed the

income taxes in the 1930s and that came from rural Washington. 5th option other revenue solutions to address problems beneficiaries are raising.

Fleck argued that if looking at reconveyance, is that under the HCP or State HCP? If not looking at reconveyance are we then looking at DNR only doing things, or are we looking at some structure within the County that is by charter charged with the duties of watching these issues? When this issue was arose at the Charter, there was a group that wanted to put this instantly on the ballot. A few of us asked, do you really know what you are asking? A group of us asked about studying, reviewing this, etc. Forks has a long history in this, as does QVSD, and there is a long history on these issues. Reconveyance would take some 20 some steps to get through Olympia. How do you get the bill together? How do you get the bill to the first hearing? How do you get through that to passing one chamber? Fleck noted he could not get there. In the 1990s there was a very real possibility that this could happen. But that was a fixed period in time and it didn't happen, and it probably won't ever happen in the future. DNR will be the manager of these lands and there is an obligation to the County to produce revenue. DNR HQ doesn't have a method to track their projection against the what they sold. It shouldn't be the City of Forks or the QVSD trying to raise this issue to DNR. It should be every tax payer in Clallam County that is asking why are you not meeting your requirements? It should not be why is the DNR harvest level for the region at 120mmbf, but funded at best at 100 mmbf, and it shouldn't be the City raising this as a problem. The Mayors of Forks have regardless of party asked about this issue. One Mayor was looking at mortgaging their home to challenge the terms of the settlement like the 1:1. But, City was told this was just a guideline, in reality it became control on DNR. Reconveyance would require a monumental political involvement, take years, and take substantial efforts. Better, the County should be able to turn to ways to monitor future DNR staff what are you doing. Selinda's report is a good example that filled a gap that use to be met by Ruth Gerdon. Questions about sort sales, thin sales, and the impacts upon revenue in relationship to the beneficiaries' fiscal year versus state year. Purchasing of things like fire trucks is impact by this, and the fire truck's equipment affects your insurance rates. How do we ensure that someone at DNR gives a flying frig about what was promised to be sold versus what was sold under the most stringent regulations in the nation per the Seattle Times?

Reandau felt that there was a question as to starting from a position of a strong liaison working with the DNR within the County every day? Murray felt that there were people who know the land and have the wits out there to do that. Byrnes noted that looking at the map, there were a lot of scattered parcels which would create a nightmarish situation with road use and infrastructure needs during sales. Swanson noted that the industry works with road easements, road permits, and the like to address that and the process by all users is to pay for use. That process exists now. Byrnes asked if the money collected in a district was kept within the district that is then used. The issue of road maintenance is usually addressed as part of an additional payment associated with the sale of timber. DNR collects that as a whole into one account and then distributes \$8m/year that to make improvements on the road network where the needs arise.

Cross raised the fact that there would have to be a method to watchdog the DNR. In order to do that, there would have to be a clear understanding that the County is entitled to reports, information, etc., that the previous administrations of the DNR would not agree to provide. He asked Fleck about the issue of feeling entitled to reports and information that previous years in the DNR, the DNR felt it was not obligated to provide that.

Fleck not that there was a time in previous DNR administrations where it was argued that the information being discussed here was deemed proprietary and not provided to those requesting it. So, the City and others began asking for legislative inquiries and requests for data. They also developed a series of work arounds to obtain the information needed. Cross asked if that was the case, then how does the TLAC develop systems within the County to address that? Without knowing the future administrations, how do you address this and how would DNR deal with 17 counties asking for this? Wahkiakum and Pacific are asking to be bought out and reflects what each County has to address this. Some here may question about the values, other benefits, etc. Cross noted that if people feel reconveyance is low, what is the probability of creating something that would ensure oversight does this. Thaler felt that if the environmental community was supporting it would make it easier. In addition, Fleck noted that there are times where the County has to be more concerned about the interests of the tax payers in Clallam County than in the past where those raising those questions were told they were not playing politically nice.

Blum questioned how such information could not be provided to a county. Blum felt that the logic behind those arguments is associated with an argument that the duty is to the County, but not to the junior taxing district as the trust beneficiary is seen as the County. Cross asked if some of the people who used this argument are still there, and are they being told to respond. Fleck noted that Commissioner Goldmark made a huge effort to engage the beneficiaries as the recipient of the funds and that the County is basically an escrow agent for the dollars flowing through. Previous Commissioners argued they only had to deal with the County. He noted that this concept, Bruce Mackie concept, is not supported in the law and that is an area here that needs to be looked at and how the County can argue that. The County and the junior taxing districts are the beneficiaries here. The fact that folks had to go to the citizenry to bring up the issues to address the funding mechanism when DNR failed to meet their obligation is a problem. Thaler noted that this had been an issue at the State and that there may be continued benefit in a liaison position which would be the point of contact and response.

Reandeanu asked if the County created a liaison position, what would the response be from the DNR? Blum noted that he could answer this based upon current staff. It would depend upon the Commissioner and the person in that liaison role. Commissioner Goldmark has made it clear to work with the beneficiaries to get information to them. He has that expectation and the staff works to meet that. Bork inquired as to whether anyone else was doing that? Is this something that could be done at the Executive committee level with the County? Blum noted that where counties have a relationship to DNR, the DNR wants to maintain that relationship of service to the beneficiaries. Wahkiakum has a long standing relationship to discuss and shape the issues affecting them. They have a much higher dependence on these dollars and the DNR has a long history giving regular presentations to the Commissioners on targets, revenue, etc.

Cindy Kelly noted that there are a lot of existing committees. One example she shared was the Washington State School Directors Association and its Trust Lands Task Force, of which she is a member, which started four years ago meeting monthly with the Commissioner. From those meetings, the task force is able to go back and tell what is going. This is an example of what could be formed for the County beneficiaries with a committee that has the ability to go back to the entities and share inform, concerns, etc. WSSDA saw impacts of an active committee and saw results.

Bork felt there was a need to discuss a deeper flow of involvement. Also there is a need of a greater executive to see what's, going on; how is it going; DNR maintains managed with a lot of input by all counties and interests.

Murray suggested that a forester with intimate knowledge of what is on the ground. That knowledge would allow more fine-tuned solutions. Scott felt that there needs to be a good working relationship with the DNR. Also need to address the unique situations and creative options within the OESF. This would allow for asking why more exciting things were not being done there. Byrnes asked for further detail from Murray on his idea of a forester. Murray noted that the County Forester would probably be a single employee with a small staff of contractors who could provide information as needed. Fleck noted that you need one person at the County that can read the documents, make the calls, ask for information, and provide responses.

Lea asked why these issues could not be handled by Commissioner Peach who is now sitting on the Board of Natural Resources. It was noted that the BNR is a policy body providing policy oversight over the Department and undertake things such as the sustainable harvest calculation (SHC) which the BNR adopts, and the long term marbled murrelet strategy. Lea felt that Peach may be the most qualified individual regarding timber management in Clallam County, but understood that the role on the BNR was different. Scott felt that an independent person is needed to address these issues and not Peach.

Doherty noted that there are always a series of risks. If the County were to hire a forest, there would be risks associated with that. There are 21 timber counties that have a cluster within the Washington State Association of Counties. They select one member to serve on the BNR and that member met with the timber counties. Further, they were able to have field trips to sites, have staff narrow topics, discuss finance issues, and educate County Commissioners. While there are 21 counties, 12 actively participate. However, the interest at the state level is not as strong as other industries (aerospace, software, etc.) have grown and those are the big dogs with economic impacts at a state level. He had asked about OFM's interest and there was a lack of interests in this area. The County did have a county forester, Mel Sun was the last person to hold that position. He addressed things like forest taxation, etc. School districts and others are concerned about harvest revenues as all revenues get tight, and it's just not timber at issue but other revenues. The timber counties approach may work in that when they wanted a meeting with the DNR, have field trips, etc., the Department met with them.

Murray noted that the resolution really only focused on the issue of trust lands. Doherty felt that the resolution for the TLAC was crafted by a few people for a narrow purpose in what was not an open process. In bad markets, there are want for more public timber. It is a big part of the political reality. The Bert Cole years was a period of overcutting and this did not address the issue of a sustainable yield. Local companies in the industry need to find a way to contribute to the sustainability of the market for the long term. Further, other revenue streams need to be pursued, for example carbon markets and initiative I-732. Thaler noted that most environmental organizations are against this. He felt that there were bigger questions that need to also be addressed as part of this discussion.

Lea shared that the history showed a race to get to the park boundaries to get timber harvested. This created a "them v. us" situation that lost a lot of people. Too many young people are falling through the cracks. While the resolution was a narrow approach to things, there should be means

of using Peach. Murray noted that Peach is really a full time County Commissioner who also serves on the BNR, and having a level of engagement and oversight of the DNR may be a full time job on its own.

Scott asked if it would be worth going back to the Commissioners and ask what the problem was that was being asked to be solved. Thaler noted that if Fleck and others are not pushing reconveyance, then don't need to say what should be done. Scott again asked what the problem was that was trying to be solved. Swanson felt that the feel in the room was such that a substantive vote on reconveyance would be needed. Grays Harbor would tell us a lot, but reconveyance issue is a gauntlet that was not likely to succeed. Bork asked if Grays Harbor was an example for what was here in Clallam County. Swanson felt it would be interesting, but the lands are different and the magnitude of the issues were different too.

Byrnes shared his reluctance on seeking reconveyance. Cross made a motion, seconded by Kelly, to advise the County Commissioners to seek reconveyance of the 92,525 acres of County Forest Board Transfer Lands (State Forest Lands) to Clallam County. On a voice vote, the motion failed 1-14 with Blum and Murray abstaining.

Murray gave an update on his request to Grays Harbor. Grays Harbor was sent several inquiries. But, there had been no response and so he was not sure they will be coming. Murray shared that Grays Harbor manages ~39,000 acres with an average age of 36 years. There are two foresters with 20+ years with the county. They do all of the work and hire consultants as needed. The lands could yield 20-30 mmbf per year, but probably closer to 20 mmbf. Roughly 500-700 acres a year being harvested in relationship to market needs. Roughly \$6-7m/year in revenue would be generated. Paul noted that the volumes by County by source are available on line. Swanson asked if this was in the State's Annual Timber Harvest Report and it was confirmed that it was with the previous year's harvest by Grays Harbor being 23 mmbf.

Bork asked if the TLAC could think about other alternatives such as management emphasis areas? Also things like carbon credits as a revenue source for the junior taxing districts? The Nisqually Land Trust undertook an arrangement that resulted in it being paid for carbon credits. Thaler felt that that example was worth looking at, while Murray felt that it was a bit of a shell game. Paul noted that in the Paris Accords there was a proposal to develop carbon parks. That if the price of \$36/ton was funded and paid, this could generate \$26m/year. While the carbon credit market was not established, it was being developed and formed. The County could benefit from that.

Doherty felt that there was a need to look at all of those details in relationship to the land base. Some lands may be worth looking at for one issue, then other lands could be looked at for other issues. Private timber needed to share in addressing the bad markets and needed to share that pain. Murray felt that there was a sharing of the pain.

Bork felt that a big issue was diversification and as such could things such as health, recreation, and other benefits be pursued? She felt that there was a need to look at having more than one means of generating revenue from these lands. Swanson noted that if one could get paid for setting the lands aside as mentioned, that could be great, but there is a need to see a model that shows that that would be a greater benefit?? Thaler suggested that the group might be interested in a presentation by Dr. Paula Swadine on these markets.

V. Update on Data Requests from DNR

Blum shared information on the trust land transfer program. He explained that this is a program that is budgeted by the State with funds from the State Capital Bond. Much of the lands associated with this are Common School lands. The chart provided covers the period from 1989-2016 and this does not apply to CC State Forest Lands.

Lea asked for clarification regarding the value shown was the appraised value and if that sum is the amount that changed hands. Blum noted that the values represent \$3.9m in land value and \$24.8m in timber value. The \$24.8m was placed within the common school construction account, the land value is used to purchase replacement lands for the common school trust.

Byrne asked about the transfer of such lands and if in the transfer the loss of revenue was something that DNR had to make up? Blum noted that the DNR treats the transfer as a virtual harvest with the beneficiaries paid for the value of the timber at the time of the transfer. Then with the proceeds for the land's value, new lands are purchased and future revenue would be generated from those new lands.

Blum also provided a five page technical paper explaining the DNR's inventory.

VII. Next Meeting Topics

Murray turned the TLAC's attention to the next meeting. There were questions regarding the date of the meeting and also the topic. Murray again noted that no response had come from Grays Harbor and that that was hoped to be the topic. Reandeau noted that the OESF and the issues to be raised in the second part of the resolution made the most sense for agenda items.

The TLAC discussed dates and on a motion by Kelly, seconded by Bekkevar the motion was approved with Thaler commenting prior to the vote that it would be ok if the topic was the OESF. There was one vote opposed to the motion.

Fleck asked the TLAC members to consider writing up the basis for their votes on the issue of reconveyance as that would be important to the drafting of the final reports. If there are no explanations provided, then the minutes would have to suffice. He noted that he would provide his explanation at a later meeting.

Thaler asked that it be placed on the agenda the issues to raise in exploring the second part of the resolution. There was a discussion about the phrase of if not in the best interests of the county. Also, the resolution at Section 3f and 2b have slightly different terms and those may need to be discussed.

For the next meeting, there should be discussion of a possible field tour with discussion of the location and the purpose/topics to be part of that. Reandeau asked that the tour discussion include site issues; operations; understanding of costs, and also roads.

Kelly reminded members of the rules associated with a special meeting and specifically the fact that it requires 24 hours notice, notice has to be posted, and the TLAC can only discuss what is

specifically on the agenda. Lea asked for clarification as to whether a public meeting is different from other groups and clubs in this regard, and it was explained that it was.

VIII. Public Comment

Carol Johnson – Port Angeles – NOTAC - commented that by taking the reconveyance vote, this was all about getting answers and people need to know the information. She noted that the cost of preservation was great to the area with lots of promises made. Regarding the marbled murrelet long term conservation strategy alternatives, she noted that alternative B had the least acres set aside. The DNR study says that the proposed strategies will have little impact upon the murrelet populations. She questioned the costs of increased set asides upon the beneficiaries. She asked that the TLAC consider the questions of the lack of revenue and the preservation of lands. She also felt that the carbon discussion is great to know that there is potential of obtaining money, but what about the impacts associated with the lack of jobs.

Jim Stoeffer – Sequim School District and a member of WSSDA Trust Lands Task Force. He asked about how are schools funded and how are the monies used. State until recently took out these funds, and that they funds are not really a large pot of money. However, the voters think that schools have the large pot of money coming from timber so they vote against proposed bonds. If the bond had been passed, then the District would have received funds from DNR timber sales. This meeting has provided more information that can be taken back to the District's constituents. McCleary task force is also talking about the trust land revenues. One of the questions that remains unanswered is what would the schools get if from whoever manages the lands?

Phil Kitchel testified that the issue goes back to 1985. In the early 1990s, there were 30 old growth sales removed by Commissioner Boyle. Belcher put in a dbh (32") prohibition within the HCP and there was no baseline analysis done. Sutherlands policies took this further. Monitoring by the County to ensure that it receives more revenue has not happened. Unless there is an increase in available acres, then it is hard to maximize those revenues. There needs to be changes in policies.

IX. Adjournment

Meeting adjourned on a motion by Thaler, seconded by Kelly, that passed by unanimous consent.

MEETING MINUTES FOR:

July 8, 2016

Clallam County Trust Land Advisory Committee

8 Jul 2016

Meeting Minutes

<https://www.youtube.com/watch?v=grSNXv5QVos>

Times that appear next to items reflect the actual time and are provided as a guide for those utilizing the Clallam Public Eye video.

I. Call to Order /Pledge of Allegiance/Roll Call

Meeting was called to order at noon by Chair Joe Murray. Prior to the meeting, the members had been given a copy of a letter from Harry Bell regarding the Washington State Society of American Foresters letter on carbon sequestration.

Bell was attending as the alternate for Tom Swanson. Bell introduced himself to the group and is associated with the Society for American Foresters. He provided the SAF position paper on working forests. He highlighted specific parts of this document. Carol Johnson was attending as the alternate for Jason Cross.

Roll was called. David Bekkevar was absent; Carol Johnson was the alternate for Jason Cross; Harry Bell was the alternate for Tom Swanson.

Ed Bowen – Clallam Bay – Raised a point of order regarding the motion by Cross on reconveyance at the previous meeting. He noted that the TLAC did not adhere to its by-laws, specifically Section 7, in that it did not provide the public written notice of the motion seven days in advance.

Pledge was then taken, Murray having realized he skipped the order of the agenda.

II. Public Comment

See above.

III. Minutes of May 20 2016

Minutes were passed on a motion by Pacheco, seconded by Brynes. Motion passed.

IV. Review – Clallam County Trust Lands

a. Review the Olympic Experimental Forest

Drew Rosenbaum, Assistant Regional Manager for State Lands introduced himself. He has worked for the DNR for nearly 30+ years and has been working in the Olympic Region since 1987. He presented information from a presentation on the Olympic Experimental State Forest (OESF).

The OESF consists of lands managed by the DNR from Deep Creek in the east to the Coast and from the northern boundary of the Quinault Nation to the Straits. It consists of 11 landscape units.

The OESF arose out of a recommendation by the Commission on Old Growth in 1989 and was incorporated in the HCP. The vision of the OESF is to be:

“a more productive, healthier, biologically diverse, and structurally complex forest that supports native wildlife species and provides a perpetual source of revenue for public schools, universities, local hospitals, library districts and other trust beneficiaries. ”

The mission for the OESF is:

“the integration of revenue production and ecological values across as much of state trust lands in the OESF as possible to meet DNR’s vision for the OESF.”

The difference in management is that the OESF is to be an unzoned forest that would allow for “the full land base to be used” rather than setting aside lands within the forest for specific purposes used in the 1980s. The approach was to be more holistic and see if there was a way to focus on what was kept and what was being removed. In addition, the DNR would move the various stands throughout various life conditions which would move the habitat available for species throughout the OESF.

One of the focal points is on the Northern Spotted Owl. Murray asked about the age objective of stands? 80+ years but stands are defined by habitat conditions: two canopy layers; 15-75 trees per acre; 3 snags per acre; certain amount of downed wood; a specific Curtis Relative Density; etc. The goal of taking this approach was to create and regain a higher degree of complexity with the forest stands. As part of this objective, there would be an attempt to create and retain various stand conditions. Most of the OESF young forests were 30+ plus and most were planted in second growth DR with a natural infusion of hemlock.

Bell asked if the objective was to provide some old conditions, manage the submarginal forests in the expectation of cutting? Yes, that was one of the objectives.

Lea asked what did complexity mean? Did it mean Diversity? Yes, in part it does. Older trees, canopies, downed wood, 20% of other species. The advantage of having such complexity is that it would allow the DNR to achieve its ecological goals.

In 1989, and in the early 1990s, the initial OESF Management Plan developed some high level concepts around commercial forests. This included:

- Greater number of leave trees;
- Address the forest canopy;
- Maintain snags;
- Keep LWD that will stay on the ground longer;

The DNR would utilize harvest prescriptions to further the diversity of the forest stands. This would create rotation age at various different levels. Scott asked about one of the goals/questions was “How to ensure the complexity doesn’t unreasonably compromise the production capacity?” This is addressed when assessing costs.

A key to that approach was the development of the 20/40 rule. 40% of the landscape was to be Young Forest and 20% would be held within the Old Forest Habitat over time. Reade Hill

meets these requirements now. Seiku is one of the last units that would meet this requirement. Once these are exceeded, the HCP allows the harvest of the surplus. Riparian zones were to be managed in a different approach that had a specific multi-step process to determine the best means of harvesting in the riparian area. In addition, a wind model would be utilized to determine where to leave trees and develop the tree edge.

Murray asked if this was 60% or 40%? No, the 20% was to be part of the 40%. Do the riparian set asides count? Yes, if they meet the stand conditions and many do. Fleck asked about a comment that once a unit exceed those 20/40 standards action can be taken on the older age. But, doesn't the HCP say you can harvest that that exceeds that amount? Blum noted that there was a rule that could allow for harvest if certain conditions were met. Fleck noted that the option exists, but the DNR has imposed an internal rule that has removed the flexibility within the HCP. Fleck noted that the HCP actually expected that some of the older forest could be harvested during the first phase of the HCP and is talked about within the HCP at pages IV. 89-91 or about there.

The subforest was to utilize a density index of 48 and not be below 115 stems/acre. There was the ability to sell wood really well with an excellent response. A few sales had to be redone due to road costs. In addition, the industry tended to like the size of log being offered. Beck asked about the basal area number used and how NSO was monitored. Rosenbaum noted that the DNR managed its land for habitat, not populations of NSOs, and the focus was to ensure a place for NSOs to live. Blum noted that there are survey sites on the DNR lands, but that they don't run monitoring for NSO. Byrnes asked who did that monitoring, and it was believed that it was the USFS.

Bell asked that with commercial thinning in young forest marginal, are there issues with cable logging versus ground logging as to the costs? So far, it's been ok, looking at ground base logging and are able to find viable stands. Some 10,000 acres have been managed in this way within the last three years. Cable operations are tough with only three operators on the west end. So cable operation required sales see a drop in price. Bell asked if the inventory can help drive that. Rosenbaum noted it was both inventory and on the ground knowledge. The planning forester also would go into each forest.

Murray asked about the stumpage prices realized. He noted that DNR received about \$300/1,000 and asked with commercial thinning what was the \$/1000? About \$60/1,000 and with cable it was about \$10/1,000. The Region's volume dropped by 2/3rds with the requirement to meet the settlement requirements for 1:1 harvests. The DNR had 2-3 years to get through that requirement and these were very low revenue sales.

Riparian Zone. This was to be an unzoned approach to riparian areas. There would be no set width like other areas that have a 150'-175' set width. Harvest is allowed and if the OESF plan is signed, there more options available to the land managers. There is also a 12 step process to evaluate harvests within riparian zones. Six steps come from the watershed analysis process – these are some 300 pages plus appendixes. The six other steps include things such as shade, downed woody debris, sediment, etc. Once the OESF Plan is signed then the 12 step process is no longer required. Rather the assessment for each basin is done by the DNR Division to determine the riparian zone. This includes the assessment of the interior core +

the flood plain, wetlands, and steep slopes. There is not a “cookie cutter” width for a riparian buffer within the OESF.

Wind buffers within the riparian zone are another issue. The DNR utilizes a wind model. If it is determined to be a red zone, they leave a wind buffer which is 80' at the outer edge of the interior core buffer. Data is provided by Division for each subbasin taking into account specific on the ground conditions. The +80' is to this interior buffer. Yellow or green may result in change of angles of the cut edge, development of pockets of trees within the unit all to address the buffer. Murray asked if there had been follow reviews of the model results. DNR has not used the model yet, as it would be used the year following the signing of the plan.

Bell asked what was being used by DNR whether it was the 100 year flood plain versus the bank full width. DNR utilizes a variable buffer that is best seen by folks on the ground. The model is a toll and the Region has been working with the modelers for three years to development the model and to make adjustments. Bell followed up with asking which was being used. What the science and trust responsibility dictates. DNR is still utilizing the old rules for stream typing.

Scott asked about the Wind model and where had it been used? The model was developed by UBC originally with feedback from region. In addition to the model there is the ability to utilize local knowledge of foresters. Scott asked about how was it to update? DNR can easily update the model and can do so frequently. Though the model would not be used until the plan was adopted which should be occurring very soon. Harvest modeling has been a good example of interaction with the model and field verification. BUT, it is important to note that the model is a tool. Foresters cannot over rely upon the model.

Brynes asked about changes within the zones and will there be monitoring by the DNR of species of concerns? Yes. The DNR works with a lot of partners in such monitoring to include Quileute Nature Resources and the Hoh Natural Resources. Murray asked about riparian or stream monitoring? DNR undertakes instream monitoring now and for the last two years. Brynes asked if this data would be released to the public. DNR plans to release the date when there is sufficient data to be released.

(12:45)

Regarding the Marbled Murrelet, the DNR is in the process of developing the long term murrelet strategy (LTMS). The Olympic Region is waiting for the plan. Blum noted that the BNR would soon have the harvest out puts associated with that. Bell asked about the differences between the alternatives. Blum noted that there were differences. Questions that were being reviewed were how those differences play out over the next 100 years. Also there will be analysis of the alternatives trust by trust. Right now there are maps with designated habitat. DNR stays away from that. Blum noted that this is a conservative approach with a no touch strategy to identified lands to ensure that options available under the LTMS can be adopted.

What are the objectives of the OESF?

- (1) Learning in a commercial forest?
- (2) Balancing of ecological and economic values?

(3) Not a demonstrative forest.

Murray asked how the DNR was building resiliency. Look at wind stands; root rot pockets – use gaps and plant with resistance trees to get rot out of the soil; and, building into harvest units wind stands.

Bell asked how economic benefits and ecological benefits? This is done by complying with the fiduciary obligations. The HCP was adopted by the BNR to comply with ESA requirements. The OESF was made part of that with adaptive management being a key component. The plan will be the answer to the question of how do we implement a chapter within the HCP.

Thaler noted that the DNR trust is not a private trust. Scott asked about the 27th of June report, and the analysis with the County opportunity what would be the impact of the OESF on that trust. Blum noted that this was done in 1997 so those impacts were address. Scott followed up with regard to the arrearage? Blum noted that: (1) Analysis of the harvest model by BNR in 1997 – so the BNR determined that certainty for increased sales was important; and, (2) 20 years of data on delivery versus targets. That does not address the question that some have raised whether the tradeoff was worth it? Scott noted that there was flexibility and changing conditions, but the management has not changed. Is this a correct statement? (1) The OESF is different – but the management has not been all that different, but the hope is that we will get closer to those objectives; (2) Performance and management has been taking place in a world of existing uncertainty; and, (3) the Plan will allow management activities to take place in stands that are 50+ years of age and within riparian zones. However, the LTMS remains a big issue and it will affect the OESF.

Bork noted that with learning being a significant aspect of the OESF, is the DNR improving its public outreach program? Also, on the issue of forest health, given that there are a variety of problems and the DNR can utilize various solutions has this resulted in improved logging techniques? Yes for many years. DNR has limited the type of equipment used and also employed various types of silvicultural treatments. Reliance on the local knowledge of the region and the region's foresters is important to this. Bork asked about data gaps and how the modeling is used to address those? Modeling tools can be used. Questions that have to be answered are: (1) what data do we collect? (2) Disconnect between sales mapping to protect areas verses converting that into GIS mapping. Murray noted that studies are starting on unstable slopes and that will be of benefit to all land owners.

Rosenbaum noted that there were ways to update DNR maps, but those are also lagging behind. Looking at GIS specialists and also ways for the foresters to update the maps. Bork asked whether this was because of staffing or funding? It's actually because of both. In addition, there are the questions of how to do this, and what do you need to do this? For example, should DNR define and map the riparian areas specifically? There is also studies on these questions and how is that study work incorporated? Murray felt that the State should map the riparian areas. Bell also noted that the USFS is looking at issues of compaction in some long term studies that could also be used by the DNR.

Lea asked whether a system existed to collect this relevant info? Does DNR have an established measure of how the ESA and the CWA affect the number of days of operation? DNR can operate between 218-230 days a year. The issue of the CWA on operations were really more significant in the first year of addressing compliance. DNR has seen that folks have

adapted and found ways to address and beat the sediment issues. All of these things do impact the ability of DNR to meet its deliverables.

DNR has an adaptive management objective for the OESF. Procedures are in place and a key associated component of the OESF is the research and monitoring. This is focused on riparian monitoring. A gap study in Queets to look at how such gaps impact regrowth and edge effects. There is also the Bigly study with control plots in PCT. Another study site is in the Goodman. Drew noted that he was glad to see this. Operational trials are also a component with a framework for these. If a proponent wants to try something, then they are required to write this up, bring it to the DNR and see how that proposal could be deployed. These are expected to be small operations. Questions remain about how to obtain the data and how the results would be reported.

The OESF is a big job and its success will depend upon partnerships. While over time there was a drifting for a little bit, but now the focus is bringing efforts closer to the OESF. The partners include the ONRC, local governments, tribes and others. Outreach is a component of this and Sue Trettevik got a solid building block started for this. Murray asked why private lands were not listed. Rosenbaum noted that private companies and organizations are also interested such as AFRC. Lea asked for additional information on the outreach plan. Rosenbaum noted that the DNR has to work to get the message out. This includes information on what DNR is doing and what are the results of DNR's activities. Form could be in newsletters, maps, etc.

Scott asked about the roadmap DNR has for outreach and R&D. She noted that she had concerns about other areas, but that OESF has a significant portion of our trust lands. If the DNR fails, we suffer. So, how does the beneficiaries of these lands get compensated for this? This shouldn't be done at the expense of the trust beneficiaries. Rosenbaum noted that the Department watches at a field level for \$ to the trusts, but that this is a valid concern that they discuss.

Bell asked about the DNR's RMAP status for the OESF. RMAP stands for "road maintenance and abandonment plan" and it is focused on addressing the needs for fish habitat. Some extensions have been obtained, but most RMAP obligations are addressed with the ability to finish early. There are huge differences in how these requirements were addressed. The big rain events are the pineapple express or a rain on snow event. In those events, staff drive and monitor culverts, there is a triage approach to improvements, and then there is a repair phase associated with blown out areas or slides. There have been situations where two old side cast failures resulted in slides. A side cast road usually is built out of unconsolidated fill that on the side of a hill. A relief culvert is along the road to move ditch water into the forest floor. The focus on the RMAP is to address salmonids. An RMAP project is one that is "right sizing" culverts, but there is also a need by DNR to discussion "right sizing" the road network as well. This will come over the next few years as DNR transitions from RMAP pipe projects to maintenance of roads. Thaler asked about the percentage of pipes that were the subject of an earlier junction and how many of those are repaired/addressed? Rosenbaum noted it was 92-93% within the OESF. Fleck noted that the DNR has worked diligently on their culverts, where DOT has not. Blum noted that the difference was DOT has a larger number and bigger projects.

OESF Forest Land Plan. This has really been driven to completion by Commissioner Goldmark and Blum. There has been an excellent level of communication on how this plan has been developed. Final EIS will be published in August with a signing of the plan in Late September/Early October.

(1:41)

Group reconvened for questions. What was meant about “right sizing roads?” Mainlines would remain, but the DNR needs to review the spurs and look at where the DNR will not be going back to work. Also, look at roads prone to failure within the network of roads.

Fleck asked for an explanation about the concept of “right sizing.” He noted that on the West End the road networking is used by a large number of folks that use these roads. There is another agency that has done such “right sizing” and has done so ignoring the interests of stake holders and user groups. He asked how this would be done. Rosenbaum noted that the mainlines would not be abandoned. That there would be areas where there are roads with a high risk of failure and those may need to be abandoned. He noted that this was in the preliminary stages. Fleck noted that this is something that the public needs to be engaged in early. The USFS in Fleck’s opinion completely failed here and efforts to address afterwards in the Calawah River plan still remain unaddressed five years later. He asked the DNR to avoid the failure of that other agency.

Murray asked about potential closures and what would be the manner of review? Examples could be where water structures have been pulled out to allow the handling of water. Also pull side casts, and pull backs, and then those roads where the DNR could just walk away from that specific area. With 2700 miles of roadway, the DNR will need to start engaging the public very early in this process.

Doherty asked about if the DNR was addressing climate change impacts? No, the OESF is not addressing those. There are a couple of processes within the DNR being discussed and strategies for some areas such as transactions associated with acquisition/purchase and also the water portfolio. The BNR debated adding to the Policy for Sustainable Forest on climate change. It is expected that after the OESF, the SHC, and the LTMS that the BNR may return to that discussion for a specific policy to be added to the PSF.

b. Plan a field trip for the Committee

The TLAC turned to the issue of planning the proposed future field trip agenda. Murray noted that he had a list of some of the items people had discussed earlier:

- The forest mosaic within the Sol Duc Valley;
- Carbon in relationship to stands that are new, 40 yo, 80 yo;
- Riparian areas;
- Harvest unit – look at the description and layout, the unit’s goal, and then how that was managed/harvested.
- Example of silvicultural regimes – PCT; CT; Harvest; Planting; Brushing; Burning; Compaction.

Fleck asked how long people wanted to be out in the field as that dictates how far away from where people were living and traveling from. In the past, there were field trips undertaken that had things like a trip up to Klahonie Peak to see the mosaic landscape. These trips were started around 9:30 a.m. at the back end of the lake (west end), and there is one site for riparian areas that is above the Oxbow bridge. This has four different units by a stream that shows four different treatments. It is off a main line and shows how DNR looks at riparian areas. Blum asked for a list of topics and then those could be triaged. Murray noted that the peak overview allows the ability to see specific examples of land ownership, management, approaches in the past and present. He felt there were a few places in the Sol Duc valley. Scott felt this may be of great interest. Thaler felt that there was a need to see riparian areas. Also, areas that might illustrate carbon sequestration in riparian areas. Also areas to see various age classes. Murray also noted that there could be areas where estimates could be made versus modeling of carbon sequestration. Fleck noted that a trip could start in that Klahonie area, have lunch in the middle, and the one riparian area could be seen with four different approaches. It's a commonly used site on the site. Bork asked if a visit could be to a recently harvested stand where the proscriptions could be explained as well as the goals for the harvest. Bork asked about how things were done and how that can be reviewed on site. Bell noted that the goal was not to evaluate whether the rules were working, but rather how well the DNR is doing its job. The TLAC was not to change policy, but how well the DNR was doing their job. The trip should pick one or two units that show what the DNR did, how they met the challenges there, and what were the issues within that harvest. Murray felt there should be some discussion of the silvicultural regimes, the harvest methods, and the forest management approach. This could include thinning regimes, plantings, slash, compaction, etc.

Scott asked if clarification could be provided on Hemlock and if those were good trees? They are good trees but the values fell during the Great Recession. Reandeanu noted that hemlock is used at the mill. It has less pitch, and straight hemlock has specific values, also hemlock chips are used at the mills. Bell noted that the markets change and prices for species change. Silviculturally, hemlock does well with rain and shade. It seeds 1,000s of trees/acre and it must be PCTed. Grows in forest duff and rotted wood better than Douglas Fir.

Thaler asked about the scheduling of the trip and suggested that maybe it should be on the Thursday before the Friday meeting; or, replace the August meeting with that field trip. It was suggested that Loni be asked to email the TLAC with potential dates. Discussion then followed on replacing the August meeting with the trip. The agenda would be the stops on and focus of each stop. Doherty asked if the Hermann Bros. chipping operation could be added as it would be worth seeing how that was done.

Scott asked about the AFRC letter from Matt Comisky distributed before the meeting. Murray noted that it was not on the agenda, so not a topic for discussion, but rather should be placed on the next agenda allowing folks to look at the website.

V. Discuss Alternatives to Reconveyance

The initial discussion was how to talk about this within the limited amount of time of the meeting and be able to leave by 3 p.m. It was suggested that a generally discussion to the alternatives to reconveyance.

Thaler noted that the environmental caucus had discussed the issue of carbon, however, those thoughts and discussions were not in an outline form yet.

Bork asked about the decision on how to proceed with that discussion? Bell responded that there were two ways to ask the question: Would the County do better? If not, should the County be more involved? This latter question would be focused on how to interact with DNR for a better understanding of what, how, and why things are getting done or not getting done? Scott asked for more information on the Skagit as an alternative. How do they do things? It was shared that they have an active committee with a contract policy person and that the committee is not a hands off approach. Scott asked if the letter addressing the way Skagit County does business could be an alternative to reconveyance. Skagit County has a different approach than Grays Harbor with an active committee that feeds the County commissions

Bell said he was familiar with that Committee. It has a much broader focus at all forestry issues. Good idea would be to have an advisory committee.

Fleck noted that Skagit County as an alternative. Way to look at this issue is: (1) Commissioners assigned with this topic; (2) advisory committee that talks to the Commissioners; and, (3) staffer or contractor undertaking the detailed information gathering. He felt that there needed to be an established means of delineating how things should be done and by who rather than taking the passive approach of if we are getting money, then everything is ok. The next six to eight months in his opinion are pretty important with the OESF Plan, LTMS, SHC, and other such things. In Skagit, the continuity of the staffer has been very beneficial.

Scott felt that the community needs to be involved and people who live here need to know about these issues.

Lea noted that he has a friend who retired from the NPS and works with DNR. That friend asked that if the TLAC voted against reconveyance, why does the committee need to exist? That friend felt that we should leave DNR alone and was against the County working with DNR. Bell responded that when a group does something it engages in public input.

Thaler recommended that actions to Commissioners across the spectrum could be discussed like the issues like those raised by Matt Comisky. However, the current model is too narrow. Interests are much broader than just financial duties. An advisory committee needs to be similar to this with beneficiaries, producers, political issues, etc. OESF includes Jefferson County so it probably should be included. Bell agreed with the fact that everyone should be at the table within a structure that has a defined set of attendees representing a broad group. Someone at the County should oversee what the DNR does and bring that back to the group. The group could then make recommendations to the Commissioners. This would require a mission, goals, etc. Question is whether you go down to specific units and talk about what is in and what is out, what sold? Why or why not?

Murray noted that staff or a contractor could interface with DNR on a trust level priority. The SHC on trust lands could be a topic where there is monitoring. Also, how to move forward with good forest management. Participation in those discussions by County staff.

Beauvais felt that there was no mistake that DNR is meeting the harvest levels. She felt that one of the reasons was the establishment of this committee. As a result a committee could be beneficial weighted towards the taxing districts. Need to oversee that the harvest level set is in fact met. Very important and that should not be left to just one person. A committee would do a better job with that. Murray felt that a forester with a technical background could bring information back to a committee. Thaler asked about the whether the Skagit County staffer shows up at the DNR? Blum responded that Kendra Smith is the staffer and she is very engaged. Sale issues and she speaks on the importance of that revenue. SHC and she indicates that she cares about. He noted that she plays a role similar to Fleck's appearance at the BNR.

Bell asked whether she did this for the County Commissioners or independently? Blum suggested that Wagner be called and asked. He recommended that she be asked on how she interacts with DNR on things like laying out a sale to reporting to the Commissioners. He suspected that her role depends upon the issues before the BNR.

Kelly noted that having just one person like Wagner from Skagit County is an option, but there may be other options to. Wagner is seen as the face usually representing interests there, but there are others like the school districts. As a representative of the Grange here, Kelly noted that she is not in favor of paying someone. There is a lot of pressure put on the DNR by the School Board Directors. They pushed to get better interactions with the Commissioner and have seen impacts. She felt that there was a need to capitalize on efforts at the state level.

Bello noted that he was not paying to be on the committee. But pay someone to look at DNR's actions and issues made sense. Disagreed with the belief that the committee could do this.

(2:45)

Bork felt that the discussion should focus on the management options for DNR to take to maximize revenue to the County and that the argument has been focused on revenue. She would love to hear DNR talk about maximizing:

1. Non-timber values;
2. Carbon;
3. Recreation with investment;
4. Partnerships to take advantage of other values:
 - a. Anything to participate with the County?
 - b. Volunteer opportunities?
5. Forest health and taking steps to see how to increase revenue in that way.

She felt that the discussion should be focused on how to diversity DNR and succeed in that manner.

Thaler noted that if the problem was a lack of adequate income, then the alternatives are not limited to the trust corpus. So, the need is to deal with the funding problem. If rural school folks get with urban folks, together they can solve the issues with tax issues. Recommend the County Commissioners take action on this front.

Doherty raised his belief that this germinated with a commissioner meeting with one group to go after the DNR to get at public timber. Other avenues exist, for example quarterly meetings that anyone can attend. They will get the ability to answer questions. Timber Counties would meet

with the Commissioner of Public Land and talk with him. He felt there was a need to get more counties involved in and be involved with all counties. When DNR staff explained issues, it's difficult task for DNR to address. They develop compromises and strategies that represent trade offs. Just a week ago, timber was shipped out of county. How many jobs were shipped out with that? There are other ways to have impacts. For example, look at the sweetheart deals associated with land conversions.

Murray asked for a time check. The TLAC continued its discussion.

Lea questioned Doherty and asked if Peach was on the BNR and if he was, what does he do? Doherty noted that the County representatives to the Timber counties committee met quarterly with the Lands Commissioner. He expressed and explained the constraints and the threats about potential litigation. Lea noted that he has a friend familiar with the mill shut down noted that one of the issues was the ability to staffing. Another friend who retired from the Park Service was one respected and his position should also be respected. He had strong feelings that the DNR was doing a very good job.

Bell noted that the DNR has to make decisions. What he recommended was ensuring that those real time decisions were transparent to the public and that everyone knows what occurred. There should not be a wait for ten years about the arrearage. This should be looked at annually. So Doherty and others could plan and look at other incremental sources of revenue.

Doherty noted that in the next year there will be a new Commissioner elected and coming in. He asked if there was a list of good ideas that could be shared with and undertaken by the new Commissioner of Public Lands. This could help with predictability and economic development. It is an opportune time to ask that person what "What new ideas would you and your staff propose?"

Murray noted that the list of alternative ideas he had collected from the discussion about how the County could interface and interact with the DNR:

1. Local advisory committee;
2. Active role with the DNR;
3. Staff member to a committee or contractor;
4. Outreach functions;
5. Oversee DNR on sales and similar activities;
6. Pay no one, all by volunteers;
7. Have on the ground foresters involved;
8. Find other ways to help DNR with funds;
9. School funding by an income tax;
10. Public meetings with DNR;
11. DNR's ideas;
12. OESF should join with Jefferson County Commissioners.

Doherty asked how can you get community timber companies to put into efforts to keep the industry in place? He felt that they should cut back on high profits and on export sales.

Lea asked what does DNR want from the County? Blum noted that it was more of what the County wanted from DNR. Reandeau noted that the question should be what does the County

and the Junior Taxing Districts who are asking more of the DNR want and can we meet that? He felt that there seemed to be a strong want for predictability and accountability. Murray's list was added.

Fleck noted that for the September meeting the issue voted on should be docketed and a public hearing held with another vote. In the September meeting, he suggested that these items be discussed within a "committee of the whole" to avoid the problem that arose.

Bell felt that there needed to be an inventory with a purpose. He noted that things were working, but there is a need to look at the way DNR was working. There needs to be a robust discussion of the inventory DNR has and can it do what people want it to do regarding the SHC?

VI. Public Comment

Ed Bowen – Clallam Bay – Noted that he was disappointed that reconveyance is no longer an option. He understands that there are barriers to reconveyance. Reconveyance is a gauntlet, but it is that gauntlet that is why we have these issues. He asked the TLAC to consider one of the barriers before the DNR: (1) DNR got an extension on RMAP issues and will that create a fiduciary issue? (2) on the Field Trip he asked the TLAC to look at the HCP and the 20/40 rule. Are there challenges to DNR that could be demonstrated on a site visit? Those should that be reviewed?

Toby Thaler – Regarding the SAF handout, he felt there was a lot of those issues he could support. An example would be the no net loss of working forests. DNR exchanges need to be looked at when they occur. He objected to the position regarding carbon. He felt that there was a fallacious analysis of carbon sequestration and carbon analysis regarding industrial forests being credited for carbon sequestration. In a carbon budget it is unquestionable that industrial forestry sequesters less carbon.

Peter Vanderhof – Salt Creek – Appreciated the issues raised. The 10-15 people he has spoken to recently were overwhelmingly congratulatory on the fact that reconveyance was not cost effective or efficient for the County.

VII. Adjournment

Motion to adjourn by Kelly, seconded by Reaume. Passed unanimously.

MEETING MINUTES FOR:

August 19, 2016

Clallam County Trust Land Advisory Committee

19 Aug 2016
Meeting Minutes

[NOTE: This is one of the first meetings where there is no video link available. The minutes were created from listening to a set of recordings made by the County's recorder, but the last few minutes of the meeting were captured by Ed Bowen's recording.]

I. Call to Order/Pledge of Allegiance/Roll Call

Joe Murray called meeting to order. People were asked to sign in and then the Pledge of Allegiance was given.

II. Public Comment

Ed Bowen - Hoko - Two items regarding the agenda: (1) field trip; and, (2) recommendations. He made a recommendation regarding a specific field trip site that would allow individuals to see many of issues addressed. He gave a specific copy of a site sale from the DNR. Regarding the TLAC's recommendations the issue of litigation is significant and has had an impact upon residents of the County. Also the politics of the Commissioner need to be addressed as part of the recommendations as the politics are such that can affect management of the lands.

Jim McEntire - Sequim - Member of the PABA spoke to address a copy of the paper from the PABA that was provided to the TLAC. He noted that it is a white paper to the governments and junior taxing districts in Clallam County. The paper is provided in hopes of addressing the recommendations adopted by TLAC.

III. Minutes – June 2016.

Quorum was asked about, and it was determined that there were 14 in attendance. Quorum per the bylaws was established with the attendance of 11 members. The meeting had a quorum.

Meeting minutes. Fleck apologized June meeting minutes were not completed due to an absence. There will be three months of meeting minutes at the next actual meeting.

Murray noted that the vote on the reconveyance issue would be scheduled for a later meeting to ensure that there is proper notification per the bylaws. There was a request to place it on the September agenda, however, that may be when the field trip would be occurring and so the vote may not be appropriate on that field trip.

IV. Review – Clallam County Trust Lands

A. Field Trip Plan

Regarding the field trip, Bowen's recommendation was circulated to the group and would be passed on to DNR. Due to scheduling challenges, the field trip was not able to be put together for the August meeting. DNR is looking at a trip in September with the location being part of the Clallam Block which is in the OESF.

Biggest challenge was trying to determine when DNR staff could be in attendance. Field trip would be tentatively scheduled for regular TLAC meeting date - 16 Sep 2016.

Could DNR be asked to show a parcel that was scheduled for harvest and then for whatever reason was not harvested. It was suggested to see the Puckerbrush Timber Sale. Also it was suggested that there be examples of what may have caused the arrearage. It was requested that sales materials be provided in advance so participants could understand issues with the specific sites being visited.

Mike Doherty asked if there might be areas that while driving past that could be highlighted in the east end of the Sol Duc that could be shared with lay folks. Also, he asked if there was a site where Hermann Bros. were engaged in biomass chipping so participants could see those types of operations. Concern was raised about whether the operations were taking place on DNR managed lands, however, if there were sites that could be driven by that could be used to illustrate locations. This request would help bring non-foresters up to speed and/or illustrate various silvicultural proscriptions used by land owners.

Murray felt that trip should look at things across the landscape to include different operations, different age classes, active operation sites, management approaches. Also, there should be sites to talk about road construction, maintenance, and RMAPs which all land owners are required by law to address, if no extension is obtained.

It was asked what is the purpose of chipping materials at the log site? Hog fuel is used for energy. Now this is being created at the landing from limbs and materials not suitable for lumber. Hog fuel or chips is also used for biomass boilers as a fuel stock. This takes logs and materials not for lumber production is converted into hog fuel or chips. A location where Hermann Bros. was active on Monroe Road was shared with the group. People should be careful when traveling in that area and near an active logging operation. Safety on the tour was highlighted.

Thaler agreed with the want to see a chipping and hog fuel operation. If it was closer to other stands or older clear cut where the slash was not used in that manner. He indicated a want to see Type 3-Riparian buffers (fish) areas in addition to the RMAP issues. Cross noted that there could be value to seeing riparian areas that were scheduled to be harvested in the past decade, but wasn't and then discuss why this was not harvested. Comparing that to one that is scheduled to be harvested or thinned in the next decade would be worth seeing and discussing. He noted that there was a significant reliance within the DNR to thin stands, including hemlock. Looking at these types of stands and having DNR explain the opportunities and challenges could be helpful.

It was asked if the DNR have any contacts for converting slash debris to hog fuel? This was something to discussion with DNR. Murray thought that in the past there was some interactions with slash post-timber sale.

He asked if there would be an value in comparing the DNR HCP and the Forest Practice HCP buffers? Cross noted that there was no value as the County would be utilizing the DNR HCP. Byrnes asked if there was any way to see how habitat is being managed for Northern Spotted Owls and Murrelets.

List

16 Sep - Regular meeting date.
Stands in general
Land for harvested but not

Background information about why there are stops, what we will be seeing, and why its relevant.
Request to see other management
Operations
Biomass grinding/hog fuel
Management for Owls and Murrelets.

Doherty asked that if there was a majority leaving from PA, he would be interested to have a loop through SR 112 and SR 101 the ride in the van could be used to learn more about M&R, issues within the valley, etc. There will be two foresters in the van to discuss things and there will be DNR foresters at each site.

Also, DNR will be asked for a potential follow up contact for members to discuss issues or questions after the field trip. Susanne Scott noted that if there are questions that could be submitted before the meeting, or afterwards. Murray asked that everyone comply with the Open Public Meeting Act as well. Doherty asked if the DNR handouts could be provided or shared before hand. Murray noted that on the DNR website that there is information regarding the Forest Practices HCP with the rules that have to be followed. It doesn't address the DNR HCP. It is not easy to find on the website, but Swanson and Murray noted that they would share the link.

Buffer rules were updated in 2006 in response to the adaptive management process. Basil area was also addressed in the update. Murray gave examples of how these calculations are done and how the rules are to be complied with. Who is coming with Kyle? Murray felt that Kyle would be working with local DNR staff. Bork asked if specialists could come like a forest entomologist. There could be others such as hydrologist, fisheries biologist, etc. that could come with Kyle. Another that might be worth having on the trip would be Angus Brodie.

(34:36)

V. Discuss Alternatives for Final Report

TLAC moved on to Discussion of Alternatives for Final Report. Murray felt that the main task was to develop alternatives to the issue of reconveyance. He did not think that there was a drive to solve all problems that have been raised to date. He felt that there were numerous approaches to addressing the different means of working with DNR. With the report being due in December, the need is to focus on getting information done. He did not feel the need to extend the committee's activities beyond December, especially in light of a new lands commissioner and potential staff changes. Thaler recalled a rough list of options and asked if that was available. Murray had the list, but felt that it was a stream of consciousness. There was a request to have a draft of a list so folks could have a visual representation. Murray asked for assistance from staff with typing that list. A recess was taken.

(39:00 - mic was left on though for about a minute. Meeting resumed at 40:09)

Murray asked for the TLAC to reconvene. The TLAC utilized a list of alternatives developed that was projected upon the screen for attendees to see.

The first alternative is reconveyance and the TLAC had already decided it was not in favor of that.

The alternatives to reconveyance discussed were:

1. No change and continue management with DNR.
2. Clallam County cooperatively manages trust assets with DNR. DNR would take direction from County. This would take active management role with DNR. County hire a forester that would take advice from County Advisory Board and Commissioners.

This was Combination of several comments. Josey Paul asked how this was different from reconveyance? He felt that this was very similar with DNR. Cross noted that this was not the same as the reconveyance, DNR would take its cut and you would have a new position. Paul saw this as DNR taking orders from the County. Murray noted that the DNR would still manage under HCP. Paul felt that the DNR would be taking orders from the County under this proposal. Swanson noted that this was dramatically different from reconveyance. Under current system, the County gets a report from the DNR every month or quarter. In effect, the County Commissioners are passive managers/overseers. DNR is under trust mandate discussed by Kyle Blum. This adds another layer of oversight and guidance funded by the County. Disagreement may occur about whether that position should be funded as an employee or contractor. Nothing is changing at the DNR. Paul noted that the way this was worded with the DNR taking direction from the County. Scott noted that the "take direction" was a bit strong and that it uses "DNR taking direction from the County in all operations." How is that a cooperative? Diana Reaume noted that there was a discussion about a county person taking a more active involved role. Toby Thaler noted that DNR cannot change, give up, or alter its role. The use of cooperative management and taking direction do not comport with the law and would require legislative change. Also, the wording shows that these concepts are at odd. Murray noted that the TLAC could make a proposal to make legislative changes.

Cross noted that there would be a difficulty with saying the County should insert itself into the management of the lands at the same level. He noted that a person could be available to be involved, be very vocal in issues, and engaged. Murray wrote what was from what everyone said. This is a chance to rewrite these concepts. Scott felt that this alternative is not what Skagit County does. Bob Leah asked that all of the list be read and then go into a discussion about them.

Coleman Byrnes asked about the nature of the list. Murray explained he didn't write down names behind comments, but just wrote down what individuals had said. It was agreed that Murray would read through the list and then a discussion would occur.

3. County should look at other sources of revenue from trust lands such as recreation passes, carbon credits, etc.?
4. County should increase taxes to offset revenue from trust lands. Such as increase property taxes and advocate for an income tax.
5. County should increase fees to look for revenue such as toll roads for example.
6. County should seek compensation from the federal services for lost revenue from the DNR HCP.
7. County should reduce service.
8. County trust lands should be sold and the money reinvested.

Scott added the Skagit County Model to the list. Thaler felt this was a subset of one of the items on the list. Doherty noted that there was a Natural Resources person. Fleck noted that the person interacted with the DNR and the USFS on forest issues.

(53:25)

Thaler suggested regarding number six, the issue was one of replacing or buttressing the revenue flowing to the beneficiaries and increasing the property tax is one option. Members of the environmental community feel that monetizing carbon sequestration. That was incorporated into one of the other responses, but the feeling was this could apply in a group of these. Reaume asked a question about PILT (payment in lieu of taxes) as if there were other such examples.

Byrnes asked about the interaction between the County and DNR under this and specifically who would authorized the timber harvest level under that option. Murray felt that it would be something that would have to be developed by the County. Murray noted that the inventory seemed to be based on LiDAR data and so he was uncertain about the sustainable yield process. He raised questions about inventory DNR has, how the inventory is developed and collected, how habitat was designated, etc. More people on the ground would be important to various stakeholders. Industry does substantially more plots in developing inventories than the DNR.

Leah asked about #2 with specific regard to a 22 Apr 2016 Letter Goldmark to Chapman about the amount of money generated in the first quarter of 2016. The letter slipped by the TLAC. Is the County receiving money from the DNR at this time? Fleck noted yes the county receives money on almost a monthly basis. The letter is part of the quarterly update/report by the DNR to the Commissioners and others. This letter tells the County when it has received money from sold sales, and when it will likely receive funds in the future. Leah asked Fleck to clarify that the Quillayute School system is receiving money from the DNR timber sales.

Leah asked about the loss of the current Commissioner of Public Lands and whether the revenue would continue? Doherty indicated that this is required by legislation. Leah understood the problem to be one of the DNR not doing this because they haven't been selling timber. Fleck said that was not correct, rather DNR has not been selling what they have indicated that they will sell. Leah asked if the Port could count on getting their money for their budget. Doherty noted that there was a host of variables. Fleck noted that the first variable is whether or not the DNR hit their harvest target of 57mmbf on western Clallam County trust lands. Port receives a portion of the sales from such volume. If the harvest projection was that the Port was to get \$500,000 from the total sales volume; but, DNR only sold 22-25 mmbf, then the answer is no, they would not.

Leah asked if the system without any changes is working or isn't? If it is not, what are the likelihood of the next public lands commissioner continuing with those. Murray noted that it wasn't a matter of whether or not it was or wasn't working, but rather is it possible that it could be working better. Fleck felt it was comparable to a student getting a D, C-, C and it was known that they could get a B or B+. Thaler noted that it worked on the assumption of what was the beneficiary's goal? If there was an assumption about the volume sold and market prices received, is that a fair assumption? Thaler felt that regarding the two candidates, it really didn't matter between them as there is an amount of inertia within the process that there won't be a lot of change for years.

Scott noted that from her understanding the last Commissioner was doing well, but now he is leaving. Thaler noted that doing well is up to perspective. Thaler felt that the current Commissioner has been more transparent and forth coming with the current Commissioner. Murray noted that the SHC was done every ten years. Fleck noted that Commissioner Sutherland undertook the last SHC. That sets the direction of the Department, but it's the Board's adoption of the target for the Department's sales program. Scott noted that DNR shared a lot of the faults with the adoption of the SHC. Thaler also noted that there were issues with overestimating sales volumes that hit the market reality. Fleck noted that the sales department never put up the volume that was targeted. Why is no one within the DNR tracking the sales volumes? Thaler and Fleck agreed on the need for this. DNR did share that that 2016 they met their projections.

Bork noted that the measure for desired outcomes is volume sold rather than a subjective resource management qualitative approach regarding forest health, species, etc. She would like to add that management focused on forest health and other qualitative issues than harvest volume. Murray noted that the way the SHC was calculated was in light of all of those requirements. Bork noted that in her experience if the objectives are such as this, the objective is driving the management of these lands and she felt it was outdated. There were other values to these lands other than timber volume. She felt DNR was missing the mark and had yet to see that a species is doing better under DNR management regarding forest health and silviculture. DNR does not have the funding and money to do the monitoring. She expressed her anger about the focus on a level of greed by focusing on volume.

Leah noted that Nippon paper is for sale, 163 jobs are on the line. His associates are not going to vote to replace the PA High School because it cannot be afforded. Someone needs to think about the future of Port Angeles. Brilliant people leave PAHS and very few ever come back. Doherty noted that people didn't think that way decades ago. There are millionaires' grandkids who cannot get jobs. There was overcutting in the past on DNR and USFS. There is sediment in the streams and now there are jobs and investments in restoring those streams. That is not brought into the equation and discussion about the use of these lands. He felt that there were much bigger issues and getting out the cut is an older way of thinking. Congress and others set up other approaches to address when the revenue was set with the harvest volume.

Fleck noted that there was a significant effort to protect and ensure habitat needs with these lands within the HCP. However, the economic obligation of these lands seem to be given less and less merit to address the ecological wants for those lands. Reaume noted that there was only one paper mill left and that mill is in decline as the product is in decline. Newsprint and phone books are no longer in demand. Efforts have been made to find other markets. That is the real reason for the Nippon mill sale. There is an effort by the owners to recovery on that mill/investment. Was there an effort to look at alternative products? Efforts were made to change processes used at the mill from mechanical processing to chemical processing. That prohibits the mill from changing to another product. Thaler asked if the issue was the need to recapitalize the mill.

Paul noted that there was not a need to give up ecological values for economical values. The amount received from those lands per year could be well exceeded by looking at the carbon being created that could be saved. This would have a value of \$26m as set by the feds. That could rise over \$100m/year. This could provide more money to the schools, and end cyclical employment. If we went after the carbon we would put all of the system work for us and create more revenue. Murray noted that the issue of selling carbon credits is that one pays another so that payer can pollute. The issue is associated with a signed treaty (Paris Agreement). Scott noted that carbon sequestration should be looked at a very specific separate alternative on the list as it was buried into one of the other recommendations. Fleck agreed it should be looked at as an emerging potential market and he questioned if the values would actually be realized. Paul noted that this

was discussed in the recently signed Paris Agreement and now has to be setup. This allows a way of putting money into the social fabric of the community. The feds will be working to set up these markets and the question is should we be engaged in this, or ignore it. Scott felt that the OESF would be a good place to review and see if this approach could be established.

Beauvais noted that she was a bit confused about the market that Paul was talking about and asked for additional information. Is this a revenue producing market? Paul noted that in the Paris Accords 195+ countries agreed that there is a need to sequester carbon in our forests. The best place to do this is right here. She asked what is the actual market? Paul felt we should go to the feds and be engaged in this discussion. Beauvais noted that this is not a revenue generator. Paul felt that the feds agreed to do this and that the money is actually there. Doherty noted that in California there was an example of \$391m was given to CalTrans from the carbon market based upon a fledgling report. There is a \$3b in revenue before the legislature on how to divide that. California and BC could be studied to understand the revenue. Beauvais asked why would you let a tree go beyond its life period when it no longer sequesters carbon.

Swanson felt that the emerging market does have relevance. But, is it the duty of the committee to learn how to engage in this. Others are working on this and is that really the purpose of the committee? These discussions could be footnotes or subsets of the discussions. Thaler noted that the BAS notes that sequestration of carbon in these forests continues long after the second century of life. There is a lot of discussion about converting forests into lumber and that role in carbon sequestration. Cross asked about the science about the second century. He questioned this. Byrnes noted that the youngest forest has a much higher conversion rate, but the older forests have a much more sequestered. Cross noted that deep soil carbon is a big issue being discussed. The removal of carbon is discussed and being measured by the UW and others to study this issue. Harvesting at the inflection point of your growth rate is how you take the most carbon out of your system. Thaler agreed to share his information. It was suggested that there may be a need of a subcommittee on this particular issue. At Forks there was a presentation at the ONRC regarding rotation rates and such. It could be a source of information for people interested in that. Doherty had asked if Frank Hanson could video tape that presentation. Reandeau noted that there has been a displacement of long term businesses associated with issues of non-harvesting. Murray felt there was not enough time to evaluate all of these alternatives. *He felt that the statements would be we support this alternative because of XX.* Then a more developed approach would need to be created. Scott asked that it be noted that there was a need for a mix of opportunities and approach to ensure that there is not a dependency on any single source. There is a need for flexibility in management to prepare revenues.

Murray noted that this list may need to be developed and raised. Doherty raised a few other items. The drafting of this recommendation was focused on getting wood to the mills. BUT, there is no discussion of the money leaving through the port and it is not helping the public. Clarification was asked about whether he was asked for the cash flow that was leaving the community. Murray noted that Clallam County timber was not being exported. Doherty noted that the Port exports need to be reviewed in relationship to logs leaving through the port. There is a value there and the public needs to know what that is. There may be a way for Private and Public to get together and address that delta. When the market is bad, public timber is needed. When market is good, privates cut more and that does not ensure a predictable job security for the community. Could this group recommend other ideas?

Scott asked for clarification as to whether Doherty was asking for an economic model of private and public timber sales. He noted that was part of it. He also felt that there needed to be a discussion of conversion of timber lands for non-timber purpose - residential use. This would be good public information for the benefit of the long term economy of Clallam County. Scott asked if there was also another picture on how land use

is related to jobs. Doherty noted that there was also the issue of fire potential. He felt here the issue was converting lands from working public forests to residential parcels (20 acres). Scott noted that development does occur in problematic areas where it is difficult to address fire. Doherty noted that landslide issues, salmon recovery, flood management are examples of development that occurred where it should not. Murray asked folks to focus back on the issue of County Trust lands. County trust lands are not subject to exporting, so not seeing how that this would be reviewed by the County Commissioners.

Doherty noted that a log from a private entity could be shipped out. He felt that the private owners should be able to provide the volume that you need for local mills. Several folks in the 1960s and 1970s visited the forests when they are overcut. The matter in Doherty's position was whether there is a need to look at a longer range perspective. Private companies do pay taxes on the logs cut and those go to governments. There was a discussion about export taxes versus property taxes. Doherty felt that the County should look at forest management across the board. Swanson raised a concern about the discussion as it relates to the free market economy of private property owners. Paul noted that the discussion was lost jobs and lost mills and the relationship to arrearage. He felt that arrearage was not part of that as the arrearage was basically zero. All of the logs shifted to foreign countries were losses to the community. The law that prohibited exports of county logs limited funding to schools and other entities. That issue is one that cannot be changed at the County. However, the County could look at opportunities to address economic issues. Murray asked if that a recommendation would be the development of an economic analysis of the timber industry in Clallam County. If folks would like that on the list, it can be discussed but it may cost a lot more.

Thaler raised a process observation. He felt that there was a lot of direct personal conflict on these issues. The process will generate a report, some will be unanimous, and some won't. There will be a process to create a minority report that can be included. The objective of everyone would be to create recommendations that have the most votes. He also raised cautions regarding the lack of revenue for carbon sequestration was connected to the need to push for such policies. He noted he had raised the idea that Clallam County should work with the urban core to develop an income tax or a capital gains tax. Murray noted such an item was on the list. Thaler felt that there was a need for unity on these issues. Cynthia Bork noted that if there are several goals, those should be written down. For example, one is to optimize economic gain in relationship to the beneficiaries. Another goal is to optimize forest health and that would be part of this larger matrix. The question is how do we do this analysis? Bork noted that some matrix could be used with each of these being measured against a set of criteria. Murray noted that these options would be proposed with the County having to undertake the next course of action.

Bork did not mean that there had to be detailed analysis where estimates could be made. Scott indicated such details may not be appropriate as the recommendations should be ideas to go forward. Bork noted that many of these items are really wants with a need to see these elements being optimized. As part of the management, integrated resource management depends upon neighboring activities. Also, there could be a way to ask how all of these recommendations meet the want to see various things optimized. These could be ranked good, medium, low. Solid alternatives could be judged against these criteria in a critical fashion.

(1:48)

[Break was taken, but the County tape was not restarted. Ed Bowen also had a recording. That was used for the latter portion of the meeting. That was utilized for another ten minutes.]

Leah noted that Belcher and Cole had a lot of power within the DNR and would it be possible to invite the candidates for land commissioner to our October meeting so they could hear what we are trying to do? This

would allow the elected person to use this effort. Murray noted that an invitation could be sent out. Leah felt that knowing where the candidates are coming from is important. Swanson felt this was worthwhile. Invite them, they may not participate, but it is hopeful that they may be interested. There was interest by the TLAC in extending the invitation from the Committee and other entities associated with the TLAC. Leah also noted that he was impressed with the Committee and that people should be proud with the committee working really well. All of the points were legitimate and worth discussion.

VII. Public Comment.

Ed Bowen - Hoko - Didn't see in the alternatives a means addressing the "sue and settle concept/threat." TLAC should recommend to the Commissioners that the fiduciaries should be involved in the settlements associated with these lands.

Ann Seiter - 1. Process - reiterated that all of the notes and handouts need to be part of the public record. Need to be posted promptly. 2. She agreed that the Committee was a good committee and diverse. The Chairman, however, needs to stop responding to suggestions out of hand. The discussion needs to continue. 3. Alternatives. Carbon sequestration needs to be discussed and needs to be included for further investigation and discussion. 4. Also supports looking at the relationship of exports to timber economy and jobs. It's important information for people to understand as part of a bigger picture beyond trust lands and jobs.

Harry Bell - Commented on behalf of the Port Angeles Business Association. Document handed out was a white paper aimed at characterizing the duties of the Board of Natural Resources and the Legislature. It's made available for a better understanding by the public. Comments on that send to him. Wearing his North Olympic Timber Action Committee hat, the Committee is off task regarding fire, health, other revenue sources, exports, etc. Mission of TLAC is to determine how the County can better oversee the DNR and how it manages those lands. It's not the goal of changing how those goals should be changed, those are really the purview of the BNR.

No other public comment. Murray asked for any other comments.

Leah motion to adjourn and it was agreed to by unanimous consent.

MEETING MINUTES FOR:

September 16, 2016

Clallam County Trust Land Advisory Committee

16 Sep 2016
Meeting Minutes

A field trip was held that was hosted by DNR with the following attendees:

DAVID BEKKEVAR
HARRY BELL
KENNETH REANDEAU
KYLE BLUM
BEN PACHECO
JOE MURRAY
SUSANNE SCOTT
TOM SWANSON
MIKE DOHERTY
TOBY THALER
COLEMAN BYRNES
MARY PORTER-SOLBERG

A field safety briefing was provided at the meet point by DNR staff. A field trip itinerary and materials were provided. Eight specific sites were visited by participants – see field material itinerary for specifics regarding times and locations.

No members of the public provided public comment. Discussions about specific sites, silvicultural management, stand information, ecological and environmental responses and obligations, were discussed during the course of the field trip. No actions were taken by the TLAC members present.

TLAC TOUR AGENDA

SEPT. 16, 2016

- 0915 Meet at Fairholm with Introductions and Safety
- 0930 – 1015 Travel to First Stop
- 1015 – 1040
 - Clallam Scatter Timber Sale recent harvest, temp type 3 stream crossing between Units 1 and 2. Discuss Type 3 RMZ buffer.
- 1040 – 1045 Travel to Stop #2
- 1045 – 1110
 - Leyh Up Sorts Timber Sale. Discuss Sort Sale new road construction and road deactivation. Possible Feller Buncher on site.
- 1110 – 1120 Travel to Stop #3
- 1120 – 1145
 - Leyh Low Timber Sale. Discuss VDT of NSO Structural Habitat, combo thinning / VRRH sale
- 1145 – 1150 Travel to Stop #4
- 1150 – 1210
 - P-1400 U1 Timber Sale. Discuss site prep, planting, and stocking surveys.
- 1210 – 1215 Travel to Stop #5
- 1215 – 1255
 - Occupied MM stand (conservation days site) restroom break / lunch. Discuss deferred habitat
- 1255 – 1300 Travel to Stop #6
- 1300 -1320
 - RMAP pipe removal site. Work done with Clallam Combined VDT
- 1320 – 1330 Travel to Stop #7
- 1330 – 1400
 - Ridges Timber Sale. Look at overview of ownership including private lands. Discuss pct of Little Clallam units.
- 1400 – 1410 Travel to Stop #8
- 1410 – 1430
 - Blowder Ridge U1 with view of Blowder Creek U1 and overview of Straits, Prison, Private lands.
- 1430 – 1530 Travel back to Fairholm

All sales visited provided revenue for O1 county trust.
Discussion of type 4 and 5 stream buffers can occur at all sites.

STOP ONE

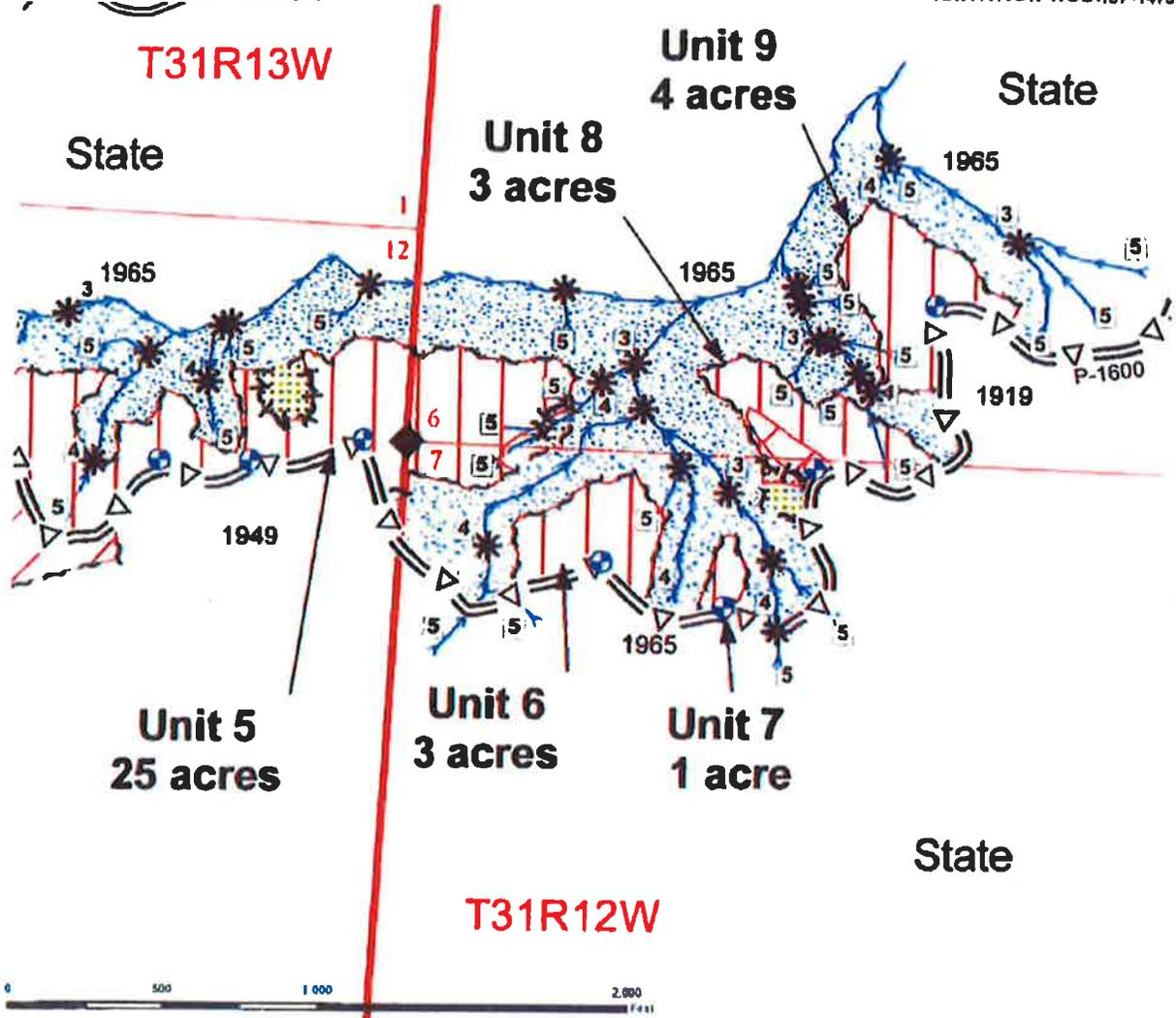
CLALLAM SCATTER TIMBER SALE

- **RECENT HARVEST**
- **TEMPORARY TYPE 3 STREAM CROSSING**
- **TYPE 3 RIPARIAN MANAGEMENT ZONE**
- **DISCUSS TYPE 3, 4 AND 5 RIPARIAN ZONES**

Timber Sales Map

SALE NAME: CLALLAM SCATTERED
 AGREEMENT#: 30-088341
 TOWNSHIP(S): T32R12W, T31R12W, T31R13W
 TRUST(S): State Forest Transfer(01)

REGION: Olympic Region
 COUNTY(S): CLALLAM
 ELEVATION RGE: 107'-1473'

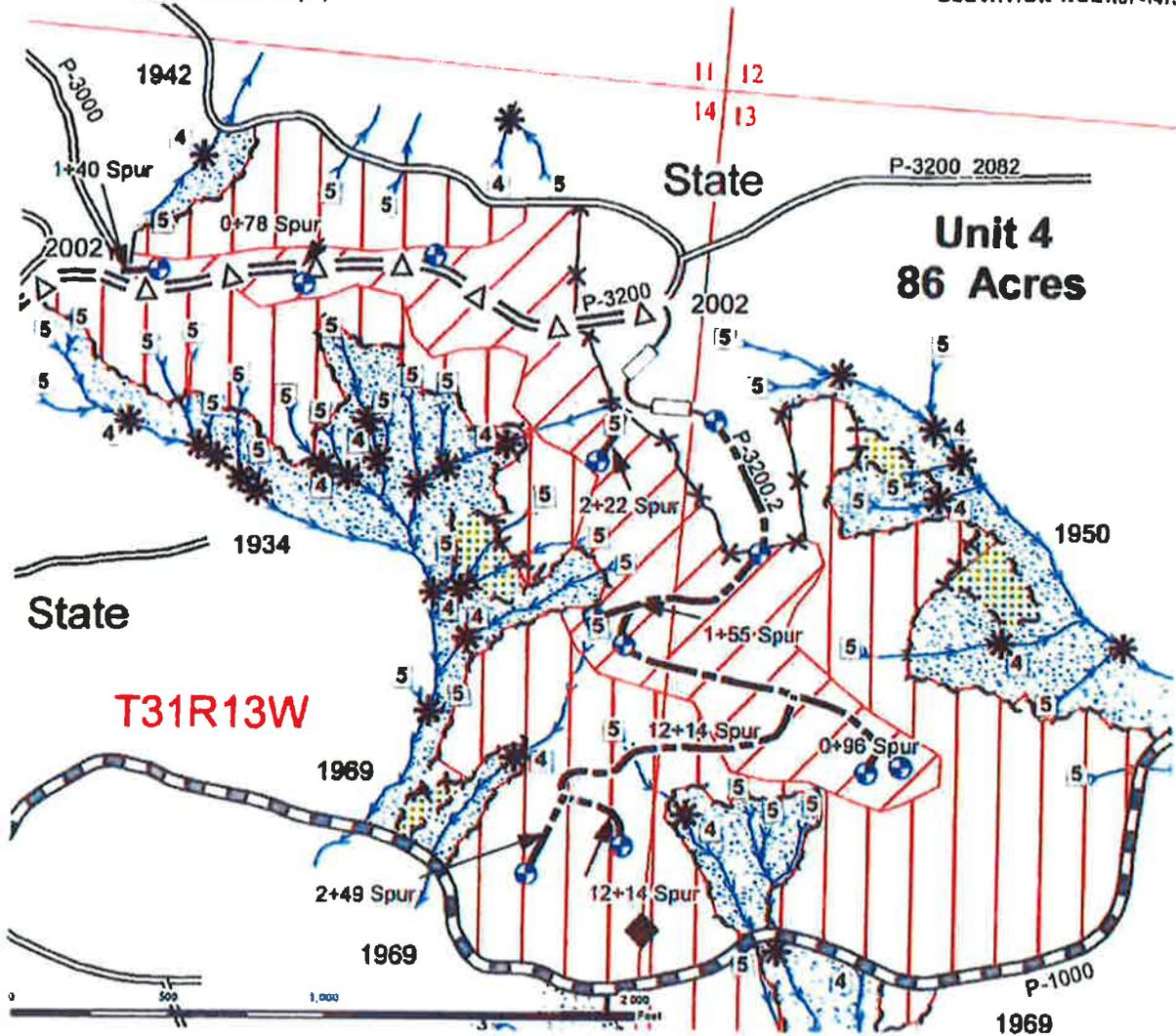


→→→→ Leave Tree Area Tags	--- Optional Construction	▽ Waste Area
--- Right-of-Way Tags	--- Optional Reconstruction	⊕ Landing
--- Timber Sale Boundary Tags	--- Existing Roads	□ Public Land Survey Sections
* Timber Type Change	□ Stream Type	□ Public Land Survey Townships
▨ Cable	* Stream Type Break	▨ DNR Managed Lands
▨ Ground	--- Streams	◆ Monument Survey Points
Leave_Tree_Area	▨ Wetlands	
--- Required Prehaul Maintenance	▨ RMZ	
--- Optional Prehaul Maintenance	▨ WMZ	

Timber Sales Map

SALE NAME: CLALLAM SCATTERED
 AGREEMENT#: 30-088341
 TOWNSHIP(S): T32R12W, T31R12W, T31R13W
 TRUST(S): State Forest Transfer(01)

REGION: Olympic Region
 COUNTY(S): CLALLAM
 ELEVATION RGE: 107'-1473'

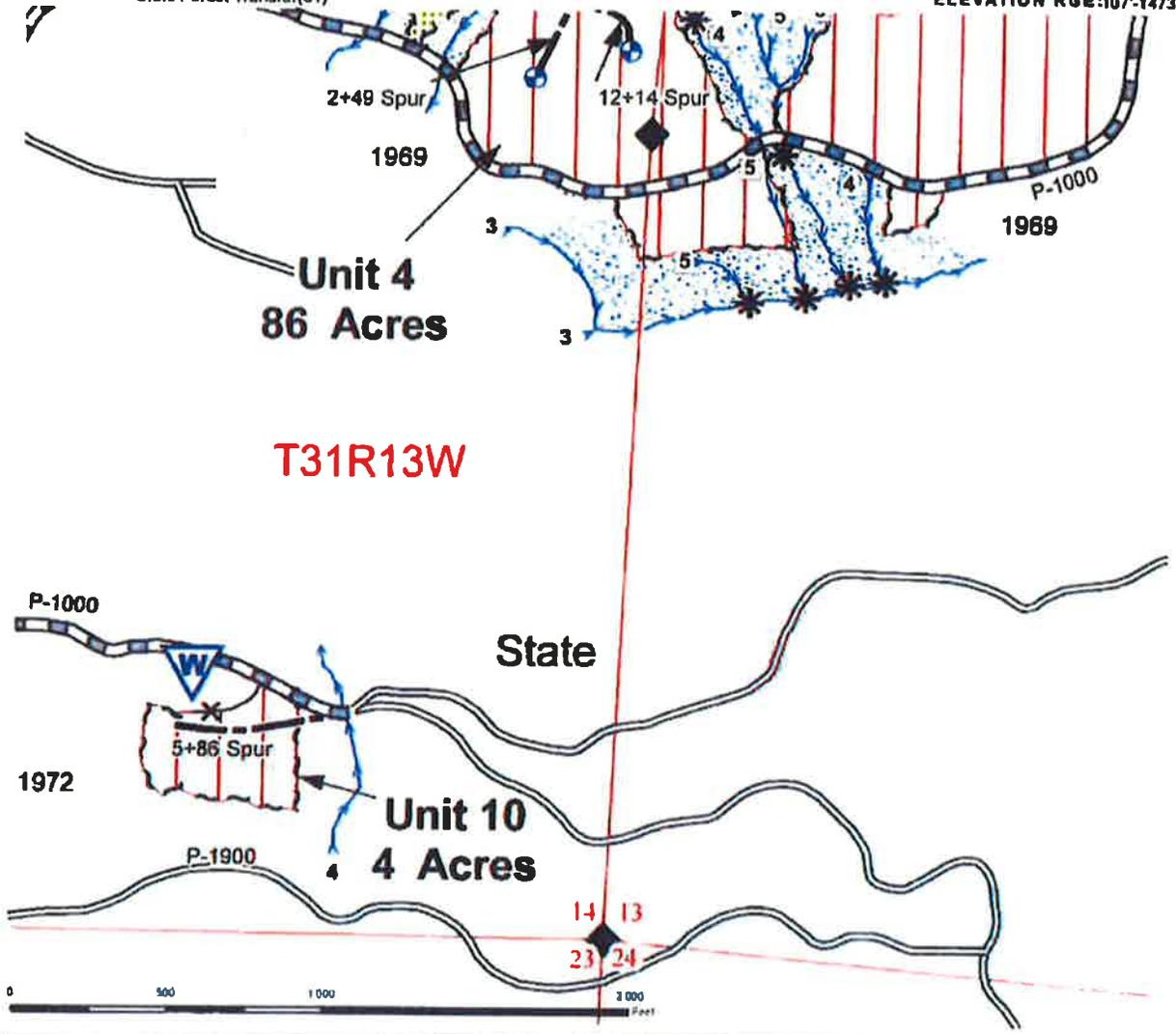


- - - Leave Tree Area Tags	- - - - Optional Construction	Waste Area
- - - - Right-of-Way Tags	- - - - Optional Reconstruction	Landing
- - - - Timber Sale Boundary Tags	Existing Roads	Public Land Survey Sections
--* Timber Type Change	Stream Type	Public Land Survey Townships
[] Cable	* Stream Type Break	DNR Managed Lands
[] Ground	Streams	Monument Survey Points
Leave_Tree_Area	Wetlands	
Required Prehaul Maintenance	RMZ	
Optional Prehaul Maintenance	WMZ	

Timber Sales Map

SALE NAME: CLALLAM SCATTERED
 AGREEMENT#: 30-086341
 TOWNSHIP(S): T32R12W, T31R12W, T31R13W
 TRUST(S): State Forest Transfer(01)

REGION: Olympic Region
 COUNTY(S): CLALLAM
 ELEVATION RGE: 107'-1473'



←+→+←	Leave Tree Area Tags	---	Optional Construction	▽	Waste Area
- - - -	Right-of-Way Tags	—	Optional Reconstruction	⊕	Landing
- - - -	Timber Sale Boundary Tags	—	Existing Roads	□	Public Land Survey Sections
★	Timber Type Change	□	Stream Type	□	Public Land Survey Townships
	Cable	*	Stream Type Break	□	DNR Managed Lands
□	Ground	—	Streams	◆	Monument Survey Points
□	Leave_Tree_Area	▨	Wetlands		
—	Required Prehaul Maintenance	▨	RMZ		
—Δ—	Optional Prehaul Maintenance	▨	WMZ		



STOP TWO

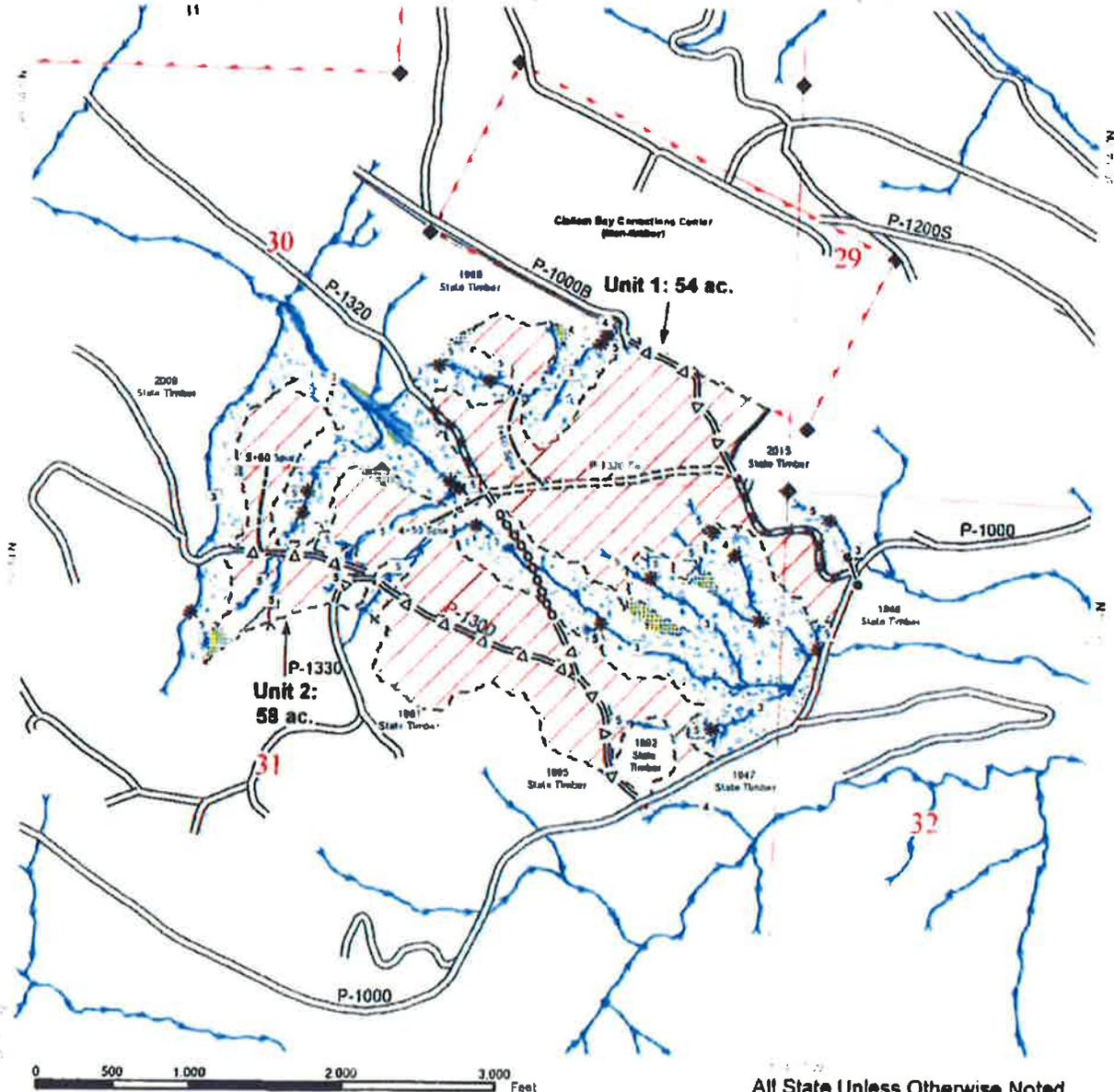
LEYH UP SORTS TIMBER SALE

- **DISCUSS SORT SALES**
- **NEW ROAD CONSTRUCTION**
- **ROAD DEACTIVATION**
- **FELLER BUNCHER ON SITE**

TIMBER SALE MAP

SALE NAME: LEYH UP SORTS
AGREEMENT #: 30-093512
TOWNSHIP(S): T32N R12W
TRUST(S): State Forest Transfer(1)

REGION: Olympic Region
COUNTY(S): CLALLAM
ELEVATION RGE: 300-620'



All State Unless Otherwise Noted

Leave Tree Area Tags	Existing Roads	Monumented Corners
Timber Sale Boundary Tags	Optional Construction	Public Land Survey Sections
Timber Type Change	Optional Pre-Haul Maintenance	DNR Managed Lands
Leave Tree Area	Required Deactivation	Gate
RMZ	Required Construction	Stream Type
Streams	Required Pre-Haul Maintenance	Stream Type Break
Ground Based Harvest		

STOP THREE

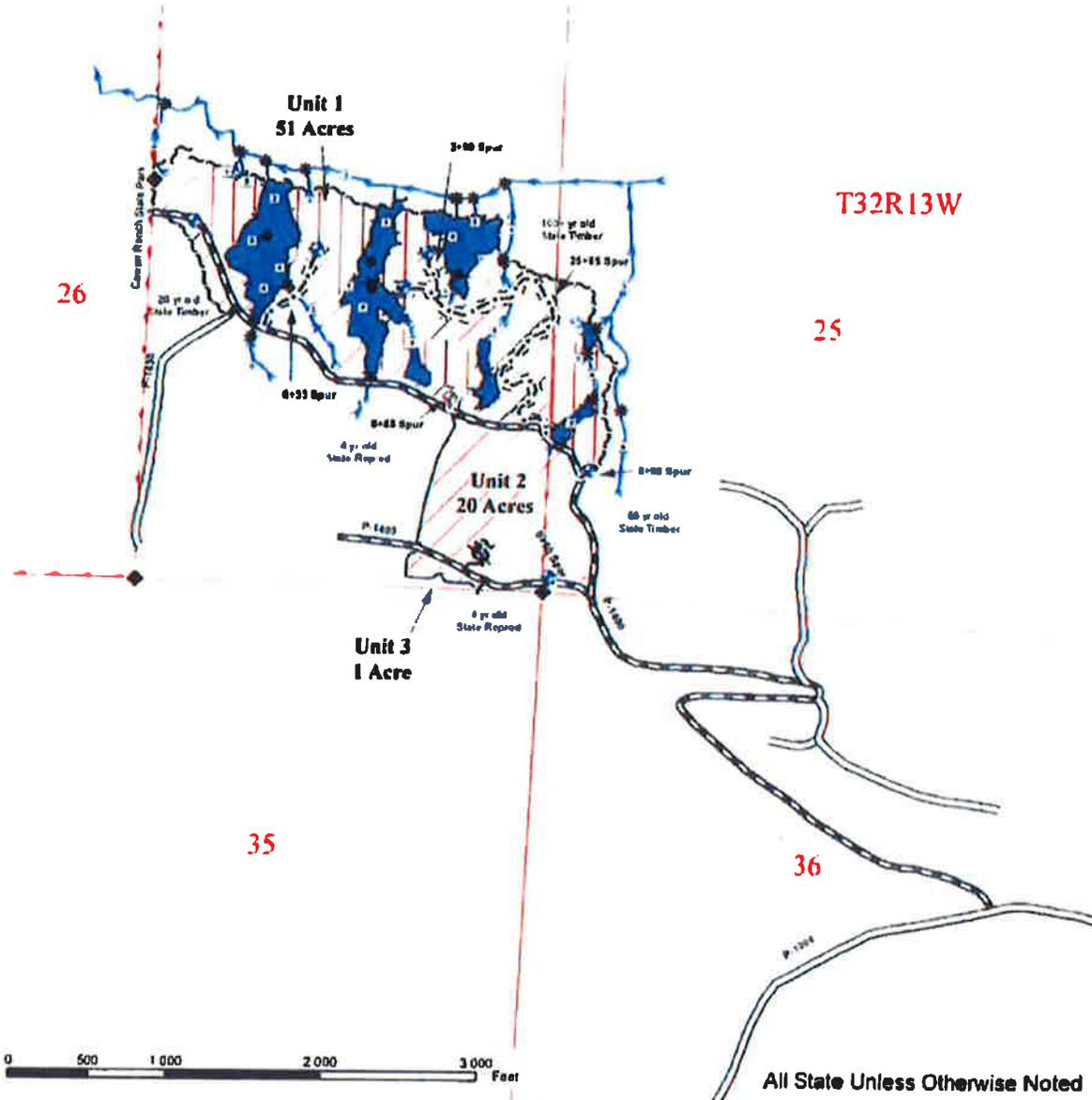
LEYH LOW TIMBER SALE

- **VARIABLE DENSITY THINNING OF NORTHERN SPOTTED OWL HABITAT**
- **COMBINATION OF VARIABLE DENSITY THINNING AND VARIABLE RETENTION HARVEST**

TIMBER SALE MAP

SALE NAME: Leyh Low VDT VRH
AGREEMENT#: 30-092345
TOWNSHIP(S): T32N R13W
TRUST(S): Forest Board Transfer (01)

REGION: Olympic
COUNTY(S): Clallam
ELEVATION RGE: 80ft-680ft



Existing Road	Stream Break	Ground Based Harvest
Optional Construction	Right of Way Tags	Cable Harvest
Optional Pre Haul Maintenance	Leave Tree Area Tags	Leave Tree Areas
Streams	Reprod Edge	Skip/RMZ/Non-Operable
Monumented Corners	Timber Sale Boundary Tags	Section Lines
Landing	Double Blue Painted Slash	DNR Managed Lands

Prepared By Bmcg490

Creation Date 3/9/2015

Modification Date Not Defined

STOP FOUR
P-1400 TIMBER SALE

- **SITE PREP**
- **PLANTING**
- **STOCKING SURVEYS**

Site Prep, Veg Mgt, Pest Mgt, Fertilization Details
 12 Sep 2016 11:05:30

FMU Name: P-1400 U1 FMU Acres: 51
 FMU ID: 76132 FMU Status: CURRENT

Activity	Technique	Completion Date	Acres Treated	Crew	Material	Rate / Acre	Total Quantity	UOM
SITE PREP	GROUND HERB	8/17/2011	51	CONTRACT	ACCORD	48	2448	OZ
					OUST EXTRA	4	204	OZ
					CHOPPER	24	1224	OZ
Objective	Reduce existing ground vegetation to allow more sunlight, moisture, and nutrients for tree seedlings to be planted.							
Comments	Mt St Helens Reforestation Contractor, w/ crew of 15 Weather was overcast Alligare product line was used. Gyphosate 5.4 Rotary 2SL SFM Extra Phase-Adjuvant Compliance and input by Albert Huggins 8/17/2011							



Regeneration Details
08 Sep 2016 02:52:25

FMU Name: P-1400 U1 FMU Acres: 51
FMU ID: 76132 FMU Status: CURRENT

Stocking Year	Stocking Percent	Stocking TPA	FMU Certification Year	Certification Percent	Certification TPA	Origin Date
2013	90	300				1/10/2012

Technique	Complete Date	Acres Treated	Crew	REGEN Activity		Species	Stock Type	Seed ID	Acres	TPA	Total Stock
				Survival Treatment							
HAND PLANT	1/31/2012	51	CAMP	NONE		DOUGLAS FIR	1+1		51	240	12240
						SITKA SPRUCE	P+0		51	86	4386

Objective

Completed by Camp
Planted by Kerschner, Pearson, Keesee
105% Performance Rating
Weather: Day 1 Rain, Day 2,3 Clear
TPA: 445 ? TTP: 16,630 Unit called for 20,400

Comments

Nursery Stock Codes Used;
DF 1+1 OLI0-498 (12,225) 1st cycle DNR DF breeding program
SS P+0(10) OLI1-767 (4,405) BC weevil resistant woods run seed

Information was collected from Plotcards and Camp Tree Cooler checkout sheets
Huggins



Survey Details
08 Sep 2016 02:52:23

FMU Name: P-1400 UI FMU Acres: 51
FMU ID: 76132 FMU Status: CURRENT

Stocking Year	Stocking Percent	Stocking TPA	FMU Certification Year	Certification Percent	Certification TPA	Origin Date
2013	90	300				1/10/2012

Completed Survey

Purpose	Complete Date	Acres Treated	Crew
INITIAL SRVL	10/25/2012	51	DNR

Completed Comments	Stocked Trees: DF - 240 TPA, SS - 93 TPA Natural Regen.: WH - 70 TPA Total: 403 TPA Low Veg. Comp. consisting of salmon berry, fox glove, deer fern, sword fern, elderberry, trailing blackberry Stocked DF ~2 feet, stocked SS ~1 foot; good vigor. Minor browse was observed on stocked trees.
--------------------	---

Pre-Survey Notes & Remarks	
----------------------------	--

TPA	Species	Damage
240	DOUGLAS FIR	BROWSE
93	SITKA SPRUCE	BROWSE
70	W HEMLOCK	BROWSE

Purpose	Complete Date	Acres Treated	Crew
VEG COMP	6/20/2013	51	DNR

Completed Comments	Unit was site prepped on 8/17/11 and continues to remain almost void of veg comp with lots of healthy conifer stock observed. There are small clumps of salmonberry, elderberry, foxglove and swordfern beginning to become established in the unit but no treatment is needed at this time. Huggins
--------------------	---

Pre-Survey Notes & Remarks	
----------------------------	--

TPA	Species	Damage
-----	---------	--------

Purpose	Complete Date	Acres Treated	Crew
STOCKING	12/23/2014	51	DNR

Completed Comments	1456 TPA including 11 red alder TPA. Trees are healthy and have good form. Heights ranged from 1-7' for DF and WH and 1-5' for SS. Respective average heights were measured at 5', 3', and 4'. The unit consists of areas with dense patches of WH regeneration which is in some cases outcompeting planting stock. VEG COMP comprises approximately 60% ground cover and consists of grass, foxglove, elderberry, deerfern, and salal. NO ACTION required at this time. PERRY
--------------------	---

	3 yr
--	------

Pre-Survey Notes & Remarks		
TPA	Species	Damage
303	DOUGLAS FIR	
144	SITKA SPRUCE	
1009	W HEMLOCK	



STOP FIVE

OCCUPIED MARBLED MURRELET HABITAT

- **DISCUSS DEFERRED HABITAT**

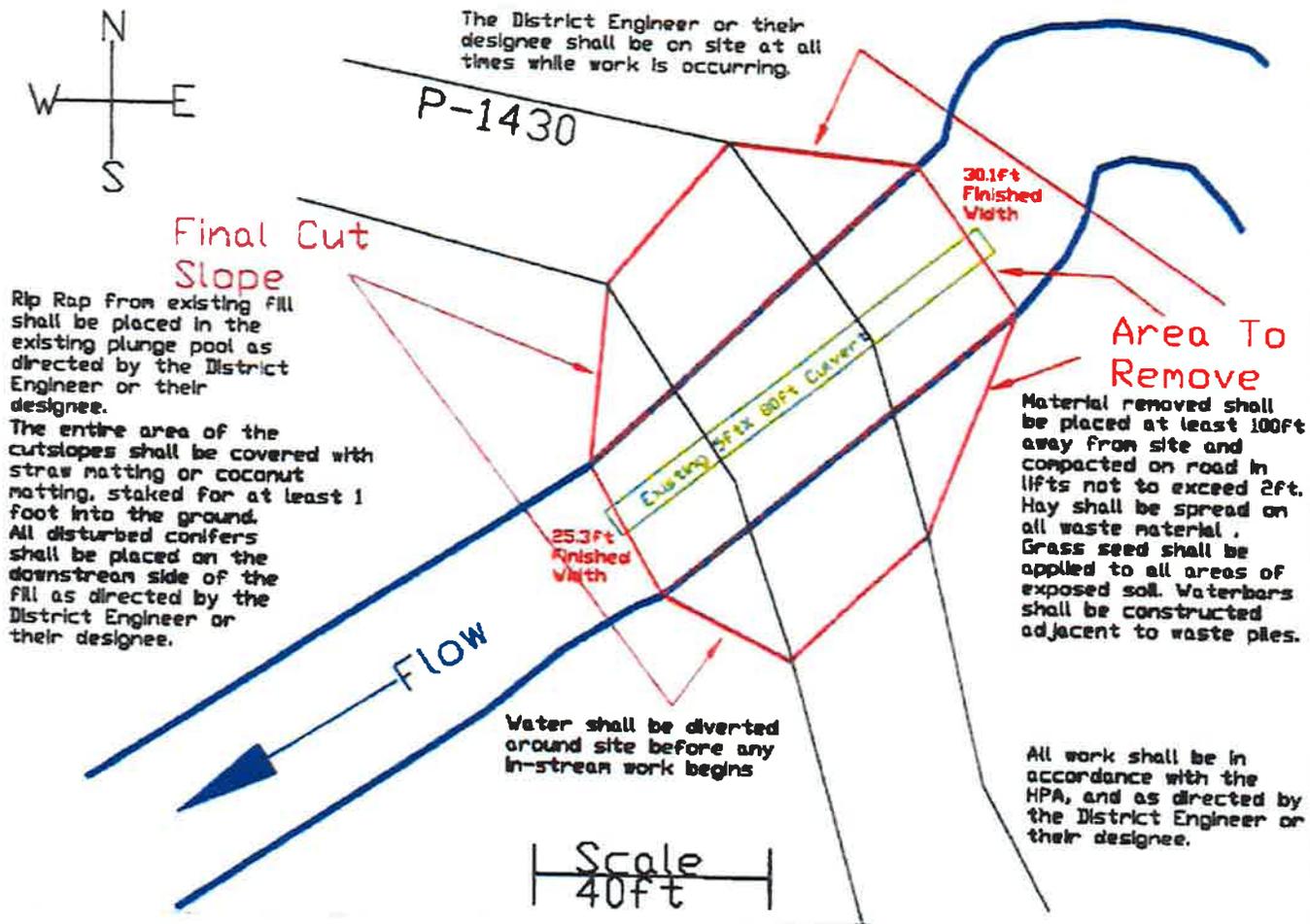


STOP SIX

RMAPS

- **PIPE REMOVAL- CLALLAM COMBINED TIMBER SALE**
- **DISCUSS RMAPS WITHIN OLYMPIC REGION**

P-1430 Station 78+40 Culvert Removal: Plan View

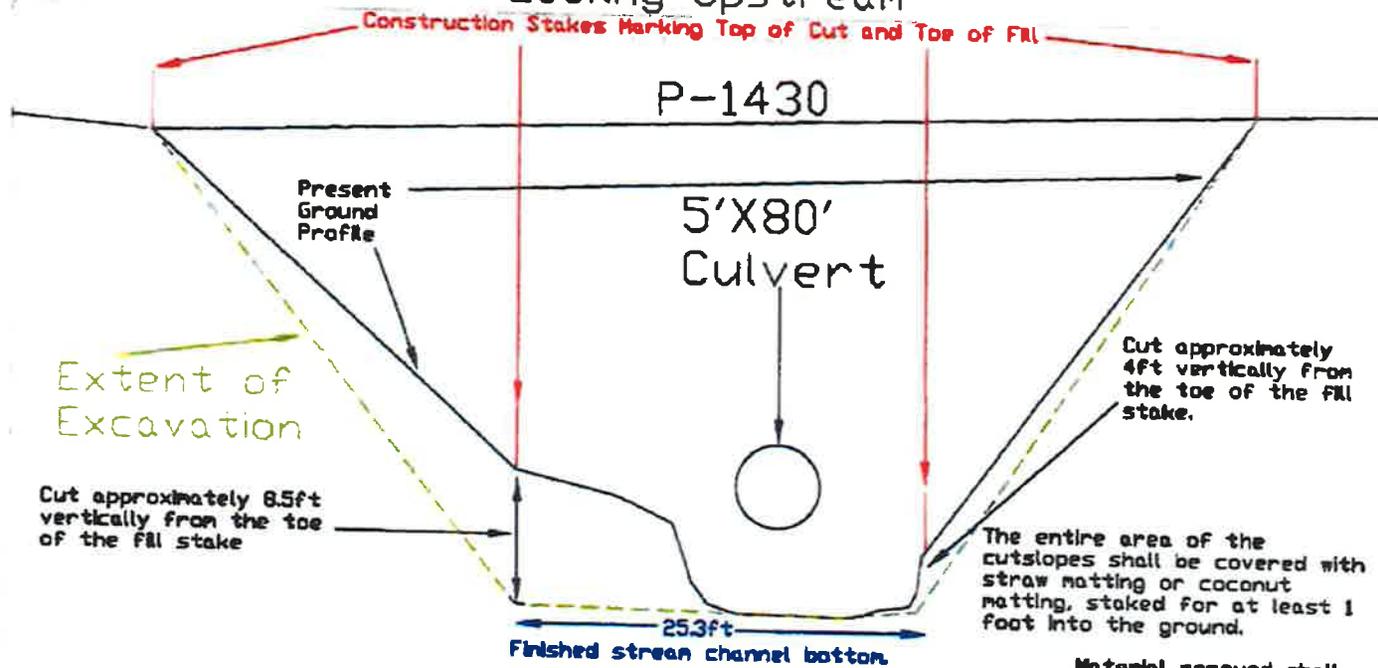


Revised June 2011

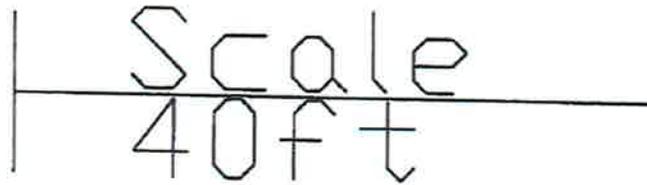
Page 56 of 67

Clallam Combined CT Timber Sale
Contract No. 30-087237

P-1430 Station 78+40 Culvert Removal: Cross Section View Looking Upstream



Rip Rap from existing fill shall be placed in the existing plunge pool as directed by the District Engineer or their designee.



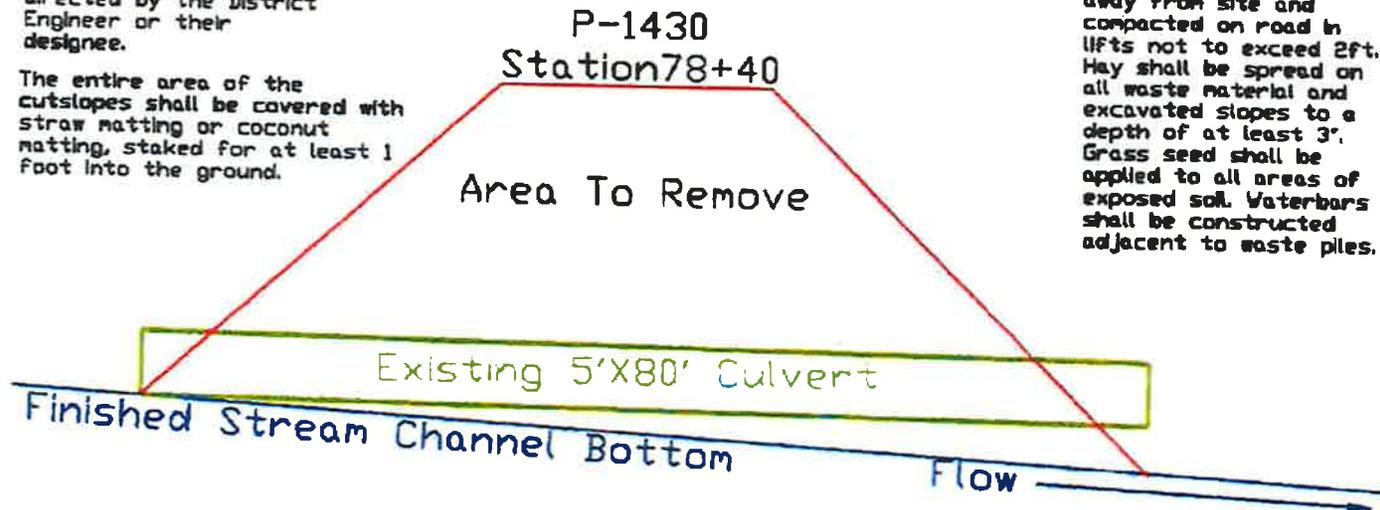
Material removed shall be placed at least 100ft away from site and compacted on road in lifts not to exceed 2ft. Grass seed shall be applied to all areas of exposed soil. Waterbars shall be constructed adjacent to waste piles.

P-1430 Station 78+40 Culvert Removal: Profile View

Rip Rap from existing fill shall be placed in the existing plunge pool as directed by the District Engineer or their designee.

The entire area of the cutslopes shall be covered with straw matting or coconut matting, staked for at least 1 foot into the ground.

Material removed shall be placed at least 100ft away from site and compacted on road in lifts not to exceed 2ft. Hay shall be spread on all waste material and excavated slopes to a depth of at least 3". Grass seed shall be applied to all areas of exposed soil. Waterbars shall be constructed adjacent to waste piles.



STOP 7

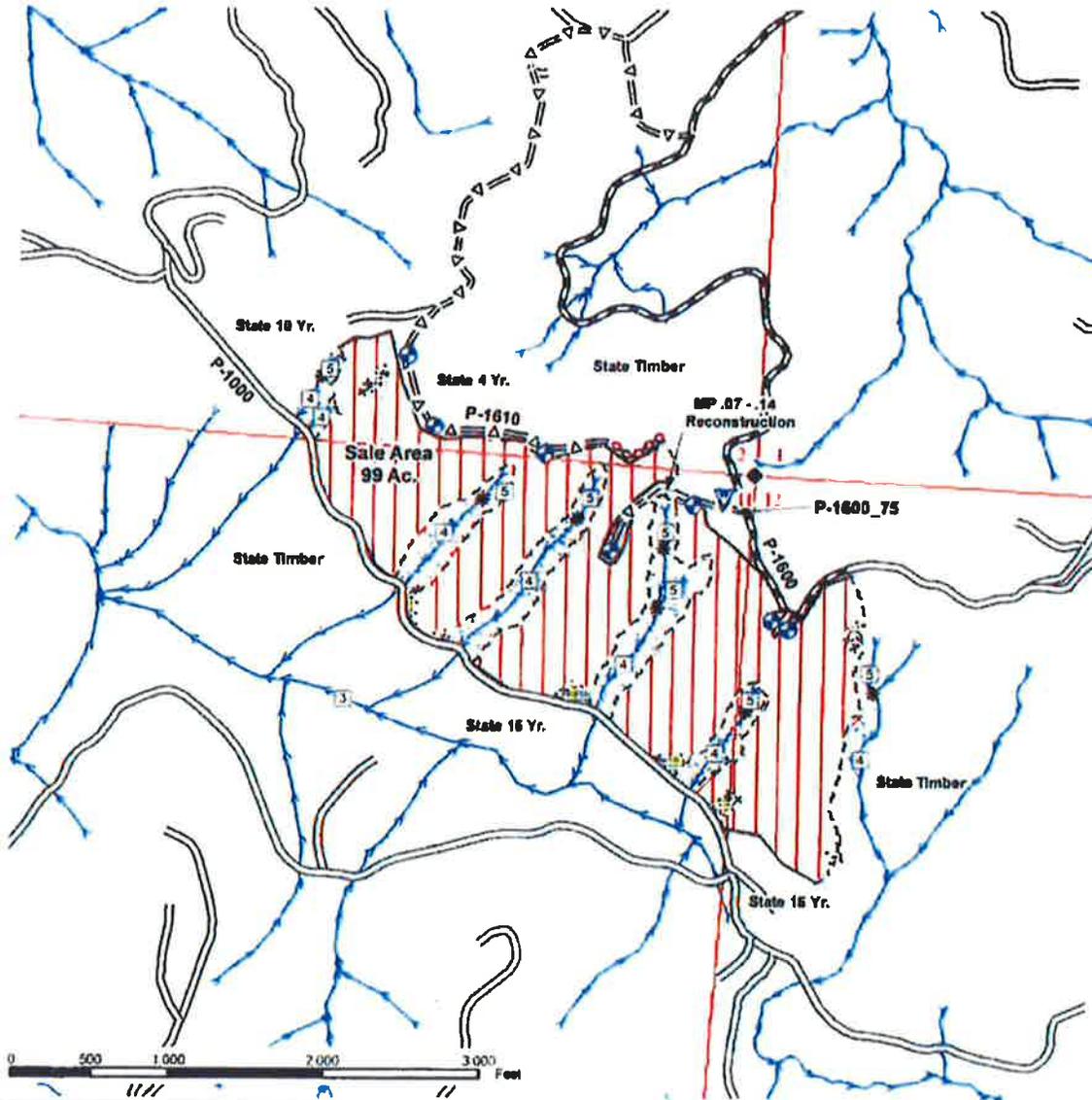
RIDGES TIMBER SALE

- **SITE PROVIDES OVER VIEW OF DNR AND PRIVATE TIMBER LANDS**
- **DISCUSS PCT OF LITTLE CLALLAM UNITS**
- **DISCUSS RMZ'S AS VIEWED ON LANDSCAPE**

TIMBER SALE MAP

SALE NAME: RIDGES CLEAN-UP
AGREEMENT#: 30-086141
TOWNSHIP(S): T31R13W
TRUST(S): State Forest Transfer(1)

REGION: Olympic Region
COUNTY(S): CLALLAM
ELEVATION RGE: 693-1361



	Cable Logging		Sale Boundary Tags		Required Deactivation
	RMZ		Special Mgt Area Tags		Optional Reconstruction
	Leave Tree Areas		reprod		DNR Managed Lands
	Waste Area		Existing Road		Public Land Survey Sections
	Proposed Landings		Required Pre-Haul		Streams
			Optional Pre-Haul		



Prepared By mpff490

Creation Date: 12/3/2010

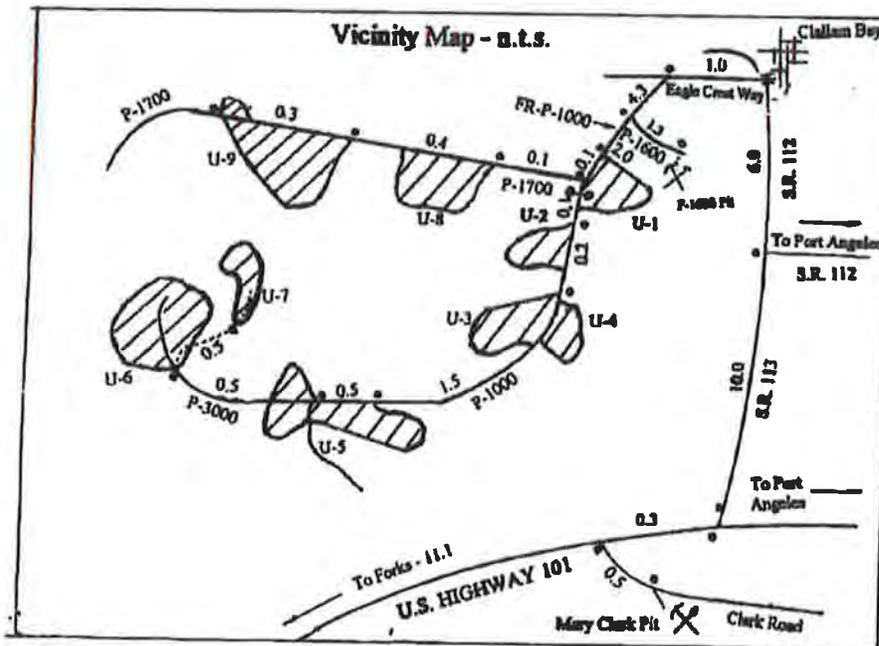
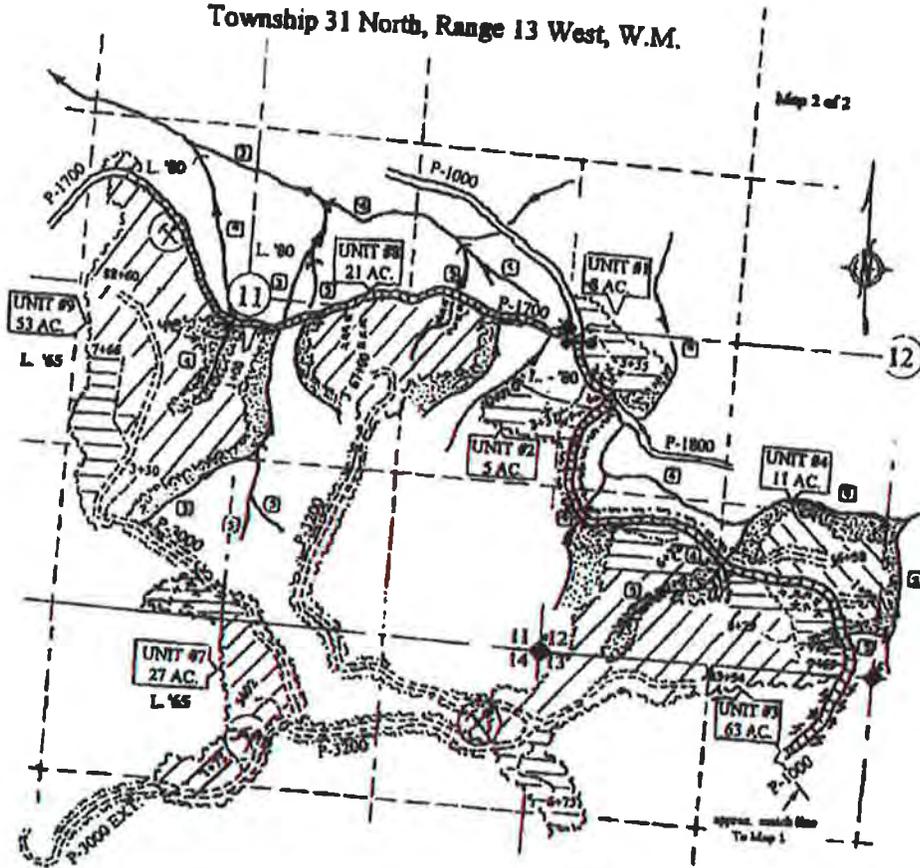
Modification Date 12/6/2010

TIMBER SALE MAP

SALE NAME: LITTLE C LAM
 AGREEMENT NO.: 30-078134
 TRUST(S): Forest Board Transfer

REGION: Olympic
 COUNTY(S): Clallam

Township 31 North, Range 13 West, W.M.



SECTION II-A: UNIT DESCRIPTION

PRECOMMERCIAL THINNING CONTRACT No 1587 Unit Description Summary Table

UNIT NUMBER	UNIT NAME	FWU #	ACRES	LEGAL DESCRIPTION	Estimated Origin YR	Estimated TPA	DESIRED SPACING	AVERAGE TPA AFTER PCT	COMMENTS
1	CABIN FEVER U1	16577	18	T31N R12W S9	2002	4034	12x12	303	Gate
2	CABIN FEVER U2	16578	14	T31N R12W S16, 17	2002	1150	12x12	303	Gate
3	CABIN FEVER U3	16580	3	T31N R12W S16, 17	2002	699	12x12	303	Adjoins Cabin Fever U2, Gate
4	CABIN FEVER U4	16581	45	T31N R12W S16, 17	2002	2409	12x12	303	Gate, Mixed alder/conifer stand
5	LITTLE CLALLAM U1	5828	9	T31N R13W S12	2002	1650	12x12	303	Mixed alder/conifer stand
6	LITTLE CLALLAM U2	5829	5	T31N R13W S11, 12	2002	800	12X12	303	Mixed alder/conifer stand
7	LITTLE CLALLAM U3	5824	64	T31 R13W S12, 13, 14	2002	2631	12x12	303	Mixed alder/conifer stand
8	LITTLE CLALLAM U5	5830	42	T31N R13W S14	2002	1447	12X12	303	Partial Unit, Pink flagging
9	LITTLE CLALLAM U6	5826	26	T31N R13W S14, 15	2002	2875	12X12	303	Mixed alder/conifer stand
10	LITTLE CLALLAM U7	5825	28	T31N R13W S11, 14	2002	3025	12X12	303	Mixed alder/conifer stand
11	LITTLE CLALLAM U8	16500	23	T31N R13W S11	2002	2187	12X12	303	Mixed alder/conifer stand
12	LITTLE CLALLAM U9	5823	52	T31N R13W S11	2002	2659	12X12	303	Mixed alder/conifer stand
13	BEDROCK U1	19058	76	T29N R12W S9, 10	2002	2780	12x12	303	Mixed alder/conifer stand
14	BEAR CUB U1	5868	41	T30N R12W S26	2000	1800	12x12	303	Partial Unit, Pink flagging, Gate
15	NE BREEZE	30639	18	T19N R12W S15, 16	2002	925	12X12	303	Gate
16	MULE PACKER	5814	54	T21N R9W S16	2001	1190	12X12	303	Gate
17	PROMISED 8300 U-2	19701	82	T21N R10W S16	2001	1025	12X12	303	2 Rayonier Gates
18	POLSON REMAINS U1	5821	44	T20N R10W S36	2000	664	12X12	303	
19	DEVIL'S RIDGE U2	18006	36	T27N R2W S25, 36	2003	1097	11X11	360	Gate
20	DEVIL'S RIDGE U3	18007	27	T27N R2W S36	2003	914	11X11	360	Gate
21	WHITNEY POINT U1	94369	165	T26N R2W S12	2009	n/a	11X11	360	Significant Hardwood presence
22	OVEREASY U1	16107	52	T28N R1W S16	2000	750	11X11	360	Gate
23	SCRAMBLED EGG	29569	47	T29N R1W S36	2004	849	11X11	360	Significant Hardwood presence. Select WRC as first leave tree choice. Gate
24	TAYLOR RANCH U2	36180	24	T28N R2W S16	2005	656	11X11	360	Significant Hardwood Presence
25	WEST JACOB MILLER	24663	50	T30N R1W S8	2005	890	11X11	360	Gate, Partial Unit treatment, access to unit through Jefferson County Transfer Station

STOP 8

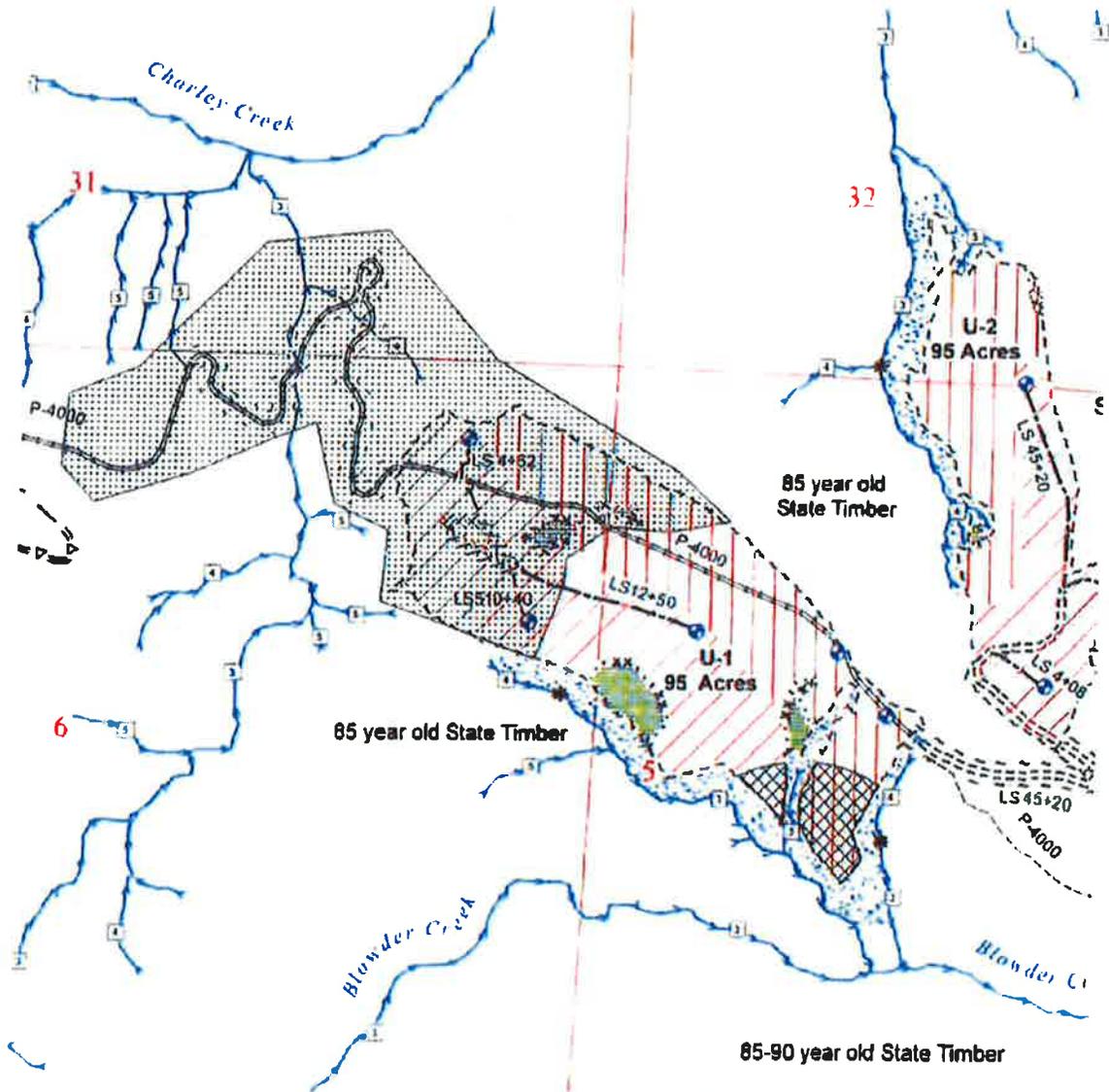
BLOWDER RIDGE TIMBER SALE

- **VIEW OF BLOWDER CK. TIMBER SALE AND RMZ**
- **VIEW OF DNR AND PRIVATE TIMBER LANDS**
- **DISCUSS RMZ'S AS VIEWED ON LANDSCAPE**

TIMBER SALE MAP

SALE NAME: BLOWDER CREEK
AGREEMENT#: 30-086783
TOWNSHIP(S): T31NR12W, T32N12W, T31N 13W
TRUST(S): State Forest Transfer(1)

REGION: Olympic Region
COUNTY(S): CLALLAM
ELEVATION RGE: 399-891



Legend	Logging Methods	Road Construction Types
Sale Boundary Tags	Cable	Optional Construction
Leave Tree Area	Ground	Optional Reconstruction
Riparian Mgt Zone	Optional Landings	Required Reconstruction
No Equipment Zone	Daily Timing Restrictions	Required Construction
Seasonal Timing Rest.	Streams	Optional Pre-Haul Maintenance
	ROW Tags	Old Grade

Prepared By mpf490

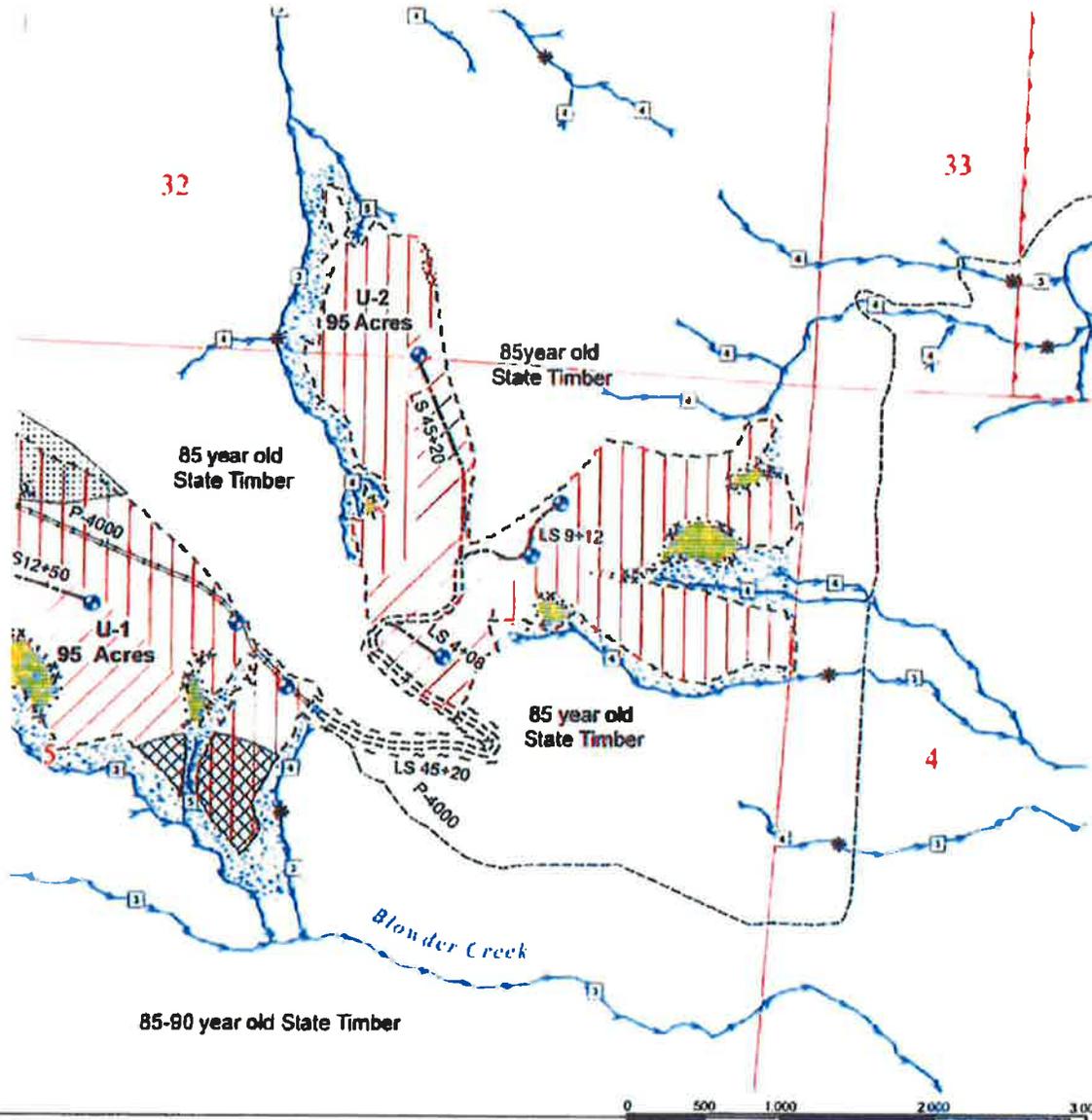
Creation Date: 1/31/2011

Modification Date 2/13/2011

TIMBER SALE MAP

SALE NAME: BLOWDER CREEK
AGREEMENT#: 30-088783
TOWNSHIP(S): T31N R12W, T32N12W, T31N 13W
TRUST(S): State Forest Transfer(1)

REGION: Olympic Region
COUNTY(S): CLALLAM
ELEVATION RGE: 388-891



Legend	Logging Methods	Road Construction Types
Sale Boundary Tags	Cable	Optional Construction
Leave Tree Area	Optional Landings	Optional Reconstruction
Riparian Mgt Zone	Daily Timing Restrictions	Required Reconstruction
No Equipment Zone	Streams	Required Construction
Seasonal Timing Rest.	ROW Tags	Optional Pre-Haul Maintenance
		Old Grade

Prepared By mpff490

Creation Date 1/31/2011

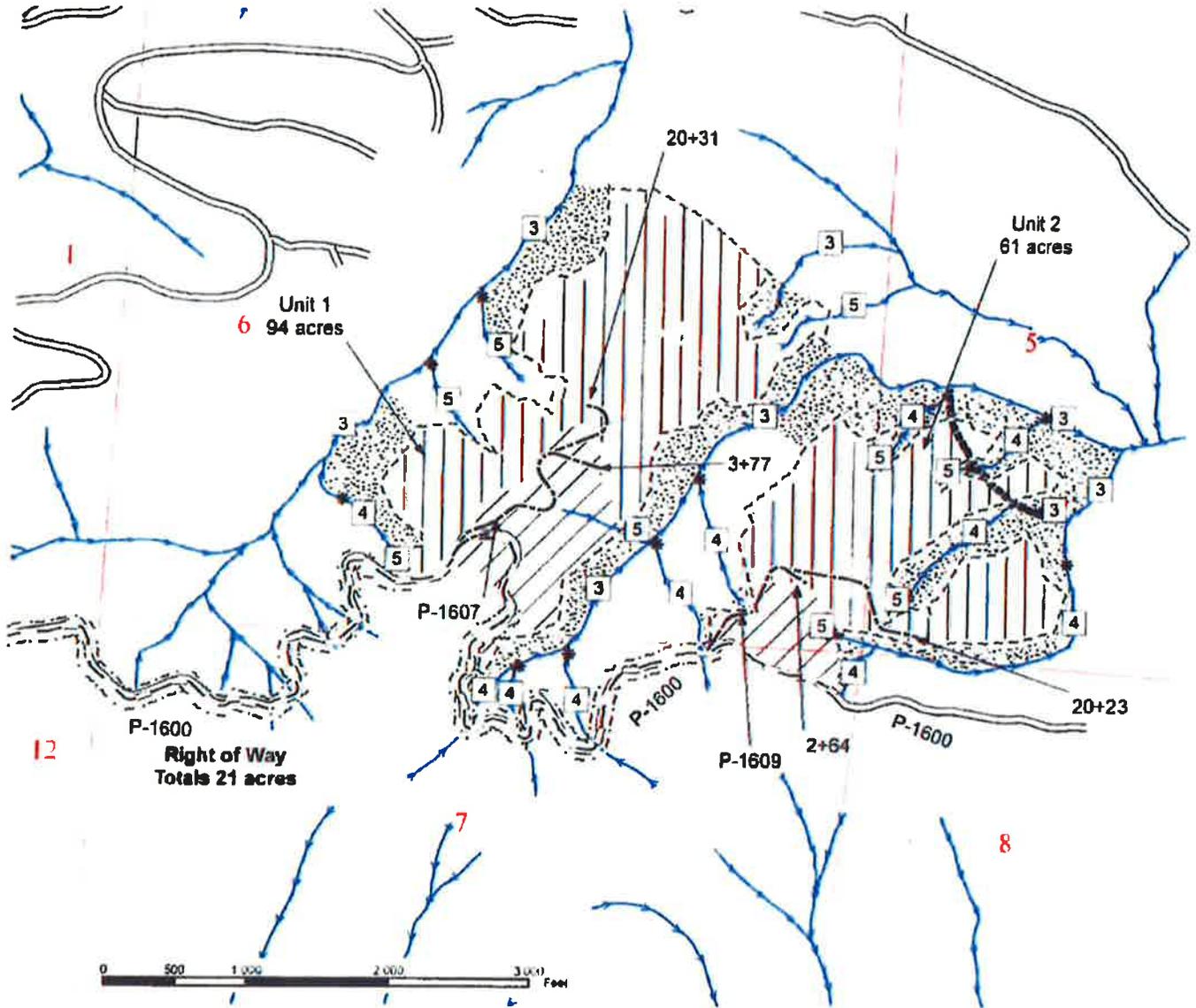
Modification Date 2/13/2011



TIMBER SALE MAP

SALE NAME: BLOWDER RIDGE
AGREEMENT#: 30-083194
TOWNSHIP(S): T31N - 13W/31N-12W
TRUST(S): FOREST BOARD TRANSFER (01)

REGION: OLYMPIC
COUNTY(S): CLALLAM
ELEVATION RGE: 500 - 1,000 FEET



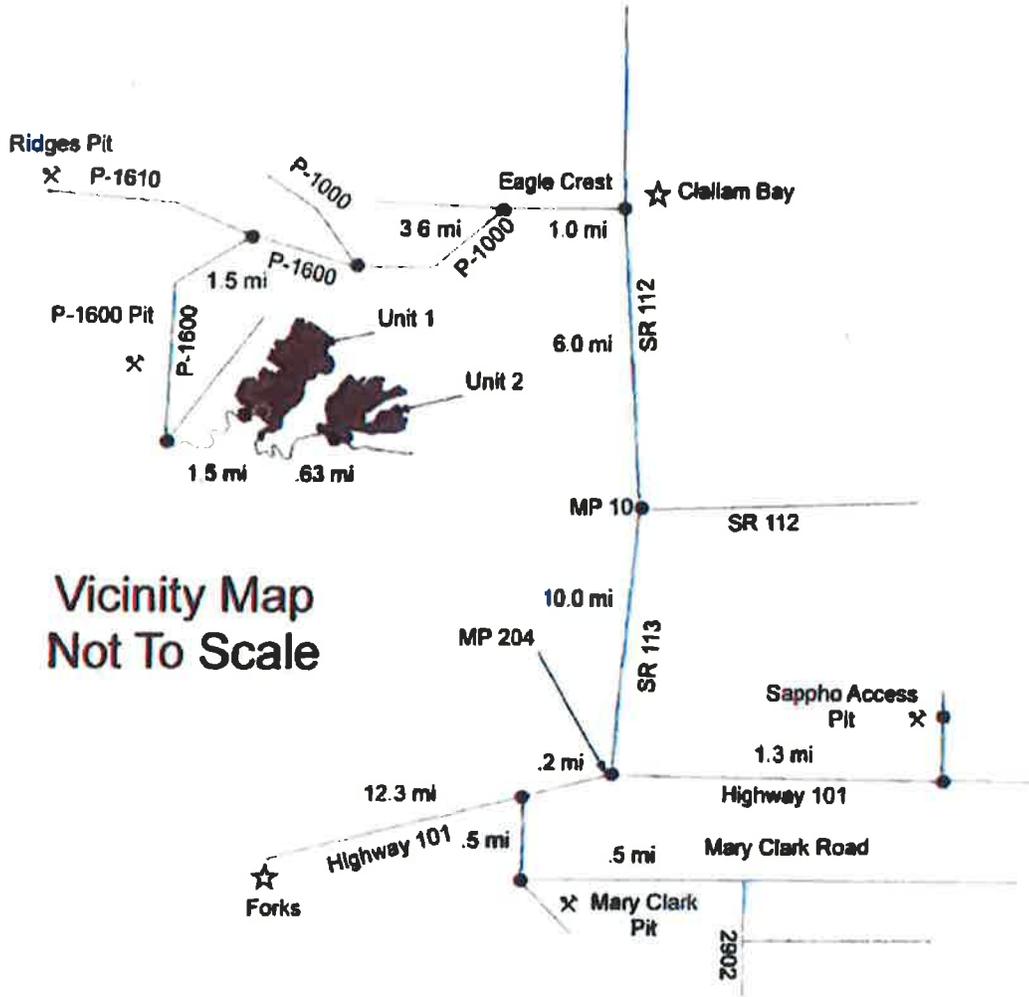
Legend			
	Timber Sale Boundary Tags		Streams
	Right of Way Boundary Tags		Stream Type Break
	Ground		Stream Type
	Cable		Rock Pit
	RMZ		Gate
	Timing Restriction Area		
	Existing Road		
	Optional Construction		
	Optional Reconstruction		



DRIVING MAP

SALE NAME: BLOWDER RIDGE
AGREEMENT#: 30-083164
TOWNSHIP(S): 31N-13W/31N-12W
TRUST(S): FOREST BOARD TRANSFER (01)

REGION: OLYMPIC
COUNTY(S): CLALLAM
ELEVATION RGE: 900 - 1,000 FEET



**Vicinity Map
 Not To Scale**

<p> Timber Sale Unit</p> <p> Existing Roads</p>	<p><u>DRIVING DIRECTIONS:</u></p> <p>This proposal is located approximately 8 miles southwest of Clallam Bay, WA. From Clallam Bay, go west on Eagle Crest approximately 1.0 mi. Turn left onto the P-1000 Road and travel approximately 3.6 miles. Turn left onto the P-1600 Road and travel approximately 3.5 miles to Unit #1. Continue on the P-1600 Road approximately .63 miles to reach Unit #2.</p>
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THANK YOU TO THE TRUST LAND ADVISORY COMMITTEE
FOR JOINING US ON THIS TOUR. IF YOU HAVE MORE
QUESTIONS OR COMMENTS PLEASE CONTACT DREW
ROSANBALM AT 360-374-2807 OR BY EMAIL AT
DREW.ROSANBALM@DNR.WA.GOV

MEETING MINUTES FOR:

October 21, 2016

Meeting Minutes
21 Oct 2016
Trust Land Advisory Committee

Meeting was called to order by Joe Murray. Roll was taken and a quorum was present with 14 participating. Jill Silver was attending on behalf of Toby Thaler.

Public Comment

Jim Stoffer - Sequim SB District 3; WSSDA Trust Lands Task Force member. Commented that he had found the issue to be complex. He was puzzled by the forecast regarding the arrearage and the amount owed to Sequim being small. Sequim's budget is \$32m/year the small amount shown is not a significant loss to the SSD at \$400k/10 years. Community has said that the School Board needs to do more and he has been attending TLAC meetings, BNR meetings, WSDA Task Force, and Candidate debates. Neither a D nor R - ran as required by law as nonpartisan and a retired USCG officer of over 31 years. Speaks with elected officials often. Excited about the Sequim v. PA football game later that evening and encouraged folks to attend.

Ann Seiter - Small Forest Land Owner on Palo Alto Road. Disappointed that the vote on recommendation regarding reconveyance was put off till after the election. TLAC started as a political effort that morphed into an educational effort. She is concerned that it will go back to being political. She felt a framework regarding the issues was needed and spent time developing an approach towards that. She provided a copy of a matrix she created to help the TLAC. Copies were shared with the TLAC.

Minutes

Fleck noted that the August meeting minutes were based upon the audio recordings which consisted of a partial recording by the County and two recordings by Ed Bowen. He suspects that there was some time missing from the recordings. Motion by Pachecho, seconded by Byrnes to adopt the June, July, and August meeting minutes as provided. It was noted that the footer on the August meeting minutes was wrong. Fleck indicated a change had been made. Minutes were approved.

Field Trip Discussion

List of participants was given to Loni, she will provide to Fleck for inclusion in the minutes. [See below.]

TLAC COMMITTEE MEMBERS

ATTENDING TOUR:
DAVID BEKKEVAR
HARRY BELL
KENNETH REANDEAU
KYLE BLUM
BEN PACHECO

JOE MURRAY
SUSANNE SCOTT
TOM SWANSON
MIKE DOHERTY
TOBY THALER
COLEMAN BYRNES
MARY PORTER-SOLBERG

Murray asked for individuals thoughts following the trip. Thaler noted his name was spelled wrong in the attached September summary.

Ken Reandeau talked with DNR staff and the public lands are treated different from private lands. For example, on private lands if you access those and are asked to leave you have to leave. Public lands are different. Surprised at the forested areas not natural converted to commercial use. Also the 1000 Area near Clallam Bay looked like a plantation. This is very different from his own 10 acres.

Byrnes requested to see the list of attendees. Felt that DNR did a good job with the tour. The Committee should send a thank you.

Scott felt that the tour was good.

Doherty felt that the itinerary and the exchange was good. The difference between private and public lands was interesting when the private timber companies and DNR discussed their differences. He also appreciated the DNR's ability to explain on the ground the differences.

Swanson felt that the DNR was missing opportunities to get more volume. They are not very aggressive. They have the opportunity to harvest within the buffer to a limited degree, but have chosen not to harvest. Rationale is not consistent with variable retention harvest justification. Harvest within the RMZ = blow down; however, uplands buffer is needed to benefit the NSO, so this is inconsistent.

Scott asked if this is really an issue of discretion? Swanson felt that it was and DNR was not utilizing their full authority. Jill Silver asked if the difference was thinning vs. even age harvest within the RPZ.

Doherty was asked by a member of the public for a copy of the hand out - 2 pgs on the science of forest management - from a website could be shared. Also information as to the website and other such sources. The DNR website has other materials on the issue of silvicultural management. He also asked if there were other sources for the best available science on these issues. Murray will look into that.

Murray shared his discussions with Blum. Murray noted that he felt that the inventory that the DNR had was not sufficient to tell what wood was available within the RPZ. The inventory was not stratified by species and had room for improvement. PCT accomplished in areas and the estimate of PCT appeared to be overstated in relationship to growth models. Not a good means appears to track this. Improvement of that is needed. Roads are very good, but the DNR may need to remove those that are not used. There did not appear to be stocking numbers of trees per acre in the inventory. Information for the RPZ need to be separated from the uplands. The stand tables did not include species, DBH, height, volume estimates, etc. Scott asked if this should be in the inventory.

Murray felt that the inventory needed to be more detailed in order to meet the DNR mandates. Fleck asked for clarification as efforts have been made to try to get information asked for and specifically inventory information. Murray noted that what he received is what DNR has and that it lacked details in the inventory already discussed. A further example of the lack of information is that there is no details between Douglas fir and hemlock in an inventory stand. Scott asked for a clarification. Murray felt that there was just not that much detail that he is used to seeing for inventories. Regarding the RPZs, those acres should be their own separate type, polygon, unit, or stand. Murray explained the level of detail that he was used to seeing from an industry perspective that he found missing from what he was given by DNR. The unit would then have information about that unit to include species, dbh, age, estimates of growth, estimates of change over time, soil types, type of area such as RPZ, commercial or non commercial. Fleck noted that DNR used the term "polygon," and Murray noted that this was a new term utilized in digitizing information.

Bork asked if the inventory that Murray was given was the same that DNR used on all types of managed lands? Murray indicated that it was the same inventory. Murray explained how the inventory information was put together from the original December request for that information. Scott felt that more information was needed about the inventory information. She noted that in the Skagit model, the County representative may have asked for more detailed information. Cross noted that the DNR uses FRIST and that was updated in 2009 by on the ground test sites. This would not allow for additions of information by individuals outside of DNR. 2009 update was created from individuals obtaining information and then DNR uses models for projections of the current inventory have been made since then. What that does is create a set of assumptions that if you had so many acres of X, then you also have so many acres of Y.

Bork - CFI? not sure? Required? Not sure? She felt it was a requirement for an actual field counting of trees as part of the inventory, as this was the standard in the Eastern USA. Murray noted that each polygon is measured but that there are various extrapolations from that based upon growth estimates, etc. It appears that there are extrapolations of like polygons. Scott noted that this could increase the likelihood of error.

Fleck noted that the DNR had provided the members with a memo dated 13 Jul 2016 regarding the manner in which the inventory is developed and maintained. Murray noted that the inventory provided was not what he was familiar with in the forest industry. He noted that there were fundamental components to forest inventories that the DNR materials did not have.

Doherty asked if there was a guess as to the cost to develop such an inventory with all of the elements Murray had referenced. Would the costs be affordable or too high and that could be a concern to the various districts. Scott asked about the cost as well noting that in order to track the return on the investment. If the inventory is much more accurate, would that result in a more accurate sales forecast that would ensure there were not inventory discrepancies, then there is a loss of revenue.

Swanson noted that the cost to maintain an inventory is trivial in comparison to the value of the resource. He felt it was a rather minor cost per acre. He asked how much was it to appraise a house for (\$10s/acre). If you live in a \$250,000 home and it costs \$500 to appraise that is a minor cost to getting the mortgage. For tax purposes and noted that the County undertakes that effort on a regular basis. Murray noted that this cost was a regular cost of doing business.

Reandeau recalled he had heard that retaining personnel is an issue, especially with junior level staffing, and that keeping people is a need. How does that go into a more detailed investigation of value? That issue has to be factored into the analysis. Murray agreed that this was a factor, that the person who is familiar with the land longer has a better understanding of that inventory. Swanson noted that purchasers evaluate sales and that that process is different from the inventory of the land base. DNR does a very professional job of advertising, permitting, and awarding a timber sale. Scott asked if anyone would be an investor that simply turned their money over without paying attention to that investment.

Skagit County seemed to have done it where they have some engagement, Clallam County has the potential to step up to the plate. Fleck has noted that Forks has had a concern for 30 years, and recently DNR has raised their management fee from 22% to 25% with a potential of raising it to 28%. This is leading some to believe that the DNR should be asked for an accounting or performance audit regarding the inventory. He noted that Scott was correct in asking about what the beneficiaries of another trust would expect in the way of not only market condition updates, but the value of and inventory of the assets being managed. It would be wonderful to have this information.

Cross stated that the ability to evaluate things on stands not being harvested. If not taking an inventory of those key elements such as the number of trees per acre, and the DBH, then there is an inability to undertake such an evaluation of whether those standards are meeting the requirements of canopy cover, downed wood, etc., for owl habitat. An objective inventory is necessary to track the conditions for the HCP required protections. Scott asked if the inventory was complete like what was being discussed, would you need all of those aspects.

Cross questioned if without such an inventory can you say the stand will accelerate to the required owl habitat? Scott felt that a complete inventory would have all of these factors within it. Can you ensure meeting marbled murrelet habitat where a requirement is a platform off of the forest floor and there is no way to know if DNR is actually making that required habitat. He felt that the sole purpose of the HCP should be evaluated with data from a detailed inventory. Failure to have this inventory may result in setting aside more harvestable land for meeting habitat obligations. Scott felt that the DNR inventory should allow this verification to be done as Cross was discussing. Paul noted that DNR does spot checks to verify their models, and those indicated that the models were accurate enough.

Cross stated that you have to spot check and verify your models, but at the same time note that there are very few nesting pairs on the Peninsula. Paul noted that the questions associated with is the HCP is doing what is required to do was a question not really in the purview of the committee? Cross felt that the HCP worked on the principal of if you build the habitat, then the northern spotted owl and marbled murrelet will come. Paul felt that these species need more than habitat. Paul expressed that we are whipping out salmon from logging practices. There is not enough high energy level food out in the near shore that the murrelets can use. Cross stated that DNR is not equal to the task they are being assigned.

DNR is not collecting the data to evaluate the problem. Paul noted that the TLAC had asked about it and was told that it was not their function as they are relying upon USFWS to do certain monitoring. Murray noted that DNR stated that the monitoring program is approved by the USFWS. Scott asked if the laws and rules to set aside lands do not do what they should, what would DNR do.

Bork noted that the TLAC was discussing the making of a recommendation that a detailed inventory update could be done on a rotating basis and could include multi-use factors. If the cost of updating the

inventory was between \$1-5/acre and there are 280,000a, then you could do 28,000a a year and budget for those costs. This may not be a stocking survey. Murray felt that all of the information DNR places within their system. Cross noted that the inventory for Sierra Pacific was reported to cost \$16/20 per four acres, so \$4/acre may be a realistic estimate.

Bork asked if we could make that as a recommendation? Murray noted that this could be a recommendation that would be "other things" for consideration. Murray noted that if the lands were reconveyed, you would start with that detailed inventory. If we maintain the DNR management, then we need to ask about this. But there are also some areas where we cannot make recommendations for management fees. Fleck felt that we could make a recommendation that the Commissioners could ask for a more detailed information. Fleck also felt that an accounting could be asked for - what is ours, what have you done with ours, and what is the status. He noted that the County lands were 92,500 acres and if you did this for 10,000 acres a year, then the costs could be about \$40k/yr.

Murray felt that if this was a car you would be researching more about the car and what it was doing. Bork was uncertain about the costs, but if it was \$40k, that was less than a person. Swanson felt that it was reasonable to expend \$100k on a \$300m investment. Murray noted his concern was with the Clallam County Trust Lands and that there should be a good inventory of those lands, while other beneficiaries can worry about their lands. Doherty felt that there should be a look at the whole system, since DNR will be asked by other counties who will want the same thing if not already done. Scott wanted to know if DNR was already doing this for some entities.

V. Recommendations

A. Discussion on Reconveyance

Murray noted it was his fault on not being able to docket the vote on the recommendation at the October meeting regarding reconveyance. Changes were made to the agenda, but he lost power and the changed agenda was not actually sent to Loni within the time needed for the County's notice requirements. Fleck explained that requirement from the bylaws was such that we have to give proper notice, including the issue that would be considered by the TLAC. The proposed question found in the agenda was such that it would allow for a yes/no vote. The first question is the reconveyance issue. Then the resolution then asks for recommendations.

Scott felt that the question of reconveyance was the clearest way to bring forward, and that the options discussed in the resolution are more difficult to develop. These can be laid out in various amounts of detail and in very different ways. The August meeting minutes did lay out some of these questions. Murray asked about a document on the screen, Fleck noted that he never got that document, but he put together what he could from the tape. Doherty noted that Loni sent out a document that is called alternatives and was in the packet for the meeting today. Doherty noted that this was sent out in September by email. Murray noted there was also a memo from Thaler on alternatives as well.

Paul asked if there still would be a vote on the issue reconveyance, and Murray answered yes it would just have to be at the next meeting.

(51:25)

Murray explained that the question would have to be published seven (7) days prior to the next meeting to allow public notice of issue before TLAC regarding a recommendation. The other questions/motions would then be considered. Scott asked if the question was a "yes/no" question. Fleck read the by-laws regarding formal recommendations and the "proposed recommendation."

The precise wording expected by participants has been used to prepare to comply with the resolution. Fleck read the proposed question on the agenda for the current meeting. There was a question by Silver about the process as to whether there would be just a yes/no vote without any discussion, or discussion of the alternatives. Fleck disagreed. Fleck read Resolution 70-2015 and noted that there were two parts, reconveyance, and then "guidance" on the continued engagement by the County with the DNR. Fleck noted that the question, which was read aloud, was also in the agenda for the present meeting. Scott felt that this question had to be answered first, before discussing alternatives to reconveyance.

(55:30)

Scott moved that the question at 5a in the agenda be moved as the first question for the TLAC to consider in November. Fleck seconded the motion. Murray asked if "Clallam County State Forest Lands" could be inserted before State Forest Lands. Silver asked if it could be inserted as State Forest Lands in Clallam County. Fleck wanted to ask Blum, who was not present, as the term State Forest Lands is a legal term of art. Cross asked that the older term, Forest Board Transfer Lands, be used as the term has been legally updated, the older term is clearly understood. Fleck suggested that after State Forest Lands insert the following: "(Clallam County Forest Board Transfer Lands)." Scott and Fleck accepted this proposed change.

(57:01)

Voice vote - Murray said all in favor signify by saying aye, numerous AYE votes heard; all opposed same sign. There was silence. Motion passed.

Fleck suggested that a group of alternatives be developed under topic areas, not to be voted on as a block, but topics such as: management alternatives, other things to consider (e.g., increase property tax), etc. Scott suggested that looking at the format provided by Ann Seiter in her public comment period. Silver suggested that Thaler's comments should also be reviewed. Seiter's was noted that it was very visual. Fleck noted that some of the items should be an individual question. Fleck noted that what Seiter had done for a matrix suggested by Bork was difficult to visualize, but Seiter did a remarkable job. Listening to the August meeting Fleck noted that it was really challenging to determine the various threads to separate into specific questions for potential recommendations. Scott noted that there may be a shift on individual's perspective on things based upon the way the information is put forward.

(1:00)

Silver noted the complexity can expand rapidly. Seiter had testified earlier to the benefit of including ecosystem services and how that can be a base valuation that includes water, carbon, ecological benefits, etc.

Silver felt that the question was more complicated than "keeping those trees standing" for example with use in a carbon tax. Use of simplistic models could conflict with other models assessing values.

Murray felt that those were the next steps by the BOCC. Scott felt that there should be a chart on alternatives and those can be wordsmithed within the next two meetings. Doherty felt that an extension could be sought as there were complex issues such as climate change, fire prevention, etc. Scott felt that proposing suggestions would require a follow on effort to develop the proposals into more detailed actions. Murray felt that the recommendations should reflect that the issues being recommended were complex/complicated processes that could be initiated by saying to the BOCC that they should look at this issue and analyze those. Scott felt that the areas needing additional effort to be examined should be noted and called out as part of the recommendation.

Swanson asked to look at the list of things on Thaler's proposal, he felt that Question No. 11 regarding export logs was outside group's charter. Questions 8-10 were other issues that should be noted.

Fleck suggested that things could be put on the "other things" list and then people could vote on those. This would address the tension that has arisen about other things that were talked about. A majority vote saying no, would then mean that that would not be a recommendation from the TLAC to the Commissioners.

Discussions on minority report followed.

(1:08)

Byrnes noted that Thaler's number four is about reconveyance, but Fleck noted that there were other variations of what the role of the county with DNR. The conversation was rather fluid. Thaler's item four was noted by Murray as requiring legislative action.

Paul questioned whether the proposed questions could in fact be gotten through within a meeting. Fleck noted that questions have to be published seven days prior and need to be published by the 8th of November. Paul asked if there was a way to get other questions added and published, and then every member could add an item for the next agenda. This would then allow for a vote on each of these to be passed on to the BOCC. He questioned if there was a way to discuss these issues in one meeting.

(1:12)

Fleck noted that the executive committee is asking what it you want on the list is. The TLAC needs to start roughing out that list and bring that back to the group for November. Fleck noted that using the format: "Should Clallam County do blah-blah-blah." These should be similar to yes/no ballot questions.

There was a general discussion about the proposed second question. Paul asked if this second question would even be voted for and should the TLAC just move on to other items. Swanson noted that an argument could be made that the current oversight may be more effective. The question is "without any changes" and the discussion noted minor or major changes in the relationship. Swanson noted that the annual review process would result in changes. Scott felt that this was a question that needs to be asked and answered. If we say yes, that is the question; if no, then go on to the next question. Murray noted that we were simply making a recommendation.

Silver asked if the pro-reconveyance would be interested in discussing some changes to DNR forest management that would improve revenue, harvest volume, and incorporate alternative values such as carbon and paying for water, recreation, etc., rather than just managing the timber lands for timber. Cross noted that he was the sole vote, on behalf of NOTAC (not OFCO), for reconveyance at the earlier meeting. He noted his goal is to obtain an appropriate review with the Hospital, School, and Fire Department. The problem is that DNR is not competent to get revenue on all of things being suggested. 20 years of arrearage is there and how is that being handled for the beneficiaries, Cross asked. Murray clarified that selling water He wanted to see the lands be used to achieve their specific purpose associated with those lands. Murray noted that neither DNR nor individuals can sell water. Silver understood that it was not paying for a gallon of water, but paying for what is associated with water.

Paul raised a concern with the motion in that there would be no change without considering of the other ideas? He felt that there was not enough time to come up with a list of ideas. He noted he wanted to have all of the TLAC add each person's list to a list to be considered that the county should be doing. Everyone could all vote and attach their names to as many or as few as they would like.

(1:20:45)

Scott asked how do you create yes/no questions with three options? These need to be written as ballot questions.

It appeared that this question was more of a continuance of the DNR status quo. Paul felt that the question was on reconveyance. Timber people want to add a county forester, so you could ask should the County hire a forester to act as a liaison with the DNR? Yes/No? Paul felt that the Yes or No was really only on reconveyance. Byrnes agreed with Paul and there were a lot of questions that needed to be voted on and there may be some that get no votes, others that would. Fleck reiterated that the reason for making the list, as noted in the bylaws, was to make sure the public knew what was going to be voted upon. That requires precision and makes it difficult to be flexible. Paul asked if the questions came in time, wouldn't that meet the bylaws. Fleck noted that if everyone put in three items you would have upwards of 49-50 questions. Under Paul's suggestion there was no way to weed out those items. Murray asked if the TLAC voted on the question that was written down, then that would be the question presented to the County Commissioners with the votes noted. This was different than just proposed individual questions. Silver felt that the group could develop a list and it probably would not be as many as Fleck suggested.

(1:25:20)

Fleck made a motion for consideration at the next meeting of: "Should Clallam County BOCC continue its current role with DNR management of Forest Board Transfer Lands, without any changes?" This was seconded by Beauvais.

Motion passed.

(Group took a break)

Meeting reconveyed with the a review of the adopted motion.

Fleck tabled a motion for the third question for consideration at the next meeting of: "Should the BOCC seek the ability to give DNR direction in all aspects of management of FBTL, to include silviculture

and forest inventory, pursuant to the DNR HCP?" Scott asked that this question be more specific about the County's responsibilities and that as a minimum the County maintain a detailed inventory of the County's investment.

Silver asked about the management aspect. Fleck noted that this was a different intent. He then tried to capture that question for one on the list being developed. Scott repeated her proposed question and clarified her suggested question. Fleck explained his use of the term co-manager in his question in comparison with Scott's discussion of a collaborative manager. This was an attempt to capture the want someone wanted of a strong management oversight.

Paul asked how this would work and Fleck explained that it would have to be approved by the legislature for the legal authority to pursue that. Question is an attempt to capture other interests voiced in previous meeting.

Scott felt that there was a need for the County to maintain an accurate inventory on these lands. Fleck felt that breaking these into questions could allow for clearer votes. Murray added accurate and updated inventory. Cross asked about Scott's question about how this inventory would be paid for, and he argued that DNR should pay for this. She felt that the County needed to consider this as like one's personal investment and whether you just turn that over and do nothing. Or, do you undertake some effort and costs to monitor what is going on with the investment. Bork raised a point of order on the discussion and the nature of the question before the group. Fleck said most may say no, but the goal was to have the TLAC vote on these questions at the future meeting. With ballot titles, the public can vote on a set that might conflict and others have to sort those out. Fleck noted that he was trying to capture the degree of involvement members of the TLAC had voiced in the past. Bork noted that there was no indication of hierarchy or layout that shows where these fall in relationship to others. So far there are just two questions, reconveyance, or DNR management with no changes, and both failed. Those that failed may not get to the BOCC, but of the list including Scott's question that may be something that gets passed.

Fleck's motion was seconded by Beauvais. Scott felt that co-manager should be more defined. Cross felt that this was a word that should be defined by the legislature. Fleck noted that this was defined as an active management by the DNR where the DNR would taking direction from the County under this proposal. Paul questioned which question was being referenced. Fleck noted that this was from the TLAC's meeting minutes and the various documents being referenced in that meeting. Paul felt that there was questions developed and agreed to, Fleck noted that there was no such votes taken. Reandeau asked Blum about this and DNR would said no this wouldn't be the approach.

Murray noted that Thaler's letter and Fleck noted that this would take action by the legislature. Reandeau noted that there is a good structure with the DNR and that there are ways to get the results people are wanting.

The question is what type of revenue do the recipients want and then approach the DNR asking them can you make this. Murray felt that this was the next question.

Reandeau felt that the effort should be at the local level. Get a complete inventory and that may involve the County taking action. Asking for reports more frequently. Cross cannot speak for beneficiaries and having attended quarterly meetings it could be said that those folks want DNR to deliver what they say they are going to do. He suggested that DNR should guarantee their efforts. This would probably mean that you would get projects closer to what beneficiaries were getting.

Cross could not know how the County employee could direct DNR in things to do. He was concerned also about paying for an inventory and the DNR not doing things. Bork noted that the DNR was a state public agency that is receptive to public input. The DNR does not say we are not going to do something because we don't care. Rather, the DNR would respond to direct requests for addressing tourism efforts, forest health efforts, etc. DNR has an immense amount to do, she disagreed with Cross' premise that DNR won't do things, cannot do things, or DNR is not competent to do things. With pressure, DNR can and would respond. Approaching DNR with a "let's work with them."

By answering no to reconveyance, we can provide input to DNR to direct them with the public oversight measuring their outputs. Those need to be prioritized by importance. She felt that the alternatives to reconveyance are really confusion and that raises concerns. She felt that working with DNR provides some assurances, but handing over the lands to someone else is disconcerting. Cross felt that the issue of DNR doing the job they were asked to do is a question raised by what DNR hasn't done. Arrearage is an example of not meeting clear objectives already spelled out. He questioned if one county could make that degree of impact in light of all that DNR has to do. Incompetence is not being used to deal with character, but rather with what the DNR has not done in the requirements they are required to meet. DNR's duties are well defined and they need to be addressed. Murray asked for people to keep in mind that these questions are all different proposed solutions. TLAC needs to make a list of proposed options for further investigation by the BOCC.

Silver noted that Cross' 20 years of experience with the OESF that there is a conflict between the volume objectives and other requirements under the HCP that hinders DNR in meeting their objectives. DNR does not get money from legislature to manage these lands. All of DNR's money comes from the extraction and sale of wood.

Inventory needed, which OFCO would agree is needed, has to come from revenue from the ground. Very complicated situation. She also raised an issue noted by Thaler.

Lea asked about the role of experts like Harry Bell and others who have an expertise? He noted that the Part O Call article raised issues between the discussion between Harry Bell and the individual from the Sierra Club. Bell recommended things to the TLAC. He asked about the purpose of what is being done in relationship to Resolution 70. Bell's recommendation should be voted on up or down.

It was noted that there is a new regional manager for DNR and that now is a good time to express that there is a need for better reporting, inventories, meeting harvest objectives. As a field person, she is more interested in these details and could be very advantageous. Murray noted he had talked to her twice.

Fleck noted that there is a motion on the floor and he had developed a list of questions from the August meeting. Murray felt a vote was needed. Motion was restated. Bork asked about cooperation element. Fleck noted that he had two pages of questions and they were exclusive of each other. Scott noted this question was one further down on the list in August, but Fleck noted that he never got that list so was trying to capture those questions. Vote was called for on this question. Clarifications were asked for.

(1:58:27)

Motion failed 3 – 13.

Fleck tabled a motion for consideration at the next meeting, seconded by Beauvais: "Should the BOCC seek the ability to give DNR direction in all aspects of FBTL management including silvicultural and forest inventory pursuant to the DNR HCP?"

Discussion on the wording occurred being shown on the screen. Murray suggested adding "and forest inventory" and was accepted as friendly by Fleck and Beauvais. Fleck noted that the TLAC was trying to develop a list of things to advertise to the public what was going to be voted on at the next meeting. Murray felt that silvicultural and forest inventory were different. Bork asked if other things should be included. Beauvais noted she was not voting on whether that was what she wanted to do, but rather she was developing questions for consideration. If these are adopted, then other things can come from those recommendations. She felt these were good questions to put on the table for discussion and consideration. Motion failed 3-13.

(2:04)

Bork suggested that the BOCC seek the ability to influence the DNR. Lea asked if the motion passed or failed. It was noted that it failed.

Fleck tabled a motion for consideration at the next meeting, seconded by Beauvais, of: "Should BOCC seek to establish via MOU or other means a collaborative means of managing with the DNR its FBTL?" MOU was defined as a memorandum of understanding typically used between governments. There was a question as to whether DNR would actually sign such a thing. Motion passed 11-4.

Fleck tabled a motion for consideration at the next meeting, seconded by Beauvais, of: "Should the BOCC hire a staffer/consultant with forestry experience to act as a liaison with DNR in order to monitor, engage, respond, and question DNR management of its FBTL?"

Silver asked about the amount of funding that the County is asking for and what is the amount of an updated inventory would cost. Where is the analysis that the services funding can come from the forest? If the liaison is only talking to DNR, what is the liaison trying to do for the County? Fleck noted he was simply pulling questions from meeting minutes. Reandeau said if this was passed, it would be up to the BOCC to define the hours, roles, purposes, etc. Commissioners could decide at what level of compensation, allocation of funds and duties. Scott asked if the question of inventory was appropriate here. Fleck noted that this was a separate question that he had done for later. Murray asked if it should read staffer or consultant. Fleck and Beauvais felt this was friendly. Silver asked if this person would report back to the TLAC? If not to whom?

Motion passed 15-1.

(2:10:50)

Murray asked if Bowen's notes could be cleaned up.

Fleck tabled a motion for consideration at the next meeting, seconded by Kelly, of: "Should the BOCC establish a representative advisory committee, with some level of staff support that would advise the BOCC regarding DNR's management of its FBTL?"

Scott asked if the term "ecosystem services values" should be used instead. Beauvais asked for a rereading of the current motion. Cross asked in light of the beneficiaries and County receiving information already, is this formularization of getting together those recipients or something different? Fleck noted that this was a variation of the Skagit County model. Bork felt that forestry was the wrong word, and that resource advisory, forest lands, trust lands advisory should be used instead. Lea noted that the DNR has very specific duties about what their duties. He read that "the Trustee must act with undivided loyalty to the trust beneficiaries to the exclusion to all other interests. It may not sacrifice this goal to pursue any other objective not matter how laudable those other objectives may be. The trust is established to raise revenue and not address recreation. Cross noted that if that had been done, the TLAC would not be meeting and discussing these issues.

Silver was adding wording that was broader. Doherty noted that he was voting no on this. He was for the concept, but if it was looked at the origins of this committee and the Port's committee with nearly all timber industry representatives. Carbon sequestration could be an important value and if focused only on money is not always the best. This is too specific based upon the history of this committee and the primary focus of industry. These are public timber lands and these issues are not as simple as Cross and others say. He felt that there needed to be included the phrase "a balanced committee."

Fleck as Doherty to turn about and look at what was written to see if the membership was even there. Doherty noted that that was not in the motion. But the ability for two commissioners to set up the membership, that was too risky. He felt that there was a need for a balanced committee. Beauvais noted that this was a concept for comment from the public and to be looked at as a broad question. If voted at the next meeting, this could be refined by BOCC. This is a question as to whether or not this should be answered.

Scott asked if there was willingness to include the concept of a "balanced membership." Doherty felt that TLAC should be asking for an extension and also ask the BOCC for advice on how this committee could be created.

Scott felt clarifying the advisory committee was needed. Fleck noted that there is nothing in the motion about the membership. He noted that one member continued to bemoan the TLAC's creation and representation. Fleck noted he was tired of Doherty's fantasy world. If the motion needs to say a representative advisory board, he would be willing to accept it. Balance would not be appropriate. Reandeau asked if this was necessary in light of the professional liaison. Fleck noted these were different ideas to be considered. Kelly accepted the inclusion of a "representative" before the phrase advisory committee.

Bork asked if Fleck would admit that he could write these questions as a leading question. Fleck noted that he was trained to do this and has done so for 22 plus years. Fleck asked Bork to do the work and put the effort into writing some question which she had not done for the past two meetings. Scott asked to look at the words.

Motion passed 12-4.

(2:24:28)

Fleck tabled a motion for consideration at the next meeting, seconded by Kelly, of: "Should the BOCC as a minimum seek from the DNR an accurate and updated, maintained detailed resource inventory of its FBTL to include all resources with annual updates?" Motion passed 13-3.

Scott asked about the need to refine the words to ensure it addressed the want for details. Swanson suggested detailed resource inventory. Silver asked if this should use landscape? Paul felt that there was a complete inventory within the economic needs of the beneficiaries.

Fleck noted that a group of beneficiaries would question this. Paul said that the DNR explained that the DNR utilizes models, goes out and spot check those models' accuracy, and then reviews the model again at the time of sale at a stand specific scale. He stated the DNR utilizes a system that makes economic sense for the beneficiaries, and to increase the details of the inventory would have little to no benefit to the beneficiaries. Cross disagreed and said that the inventory should be able to answer other questions that do not just focus on a timber sale. So, the inventory needs to also address habitat. Paul said that Cross did not object or raise questions about the inventory. Cross disagreed. He raised questions with Angus Brodie and Kyle Blum. With regarding to the marbled murrelet the DNR cannot determine what areas exactly meet the DNR's habitat information. They require to do additional surveys and evaluations. Paul felt that this was addressed without much disagreement. DNR did spot inventories and there was not a need to do additional inventory work. He noted that the DNR did not get questioned or criticized on these points earlier. Cross disagreed.

Scott noted that she felt that there was additional detail. Paul asked what level of detail was needed? Scott felt that this was something that required additional work such as habitat, stand height, stands by species, etc. Cross noted that the definition of Northern Spotted Owl habitat is defined in WAC 226-16-085 defines habitat with six hurdles that have to be met. He felt that there was a need to evaluate the inventory for compliance with this. Additional information within the inventory would allow to review this. Murray asked to focus on the general recommendation. Details will need to be worked out. Scott asked if examples could be included to help explain the aspects of the inventory. She suggested that the inventory needed to include such things habitat, stand tables, type, location, size of species as examples. Murray asked if this should be included?

Bork noted that there was a want for suitable data, analytical tools for decision makers to have to allow them to make the right decisions. This requires data collection, storage, security and then have the right analytical processes to come up with the needed information. This is information management. The discussion seems to be looking at how to make better decision making. This is a large realm of stuff that needs to be incorporated into the want for a higher level of quality for information management.

Scott asked if there was a way to get more specific than this? Murray clarified details and also noted that updating the inventory once a year can also increase accuracy. Paul felt that in order to vote on this there is a need to understand the cost implications of this recommendation compared to the benefits. Swanson was not sure if DNR didn't have what was being discussed, but what was received wasn't this. There may be a need to update, add to, or modify. He felt that there was a need to be able to get more detailed information from that inventory. Swanson referred to Cross' issue on definitions for habitat. Paul noted that he had testified to the need for more specificity. He was told that this was a cost not to the benefit of the beneficiaries. Scott felt that this issue was important and one that needed to be clarified. Murray noted that the inventory that was given to the TLAC which he reviewed and evaluated was not the same as that used by industry. Byrnes felt that the information for meeting the definition may be in DNR's possession. Scott asked how we incorporate the level of detail into the question itself.

Fleck made a suggested revised version of the motion based upon the conversation: Should the BOCC as a minimum seek from the DNR an accurate, updated, maintained and detailed resource inventory of its FBTL to include all resources with annual updates? Scott asked about habitat definition, details regarding stands, etc. Murray noted that what was being described was a resource inventory. Silver noted that if you didn't incorporate these other resources, you are only getting a timber inventory. Swanson felt that DNR does a great job of cataloging all of the non-harvestable aspect of the landscape. Silver felt that additional information was needed for example the word species covers a large aspect of things. Murray suggested adding "all resources" to capture these issues. Silver felt that this was expansive. Cross suggested that it read "resources to be managed pursuant to the HCP." Bork felt that inventory work has a specific standard and this is what should be done. Others questioned the standard.

Silver noted that carbon storage was a function of the landscape that was not being incorporated into this definition. Swanson felt that the carbon aspect includes more details. Silver felt that OFCO would want to have this spelled out. The HCP was not broad enough as the HCP was written in the 1990s and more information exists now. Suggested "for all resources to be managed pursuant to the HCP?"

Lea asked what the original motion was on the table? Cross asked Silver if there was a way to develop a question to help add additional explanations to the issue of resources. Cross noted that HCP was a limiting factor. Silver read the information within Thaler's discussion on inventory in relationship to ecosystem services definition. This was much broader and not limited to the HCP. Cross suggested that Silver and others develop this into another question.

Fleck read a proposed question on ecosystem management in relationship to the current question. Paul suggested that this be scrapped and the new forestry advisory committee develop this. Silver noted that the TLAC was trying to develop the questions for the community to respond to in the future. Murray felt that this was something that the BOCC could and would develop.

Scott felt that additional information was needed. But, the HCP language suggested was a limiting factor. It was noted that the inventory could cost about \$20/plot, but Murray said that the question was what was being collected. Swanson felt that the ecosystem services may include things that do not include actual values. Silver questioned this. Swanson read some aspects of a definition and questioned

if that did in fact include economic aspects. Silver explained some of the terms used and what they include. Murray asked if a vote could occur on the question before the group.

(2:51:09)

Murray read the question. Should the BOCC as a minimum seek from the DNR an accurate, updated, maintained, and detailed resource inventory of its FBTL to include all resources with annual updates? Motion passed by 13-3.

Fleck noted that so far there were six questions adopted, but that these were not all of the questions being discussed by the TLAC for consideration. He read through a list of questions that he had been writing regarding the various issues. There were 22 of these.

Swanson felt that those that were associated with revenue streams, recreation, etc., were such that they could be combined into one question. Murray asked if we are going to continue on with these items and discuss how to proceed.

Motion to end meeting and allow each TLAC member to send their questions by 8 November to Secretary for compilation was made by Cross and seconded by Paul. Scott asked about the questions already submitted. Cross felt that individuals should submit their questions by the 8th to Fleck and they would just be listed for a vote at the next meeting. Murray noted that an earlier motion was voting on whether the TLAC was going to make the list. Fleck asked for clarification and was told that any questions received were just going to be put on a list. Scott was concerned about the impact to Fleck about that. Paul noted that this was similar to his earlier suggestion. Fleck appreciated Scott's acknowledgement of the staff work needed to do this.

Byrnes noted he would like to just continue to proceed to develop the list for the public. Murray noted that the questions were going to be voted on as a yes or no as a recommendation to the BOCC. Others indicated a willingness to stay. The motion was restated to the TLAC. Beauvais indicated her not voting for the motion due to the effort to establish the questions. Lea agreed with Beauvais. Motion failed 5-9-1.

Motion by Kelly to end the meeting now and continue this on the 18th. Seconded by Cross. Motion failed.

Motion to have the TLAC seek an extension from the BOCC to continue its efforts until 31 Mar 2017 was made by Kelly, seconded by Cross and failed on a tied vote 8 to 8.

Fleck made a motion, seconded by Beauvais, to use the following approach for the November meeting: Place on agenda for consideration/vote at the November meeting the first block of questions adopted by TLAC; Place on the agenda for consideration/vote at the November meeting, after review and editing by the Executive Committee, the other questions Fleck captured from discussions; and, Place on the agenda for consideration/vote at the December meeting those questions members bring forward in a similar format for submission at the November meeting.

Paul asked how this would work with the requirement to have a report. Murray felt that the report could consist of the questions and the votes of the TLAC. Paul asked about how the vote would occur. Beauvais noted that the questions approved today would be ones that are published and voted on. She thought the second set of questions could prove to be irrelevant. Murray clarified that the six questions brought up today could be voted on. In addition, the others would be on the list too. However, a question doesn't have to be voted on at all. The motion was clarified by Fleck in the manner noted above. Scott asked if the subsequent questions would receive the same review as the first six. Fleck noted that under this motion, the new questions would only be reviewed by the Executive Committee. Scott felt that the first six should go quickly and then the next set would be ones to be discussed. Cross noted that anyone wanting another to be reviewed would have to bring those to the meeting in November.

Clarification on discussion was provided, the TLAC would be able to discuss the questions. Scott asked if the list of questions could be consolidated? Fleck noted that there may be people wanting to discuss some items separately. Murray noted that there would be the opportunity to torture every word if necessary. Paul asked for clarification on the process of the development of the questions. Paul questioned about the expectation that the voting could be completed in November. Murray noted only the questions that passed will be on the list.

The other questions noted will be in the second block as a yes/no question and will be docketed for the next meeting. Paul felt that there was a need to review and discuss these issues. Paul felt that there was a consistent approach of putting more and more on the agenda. Fleck noted that there was an effort early on a means of laying out a task approach to address that concern. He recalled that the opposition to this was that the approach was driving the committee to a conclusion.

Lea questioned this. He felt that Fleck's behavior was inappropriate and that Mr. Doherty deserved respect from Fleck. He stated that Fleck's behavior was out of line and inappropriate.

Beauvais suggested that there be schedule a second meeting in either November or December. Paul questioned this. Beauvais noted that she was just trying to address Paul's concern of not having enough time to address things. Murray felt that there was a need to vote on the motion.

Bork asked if there was any effort to prioritize these questions. She asked Fleck if the TLAC would really go through these. Fleck noted that this is what the TLAC wanted to do. Bork noted that, but asked if there was a way to prioritize these issues. She felt that these exceeded the ability of some to remember what the issues were. She felt there was a need for fewer questions to ensure everyone could remember the issues. Fleck felt it was difficult to ask him to cut down the questions that everyone had raised as what they wanted to discuss.

Scott felt that the proposal would reduce the list. Bork felt that the process of editing, discussing, and review really did not allow for things to be prioritized.

Scott asked that this motion not be tied to the November or December meeting. Silver asked about the motion in relationship to the seven that had been voted on and discussed. It was clarified and the vote was taken.

The motion passed by a vote of 11-3.

(2:20:25)

Kelly asked about the meeting on the 18th. She was not going to be available and asked how to call in. Reaume and Kelly would be at a conference.

Public Comment

Jim Stoffer provided notes that were read by Ann Seiter - provided a document from the Washington State School District Association Trust Land Task Force. He noted that the focus of that was on the common school trust lands for sustainable revenue had been the permanent position of WSSDA since the 1960s. He wanted this conveyed to the group.

Ann Seiter - raised concerns about the difference between implementation and issues. Felt that there was a need for broad questions regarding broad management decisions and place the options under those.

Ed Bowen - shared his disappointment with the earlier vote against reconveyance and was not clear why that was the position taken. He felt that the legislation for reconveyance could be expanded, and there was an example of that with the Blue Mountain reconveyance. He noted that the trust lands could also be reconveyed for park purposes. Legislation does exist on the books to do reconveyance. He felt that the report should explain or detail the reason why not to seek reconveyance.

Murray asked about the next meeting. Scott suggested that there as discussion about the extra meeting. Murray asked about that. Silver warned about the holidays and the difficulty in adding an extra meeting. Doherty noted that an option the TLAC could continue the meeting to another date once started. Murray asked about the TLAC just meeting for the entire day. Scott asked for clarification and Murray proposed two meetings. One in the morning, a break, and then one in the afternoon.

Motion to start the meeting at 9 a.m. in November, and end later if needed, was made by Swanson, seconded by Lea and passed 9-5-1.

Doherty asked about the issue of converting from regular timberlands. He noted Peach offered to share information. Reandeau noted that statewide there was some 50,000 acres are converted from commercial forests. While hard to believe, Murray suggested individuals look about I-5. Murray indicated he would ask Peach about that request.

Motion to adjourn was made by Kelly, seconded by Byrnes, and passed unanimously.

MEETING MINUTES FOR:

November 18, 2016

9:00 a.m.

Trust Land Advisory Committee

Minutes of the
18 Nov 2016
Special Meeting

Special meeting was called to order at shortly after 9 a.m. by Joe Murray. Mike Doherty asked about ****, Murray noted that as a special meeting the TLAC could only address those things advertised on the agenda. Roll call was taken and seven of the members were not present at the start of the meeting. Swanson came into the meeting midway into it. Absent were: Bekkevar; Reaume; Blum; Kelly; Cross; Merideth; and, Wolfe. Bob Sextro was the seated alternate for Josey Paul.

II. Public Comment – A packet of written comments were proved to each member of the TLAC.

Doherty asked about amending the agenda and asking if in the regular meeting the agenda could be reviewed and he could add a few things for consideration later. Murray noted that as a special meeting that things needed to be as on the agenda. Doherty felt that that was a ruling and there was a difference of opinion.

Brian Grad – Sequim. Mr. Grad read the following:

I am opposed to reconveyance of our Public Trust Lands because of the exposure to liability for the County. The potential liability for forest fires, landslides, environmental damage affecting clean water, spawning habitat and bodily hard could have catastrophic impact Clallam County finances and local economy at large. Why should the citizens of our County be asked to bear the burden of such responsibility? Our Trust Lands are already managed appropriately by the DNR and the State is better prepared to deal with those issues which we cannot afford to do. We pay enough already, don't ask us to be on the hook for something we cannot afford.

Jane Marx – Port Angeles. Mrs. Marx read the following:

You should be reaffirming the earlier vote of NO on reconveyance. It will cost the County Commissioners a great deal of time, effort and money to pursue reconveyance with little guarantee of success.

Instead you should be considering how to heavily tax log exports to compensate the timber counties for their loses. Log Exports have cost Clallam County a loss of tax income due to unemployment and business closures.

Ann Seiter – Palo Alto Road. Noted that she had attended the meetings many times and had provided written comments that were included in the packet provided to the TLAC. First, she urged the TLAC to vote no again on the issue of reconveyance. She felt that was an honest vote on the information at hand and any changes in votes needed to be explained. Second, the second question needs to be worded better. "Don't make any changes" prevents a need to better improve communications between the County and DNR. She asked members of the TLAC to also read through Question Six.

Ed Bowen – Clallam Bay. He felt that question need to be addressed. Question 3 is a very valid point. The fiduciary responsibility seems to be open to change. There needs to be a formal understanding and the TLAC should consider a formal MOU to review these alternatives to reconveyance.

Tim McNulty – Sequim. Expressed that the TLAC had done good work and had a good vote in June. DNR has the expertise, serve the beneficiaries, and comply with environmental laws. CC lacks the expertise and has no means of taking on the management of those lands.

Ed Chadd – P.A. Expressed concern about no substantive discussion on the issue of reconveyance. He underscored what Ann said. If the vote changed, why? Discussion occurred in depth when making the earlier decision. He was concerned about liabilities of the County taking over responsibility for these lands. Climate change was another issue as it impacts wild fire, erosion, and landslides. There runs a real risk of major lawsuits. These issues are of huge concern to him.

Marc Sullivan – Dungeness. TLAC should reconfirm that the County should not pursue reconveyance. It's not going to happen and he could not image the legislature, the Governor, nor the Lands Commissioner supporting or signing such a bill.

Elizabeth Oaks – Ramhill Road. Saw the notice for the meeting in the newspaper. Native Texan who moved to Clallam County in '98. She owned an environmental consulting company that worked with the USACE. Seas are up due to climate change over the past 71 years and there is more dramatic change in the last 30-40 years. Already there have been two 500 year flood events on the Braze's River in a six week period. Nothing like it in written history. Flood plan was over a mile wide. Climate change is a concern.

Norma Turner – P.A. Provided written comments to the TLAC. Wanted to add that the members should reaffirm their votes. The County has issues with juvenile services, roads, homelessness and it doesn't need to add this to its various issues. Comments about looking at Grays Harbor. Grays Harbor does not come ahead as a result of managing its own trust lands. So not an economic stability issue. Work on policy to keep logs here rather than exporting them.

Peter Vanderhoof – Salt Creek. If there were to be a change in the vote on reconveyance, those that change their vote need to explain why. He has attended most of the meetings, but unable to attend all. He felt that there was no clear good reason that Clallam County could more cost effectively manage lands for the beneficiaries. He urged members to vote no on reconveyance of trust lands.

Jane Vanderhoof – Salt Creek. Also hoped that the TLAC does not vote to reconvey these lands. DNR lands cannot be sold to China. Timber company can make the sale and this is inconsistent. This issue amounts to a money grab for someone.

III. Minutes

Motion to approve the minutes made by Ben Pacheco, seconded by Coleman Byrnes. Motion passed 8-0-3. Toby Thaler noted his name was spelled incorrectly in the list of attendees. Motion to amend the minutes adopted to correctly spell Thaler's name was made by Thaler, seconded by

Scott. Also there was information provided regarding a sheet on carbon sequestration from CORRUM UW handed out by Harry Bell. Motion carried 8-0-3.

IV. Review Clallam County Trust Lands

Murray read Clallam County Board of Commissioners Resolution No. 70-2015 to the TLAC. Fleck noted that he would need to county votes and that they would be taken via a roll call per the bylaws. Thaler asked if a quorum was present. After a brief discussion, Fleck confirmed that a quorum was present.

V. Recommendations to the Board of Commissioners

- A. Question No. 1 – *Should the Board of County Commissioners seek the reconveyance of State Forest Board Lands (Clallam County State Forest Board Lands) managed by the Department of Natural Resources back to Clallam County to be managed by the County?*

Motion by Byrnes, seconded by Fleck. Thaler asked for a clarification about the voting. A vote yes was for the question, a vote no was against.

Connie Beauvais noted that the Port has been and continues to be concerned about the economic loss to the County. This loss includes the direct and indirect jobs lost due to DNR's problems with its decadal harvest. Over the past ten years, the Port did not receive an estimated \$599,000 dollars. There are concerns about what the other junior taxing districts did not receive. They did not receive their money; and, they may have had to pursue additional taxes to pay for schools and fire district needs. She did not feel that addressing export limits on private industry was the job of the Port.

Thaler fell all of that was accurate. Comments today indicated clear data, but not complete in the information. Arrearage figure from DNR did not take into account the substantial impact of the Foothills Land Exchange where mature timber was traded for younger stock. He was not sure what the impact of that was as a percentage of the arrearage and it had to have been a contributing factor. Murray asked where that exchange was located. Thaler indicated it was about the Peninsula and in the Ozette drainage, the Straits, and Shelton. Thaler noted he had asked Kyle Blum for a breakout, but that that had not been produced yet.

Fleck noted that he voted no in the Summer and would vote no again. There are some 22 steps to get a bill passed. When it was originally proposed, as Beauvais can attest, there were a few asking that this needed to be reviewed and discussed. There is a need to have engagement by the junior taxing districts beyond the City of Forks and the Quillayute Valley School District. There needs to be issues addressed with the inventory. The issue with arrearage mentioned by Thaler is a bit of a red herring in that the Settlement Partners raised issues with Blum's predecessors regarding the growing arrearage in this issue. Other issues such as litigation by certain entities that played a significant role in the matter as well. There is a significant arrearage of 702mmbf with 247 mmbf in the Olympic Region with 92mmbf of that owed to Clallam County. That represents monies that did not go to a list of junior taxing districts.

Suzanne Scott noted that an ordinary person would never budget on what they didn't get. Rather they would hope for the best income. She felt that in some ways the issue with the arrearage was betting on something that was not a sure thing. She felt there was no reason why any public entity would be counting on that.

Cynthia Bork asked for clarification on the process. She then supported the public concerns, but also noted the concerns of the junior taxing districts. She felt that they could not expect the burden of their funding needs coming from timber resources and timber harvests. She felt that there was a need to look at a broader means of generating revenue from such things as tourism. This would create investment in the County by taking advantage of the systems that will bring funds into the County. This does not prohibit harvest for forest health. But recreation tourism captures money from tourists. DNR should consider other means for providing revenue to the junior taxing districts and the County.

Coleman Byrnes noted that the population of Washington had doubled in his life time. That means there are more school children. It is unrealistic to look at DNR for significant tax base. Population grows and DNR is unable to support the funding needs.

Ken Reandeau noted that both sales and lodging tax revenues are up. Urban areas want to come here. People are coming earlier and staying longer. Also, there are some 50,000 acres a year state wide being converted to other purposes, so there is a need to use these lands wisely. He felt that there was a need for a proper inventory and the County did not seem to be getting that. Port forced its own committee around timber issues with highly qualified members. He noted that the public was against reconveyance and so was he.

Mike Doherty noted that he agreed with the number of topics mentioned. He felt that other issues should be included on the agenda to include:

1. Climate change impacts and felt that there were many ways to discuss this issue later in the day. He felt that there was room within the Resolution that could allow the discussion of these matters. That would result in a better a means of discussing these issues
2. He felt that there were studies done in August 2013 and October 2015 on climate change. The County is not using, nor disclosing to people, the 2013 Wildfire Risk Study. He asked how many had read and used that? Section by section of the County was covered in the study showing risk by month. He felt that Clallam County had an obligation to respond to that study. He felt that there was a liability being placed on the user and this should be noted and follow the sale of the parcels. The study notes that Clallam County has the highest existing risk of catastrophic losses within all of Washington and the 5th highest risk within the Western USA.

(43:30)

He also felt that with climate change there were noticeable changes in moisture content, increasing winds, etc. that lead to an increased risk of forest fire. He felt that the DNR has

additional duties under the HCP and that the County would face a huge risk associated with reconveyance. For example, the OSO Landslide study indicated a significant risk and something similar could have the County at risk for millions. Commercial sellers of lands being converted from forestry uses need to have this information disclosed. Further, there is the potential for the rise in sea levels, wildlife risks that also need to be considered.

Murray noted that Doherty had asked about conversion of forest lands to residential use within Clallam County. Bill Peach shared with Murray that unfortunately to pull the various files would take one FTE 30 days to get that information. Murray suggested that people utilize aerial photography.

Roll call vote was taken on Question No. 1:

Should the Board of County Commissioners seek the reconveyance of State Forest Lands (Clallam County State Forest Board Lands) managed by the Department of Natural Resources back to Clallam County to be managed by the County?

The motion failed by a vote of 3 – 9 – 0. (Yea – Nay – Abstain)

TLAC turned to the proposed second recommendation to the BOCC identified as Question No. 2 which was placed before the group by a motion by Beauvais, seconded by Fleck:

Should Clallam County BOCC continue its current role with DNR management of Forest Board Transfer Lands, without any changes?

Thaler noted that he would say yes to this question, all others later on the list are implied. He noted that courts are inconsistent in some of these issues. However, encouraged people to vote knowing that Questions 3, 4 and 5 are significant and totally different than this question. Scott highlighted the importance of the last three words of the question. Thaler felt that the question as it ended was rather stark and made a motion to strike the last three words. Murray intervened and asked if that would be a substantial change, as this was an advertised question associated with a special meeting. Fleck felt that it would be a substantial change. Reandeau noted that change is happening regularly and with new elections there would be additional change in a role that is dynamic within that change. Murray suggested that members vote no and then move on to the other questions.

Bob Sextro noted that if the group was happy with the status quo, this would be a yes vote. Happy with the management on behalf of the tax districts, then yes. Last three words were not set to circumvent management style. He felt that there was a need to allow for other interactions. He noted that the personal were not in this matter or other questions. He suspected that DNR would continue to work in the same manner. He felt the TLAC should vote on the question. If it was not adopted, the TLAC can then focus on the other questions.

Reandeau encouraged members to vote No and that the question was vague. To set it aside, vote no. Byrnes asked if these were only recommendations. Murray affirmed that the TLAC was only advisory, so any recommendation would be to the BOCC and it would be up to the BOCC to accept or ignore the recommendation.

Beauvais noted that she had been working on the issues involving the DNR for more than a year. The issue arose out of a lack of communication and understanding on a lot of issues by people. Arrearage and revenue could be lost if the County just rolled over and she hoped that the County could do more. Lea asked if each question would be open to all members of the TLAC to vote. Murray explained that each member could vote on each question.

Roll call vote was taken on Question No. 2:

Should Clallam County BOCC continue its current role with DNR management of Forest Board Transfer Lands, without any changes?

The motion failed by a vote of 1-9-2.

(1:00)

The TLAC then considered Question No. 3 as a recommendation to the BOCC upon a motion by Beauvais, seconded by Fleck which read:

Should BOCC seek to establish via MOU or other means a collaborative means of managing with the DNR its management of FBTL?

Fleck noted he would be voting no on this. DNR is going to be the manager and an MOU would be problematic. There are other more beneficial means for the County to engage the DNR. This would create a duality that would not be in the best interest of the County.

Scott asked if this question was how the Skagit County model was being proposed? Fleck noted that that was Question No. 5 docketed later in the agenda. She noted that an MOU was unlikely. Also, Skagit County has a different way of working with the DNR. She felt the Skagit County model was worth considering. Bork felt that with an interest in government, the DNR is open to involvement and public opinion. An MOU throws the relationship into an unnecessary category. Also, DNR is already doing this. Beauvais disagreed and felt that things move and change. An MOU would tie the DNR to things during more fluid times.

Roll call vote was taken on Question No. 3:

Should BOCC seek to establish via MOU or other mans a collaborative means of managing with the DNR its management of FBTL?

The motion failed by a vote of 0-10-2.

(1:05)

The TLAC considered Question No. 4 as a recommendation to the BOCC upon a motion by Pacheco, seconded by Beauvais which read:

Should the BOCC hire a staffer/consultant with forestry experience to act as a liaison with DNR in order to monitor, engage, respond, and question DNR management of FBTL?

Scott noted that the County already has problems with money. She felt that this was not really an option based upon the reality of County finances. Reandeu felt that the question was one of risk versus reward. It could be argued that yes this was needed and point to the Commissioners the fact that the inventory, and assets were not well defined. County did have a person who interacted with DNR. Discussion within the group was about the need to have a professional so engaged in that effort.

Fleck felt that there was a lot that DNR does in their public documents that need specific focus and that individual departments could help in hiring individuals with the expertise. The BOCC could work this issue out.

Scott liked the idea of having more involvement, but felt that there were 11 staff vacancies at present and the County cannot fund those. She felt that the TLAC needed to be realistic and that this was not the only option. Murray felt that this would be an investment by the BOCC. He felt that they could hire a firm that specializes in this to look at very specific questions. Reandeu noted that it was budget time for the County being it was December. He felt that now was a good time to get this out there for consideration and to have this before the BOCC

Doherty felt that there were different ways to address these issues. Assessor had a forester to help with tax matters. That person had an impact upon timber tax law. Another way, instead of each county having a lobbyist, WASC hired someone to deal with the system itself. DNR will also ask for an increase. There will be a new BOCC, with noted conflicts, that will need to work with other counties. Tom Robinson who was a former DNR employee was hired by WASC. He came back to the counties with pros – cons on the various issues. He was able to use his experience and testify to legislation.

Ben Pacheco explained he was with Fire District No. 4 and that it was a volunteer organization. While the district does not budget for these funds, nor expecting a lot, they do hope for those funds. Realistically, he believed that the TLAC should vote yes on this question. He did not think that the position would need to be a 40 hrs/week full time position, but if the person could look at alternatives suggested by Sierra Club, etc.

Bork felt that as written, consisted of a staffer with forestry experience. She felt that this was extremely narrow and did not include ecosystems or public engagement experience to address the various interests involved should be included. A forester is limited and broader level of experience was needed, but that that was not even said. Murray felt that foresters were also ecologists.

Beauvais felt that forestry background and expertise was needed to look at timber cuts and harvests. Also, she wanted the advisory committee and would like to see this person work with the advisory committee. Murray noted that that was the next question. Scott felt that the question needed a rewrite. Byrnes felt that the question did not include fishery issues. As a result, he felt that the question needed to be changed and tabled, or needs to be defined better. Murray felt that a forester would have to look at all issues to include fish and habitat issues.

Sextro felt that the question should be tabled or clarified. He suggested that the question be broadened and returned in December to include more ecological or more holistic approach. As written it takes different directions, and so it should be tabled and redone for consideration in December. Bork suggested that the phrase "natural resource management" be considered instead of "forestry." Fleck noted that it would be cleaner to propose a different question to clarify this at the next meeting than try to amend a published question.

Thaler argued that members should vote no. He felt that Question No. 5 got to the same place and that this question injects political mischief into the system. Doherty felt that with the change in the administration and at Clallam County, hopefully, there will be a lot of discussions. He supported the TLAC asking for an extension to continue its efforts until March/April. He felt that would allow for communicating with the DNR in light of these new changes. He also felt that with 21 timber counties, that might be a better approach than hitting DNR with these issues alone.

Beauvais felt that the effort was really one of ensuring a level of stability with what happens. A staffer could maintain consistency. She would be voting yes and recommend also that such a person have experience in environmental resources.

Doherty asked about clarification of the motion. Murray reminded that people were voting for or against making the recommendation to the BOCC. There were items noted for the December agenda

A roll call vote was taken on Question 4.

Should the BOCC hire a staffer/consultant with forestry experience to act as a liaison with DNR in order to monitor, engage, respond, and question DNR management of FBTL?

Motion passed by a vote of 6-5-1.

(Break)

(1:25:45)

After the break, the TLAC reconvened to consider Question No. 5 as a recommendation to the BOCC upon a motion by Fleck, seconded by Thaler which read:

Should the BOCC establish a representative advisory committee, with some level of staff support that would advise the BOCC regarding DNRs management of its FBTL?

After some general discussion, the meeting continued. Beauvais noted that the Port found it important to have a timber advisory committee that helps the Port's engagement. Here there needs to be folks close to government, but also folks from all different areas. Scott felt it was critical to bring in all views and then take those to the street. By doing so, you involve people and increase learning. Thaler noted that such an effort would provide a forum for an urban lefty to come to and engage.

Doherty felt that a stacked committee would equate to no public support. Fair representation was required. There could be no secret emails or meetings such as what occurred with the formation of the TLAC from the Charter Review Committee. Thaler suggested that this statement be part of the report from the Committee. Bork noted that the question could stand, or might need to be embellished to explain what was being suggested. She felt there was a need to develop the recommendation. The group would need a facilitator as an essential aspect of it. Doherty disagreed with the Chair about the Chair's comment that amending the question would be improper, and Doherty felt that there were ways to discuss such things in spite of the Chair's position.

Reandeu felt that the word "representative" in the question was key to the discussion. He noted that the TLAC did not have members of the younger generation on it and that they need to be included. He felt that there was a need to be conservative with the use of these lands much like he is with his own lands. Byrnes noted he was ambivalent with the question. He asked what did representative mean. He hoped that such a committee would have tribal, recreation, fish and wildlife interests. So what does that mean for this question?

(1:33:10)

Scott felt that there was a need flush out the question more. Fleck noted that it could be done in the report on this recommendation with reference to the discussion in the meeting minutes. Murray felt that a vote on this question would then determine if another question was needed. Thaler noted that he would be voting yes, but that it was relying upon the foundation of Doherty and Byrnes comments on the need for broad membership. Bork noted that the question was developed at the last meeting during the latter part of the day when most were exhausted. She asked if there could be a discussion that allowed for a consensus revision. Fleck noted that the bylaws required an advertised public notice on the question to be considered. There was agreement that maybe more work on the details of the questions may have been warranted prior to the publication of the notice.

Reandeu felt based upon his years in attending Commissioner's meetings that this should not be made longer than it is. Commissioners make decisions with input from staff and the public. Beauvais noted that she had faith in the Commissioners to address the representative nature of a committee. They did well with the creation of the TLAC and expanded it to include more groups. The BOCC would do the same with the formation of such a group.

Swanson arrived. Fleck felt a committee was needed. He hoped that a committee would continue with some of the educational components that the TLAC has undertaken. There has been a constant need to educate the public on the unique role that these lands play. The issues with these lands are not simple, nor easy. Further, understanding the management processes used by the DNR are not easy to quickly understand either. Having a group engaged in these issues can help significantly.

Doherty felt that the Port of PA stacked it on their committee with one side of the issue very heavily. Such efforts, and others like those by McEntire and Kitchel, are not great examples. Commissioner of Public Lands recommended to add two positions to this committee and the BOCC did not do so. Beauvais disagreed and noted that the Port's committee was created for a specific purpose.

Sextro felt that the recommendation was terribly undermining public involvement. Issues come to the BOCC in private, in meetings, and in public comment. If the BOCC established another committee regarding DNR and trust lands, how would the public know who to go to? Commissioner could send the person to the standing committee. People should be able to go to the BOCC. Question No. 4 passed so there was no need for a committee as that person would be the liaison between the BOCC and the DNR. He felt that this was not needed, and it would be silly to do so.

Reandeu felt that people could come and testify. Some concerns might be behind scenes, but Commissioners will tell you what is going on. After six years observing people coming to the BOCC, he has seen people telling the BOCC to its face what they think. If you are concerned, come to the BOCC. Sextro noted that he did that, but the question isn't right in that it would create another layer of bureaucracy. If committee is advisory, then there is another layer to deal with as a member of the public. Public then has limited direct access. Swanson agreed. He felt that the BOCC was open to criticism based upon the experience of this group. If the BOCC hired the right person, and select someone from outside of the area, there would be less suspicion. Byrnes was skeptical as to what the committee would do.

Scott felt that there was a lot of interaction with the DNR and that there needed to be a broad group to respond to that. She felt that there was a clear call for something else. The committee creates an opportunity to be interactive, and there was nothing to stop a person from going to the BOCC. She felt that the committee would be a positive resource. Thaler noted he was leaning towards a no vote. He was concerned about redundancy and the unlikelihood for broad representation. He noted that the conservation community cannot be well represented over time. Other have the ability to be there more often.

Doherty noted that he favored public involvement. Maybe after the BOCC could reinstate this or expand this body which has a fairly balanced committee. The Port was not that way. Also the EDC once had a cluster for the purpose of addressing some of these issues. However, he noted he would be voting against the question. Scott questioned this as she felt he had said he was for public involvement.

A roll call vote was taken on Question No. 5:

Should the BOCC establish a representative advisory committee, with some level of staff support that would advise the BOCC regarding DNRs management of its FBTL?

Motion failed by a vote of 6-7-0.

The TLAC considered Question No. 6 as a recommendation to the BOCC upon a motion by Fleck, seconded by Beauvais which read:

Should the BOCC as a minimum seek from the DNR an accurate and updated, maintained detailed resource inventory of its FBTL to include all resources with annual updates?

Thaler noted that DNR would be changing its inventory structure and that some aspects of the question may be inappropriate. He questioned if the inventory was inaccurate and not current. Scott felt that the TLAC should hope for the best in that it should recommend the best option, regardless if that is fulfilled or not.

Fleck moved the question for considered, Beauvais seconded. Fleck noted that in his listening of the meetings for typing the minutes, there was a discussion about the inventory was commented on by Murray, Swanson, and others as having information missing from specific polygons. He expressed a concern about the inventory and felt an accounting was necessary. If anyone was managing a trust, if he was for his nieces and nephews, he would want an accounting. The costs are such that should be paid as essential aspect of the management. When people ask about the arrearage and the trees not being there, then that implies that part of the asset has been lost. That raises significant concerns. The inventory should meet the best industry standard. Thaler asked about the cost Fleck noted (\$500m). Fleck noted that the individuals commented on a cost of \$4-\$8/acre x 92,500. Could that be reviewed over a ten years.

(1:55:00)

Swanson noted that the FBTLs have a value of about \$300m and that an inventory as being discussed would cost between \$350-750K. He felt that it was a fundamental requirement for the trust to know what the asset is, its value, and its inventory. They cannot do this. Update to the inventory to the industry standard is reasonable. DNR is managing for habitat and so it can update this. Murray felt that DNR needed to put various things into its inventory, but it needed fundamental metrics.

Byrnes asked about how the inventory addressed riparian set asides, unstable slopes, etc. Swanson felt that DNR needed to get more boots on the ground and in doing so would get more accurate information.

A roll call vote was taken on Question No. 6:

Should the BOCC as a minimum seek from the DNR an accurate and updated, maintained detailed resource inventory of its FBTL to include all resources with annual updates?

Motion passed by a vote of 12-0-1.

IV. Public Comment

Ed Bowen – Clallam Bay. Shared that he was disappointed in the decision on reconveyance and the no vote. He felt that the Services need to be consulted if the agency not living up to its

fiduciary burden, then the lands need to be brought back under local control. Further, the threat of litigation is not being addressed as an item that he was interested in. He felt groups were continuing go forward with those issues.

Brian Grad – Sequim. Thanked the TLAC for its tenacity, patience and commitment to deal with “the commons” and the represented interests of the public at large. Presumption that the DNR is not performing. What is their requirement to manage trust lands? Statutory? WAC? Then if DNR was not satisfying its role, how do you engage? Legislature?

Peter Vanderhoof – PA. Thanked the committee for its hard work and was happy to see the previous vote upheld. Those that changed their vote, he asked them to please explain the change. Arrearage keeps coming up, but it is based upon a model. It’s not the real world. If timber harvest doesn’t happen, it doesn’t vanish. Unless there is a 1921 blow, but if not cut the timber is worth more over time. Not quite proper to say it disappears.

Toby Thaler – Seattle. Appreciated the conversation. Where conflicts arise, it was a pleasure to get to know the basis for different opinions. Couple of occasions he had advocated that rural communities and their governments need better revenue. The election results emphasize that the red-blue divide is even more apparent. Blue is coming to this you in this area. Order for CC governments critical find allies in urban areas to revise state tax structure. Not done fighting until that happens.

The special meeting was adjourned by unanimous consent based upon a motion by Beauvais, seconded by Pacheco.

(2:06:52)

MEETING MINUTES FOR:

November 18, 2016

12:00 p.m.

Trust Land Advisory Committee

Minutes of the
18 Nov 2016
Regular Meeting

[Meeting recording starts this meeting at 2:07:00]

I. Call to Order/Pledge of Allegiance/Roll Call

Chairman Joe Murray called the meeting to order, the Pledge of Allegiance was done, and the roll was called. Seventeen members were in attendance.

II. Public Comment

Rod Fleck – Forks.

Ed Bowen – Hoko. He felt that there was a need for an advisory committee. He emphasized the need for representation that must include a citizen at large on such a committee.

Brian Graf – Sequim. Felt that there were other questions that needed to be added to the second block. The new Lands Commissioner be extended an invite to speak with the group. It would allow to confer with her on emerging policies for example, clean air, carbon banking, and carbon sequestration. She will have an effect upon those. Further study and review is needed on more than one of the questions being considered.

Peter Vanderhoof – P.A. He noted that Kyle Blum made clear that there were a whole host of reasons why the model was not met – people; environment; market crash. He congratulated the DNR for not making its mandatory cut. He stated that the arrearage was a fake cause because the trees do not go away. Worth more in the future than when sold in a low market.

III. Minutes

IV. Review of Clallam County Trust Lands

Mike Doherty noted that there was now a 140 page report on the future management of the Olympic Experimental State Forest that should be reviewed and thoughts shared by the TLAC and others. He also felt that the County should look at the Climate Action efforts, particularly Step Three (3) of the five (5) step plan. Process to develop working with forestry in our rural county. Climate Action Plan is valuable in that it relates to getting points on grant applications. The County needs to show progress on these efforts for those grants. He also renewed the want for more detailed information on the conversation of private lands to residential development. It was noted that 50,000 acres were converted on a yearly basis. If there is a want for working forest, this needs to be discussed in relationship to GMA Comp Plans and WRIA plans. There was also a clear public concern on the issue of exports that was within the public opinion in the packet. That should also be discussed. He questioned the balance of the research shared by CORUM in that

there is info that shows different outcomes on carbon sinks, timber rotation, etc. He noted that someone offered at the last meeting to bring that additional information and raised it again. He expressed concern that regarding arrearage and the PABA White Paper by McEntire, Kitchel and Bell was getting traction in the public, but there was no other opinion getting traction.

(2:20:45)

Joe Murray asked if there were other questions. Susanne Scott asked about the timing of things. Would there be a way that Doherty could put these thoughts together in a way that would allow them to be discussed in December and then the TLAC could focus on the remainder of the questions before the TLAC. Doherty felt that there was a need to ask for an extension for additional time to consider these matters and get some of the science behind these matters. Murray suggested that that could be something Doherty brings forward for consideration at the next meeting.

Murray read Board of County Commissioners (BOCC) Resolution No. 70 that chartered the TLAC and articulated its purpose.

Connie Beauvais offered a motion for consideration in December that was introduced as follows:

Unlike the Port's timber advisory committee which has a narrowly-defined mission, have a motion reading:

"Should the Board of County Commissioners establish an advisory committee composed of representatives of all entities with an interest in Clallam County trust lands to advise both the public and the staffer/consultant regarding DNR's management of Clallam County trust lands?"

Motion by Beauvais, seconded by Cynthia Bork.

Tom Swanson noted that we elect and hire people to do a job. Any more bureaucracy leads to inaction. What is needed is to send a message to DNR to do its job.

Beauvais felt that there was a need to do something to get people engaged into the discussion. Jason Cross felt that such a group could not be productive composed of all interests. David Bekkevar thought that the TLAC was the way to make things happen. Should not have to cost taxpayers more to tell DNR to do its job. This would just add to bureaucracy. He noted he was disappointed with what recommendations had been made.

Scott disagreed and felt it was amazing what the TLAC had gotten done. She noted that democracy is not a spectator sport. One way is to get citizens involved. This is so beneficial and the cost is minimal for the information that we generated. Commissioners limited the time of this committee. This committee is made up of passionate, diverse views. This has been an amazing and exciting process. Bork felt that the DNR was getting the job done. This is not saying though how to get it done. Also, she did ask what does that entail. Currently, DNR is doing the job with constraints. DNR could do other things to bring in revenue. This proposal would help the DNR get the right job done.

Sextro felt that this motion was rehashing the advisory committee recommendation which was voted down earlier. The TLAC approved Question No. 4, [hiring staff/consultant], that person will interact with the DNR. He felt that a committee was a silly waste of effort.

Fleck noted that in the past meeting minutes there was a huge amount of time regarding the Skagit County model. He felt that reconsidering Question 5 was warranted and hoped that that would come forward for discussion and comment in December.

Motion to place on the December docket the Beauvais/Bork question passed by a vote of 10-7-0.

A motion was made by Beauvais, seconded by Bork to consider adding to the adopted recommendation regarding the hiring of a staff/consultant the following:

*Should the BOCC add **integrated resource management** to the definition of forestry experience in employing a staff/consultant?*

Kyle Blum noted that this phrase is not a defined term and there needed to be some definition developed or applied to this to ensure it is understood as to what is meant. Bork felt that it was not undefined. Rather it requires a consideration of all resources and how they relate to each other in relationship to the decision being made. Blum felt that IRM was the consideration of a lot of factors and how broad that goes is the issue he was raising. He noted that the group seemed to be looking at someone to align resource and forest management with issues such as climate change, forest health, etc. Swanson felt that it should be left to the DNR and professionals to consider what resources should be considered. Thaler noted that this was addressing the position that "forestry" was too narrow. He had voted no on that as he wanted to have the focus to be broader.

Jason Cross noted that forestry delivers revenues. DNR has a job to do. He felt that IRM was addressed by the HCP as it was doing that. Revenue to the County is DNR's duty, it needs to be doing that with experts. It should be focusing on how the FBTLs deliver revenue to the beneficiaries. Scott questioned whether DNR should only be focused on revenue from trees, especially when there are shifts in markets? She felt that the DNR needed to consider other ways to derive income. Swanson agreed that there were shifts in the market. But, he questioned about the DNR being able to obtain funds from carbon within the OESF. He would love to know where, when, how long would be associated with changing harvest schedules for those funds. He felt that there was really no existing market for such things.

Scott felt that carbon sequestration was not the only thing that could be looked at for revenue. The definition right now only addresses trees and the inclusion of IRM would broaden that to consider recreation, carbon, etc. All of which could help produce more revenue for what we are looking at which are the fire departments, hospitals/medical, and schools. Cross felt that these additional things do not bring in money presently. He also felt that these were beyond DNR's legal authority and mechanisms to consider doing these things. Scott questioned the wisdom of not considering something because one was not seeing revenue now.

Bork noted that IRM was a process and she read a definition she had found on Wikipedia for IRM. She felt that this was a clear explanation of the term. Swanson felt that such issues were not questioned or

precluded, rather that it was implicit within an RFQ for this position. Robert Lea asked if this staff/consultant would only be focused on DNR trust lands? Yes, as currently written. Beauvais felt that when one read Question No. 4 there was a want to ensure that the forestry experience also includes IRM. Hoping that the BOCC would look for this as a component of a broad background. Murray noted that foresters manage beyond just trees. He felt that Question No. 4 does not preclude a broader set of considerations. Coleman Byrnes noted that he would like to have IRM explicitly included in the recommendation to the BOCC.

The motion to docket the addition to the adopted recommendation, Question No. 4, was approved on a 16-1-0 vote.

(12:40 p.m./2:45:50)

V. Recommendation to the Board of Commissioners

The TLAC turned to the questions advertised for consideration during this meeting.

- A. The TLAC then considered Question No. 1 as a recommendation to the BOCC upon a motion by Blum, seconded by Fleck which read:

Question No. 1 – Should the BOCC establish a means of coordinated, regular and meaningful outreach with the trust beneficiaries and the public regarding its Forest Board Transfer Lands?

Blum noted that there was a need to do this within the County and the TLAC was doing that at present. The County has the ability to do outreach to other junior taxing districts. This would not be off loading the DNR's objectives, but aiding in that. Fleck noted that outreach to those other beneficiaries is relatively new and could be tied to Blum's employment. Bruce Mackie use to say that those were just part of the County. Forks does a quarterly meeting and tries to invite as many as possible to that meeting which has been going on for about 20 years. It is questionable as to whether this was the City's function, but the Region has engaged in those and used it to help nip things in the bud. Yes the County should do this, not sure how best to do it.

Bork noted that she did not know what "regular and meaningful" meant as it was being used. Blum felt that this was not for DNR to do, but something to let the County do. Scott felt that this would not change allowing the taxing districts from going directly to DNR, the BOCC, or other avenues to express their needs. Murray felt that the TLAC was unable to do exactly this in its meetings. This would provide direction on what may be worthwhile for the County to do.

Doherty noted that the BOCC publishes their quarterly meeting with the DNR on the calendar. Commissioners can add notice to others and the DNR, the Treasurer, etc. can sit in on those discussions. In this day and age, it might be better for these meetings to be captured on a more robust website, and DNR could do that as well. Thaler felt that the wording was such that it really should say that the Commissioners "continue and improve" as necessary such outreach.

Beauvais felt that just publishing notice of the meeting was not good enough. Rather, the BOCC should send an invite via email to these various groups. Further, there should be more specific outreach that includes talking to those groups that cannot meet at the table.

Roll call vote was taken on Question No. 1:

Should the BOCC establish a means of coordinated, regular and meaningful outreach with the trust beneficiaries and the public regarding its Forest Board Transfer Lands?

The motion passed by a vote of 15-1-1.

- B. The TLAC then considered Question No. 2 as a recommendation to the BOCC upon a motion by Fleck, seconded by Beauvais which read: – *Should the BOCC establish a means of overseeing and monitoring the DNR's revenue generating methods regarding its FBTLs?*

Fleck noted that this would be something for the BOCC to create a means of overseeing the projected revenue, and the revenue received. Fleck noted that this can be a challenge. The City utilizes a form to do this, but there are various reports used by the DNR, but there are challenges. The City's tracking is off, and DNR and the City go back and forth. Scott asked how does this address that issue. Fleck noted that the BOCC would say we want to establish a means to do this and utilizes that means to track that.

Lea asked if this question and Question 2 were in fact being done by what was recommended in the earlier meeting's Question 4 [staff/consultant]? Blum felt that this could be a task that would be given to that person recommended in Question 4. Scott also felt that the BOCC would not implement all of the recommendations made by the TLAC. She felt that the earlier recommendations were the highest ones, and then these help break down those into more detailed elements. She asked if there were other ways to address a need that Fleck identified. Blum felt that there could be other ways of engaging on these matters. Lea felt that this was redundant and that the focus should be talking about revenue from these lands. If the revenue was coming from these lands, would the TLAC be in existence?

Scott noted that this was consistent and recommended the report used by the County. There are a variety of reports and at items they tell different results. There is a need to have a consistent and reliable that is understandable. That needs to be seen as reliable, consistent to understand the role of these lands. Lea raised the question of how does the community replace the Port Angeles High School which needs to be replaced and the role these lands play in that discussion.

Scott expressed the position that the trust lands are there for revenue and specifically, in part, for the construction of buildings. Cross noted, however, the state passed an initiative a requirement to reduce class size, but did not fund the building of rooms for those classes. There will be a need for additional money for school construction. Blum noted that historically, DNR timber related revenues provided 75% of the construction costs, but for the past few decades, the DNR revenues are at about 25% of the construction costs. The need for construction dollars is greater than the revenue available, plus there are significantly more students today than in the earlier periods of DNR management. Scott felt that it was a situation where DNR never covered all aspects of such budgets. Swanson agreed and noted that it was a component of the budget for such projects. In order to get those dollars, however, the community has to pass a construction bond to get the funds. Doherty also felt that the issue of the Port

Angeles High School and its replacement was complex. He felt that there were a lot of issues with that effort. Thaler noted that he agreed with Lea in that this question was such that it

Roll call vote was taken on Question No. 2:

Should the BOCC establish a means of overseeing and monitoring the DNR's revenue generating methods regarding its FBTLs?

The motion failed by a vote of 3-14-0.

(3:05:58)

- C. The TLAC then considered Question No. 3 as a recommendation to the BOCC upon a motion by Fleck, seconded by Cross which read: *Should the BOCC seek a trust accounting/performance audit of the DNR's management of its FBTLs?*

Cross asked who would pay for it? Fleck said that the Department would. The accounting concept is one that goes back thousands of years. The Legislature could do this; performance audits by the State Auditor could do this, but the legislature does not fund those any more. This is for the County's trust lands, so the acreage is smaller and the County could fund that. There are questions about assets on base, off base, on base and passed over. He also questioned the issue of arrearage as trees still being there when the ability to access those trees no longer exists. The auditee then has to address the issues raised in the audit. In the Policy for Sustainable Forestry notes that the DNR is required to track the harvest volumes. But his high school intern noted and asked, who was supposed to do this. Cross noted that there may be a willing ability to pay with funds maybe even pay for better inventory. The motion doesn't say who pays, and this could be a good use of county funds. The county could pay for it as the best means of getting this done.

Scott felt that such an approach would provide a picture of the trust within its history. She felt that there was no way to change the past actions and need to go forward. She asked how do you make any decision if you don't know what you have available to you. Thaler asked about the means of undertaking such an audit?

Blum noted that there were different ways to undertake such an effort: (1) contract with a third party; (2) DNR undertake it as an internal operation; and, (3) JLARC (Joint Legislative Audit and Review Committee). Swanson noted that this was a fundamental part of the inventory requirement adopted earlier. He felt it was a fundamental duty to what DNR is doing with these lands. Lea asked doesn't the County audit itself? He felt that there was already a statutory process where the state audits the government. Doherty noted that the State Auditor chooses risk areas when they do those audits. The County also has a check and balance system over its own expenditures. Cross noted that the JLARC option usually has a limited jurisdiction over its review. Blum said that the proponents would have to work with the Legislature.

Doherty noted that such a proposal is a process that needs to be worked through. He wondered if there was a way to address this need/concern while looking at all issues. He also asked if there was a way to

ask for this level of detail while reducing the costs associated with such an effort. Murray felt that maybe the BOCC would limit the nature and aspect of the requested review. Sextro asked if the County had ever asked for such an accounting. No. He felt that there may be other timber counties that would be interested in such an effort. Blum felt that a performance audit would be one that would include looking at the investment, staff constraints, the beneficiaries associated with the trust, the role of the trust land manager, etc. Do this in relationship to others. You would also ask about the costs v. revenue received by the beneficiaries?

Scott felt that with DNR being the only trust lands manager of state lands, it would also look at costs in relationship to expenditures over time. Blum said others have not asked for this.

Fleck said you look at the investments, the assets, and the way management generated those revenues. There would be a need to look at the costs, and also decision factors to not meet your revenues. Scott noted that there needs to be an understanding of the clear expectations of the parties and also what did in fact occur with the investment over time.

Roll call vote on Question 3 was taken. *Should the BOCC seek a trust accounting/performance audit of the DNR's management of its FBTLs?*

Motion passed 10-5-2.

- D. The TLAC then considered Question No. 4, which was a combination of proposed Questions 4-6, as a recommendation to the BOCC upon a motion by Scott, seconded by Bork which read: *Should the BOCC seek from the DNR ways to:*
- a) increase revenues from recreational uses on its FBTLs;*
 - b) increase fees from road use, forest products, etc., on its FBTLs; and,*
 - c) secure reoccurring revenues from future established carbon sequestration markets on its FBTLs?*

Swanson asked if these could be combined into one question. Thaler felt that if the substantive drift of these were not being changed, but you could combine those. Blum agreed. After some discussion, Scott felt that Questions No. 4, 5, and 6 could be combined as written as they were all addressing increasing revenue. She made such a motion which was seconded by Bork after a brief discussion that such an approach would not violate the bylaws or notice requirements as these were simply being made into a list.

Thaler noted that there was a need to push the Trustee/Trust Manager to increase revenues for the trust corpus as time moves on in a way that is not just timber based. Cross felt that it would be nice to consider recreation as a separate question for the TLAC to vote upon. He felt that recreation was a poor revenue generator in relationship to the costs demanded for such access. Murray cautioned everyone to understand that if DNR raised its road use fees, all other land owners may do the same.

Swanson noted that the question uses the word "seek" and does not require specific actions. Bork noted that there was a wide spectrum of society that comes to enjoy this region and there were ways to

expand upon that. She did not necessarily see the recreation discussion focused on recreation fees, but rather through the promotion of recreational use and activities there would be additional benefits to hotels, motels, restaurants, etc. In addition, currently there is not much to bring people here and that there could be trails and other things that could attract people and their money into the area that leverages outdoor usage.

Cross said he agreed noting that there are one million acres within the NPS and 660,000 at the USFS, but for the DNR these things do not generate much in the way of direct revenue. Bork felt that the recreation options were a means of supplementing revenues. Bork shared that DNR's recreational lands are where roads and access are available. Swanson noted that he felt that his position lied between Cross and Bork regarding the potential for revenue and asked what percentage did the DNR receive from the NW Forest Pass/Discover Pass. Blum noted that for every pass sold, DNR received \$2.40 which amounts to about \$1m/yr. Swanson noted that you could grow that, but that it would not be a huge revenue source. He noted that there was a positive to this effort.

Blum also noted that currently DNR spends more money on its law enforcement efforts than it receives from this income stream. Swanson noted that in many cases though the law enforcement is already a committed obligation. Timber theft is a big issue. Cross noted that the more people in the woods require more individuals to be out and monitoring activities. Murray mentioned that one of the big challenges is garbage and littering. Blum shared that there was a case where there was 50 bags of asbestos left on DNR lands. Bekkevar noted that not all recreational users were nice. He explained a situation where his company's equipment was vandalized and noted that the gates help protect equipment. Those gates also help with keeping operators and recreation users safe. Cross noted that the recommendation uses the word seek and not do. He felt that the proposed hiree [Question No. 4 staff/contractee] would have a full deck and that this should not be added to it.

Beauvais noted that the question was focusing on generating revenue for our county. The question is whether recreation dollars would come into our county versus a larger part of the role of these lands. Blum felt that it depended on how this was developed. For example, there is the Discovery Pass and the attraction/day use models. Yet, the public does not have a high tolerance to changes for access. There is a strong negative response to even paying \$30/yr to access 5m+ acres of state owned land. Scott asked if there are destination attractions or uses who manages those activities. Blum noted it depends. For example, the Darrington Mountain Bike facility was developed with DNR and the Evergreen Mountain Bike Association who received some State Capital funds for the project. Sextro asked for clarification about these fees and those from road usage. Blum noted that those were different and confirmed Sextro's understanding that the road usage fees were very specific.

Sextro was concerned that these revenues could end up in the general fund. He felt that the element that was Question No. 6 regarding carbon markets and carbon sequestration could be a means of securing revenues as those payments would be associated with the specific land use. Bork felt that there could be a way to develop in a comprehensive planning process that looks at recreation uses. She felt that there were others looking at this issue and that it shouldn't be looked at isolated from those other efforts. Scott noted that the way the question was worded, the objective was to generate revenue for the County. Thaler said that this was inherited from the role of the FBTLs and that too

needed to be reviewed and discussed. Doherty noted that the use of the “etc.” allowed for further expansive review. DNR does a good job cooperating with others, as does the local timber companies. Murray and Merrill Ring helped with the Scenic Byway efforts on SR 112. Green Crow helped with the development of the Olympic Discovery Trail. DNR has found ways to increase revenue through use of sort sales, cedar salvage, etc. This should be seen as a way of encouraging partnerships. He recalls that there were pushes to shut down the County’s parks, but in reality those tend to be self-sufficient and the money provided maintains those facilities. They also attract users which brings additional money into the community.

Roll call vote on the modified Question 4 was taken.

Should the BOCC seek from the DNR ways to:

- a) increase revenues from recreational uses on its FBTLs;*
- b) increase fees from road use, forest products, etc., on its FBTLs; and,*
- c) secure reoccurring revenues from future established carbon sequestration markets on its FBTLs?*

Motion passed by a vote of 10-6-1.

BREAK (1:45/3:41:10)

- E. The TLAC returned from a break to consider Question No. 7 as a recommendation to the BOCC upon a motion by Cross, seconded by Pacheco which read:

Should the BOCC seek other revenue sources for county revenues such as increasing property taxes?

Thaler felt no one should vote for this and this was absurd. While he noted he discussed this issue, he felt it was not relevant. There was a series of side discussions about the relevance of this question to the TLAC’s mission. Murray noted that this list came from this group for at least consideration. As this was being discussed in the meetings, there was a belief was that there was a need to at least review this question and vote on it.

Cross noted that he would move this for consideration of this question because the focus should be getting money from these timber lands. If that is not going to be a source for revenue, then we will have to fund the County’s operations. He felt that he did not want to live a county with less opportunities and offerings as King County. As a result, we have to find ways to pay for these things. He wanted to ensure that we had the finest schools, the finest hospitals. He did not think this was the way to do that, but it needed to be discussed. He felt it was relevant to funding county institutions and if not using those instruments established to do so, then this has to be discussed.

Swanson noted that all of the County’s residents pay less in property taxes as a result of the timber revenues coming from these lands. He noted that already there is a silent creep in the increasing of property taxes as the revenues decrease, there is an increase in property taxes collected. Scott felt that the question does not explain that this would be for other usages and that the state receives a portion of the property taxes. Pacheco seconded the motion for similar reasons expressed by Cross and felt that this should be discussed and considered.

Sextro noted he was voting no and encouraged others to do so as this was outside of the TLAC's purview. Doherty also noted he was voting no as there are some 21 hardship counties for economic development that is called the opportunity fund. This was developed in the good years and this can be done to help develop those counties.

Bork asked if there were State equivalents of "Payment in Lieu of Taxes (PILT)" and particularly for the natural resource conservation areas and open space areas? It was clarified that the federal program did not have a real equivalent at the state level.

Roll call vote on the modified Question 7 was taken.

Should the BOCC seek other revenue sources for county revenues such as increasing property taxes?

The motion failed on a vote of 2-14-1.

- F. The TLAC considered Question No. 8 as a recommendation to the BOCC which read:
Should the BOCC seek a means of increasing revenue through advocating for a state income tax?
Thaler argued that this was the single best, most progressive way of deal with the issue of needed revenues in the state. He felt that the question was totally outside of the scope of the TLAC and was irrelevant to the Resolution

Lea noted that at the Port Angeles Business Association meeting Commissioner-elect Hillary Franz floated the idea of uncoupling timber revenues from schools and she mentioned an income tax. He was very much against an income tax and noted that in his readings some 87% do not trust government. Many remember how the lottery was created to fund education in Washington. Now its revenues go to the general fund. He and others are not voting to increased taxes until Olympia begins to listen. Olympia will decide where they would spend those dollars. Needs to be trust in Olympia first. Doherty noted that there were other ways to address tax issues such as the capital gains tax.

Murray asked if there was a motion to consider this question. The question died from lack of motion and second to proceed with it.

- G. The TLAC considered Question No. 9 as a recommendation to the BOCC which read:
Should the BOCC reduce county services associated with/tied to DNR when revenues from its FBTLs decline?

Both Scott and Thaler felt that the question was poorly worded. Doherty felt that in reading the various reports about how the DNR Timber dollars are used, you find that those dollars are placed into the County's reserves. Most of the time, this type of approach doesn't apply as these funds are placed in reserves. He felt there were other ways to discuss and consider the issue. Reandeau agreed that this was not an issue for Clallam County.

Murray asked if there was a motion to consider this question. The question died from lack of motion and second to proceed with it.

- H. The TLAC considered Question No. 10 as a recommendation to the BOCC which read:
Should the BOCC, if a liaison is hired, expand the ability of that liaison to utilize ecosystem services values in reviewing the DNRs management of its FBTLs?

It was questioned whether this was just a rewrite of the IRM question that will be considered in December. Doherty felt that there was a trend to target set asides and also the need to do intense analysis. He felt that this could help in critically targeting specific questions and issues and so supports of this should not give up. Swanson felt that the question was already being considered and that forestry places values on these elements as part of their efforts. There was a concern that this could help giving up less land, but there was a need to prove that. Scott asked if this wasn't similar to the IRM and should be considered then. Fleck also noted that there was an argument that this was already considered as an element of the HCP.

Murray asked if there was a motion to consider this question. The question died from lack of motion and second to proceed with it.

- I. The TLAC considered Question No. 11 as a recommendation to the BOCC which read:
Should the BOCC seek an economic study discussing private and public forest lands that reviews such items as harvesting, milling, exports, and land conversions in Clallam County?

Scott felt that the focus should be on the inventory as discussed earlier. Thaler noted that this raises a whole bag of political and other issues. Scott asked if this pertained to the resolution, and Murray expressed his opinion that it did not. Doherty disagreed and noted that these issues were part of a sustainable economy. He felt that the TLAC needed to consider the comments on the issue of exports as it is in people's minds. These are issues that have been raised in the past and the issue of conversion is also one that needs to be reviewed. He felt that this could be adopted. Scott felt that an economic study was not the right term that should be used in this recommendation. She suggested that Doherty rewrite this as something that could be considered in December. Doherty felt it could be discussed in December if reworded.

Murray asked if there was a motion to consider this question. The question died from lack of motion and second to proceed with it.

- J. The TLAC considered Question No. 12 upon a motion by Cross, seconded by Beauvais as a recommendation to the BOCC which read:
Should the BOCC seek from the federal government compensation for lost revenues associated with how the DNR's HCP applied to its FBTLs?

Blum cautioned people as there was no legal mechanism to do this. It would require a change in laws. He also explained that this was a voluntary, optional undertaking by the Department to enter into the HCP. He felt it a bit odd to seek compensation from the federal government to create a means of addressing the impacts from the utilization of a carve out within the Endangered Species Act. Doherty noted that it also done to avoid litigation.

A roll call vote was taken on the question of:

Should the BOCC seek from the federal government compensation for lost revenues associated with how the DNR's HCP applied to its FBTLs?

The motion failed by a vote of 2-15-0.

- K. The TLAC considered Question No. 13 upon a motion by Swanson, seconded by Reandeau as a recommendation to the BOCC which read:

Should the BOCC seek that its FBTLs be sold and the proceeds be reinvested?

Blum noted that there is no legal mechanism to undertake this. The legislature would have to permit this. The reconveyance statute would create a deed restriction on the land that would devalue the asset substantially. Swanson noted that these lands use to be in private hands and in theory that could work with private lands, so there should be something similar here. Thaler noted that there was a contract on them with US Fish and Wildlife Service. Cross felt that there was a need to seek money for the various impacted institutions. UW has a lot of the lands impacted by this. Yet, the UW has a tract of land in Downtown Seattle that produces more revenue for the UW than all of its timber lands. While it may be painful to go through the effort, it may result in additional money.

Scott asked for clarification about how money could be obtained. She also asked about the land in Downtown Seattle. It was explained that this was the former UW tract that the Fairmount Hotel is located on today. Thaler noted that using Swanson's estimate that the 92,500 acres would have a value of \$350m so there should be a way to do this. Blum said he understood the argument but that it would require a change in the law. Fleck noted that this was far fetched, but he noted that this was talked about in the past by WSU, UW and both Pacific and Wahkiakum Counties. He felt it was not in the best interest of Clallam County to do this. If you were focused on just revenue, then an argument could be made. He felt that there was a lot of danger to the County's economic well-being from Neah Bay to the Dungeness that would be harmed in such an action. It is talked about a lot by a range of people over the years.

Lea noted that he kept hearing that timber revenues were not sustainable from these lands? How does one explain that? Scott replied that the revenue over time was consistently decreasing. It was explained that this was due to regulations, markets, etc. Sextro felt there was a need to consider intergenerational equity and consider climate change. Half of the lands could be lost in a fire. 50 years out, there may not be such impacts which would provide for a level of sustainability not seen in the last ten years. Murray felt that the most dramatic change in the past ten years was regulations. Lea felt that based upon examples such as Abner Weed buying lands in Northern California there was a history of investing small amounts in timber that resulted in increased values over time from both land and timber. Timber increases in value over time. Cross agreed with that concept, but noted that that only held true so long as you could harvest those lands. Lea felt folks don't get the fact that you can't manage a public resource if it was constantly being over regulated so much that we have decreased its value. Murray noted at 42% of the FBTLs were off limits from such harvests. Cross noted that in the past, never has DNR been sued to go out and harvest timber, rather the litigation has been used to stop all action. However, litigation had not been used to get the promised habitat created or developed.

Swanson asked Blum for clarification as to the sustainability when looking at the last 20 years and forecasts going out. On an annual basis, it appeared that DNR generated from all revenue sources some \$200-225m/yr being generated with some ups and downs based upon market. Swanson felt that this was a good demonstration of sustainability. Blum noted that since the signing of the HCP the DNR has had a harvest level of 450-475 state wide. The target was always more than that. Revenue has been reasonably consist with slight increases, but down when adjusted for inflation.

Reandeau asked about whether the State could buy out the land. Blum felt based upon things occurring in Olympia it was not likely and that other smaller counties had asked about the same thing. Thaler questioned whether such an approach to remove the assets would be in the long term best interest. He felt that the Asian markets would not continue to be as heavily an influencer in these markets. He also felt that as the global economy cooled, there could be more available for local demand.

Blum also noted that a longer rotation did not necessarily mean a more valuable product. Because if there is a lack of product, that then results in the loss of the infrastructure. Further, when the product does come on market, it may not be of the optimum size for the infrastructure that remains. Cross noted that logs could then pass out of obtaining the expected maximum value for that timber. Blum said that the historic model was one where the value increased with larger DBH, but not the case now. Murray noted that the market actually pays less for big logs.

Bork asked about whether the mills were retooling? There is a strong incentive to match the mill infrastructure to the available resource. The former Interfor mill was seeking in 2011 means of supplying mill with wood. There were efforts to secure financing for a retrofit that would have cost \$25m to update its technology. If there was a commitment to wood supply, the Board was willing to make that investment for the update. However, DNR was unable to show harvests that far out, and the past history of DNR was such that it was uncertain. Also, the private sales were higher in value. However, the mill closed and it was sold for salvage. Murray noted that mills have moved away from larger logs to a maximum of 18" dbh. Beauvais asked that the vote be taken on the motion.

A roll call vote was called on the question:

Should the BOCC seek that its FBTLs be sold and the proceeds be reinvested?

The motion failed by a vote of 0-17.

(4:25:11)

VI. Next meeting

Discussion focused on the next meeting. After a brief discussion, a motion was made by Byrnes, seconded by Lea to hold two meetings on Dec 16th, one starting at 9 am and one at Noon, with another meeting scheduled for Dec 29th. Motion passed on a 16-1 vote.

Bork asked if this list could be developed in a way to help to explain how it would work; or, how would it be implemented? Scott asked if Doherty could email this information out so that members have the ability to

look at it and review it. Cross shared that there was information in the Washington Forest Parcel Database that can also be accessed to get information about forest lands conversations. Another source that looks at the conversion issue is WDFW.

Murray asked about the content of the report and asked for ideas based upon his approach of utilizing a brief letter to the BOCC. This letter would list the questions with the votes. He did not want to include a lot of time developing a narrative that would require editorial work by the committee. The concern was that there could be a want by some to elaborate on such a narrative which would require discussion that was not readily available.

Scott asked about who would write and in what manner would they write the minority reports. Murray asked that for the inclination of the group. Scott asked if there was to be a group review. Murray questioned if this would be efficient and even comprehensible. Scott asked that notice be given to everyone how that was going to be done and include that in the next meeting. Beauvais asked how detailed were the minutes going to be on the questions' discussions and votes. Fleck indicated that the meeting minutes could be attached to the cover letter. Cross noted that given the time that the TLAC had, the majority voted for specific questions. Comments could be included. The minority position can add to those issues, but it was not up to the minority as to what that report should say. He felt that the majority report should hold to the recommendations, the comments in the meeting minutes, coupled with the votes recorded.

Murray noted as an example there is the recommendation regarding the BOCC hiring a staffer/consultant. He would include the question, the vote tally, and a reference to the meeting minutes and the minority report. Cross felt that the positions taken by people for and against shows the breadth and depth of debate. This would be the final word, and the minority would submit its position which would be included and submitted to the BOCC. He did not see it being feasible to develop a universal report. Thaler agreed with this. Sextro felt that the votes from this set of meetings would be needed. This would allow the minority voters to address their positions. Murray felt that anyone writing a minority report could write what they needed. Thaler asked for a copy of the administrative record of the motions and all of the materials. Fleck noted he could try to schedule coming into a meeting with Loni to see if all of the documents are on the County's website. Fleck gave an example of a handout that he had part of, but not sure he had all of it. Murray also felt he had every document. Lea asked if this all could be done by the 31st.

Bork felt that there needed to be a clear report with the information, opinion, feedback and organized in similar sections. The public input needed to be acknowledged and incorporated into the report. Additional information should be included where it is available. Fleck noted that the meeting minutes attempted to get the statements of those providing public comment. Murray understood the want.

Murray discussed the next meeting. There was a motion by Byrnes, seconded by Pacheco to have a meeting on the 16th with a special meeting at 9 a.m., and the regular meeting at noon. Motion passed with one nay.

Scott asked whether there should be a determination to schedule a meeting on the 29th or 30th. Doherty noted that he was not available on the 29th. Fleck suggested that the meeting be scheduled for noon. However, it was suggested 9 to 11 be used. Bork asked if there was a set format for these reports. Fleck noted that Murray was using a letter format for these reports. What is a bit awkward is that the minority

report has to be within that portion of the report and question. Doherty asked if Trish or Loni could be available that day to also help with this effort.

Scott noted that Doherty had asked about certain things, and she asked if there were reports that could be reviewed. Doherty noted that he was asking about some things to see if others shared his interest and concern.

He felt that articles and materials could be shared before the 16th meeting. Blum noted that he was going to get the OESF land plan out to everyone. Scott noted that there was a fire safety report and it was discussed. Doherty noted he could make those available. Doherty offered to go through the list again and did so. Murray asked if these were going to be recommendations, or items that are shared for the next meeting.

Doherty felt that the OESF Plan should be known, there may be interests that would be worth discussing. The BOCC also needs a climate action plan. This was dropped three or four years ago. It was dropped a few years ago. This allows for planning for emergency response. That process allows for the development of strategies. There will be asks about this for funding in the future during grant applications with the Centennial Clean Water grant. The Public Trust Fund is another grant source that requires this information. Scott asked if there was a link? Doherty noted it was on the County website. He asked if Loni could send out that link. Bork noted that Doherty was wanting to have these items rolled into the recommendations. Scott noted that there was a need to look at these first, before telling the BOCC to do something. Doherty will ask Loni to send these. There was the need to look at conversion of timber lands and Blum/Cross noted that there was a site with this information developed by the UW. Murray asked Doherty if these are going to be recommendations or items of discussion. He suggested that Doherty's list should be developed into questions that could be considered at a meeting in December.

(4:58:52)

VII. Public Comment

Bob Sextro – Sequim. Now sitting in for Josey Paul. Thanked everyone for the opportunity to participate. He said it was a pleasure to meet and interact with everyone.

Ed Bowen – Clallam Bay. Felt that one didn't harvest more value at a future date. Rather, the arrearage represents a debt on the books. This was devaluing the trust. He felt that it would be worth asking for payment in gold from DNR. While humorous, gold keeps its values. Also, by not harvesting those expected trees, does that play into further litigation as you now have larger trees. The TLAC thanked Bowen for his help with the meetings and note taking. He noted he would not be at the next meeting and he suggested others help out in the same manner he had helped.

Meeting adjourned on a motion by Beauvais, seconded by Byrnes and adopted by unanimous consent.

¹ The TLAC used this term as a short hand for those State Forest Lands managed by the DNR on behalf of the trust beneficiaries of Clallam County.

MEETING MINUTES FOR:

December 16, 2016

9:00 a.m.

Trust Land Advisory Committee

Minutes of the
16 Dec 2016
Special Meeting

I. Call to Order/Pledge of Allegiance/Roll Call

Joe Murray called the meeting to order at 9 a.m. Harry Bell was attending for David Bekkevar; Brian Grad was attending for Mike Doherty, with Doherty on the phone at the start of the meeting; and Bob Sextro was attending for Josey Paul. A quorum was present.

II. Public Comment. There was no public comment.

III. Minutes.

This was moved to the end of the meeting in order to give people the opportunity to review those minutes from the October meeting. There were a few typos raised by Reandeau, Thaler and Beauvais. There was a discussion about what would occur if Fleck was unable to finish meeting minutes prior to the end of the TLAC. Fleck noted that he would finish them and they would be left as draft minutes only. Comments about those minutes could be attached via email he thought. Coleman Byrnes asked if the September meeting minutes had been approved. Rod Fleck noted that the very truncated minutes had been approved for that field trip.

Bell asked as to whether the meeting for the 29th was still an open question. Murray noted that it was contingent upon this meeting and the one that starts at noon. Ken Reandeau asked about the email comments from Bekkevar in relationship to his proxy attending the meeting. It was noted that a proxy can vote as the proxy deems appropriate. The note from Bekkevar about how he would vote was just a comment.

IV. Review – Clallam County Trust Lands. There were no comments.

V. Recommendation to the Board of Commissioners (BOCC)

- A. Murray read the question as it was advertised which would be Question No. 1 to be considered by the TLAC, upon a motion by Fleck, seconded by Connie Beauvais:

Should the BOCC establish an advisory committee composed of representatives of all entities (needs clarification/defining) and an at-large position with an interest in Clallam County trust lands, to advise both the public and the staffer/consultant regarding the DNR's management of Clallam County trust land?

Murray noted that the question was advertised as needing clarification or defining as to how to address "all entities." As a result, the TLAC could make adopt an amendment to clarify that specific aspect of the advertised question. Beauvais indicated that this should be left to the BOCC to decide how to clarify that section. Susanne Scott noted that it could be changed to read all interested parties. Harry Bell felt that it should be removed as it was leading the BOCC. Fleck noted that this was advertised as needing

clarification and defining, this was done in advance in order to address this issue. Three people worked on this and left it to the Executive Board to define, and they declined to do so.

Tom Swanson felt that using the TLAC membership would be the basis for such an advisory board. The wording should use the TLAC membership as an example. Reandeu noted that there was a citizen at large position that was already included. Scott felt that the question should be left and referred to the BOCC for them to work out who should be there. Coleman Byrnes felt that there should be tribal representation on any such advisory board. Bell felt that this should be left up to the BOCC to define and decide on. There was a broad mission noted versus simply maximizing revenue per the trust mandate.

Toby Thaler was opposed to this recommendation creating an advisory committee. He felt that if the BOCC wanted to establish such a committee, it could do so on its own and we should not be recommending that they do so. Bob Sextro noted that a similar recommendation had been voted down in November with a seven to six vote with seven voting no and six voting yes. He felt this was redundant and already considered. With the passing of the recommendation on Question No. 4 (staffer/contractee), this recommendation was not needed.

Scott disagreed. She felt that this was something that the County needed to have and could pay for. The proposal factors into the issue the citizens who are concerned about monies to schools, fire districts, etc. Citizens need to be represented and involved. Brian Grad noted that Cross felt that there was a limited role on the ability to influence DNR what would this do the change the efficacy or ability to bring about changes of policy. He felt that there was a need for substantive proof of such influence before recommending such a committee. Byrnes felt that Skagit County model was attempting to do this, but he felt that it was really not that efficient and was just keeping people busy. Scott noted that as a small county it is possible to be ignored in the political process. This committee was a mechanism to be visible and not be ignored. She felt that there was discussions indicating that in Skagit County their activities had influenced decisions in their favor. Bell felt that this was presumptive about the budget issues. The question should be left to the BOCC. As there was not changes to policy as those are found within the HCP, he felt that this was a question of whether there could be changes in policies that build upon those.

Cynthia Bork noted that the US Forest Service has very formal Resource Advisory Councils. Those are maintained by the USFS with people coming to advise the USFS regarding the use of funds with payments to counties. Such entities need to have life and be lasting to be effective. She felt that the BOCC could look at the USFS RAC for a model for such a committee.

Fleck noted that Skagit County and Kendra Wagoner is very effective. She shows up, comments, and you see DNR tact differently in response. Going through his mind, he is not sure who within the County itself commented on the OESF Plan, he couldn't recall anyone commenting. There is also the SCH and the Long Term Marbled Murrelet Strategy out for comment and he hoped that there could be comments from the County. In his 22 years at the City, the County has for the most part not been engaged but for occasional flashed in a pan. In a committee proposed, there is a way to include other

participants. The role the dollars play down to the junior taxing districts warrants a more engaged group and the advisory committee is a way to do this.

Bell felt that there were previous comments on providing oversight on DNR's activities regarding timber sales within the HCP. The County does need someone to respond to the DNR's actions. He felt it was extremely difficulty opportunity to administer Clallam County's trust lands on decisions impacting trust land management. He felt that what Fleck was describing was different than the way the question was presented. Scott felt that the issue was not just oversight. Rather it was engaging and maintaining interests by the parties such as the schools and fire districts. As mentioned in the past, the DNR does make different decisions based upon who is paying attention. This is an investment benefiting the County and people who have investments just don't turn over their portfolio without any guidance or involvement. It's an area of concern and a possibility to bring about changes.

Murray noted that such a committee could provide both technical and policy oversight. Such a group would be able to develop comments on SEPA EIS documents. Committee could have oversight with what the BNR is suggesting for policy changes. A forester could go and look at revenue efforts with the DNR and bring that back to the Committee. He did not believe that there should be a means of filtering that group. Cross asked about the role Kendra Wagner played on behalf of Skagit County. Fleck noted that the comments were applied at DNR meetings, SEPA documents, etc. There are components of the DNR with the BNR as the policy decision makers, then HQ staff, local staff. There are examples of groups like OFCO meeting with DNR regional staff that have changed approaches in the management. When an advisory group asks for an explanation, this is broader than just the six or seven people who have a history of interacting with the agency.

Grad felt that this there was an underlying suggestion or implication regarding the role of the County. The issue of standing was prima facia exists for having a committee to submit responses and that doesn't necessary ensure the efficacy for such a committee. This committee could be better served to ask for modifications by Olympia to the statutes associated with the DNR. If that was not able to bring a response from DNR, then litigation may need to be utilized. However, everyone needs to understand that not only does Clallam County have interests in these broad issues, but so does Franklin County and other counties. Arrearage being a major issue, you are asking DNR to apply various interpretations and methodologies where the DNR is not obligated to listen to any of that. He felt that it was wrong to assume the way things would operate. Murray noted that this was just a recommendation to the Commissioners and not telling the Commissioners what to do. Fleck disagreed with Grad based upon 25 years of dealing with DNR issues, trust law, and regulatory requirements. Franklin County's interest is different in that those are agricultural lands. There are the restatement of trusts, there are court cases and AGOs about the nature of these trusts. This is a public process and there are state interests that are overriding, but DNR is responsive to those counties that are more active and engaged. Fleck also disagreed about the issue of standing, the junior taxing districts do have standing and the briefs are available for that. DNR has obligations to them as a result of the nature of the trust.

Beauvais felt that the TLAC had already recommended the establishment of a paid position. It was important to stay engaged and watch what was happening. She felt that this was something that would allow the County and others to stay engaged and involved. *She suggested that the recommendation use*

the phrase "similar to the Trust Land Advisory Committee" and made that a motion which was seconded by Fleck.

Thaler responded to Fleck's statement on the trust issues and actions. There is a contrary position. Thaler noted that Skamania discussion on duties and obligations is considered dicta. Very little has been decided on the nature of the trust obligations. AGO 96-11 clarifies to some degree the law and status on those obligations.

Cross noted that DNR had presented on the OESF and in the planning of the SHC indicating that there was an expectation for additional volume coming from the riparian zones. They build the model used for the SHC and from that some 394mmbf were to come from riparian harvests, yet DNR only harvested 39mmbf from those areas. Their model was off by 90%. This recommendation misses the boat. Timber sales layout was not why this was missed. The Model was bad. If the focus is only on implementation level, you need to have a focus on the BNR. The region implements what the BNR adopts and what it gets comments on. He felt it was preferable to get the DNR back on track to meet its actual levels. The Committee should focus on the plans themselves. Why was the last one so bad? Only DNR could get away with that and come back again in the next ten years to do it again. The question then becomes is there enough wood in any one timber sale to make up this volume lost?

Bell agreed with Jason and felt that there were separate things being considered. He felt that the TLAC had recommended to hire or contract with someone to oversee DNR timber sales and related matters. This committee could do something similar with all of those matters.

Bork recommended that instead of an advisory committee to the BOCC, that there be one to the DNR instead where the DNR runs it, operates it, and listens to it. These are not easy to establish, and are expensive to operate. It could also be that the person hired by the County could sit on such a committee. Cross appreciated the idea. But, he felt that there would be less success if DNR was asked to do it. Bork noted that some of the most intelligent folks work for DNR, her husband included. They are used to such things, so she felt that Cross was in error. She saw this proposed committee functioning like ones similar to the USFS. She invited Cross to consider serving on such a committee. Reports would be made to the Commissioners with the flexibility to make changes.

Thaler felt that the DNR was not setting policies within the plans. Rather that is done by the statutory entity empowered to do that which is the BNR which is a political body. They establish the parameters that are used to create the plans. He felt that there should be a stop to blaming the DNR per se for these issues. Cross noted that the meat of the models are the definitions of habitat, volume based upon inventory that doesn't exist, etc. All things are built on those aspects for the model. Poorly based, or lacking data, so how can you get to where the projections are made and used by the BNR? He didn't mean to implement the plan are the problem. It is the people in the room building the models that are based upon no up to date data. Scott noted that all of these problems can be successfully influenced into how there is management of trust lands. Yet there seems to be a refusal to acknowledge that approach. Cross felt that the objective should be getting money back to the trusts and the question to him was one of throwing good money after bad based upon years of evidence. Scott felt that there was a lack of oversight and interest by the County that allowed for some of these issues to occur. Bell asked

a question that Fleck raised about the Skagit County Committee. They do provide good testimony, but they also have a broader mandate. Is it reasonable to have a committee like this to understand the internal working of the DNR. Cross did not think that a committee like this would have the ability to understand the works of DNR.

Cross felt that the best way to address these issues was to seek to have the lands reconveyed. Rather than be victimized, let's have the County take them back. USN employs foresters to manage their acreage. JBLM has 40,000a and eight foresters to manage those forests for a complex set of requirements. He felt that there was a need to get the lands back, regain control, and quit being victimized. Grad noted that there appeared to be a high degree of concern about mismanagement. He felt that there may be value in exploring a lawsuit to address the manner in which the county is being harmed. Debating the shortcomings will not do more for you, explore a lawsuit.

FLECK

Byrnes asked about the makeup of the Skagit County committee. Fleck did not know that but noted that there was a letter from ARFC about that committee that was submitted to the TLAC in the Spring. Bork felt that we can't be a victim as we are a participant in the process. If the County pays more, it needs to make sure that there is a thorough and intensive need to be cooperative partners. Implicit county involvement in these issues, so lawsuit will not address this.

Bell noted that Fleck outlined a specific role that would make sure the DNR is fulfilling its timber sales program. He could see that being useful and narrow the role of the forester. BOCC should decide on how to do this. He is not sure that it should be done by an advisory committee. Doherty noted that the County has engaged on these issues. There have been people going to the BNR to make arguments about policy decisions. Also, there is the Timber County Association that has Scot Swanson working for them that gives reports on what the BNR is doing, as well as providing information to the BNR. He felt that there was a need to focus on other suggestions and whether there was a need for the committee was a separate issue.

Vote was called on the proposed amendment. The Amendment to the original question was adopted by a vote of 9-4-3.

Discussion turned to the original question as amended.

Bell felt that this is more specific than what we need to do. He asked to look at the proposal first. Cross asked if this could be considered at the special meeting in order to see how the BOCC would interpret this.

Murray read the question as amended.

Should the BOCC establish an advisory committee composed of representatives of all entities (similar to the Trust Lands Advisory Committee) and an at-large position with an interest in Clallam County trust lands, to advise both the public and the staffer/consultant regarding the DNR's management of Clallam County trust land?

Roll call vote was taken on Question No. 1 as amended. The motion failed by a vote of 5-10-1.

[BREAK]

- B. The TLAC returned from its break to consider Question No. 2 as a recommendation to the BOCC upon a motion by Fleck, seconded by Beauvais which read:
*Should the BOCC add **integrated resource management** to the definition of forestry experience in employing a staff/consultant?*

Bell asked for a definition and Cross noted that it was not forestry. Bork and others disagreed and said that was it forestry and beyond just that. Thaler felt that forestry only was a constraint on the management of these lands. Cross noted that the purpose of those lands were to generate money and that in many cases it was suits by the environmental community that had constrained those lands. Thaler objected to the notion being said over and over again about litigation. He was tired of being blamed for the problems within the region's economy. Grad noted that while not directly related, the TLAC adopted Question No. 6 back in November regarding carbon sequestration as a revenue source so is that directed at "integrated resource management? (IRM)"

Scott felt that this was left open to define issues not included in use of the land for timber only. The definition was discussed at the last meeting. Grad asked if the issue was one of having things limited to just revenue. Scott and others felt that IRM ensured that there was a broader agenda than just that. Bell noted that the HCP addressed the economic benefits balanced against the ecological benefits. He heard that same issue within this term. There is value in the lands if DNR gets the benefit of the wood products within the harvest. This also requires a focus on things other than getting a big tree. All restreams of revenue should be considered by DNR to maximize the money it receives. Grad felt that there have been successful efforts to address forest health and ecosystems as part of grant requirements addressing clean water requirements and efforts. Murray felt that the HCP addresses all species needs and it also addresses water needs.

Cross felt that all of that was far away from the details of the specific contracts in place and adopted. Scope appears to be to focus on new means of capturing for the trusts revenue, which will be rather slim. There should be focus on the policies already adopted. Scott noted that Cross had supported reconveyance with no direction as to what needs to be changed. Cross felt that the person envisioned would be challenged to tell the DNR about where carbon markets may or may not exist and DNR would not be able to respond. Scott noted that with the OESF, there was a change to do experiments, so that might be the location for that. Cross noted that one would still need a contract, and DNR would still need authority to enter into such an agreement. Scott felt that this was inherent to the OESF and the bargain being made where Clallam County would bear the burden and costs of those efforts for not only its benefit, but all of the state's forests. Bell noted that there were concepts being discussed on how to be paid for ecological benefits. These include things like how are land owners paid for ensuring clean water. He felt that these were conversations where DNR needed to be active and engaged. The OESF was a way to look at alternative land management approaches. The OESF Plan does include such innovative research ideas.

Bork noted that the definition could be found on Google. The goal was to broaden the qualifications of the person in this position. The inclusion of IRM was to ensure that there was a well-rounded, full capable individual that would be looking at all resources. They would be looking at development, roads, not just timber focused. The goal would be to balance the needs of the ecological parameters and this was the best way to say this versus just focusing on the harvest methods. Fleck that the group was trying to develop additional aspects to the position adopted earlier. An element felt that forestry experience was too narrow. He noted that management was more than just timber sales, it was also the implementation of BNR policies. It is understanding how things work. Fleck reads forestry broadly and that comes from his grandfather's explanation that forestry is more than cutting trees. Yet, some in the TLAC felt that this needed to be broader to address their concerns. IRM was a catch all phrase as a new innovative way to engage in resource discussions that could have value to the County. Bell noted that the Society of American Foresters are having talked about this specific issue in the policy document on working forests. That notes that forests are managed for their ecological, economic and social values. This comes from their position paper and that is much more focused than IRM which seems to indicate we are managing for everything.

Lea noted that the U.S. Speaker of the House was quoted as saying that there would be relief for the loggers of the PNW from regulation. Yet, he heard that the new Commissioner of Public Lands wanted to decouple revenues from timber from school construction. Constant said once that the ONF would be the region's wood basket. In Hoquiam, you no longer have some of the big mills that once were there. He felt that there was a lack of direction. Hearing Thaler talk, one could look at the conflict that may be coming. While prosperity has occurred elsewhere, there needs to be an effort to come together and compromise on these issues. He was unsure, however, if that would occur at a federal or state level.

Grad gave the example of the State's clean water revolving fund where credit was given to forest projects. Organizations provided access to forests to help with obtaining those grants.

Roll call vote was taken on Question No. 2.

*Should the BOCC add **integrated resource management** to the definition of forestry experience in employing a staff/consultant?*

Motion passed by a vote of 10-5-1.

Thaler wanted to provide a more temperate response to his early one regarding litigation. He noted that consistently accused as being part of the problem because OFCO files appeals on ecological resource issues when not being adequately addressed. He really disliked the all of the war related language used earlier. In a democratic society, non-violent dispute resolution is key. Courts are ways to avoid the violence seen in Northern California and Oakland. That is avoid within this region. OFCO is not the only ones who litigate. Skamania was brought by the County, not environmental groups. 1950s cases were brought by the timber companies. OFCO was sitting at the table to use diplomatic approaches to resolving these issues.

TLAC returned to the postponed minutes. A motion was made by Fleck, seconded by Beauvais to adopt the minutes subject to them being corrected with the typos found by Thaler, Reandeau, and Beauvais. Motion passed with one abstention.

VI. Final Report Discussion

Murray started by noting that the draft of his letter was a straw dog for the final report. He asked for the TLAC's thoughts on that.

Scott felt that the letter was non-controversial. Cross noted that the first question was on reconveyance, and he will be offering a dissent to that. He felt that it should be attached versus being placed with Murray's proposed letter to allow for readability. So he would like to offer the minority report on that matter as a separate letter. Murray asked if other minority reports would be by letter. Cross felt that explaining his position was going to take more than a few paragraphs. Cross was unable to be at the official vote but he was planning on writing a minority report. Three people voted for reconveyance – Murray, Lea and Beauvais. Cross wanted to be part of that, but he could send a copy of his thoughts to the other three. That is not a majority and would not trigger a public meeting. Bell noted that Bekkevar was absent at the meeting but had indicated that he agreed with the minority. Fleck discussed how that could be addressed. For example, if you were not voting, could you be listed as absent in agreement? Cross noted that he would send out what he was planning to write to Fleck for a copy. Fleck said the minority group can write it the way they want. One could author it and explain why they voted why they did. The majority report needs to say, see the attached letter. If people agreed with Cross, feel free to sign on. This is not the minority report, but rather a minority report.

Sextro agreed with Fleck that you couldn't be the listed author of the opinion if you didn't vote. The minority could of course determine who they were going to have to ghost write their position paper. Cross will be writing a response and providing it. Swanson felt that not much should be made on this, as whoever signs on to this position, a minority agrees to it and signs on to it. There were 15-16 items voted on and in every case there were winners and losers. In every case, would there be the opportunity to develop a minority opinion? Yes, based upon the roll call votes. Sextro noted that the Sierra Club was the minority on some votes, so then they would have the latitude to write a minority position. Would five that voted in the minority could write five separate positions. Fleck shared Art. VII, Sec. 2 of the by-laws that discussed the minority report options. Thaler commented on the structure that that implied. He felt that if Murray was developing a cover letter document that said, this report consists of the following recommendations from the attached list of questions, then you could have the recommendations followed by the questions followed by the minority report. He didn't have an issue per se, but was just wanting to clarify the approach to the report.

Swanson felt that the first question was such that it was the bigger issue that makes moot all other aspects of the lesser details. Cross noted that he would be proposing a statement on the first issue. Scott noted that there was an opportunity to write a minority report on each of the recommendations being voted upon. Bork felt that the report needed to be substantive followed by research methodologies with each issue, objectives, alternatives, etc. In addition, there needed to be a consistency of format so everyone was able to look at the issue in the same way. She felt that there needed to be a definition of the problem associated with the social experiment that had taken place here. That should include findings. Without such a structure, the report could look like a chaotic mess.

Grad felt that the approach was appropriate to the way that the committee operated. Incorporating the minutes into that report would be appropriate. In the appendixes, that needs to incorporate fact sheets and materials. Murray did not intend to do that. Grad suggested a bibliography to all of the materials. The bylaws noted that minutes would be include. Fleck noted that in January he and Loni would go through materials to see what was received. Grad felt that if the report was citing a discussion, it needed to reference that via bibliography, footnote, or something to show the context. Bell suggested that there be a cover letter, a list of the decisions, the minority reports, and attach all of the minutes. This would allow people to access the minutes. As to the handouts and materials, he suggested sticking all of that into an appendix. Murray suggested changing the last paragraph regarding committee participants. Bork felt that if the minority report was multiple pages, it would give short suit to the majority report. There needs to be a standardized approach to this report. Thaler noted that based upon the content of materials, developing that into such a report would take time that does not really exist. The ability of all groups being able to review and edit this over the holidays was not attractive. Murray noted that the resources are just not available.

Fleck noted that a more detailed report may have been a goal, but over time that is not available. Fleck also noted that the amount of time spent upon this was equivalent to a five credit course on DNR. Before this effort, there was only a handful of people that could talk about these issues in the detail that this committee's members can now do. That is vital to allow people to know about the DNR. The materials and the on-line videos allow for people to access this. He hoped people could save that and attach it to digital media that can be accessed in the future. It is an interesting social experiment that covered a great deal of meaty stuff.

Murray noted that his approach would create a very basic document. Swanson felt that there was a lot that could be done with such a letter. If there was interest, readers could familiarize themselves with the issues, law, and details by going through the meeting materials. Scott felt that the details were important. This issue is not the first time it was raised. This record and the video history of the questions needs to be included as part of the materials. Grad felt that as people step through each question there should be a way to explain how those were addressed.

Fleck noted he was almost through the first part of the November special meeting. But the process takes time. The motions are clearly identified, followed by the discussion, followed by the question again, and finally the vote on that question. He noted that maybe he should consider doing a table of contents for the November meeting. It makes sense, but it will take time to sort through to do that. Murray felt that tabs to organize this report.

The 29th would be the day to get the reports into the TLAC. The meeting would be to adopt meeting minutes and going forward with the report. Murray noted that there would be no discussion of the minority reports, rather they would be included into the document. Bork noted that this could be a long rambling message, a letter, or a few lines. Yes, they could be that. Fleck noted that the group is out of time and there was a suggestion about developing a more detailed report, but that was no longer an option. Grad asked about the format, would it be in a PDF form. He also asked about the file to be provided. Reports should be sent to Joe, Fleck and Loni. Grad asked if it was possible to make a statement regarding the sense of the committee. He said he was impressed with the scope and breadth of the discussion that is defined by the

regulatory role of an agency. He felt there was a good counsel and advice being given and that there was still hope for improved revenues. Murray felt that the agenda would be rather limited, but discussion could take place on issues.

Motion to adjourn was unanimously agreed to by the TLAC.

MEETING MINUTES FOR:

December 16, 2016

12:00 p.m.

Trust Land Advisory Committee

Minutes of the
16 Dec 2016
Regular Meeting

I. Call to Order/Pledge of Allegiance/Roll Call

Joe Murray called the meeting to order. Pledge of Allegiance was made. Roll call occurred. Angus Brodie was attending for Kyle Blum; Harry Bell for David Bekkevar; Brian Grad for Mike Doherty; Bob Sextro for Josey Paul.

II. Public Comment. There was no public comment received.

III. Review of Questions for Further Development – Discussion of the Report

Rod Fleck passed out copies of the tally sheets that were used during the roll call votes. He explained that for questions 4-6 which were combined the vote is found in the column for Question No. 4. For Question No. 7, the vote is found in the column for Question No. 5 and that arrow at the top to column seven is trying to explain that. Also he noted that the December votes were written into that page and the slant was a problem. Murray felt that it was helpful to have this original document. He hoped that there should be a way to have a cleaner version of this. It was great to have the actual tally sheet. Bowen's tally sheet helped Fleck to clarify the official sheet.

Murray noted that there were votes on the questions this morning. There was then a discussion about what the report to the BOCC was going to look like. There was also a beginning discussion of the record followed by a break for lunch. He felt that there was a discussion about a format for the minority reports.

Bork noted that she would hate to see the effort made lost in a hastily written or quickly tossed together report. She suggested that the TLAC ask for a reprieve just for the development of the report. Murray asked if that was a motion, she said she was just wanting to discuss this. Everyone is busy, there are the holidays, and it seemed unfair to try to figure out how to get the report done. There was a motion to accept the cover letter made by Grad, seconded by Connie Beauvais.

Sextro felt that this would include the effort to develop the layout discussed earlier including the minority reports. Murray would add two things. One would be the inclusion of the minority reports as a noted section. Second, he would check with Loni to make sure that the documents are available and on file. He felt that there should be a reference to the website that holds all of this.

Fleck noted that Bork had talked to him about the value of having a similar format for the minority report. There may be a want to sketch out a template for that. He did not think he could develop that due to the holidays. But, that framework could be of value for this. Scott asked if there wasn't a frame work for the questions that could be used. The questions were developed as yes/no. If

there was a letter, how would this be put into a format. Scott felt that there should be a reference at the top to the specific question that report is referring to as well as indicating that it is a minority report. Bork felt that we need to do this for the readership and the consumer. If the reader can find things in the same place, they can easily make linkages and not have to scramble through the document.

Vote on the motion to accept the draft letter as an outline with the edits and the changes noted above. The motion was approved unanimously.

Murray noted that with this as an outline, were there suggestions about how the minority and majority would like to have the information put into the document. Thaler noted that votes needed to be included. If the committee was not going to be extended then there needed to be a way to explain what the positions were. Scott suggested using this format:

Minority Report: Question No. ____, meeting date
Repeat the question
Body, and she suggested that the report be one page.

Cross disagreed and felt that the majority should not be telling the minority how to do this. Scott noted that she probably should not be considered to be the majority. Grad felt that there was value in having the same format for consistency. It would be nice to have a link to the minutes associated with that question. Scott noted that there would be a way to note "See Minority Report." Cross explained that this would be for the first question on reconveyance. There will be a statement of the question, the vote, and a reference to See Minority Report. Then after that there would be the next questions. Scott asked why would you change the format and not keep it consistent within the document. Cross felt question one set a condition that the others were depending upon a no vote on the first. If others want to write a report on those other questions, then maybe that could be inserted into the letter. If people were going to write longer portions, then maybe use the same approach. Cross was prepping folks that on the dissent on the reconveyance question was going to be lengthy that having that in the body of Murray's letter would be too long. For ease of reading, having that separately would make for ease of reading. Cross felt that those other questions would not develop enough content for a lengthy response.

Bork felt that people were talking about how to present the question, the vote, and the information that could include references. This would allow the reader to not have to go through the materials. If a person wants to write twenty pages, there should be a summary at the end, or abstract at the beginning, that makes it easier for the reader. Murray felt that there would be two steps. The letter providing the question, and if there was a minority report, the letter would reference that. If everyone used that same format, it would be able to create a section for each minority report in relationship to specific questions.

Fleck asked for clarification on the appendix concept discussed earlier. The first question is one that the TLAC would have to answer. He thought that there would be a statement of the question, what the vote was, who voted how, and a reference to the minority report authored by, joined by, and

joined by those that were absent. This would then reference a tab. The minority report should say Minority Report, Question No. X, Meeting on XX, and the vote. This would then note have to develop which date, which meeting, etc. Make the reports allow someone to quickly recapture the discussion in a brief amount of time. If the group wants to write a novel, or four sentences, then that allows for that. He felt that making a reference to the meeting minute page numbers made sense.

Beauvais asked if all of the questions would be included. Fleck noted that there were some 19-20 questions. There were six questions voted on in the morning, in the afternoon there were votes on others and not all of those passed. Beauvais thought that there would be value to show the list of questions that were discussed, voted on, etc. Murray noted that there were two steps. Some of the items voted on for consideration, were not moved forward as they died for lack of a motion and second. She felt there was a need for the questions voted upon. It could be divided into what was passed, what failed, etc. Scott noted that she was making a reference to the date, meeting type, and the question number. Scott noted that this would create a fairly lengthy header.

Murray noted that copies of all of the minutes would be included. Those approved to date would be included as such. Those not approved would be noted as draft. Scott asked about the minority report process, if there was contact to others would that be a problem. Fleck noted that people should only contact those in the minority. If the group suddenly becomes the majority, that violates the PRA. Count, and if you have more than eight people, double count. Just adding people to include them for information could violate the PRA. 11 people on the message would be a violation of the PRA. Examples of what to avoid were given.

IV. Next Meeting Date/Items

- A. The discussion turned to the next meeting. The idea was discussed of having the reports available by 9 a.m. allowing people time to sign onto minority reports. Then a discussion of the final report. Bork asked if there could be an after action review, similar to those done on fires or major incidents, as a means of sharing what people learned and experienced in this process.

Also the agenda would have approving the minutes of the November and December meeting allowing those to be voted upon if they are in fact completed.

- B. Grad noted that the issue of Climate Change was not brought up in the recommendations. But, what should be DNR's policies regarding the impacts of that; related infestations; fire issues such as those seen at Ft. McMurry; etc? Is there a DNR policy? Are those subjects worth contemplating?

Murray said yes, but that those subjects were not within the confines of the resolution. Things like what can be reviewed to reduce the risk of fire, etc. Reandeau noted that a minority report could tie this into its comments if linked to the recommendations. Murray asked how that would relate to which question considered and Reandeau noted it would be up to the person who is writing that response. Bell noted that there are a lot of discussions regarding how to respond to Climate Change. There is a whole amount of interesting responses, research efforts,

addressing climate change, infestation, fire, etc. Scott asked if these were online. Connie Beauvais noted that the North Olympic Peninsula Resource Conservation District has a report regarding these issues within this region on its website and it discusses fire issues as well. Grad asked if there were recommendations regarding prophylactic measures? Could there be an ask to DNR for a presentation on these issues.

Angus Brodie, DNR, noted that there were two subjects being discussed. One is regarding addressing Climate Change, and another is regarding Catastrophic Events. The latter is straight forward as the RCW requires salvage of valuable materials. In 2007 with the Coastal Storm that hit SW WA, the DNR developed a salvage response using an incident command structure. An emergency was declared for that area and the salvage operations were undertaken as a result of there being value.

On the Eastside with some fires, there is an assessment about the economic valuation and the financial costs, and then would that value be returned to the trusts. If the answer was no, then there would be no salvage undertaken. If the answer was yes, then the salvage was undertaken. The issues include whether there were markets for the salvage materials. Each incident is considered on its own. The evaluation is done as to what is in the best financial interests of the trust. Grad asked about rehabilitation of those areas lost to catastrophic events. Brodie noted that there is a need to look at this in both the short and long term. The Department uses net present value to determine its response. By looking at this, usually on the Westside the evaluation will show a positive NPV and so with a return to the trust the salvage is undertaken. On the Eastside that is not always the case. Reforestation also is one where the DNR utilizes the NPV to determine the best action as to whether to replant or let it naturally return. Other issues to consider include the growth index of the site, the discount rate of NPV, and how the land will respond under natural processes.

Bell noted that if the mills were closing as on the Eastside then there is no market, then there is no NPV. This is now starting to occur on the Westside. Bell also discussed what occurs if climate changes occur rapidly, which may prevent adaptation to that change in any given area. Bell shared with the group that the DNR has an extensive genetic program that is part of research coops that are testing seed stock under potential future climate changes.

Brodie shared that the DNR is participating in the Seed Source Movement trial undertaken by the PNW Lab of the USFS. They are trying to see how Douglas Fir from Northern California responds to the climate of Western Washington. These seed efforts look at a wide variety of growing conditions from Northern CA through BC. There are similar trials for other species. Murray asked about how the tests were done of the seeds to determine how they adapt to various changings from being moved Northward. Brodie noted this was a long term guessing game to some degree as the tree species are usually ones with a 40-80 year rotation. Most foresters are rather conservative about trees. So, these studies look at diversity of seed stock, the site locations, and density as a measure of structure. There is no secret recipe to date for a specific seed mix.

Murray asked if any of the trials were looking at hemlock density and its tolerance to shade over Douglas fir? Brodie noted that most of the studies were only looking at Douglas Fir and Lodge Pole that he was aware of. Bell noted that there is a Hemlock Cooperative which is interesting stuff within their seed programs and seed orchards. Foresters have been worrying about Climate Change for some time and looking at seed programs as means of doing this. DNR is doing interesting things within the cooperative looking at seed site, locations, etc.

Grad asked about how the DNR dealt with diversity of the species, its genetics. Brodie noted that the DNR maintains various sites that are healthy controls and the DNR invests space, resources, and staff to maintain and study those sites.

Lea asked about the article regarding DNR and Commissioner Peach being in the room regarding the tax revenues derived from timber sales. Lea asked if the TLAC could get copies of the report that shows how much money has been derived from the DNR lands. Peach offered to get Lea that report.

Bork noted that she hoped the next meeting's after action review could be on where people could also think back as to who made presentations and the TLAC thank these people in some manner. She also said it would behoove the group to invite the Peninsula Daily News regarding this effort. They could interview people about what were the issues and responses. Murray noted that he would invite them. Fleck noted that they also watch the meeting. The reporter then shows up at the end to double check things and did that when the TLAC was voting to double check the vote. Bork felt there should also be comments from the Chair about this experience. Brodie asked about the meeting minutes that discussed the issue of inventory in the past. Fleck noted that they could get those to Brodie, but he felt that the October meeting minutes had that discussion.

Murray expressed his thanks to everyone on the TLAC for their time and involvement. He also gave a special note of thanks to Fleck for the work he did.

V. **Public Comment.** There were no members signed up for public comment.

VI. ***Motion to adjourn by Scott, seconded by Sextro. Meeting was adjourned by unanimous consent.***

MEETING MINUTES FOR:

December 29, 2016

Trust Land Advisory Committee

Minutes of the
29 Dec 2016
Special Meeting

I. Call to Order/Pledge of Allegiance/Roll Call

Joe Murray called the special meeting to order and asked Rod Fleck to call the roll after Toby Thaler was brought on line via telephone. Harry Bell was attending for David Bekkevar. Brian Grad was attending for Mike Doherty. Others in attendance were Robert Lea, Connie Beauvais, Ben Pacheco, Tom Swanson, Jason Cross, Cynthia Bork, Coleman Byrnes, Diana Reaume, and Susanne Scott. Quorum was established.

II. Public Comment

There were no members of the public signed up to give public comment, nor were there anyone wanting to do so that had not signed up.

III. Minutes

Fleck noted that the minutes included the regular meeting for November, special meeting for November, the regular meeting for December and the special meeting for December. It was determined that the TLAC did not have one copy of the draft meeting minutes. Those were being permitted. Discussion occurred with the request for the minutes to be considered later in the meeting to permit some members of the TLAC to review them before taking action.

IV. Report

Murray asked if there were any concerns about including the questions and results of the voting as the first part of the report followed by the minority report. He noticed a few things about the questions and their numbering was associated with the meetings. The minority reports may not use the same number. Also there were a few questions where there was no motion to consider those. Should they be included in the report?

Beauvais felt that only those questions that were being voted upon should be included. Scott noted that there was significant documentation in the minutes about those issues and if someone was interested, they could consult the minutes. There was consensus that the report would only include those questions that were voted upon. Bell suggested and asked for a one page document with the questions and the votes taken. Cross suggested that the motion table be consulted for that information. Cross noted that on the draft of the TLAC list of questions voted upon, the intro for the special meeting needed to be moved before paragraph No. 2. This should be moved down five lines and as an introductory paragraph it was not part of the actual motion. Murray agreed.

Murray recapped the discussion on his draft letter which would be the report. He asked if it should be added to. Beauvais felt that the shorter the documents, the better with the substantive record. Scott suggested that on the summary prepared by Loni that it might be easier to indicate the vote count. Beauvais agreed that formatting would make it easier to read. The report would have those questions

with no actual votes removed. The minority report needed to be referenced within the report of the Committee which was the proposed one+ page letter drafted by Murray. Cross noted that in the previous meeting there was text on the screen that proposed how the minority reports should be headed. In addition, there was a discussion about the signatory line of the reports. There were concerns that with some of the minority reports the voting would be lost. Swanson asked how many minority reports there were. Thaler had signed on to the Sierra Club's submitted reports, Bork and Cross also had submitted reports as well. Discussion occurred about the fact that the copies of the reports were being printed by Loni. Fleck noted that in the body of the letter, in the third paragraph, the reports should be noted and referenced. Bell asked if there was a means of providing another minority report. This would comply with the by-laws requirement that the minority report be included in the body of the majority report. Fleck noted that the signature on the minority report discussed before would require people to sign on to the minority report.

Bell asked how the TLAC would handle the situation where the person who voted in the majority, but did not provide a minority report. Individuals would have to sign on to the report, but it would be required that they note "absent but supporting" the minority report. It was noted that Brian Grad also provided a minority report to Loni for copying.

Cross noted that the minority report would be referenced by saying: "See minority report by _____, joined by _____, and including _____ who were absent but agree with the minority." There could be lots of these reports depending upon the question. This should be included in the letter. Murray noted that if there were no minority reports on a question there would be no reference.

Fleck noted that there were minority reports by Sextro, Grad and Thaler that had been submitted that was being copied. There were also large number of attachments with these reports. Bork asked if there would be a chance to review these reports. Murray noted that the intent was to allow TLAC members to review those reports once they were copied. There was an abstention on a vote and Grad noted that he wrote a report on that issue. Paul abstained on a vote and was the only one that did so, and he wrote a report on that abstention. Murray asked about the process with such a report. Scott asked if the minority report explains the background for Grad's report on Paul's abstention. Grad explained he has an email that Paul was against a position, but abstained from voting. Fleck noted that there were minority reports and these were signed by the primary member, alternates, and in at least one occasion individuals not participating.

Bell asked if he could submit his minority report. Scott noted that the deadline was 9 a.m. for those. Fleck explained that this was to permit those to come in and allow for copying. The deadline was not within the bylaws and so the body could address. Scott noted that it was rude to provide so much at the last hour.

Motion by Thaler, seconded by Byrnes to permit Bell to submit his minority report for Bekkevar.
Motion passed on a vote of 11-2-1.

(36:30)

There were questions about how the review of the reports were going to occur. Bork asked if there was a way to name and number the reports to allow for a quick reference. Murray noted that the reports were using a format that allowed for that. Bork asked if there could be a name and number used to

identify the reports. Cross noted that the report he wrote referenced the question that was voted upon and used the format. Fleck noted that all of the reports are similar enough in their format that should use that.

Cross asked if the bylaws required a person to be in the minority to sign on to the minority report. Murray felt that that was the case but it may not have been followed. Fleck consulted the bylaws. He read Article Seven, Section Two regarding the minority report. The minority voting against the motion may submit the report, so long as the person who was submitting the report was in the minority then it met the bylaws. The others could join on it in the manner noted above. Cross noted that someone could switch their position and sign on to a minority report. Fleck noted his confusion on the question. Sextro was proxy for Paul, Paul abstained and Grad wrote the report. The seat that abstained was trying to filing a minority report. Fleck felt it could be permitted, but it really should be considered what they were doing, and some familiar with government may ask "what the bloody hell" was going on. He noted that it was odd. Bell asked if the purpose was to show how the decision was reached.

Murray refocused the group on the issue. Minority reports would be referenced. There was a need to review those to see if people wanted to sign on to the reports. Fleck noted there was no editing, commentary, simply joining by signature to those reports.

There was a motion by Fleck, seconded by Beauvais to have the TLAC recess into a Committee of the Whole until 10:30 to permit members to review the submitted minority report. Fleck noted that there would not be meeting minutes for that committee period. The concept was explained. Copies of the reports were in the process of being made. Fleck did comment on the volume of paper being used in addressing these issues. Process was noted. He asked that individuals sign and print their name. Lea asked for clarification. Anyone could join the report, even if not in the minority, if they agreed. Motion passed 14-0-0.

(47:50)

(Recording continued while the reports were laid out for the committee to consider working as a Committee of the Whole).

TLAC reconvened at the request of Murray. It should be noted that Bell's minority report was withdrawn.

Murray asked the group about the background information or additions to the minority report. He felt that these were not well documented. Murray said that he felt it was highly opinionated. Bork asked if this was his opinion. Murray said yes, it was. This is material provided in addition to the minority report. Bell asked if the report by a consortium of universities regarding carbon storage within products, not trees, was included and if not should it be added. Murray felt that it was too late to add additional materials. Fleck if it was not attached to a report. That was given out at a meeting and should be in the materials that in theory the TLAC has in its files. The minority were to write reports. There was no reference in the bylaws regarding attachments. He felt that the readers would weigh the reports and the credibility of the sources attached from research reports to Port o Call articles. People can judge the report on the merits of the materials and the attachments to it.

Pacheco felt that it was important to have the minority reports and that the additional materials were a lot to go over with the information that was in there. Grad noted that regarding Bell's comments and the CORRUM documentation was submitted regarding the sequestration of carbon within products. Bell noted that it was a question as to how you want to address this as it was not connected to minority reports. The research materials attached are they part of the minority report.

Fleck noted that the minority reports came in and they were simply laid out for signature. They were not edited and earlier discussions were that the minority report could be submitted by someone who voted in the minority. These reports could be joined by others. Those letters are noted within the draft revised letter that was the proposed majority report. The formatting of the submission, support and agreement. There would be a majority report, Murray's letter, then the specific reports. Bork's did not reference a specific question but the process. He argued whatever the minority gave is what they gave regardless of his thoughts on it.

Bell noted that all of these research documents are they included in the reports? Fleck noted that at least one report references those and lists those. Bell was wondering if there were other research materials that were part of the meetings and if those were going to be attached. Fleck said they were just part of the

Murray asked about process. It was noted that the TLAC would reconvened at 10:30. Fleck raised a point of order. The bylaws note that the minority report could be submitted by a member in the minority, if a committee member supported they could join. If individuals were absent, they could sign and support. Fleck asked the TLAC who Robert Phreaner and Mary Porter-Solberg were? [See *Minority Report on Question 3, Regular Meeting of 18 Nov 2016 re: trust accounting/audit*]. Fleck noted that he has no record of their attending a meeting, nor a member identified. Fleck raised this as a point of order as they were not members of the TLAC, they did not vote, and they should not be included. Cross noted that there was an issue with Doherty and Grad also as they represent one seat.

Scott asked if all of the folks did speak or sit for Byrnes. Byrnes noted that he had been at all meetings. Scott asked if this should be stricken. Fleck raised the fact that he simply felt that their names should be stricken from the report. Thaler noted that Porter-Solberg was with the Audubon and would be an alternative to Byrnes. Byrnes agreed that he attended all of the meetings and had agreed to sign onto the report. Murray felt that something should be addressed with Doherty and Grad. It was noted that Grad was the alternative. Cross noted that there were two votes reflected in a document that was not there. Fleck noted that if in this situation if anyone listed Matt Comisky or Ann Forest Burns on a minority report were listed that would cause significant problems with those environmental groups. Thaler noted that would be the case. Cross felt that this was falsely inflating the support for these positions. Scott felt that as listed, it shows two people voted for that position when only one did. Pacheco felt that the TLAC should stick to the 20 votes and that there should not be more than that. Scott noted that without any explanation it looked like there were two votes, when Robert Sextro signed but Paul had voted. Thaler noted that Sextro replaced Paul and was the one who had drafted the report. Cross asked if there was a motion needed. Fleck suggested that while Chair could make a ruling, the noted that Sextro signed on to reports and that there was a report by Thaler and Sextro who replaced Paul. Motion made by Reaume that either the alternate or the original member be the only one signature for the minority report. Seconded by Lea. Motion passed 14-0-0.

Murray noted that all of the information attached could be included as an attachment. He felt that it should not be included. Cross moved that only the minority report be included in the report. Beauvais seconded.

Fleck noted that he would probably vote no. The bylaws were argued that the minority report was to be accepted whole cloth without any real review or edits to what was in it. He felt the motion goes against that intent within the bylaws. However, he noted that it was inconceivable to the point of bewildering what was being included. Some of which was false and in his opinion slanderous, however, he felt that it spoke volumes regarding those that signed onto the report. Swanson felt that the TLAC should grant the Commissioners the acumen to sensor out garbage within the materials. Bell asked if that would mean not including the research materials including the scientific reports. Cross noted that on the third page within the packet that it would be included, then the bibliography would be included. However, the attachment of the actual Port o' Call material would not be included. The document is referenced and his motion did not mean to edit what was written. The report should reference materials, if it was done then he had was not supportive of that. Bell asked if the concern was that the materials attached or included were cherry picked? Cross actually was concerned that the commissioners may not read the actual report with the amount of the materials attached. That may result in those lower questions and minority reports not being read.

Byrnes noted that the attachments could be done as an appendix. Cross noted that he would think that as friendly. Beauvais asked why are materials being added that were not shared with the TLAC prior to the vote. Grad noted that there was no discussion or rules regarding supporting documents and materials. While this may appear as new, this is in fact part of the record. The commissioners need not be censored to protect them. The documents do not get in the way of reading the report as it is simply an attachment. Cross asked if Byrnes would make a friendly amendment. Byrnes offered to amend the motion that this include these as an attachment to the report given to the Commissioners. Cross felt it would be great to let the commissioners read these materials as it goes to the credibility of the minority group. However, the reality is that the minority report would not be given the same review. Beauvais did accepted Byrnes proposed amendment as friend. Scott asked for clarification and under this amendment all of the attachments would be provided. Grad asked if that was the same for all submitted documents. Byrnes noted that yes, however, he would not have used the Port o' Call as a supporting documentation. Grad asked about the CORRUM report. Fleck noted that the report was Murray's letter of a page plus that had been shared for months. Bork asked that there be an electronic version of the entire document. She asked if there was an electronic set of links that could be given instead when the digital item was provided. Cross simply noted that he is just wanting to separate the materials from the individual minority reports. Fleck noted that there probably would be a PDF of the documents. Motion as amended passed 12-2-0.

Fleck asked the TLAC to look at the minority reports listed in the draft. After explaining the formatting, but in the draft before the TLAC on item seven he provided a description of the minority report. [*Minority report written by Grad for Paul who was represented by Sextro.*] Bork asked for clarification. Fleck explained that Grad submitted the report on behalf of Paul who abstained but is now represented by Sextro. Fleck noted this challenged his approach to government. Murray asked if Grad was at the November meeting. Fleck noted that Sextro was at the 18th meeting, and Sextro was representing for Paul. Cross asked if Grad was there. Fleck said just leave it as it spoke volumes about those involved. Cross noted that Sextro abstained, so only the minority member could vote and submit a report. Grad

noted that he was there at the meeting in the audience. Cross noted that earlier the TLAC said you had to be a voting member of the minority, or an abstainer, to submit a report. So under that position only Sextro, or others voting in the minority, could submit a report. However, only Sextro abstained. Scott noted that the person usually attending had a representative who did not vote the way he had hoped and how do you do that? Cross noted that maybe that member should have had his ducks in order and that there are rules. There are ways to register dissent from writing letters to wearing a sandwich board. Scott asked if this could be submitted as public comment. Cross moved that the offered minority report by Grad be removed from the report as it did not meet the bylaw requirement. Seconded by Swanson. Motion passed 12-1-1.

Cross raised an issue with the Bork minority report. He noted that this report was not regarding a specific question voted upon. He asked if it was associated with a specific question? She noted it was more about the first question, the difference of the opinion on the issues of the committee, she felt that she was uncertain where it would be placed. Murray felt that maybe it should, like Grad's be placed into public comment. Bork withdrew the letter as a minority report and said she would place it as public comment.

Bell noted he had a hard time cross referencing the minority report numbers and the questions. Noted that the order in the draft was long. He needed to change that order. Fleck left to make the suggestion that Murray had for placing the reports by meeting dates when votes occurred. Murray covered what would be the order of things:

Letter from Murray as majority report;
Minority Reports;
Resolution;
Participants
Appendix

TLAC recessed for five minutes until 11:13. TLAC reconvened when Fleck brought back the drafted edited report.

Meeting Minutes

Murray asked for a motion to approve the meeting minutes of the November and December meetings. Bell noted that he had read through some of the items but did not see the minutes for the regular meeting of 16 Dec. Specifically looking for the discussion and comments that supported the reconveyance vote. Swanson noted that he did not arrange to have a proxy so not included in the minutes. However, the signatories to the minority report are significant.

Beauvais made a motion, seconded by Scott, to approve the minutes of the 18 Nov 2016 meetings. This was clarified to include the minutes for the both special and regular meeting on that day. Motion passed 14-0-0.

Beauvais made a motion, seconded by Byrnes, to approve both of the meeting minutes from the meetings on 16 Dec 2016. Motion passed 14-0-0.

V. Reflection Discussion

Murray opened the floor to members of the TLAC to discuss and share their thoughts on this effort. This was a suggestion made by Bork and he included that on the agenda. She asked if this was the after action review she asked about. He said it was.

Bork noted that she felt it was a privilege and honor to sit in the chair and meet everyone regardless of their interests. She felt that this was a fabulous group that's been open, and at times argumentative. She enjoyed being a part of the effort. The decision made was a good one. She felt that there was a need to go more in detail as to the future of these trust lands their management. She is very much in support of finding additional sources of income from the County lands from a variety of alternatives and uses from the uplands. This is hard because it is a change but we need to be change advocates today. There is a little short sightedness in some of the things done. This is very complex and very hard to put in a report. This committee showed real valor in representing the best foot forward on these issues. Thank you for allowing me to be here. She noted she had made new friends. There were no safety concerns.

Scott agreed with Bork. Part of the effort has been the free discussion that was rather amazing with diversity and civil discourse. This is good. Everyone was able to talk and came to agreement on these issues. This was very beneficial to the County.

Reaume thanked Murray for chairing and Fleck for his work. She felt that there was a need to also thank DNR staff and Kyle Blum for all of the materials shared with the committee. She noted that the factual information was very important to the work.

Grad thanked everyone for participating in our democracy. The work speaks well for the effort and thanked everyone for the time and effort that they provided.

Lea thanked everyone on the committee. He noted that it was extremely annoying when people like Bill Peach, Randy Johnson, Harry Bell, Joe Murray and himself are implied to have no interest in the environment. He asked how many of the TLAC had worked outside in three inches of rain. He noted that we need to manage the resources we are harvesting. There were mistakes that damaged the environment but they were told to do so. In the 70s, there was the last decade of unlimited harvest. What ITT did to Rayonier was criminal. The articles read here are bothersome. He felt that this matter would have to be settled in the Legislature. He noted that there will be continued automation in agriculture and timber. He wished everyone a belated Merry Christmas & Happy New Year. He that they should be given credit for having enough brains to know that when you harvest a tree you have to plant others in its place.

Beauvais applauded the Commissioners for creating a broad and diverse group that brought 20 people together. She felt that this was the way of the future and was similar to Kilmer's collaborative. People agreed on common goals and yet worked out approaches to those. She felt that the way the group worked today shows what we can get done. She thanked Joe for his work as the Chair and Rod for his work on minutes and materials. Everyone is busy, and all took time out to work on this. These our trust lands and it behooves us to watch these issues. Great effort.

Bell followed up on what Lea said. He did hart time at Rayonier. Was "the scientist" called on to work on buffers. Going to Olympia and argued how to write good water policy. Good policy is written on

good science and analysis. Glad to see that in the minority reports. Doesn't do any good for policy if you cherry pick to meet your position. Not sure if that is the case here. Next few months major policy efforts by BNR. The draft EIS are out and they are the science used to make a decision. There needs to be an effort to undertake critical evaluations. There is a need to make sure that the science is not cherry picked.

Fleck noted that he commented on the amount of work by everyone. There is a group that continues to believe that this going to be a small group to work on this issue. But the Charter Review argued that it should be larger and broader. A few argued that it was complex. He noted that in the 1990s reconveyance might have been able to occur. But, two decades later with the HCP and all of these issues, he is not convinced it could occur. The TLAC gave the County a good set of suggestions on how the County could be engaged rather than relying upon the City of Forks, Quillayute Valley School District, Quillayute Valley Park and Recreation District, and the Forks Community to carry the County's water. Of his 22 years, he felt that that had been occurring for about 17-18 of those for the benefit of the citizens of Clallam County and it reduced your taxes. Those lands have purpose, they have value and specific roles. It is just too important to make simple statements.

Byrnes appreciated the civility of the group and how it conducted itself. There were lots of diverse goals and concerns. Really appreciated the effort and time for the good work done. Thanks to Joe and Rod for their work.

Joe thanked everyone for participation and the support of the community. Noted that life is Chaos or Order and this was both at times. Thanked everyone and he will draft a letter thanking Kyle Blum and his staff for their participation in these efforts. Byrnes asked if a thank you could be extended to Mona Griswald and her staff.

Bell asked how this gets before the Commissioners. It will be put together in a binder by Murray and Fleck with Loni and given to the Commissioners. Fleck noted that Murray was on the Commissioner's agenda for the 30th of January to present the information. It is during a Monday morning during a work session of the Commissioners. Murray will have 15 minutes to present the information and overview. Loni will be asked to send notice of that to everyone.

VI. Public Comment

Brian Grad – Sequim. Submitted written comments to the TLAC regarding the issue of enhanced inventory.

Cynthia Bork – Forks. Submitted written comments to the TLAC regarding the overall organization, function, and operations.

Motion to adjourn was made by Beauvais, seconded by Swanson. Motion passed 13-1-0.

The Honorable Mark Ozias, Commissioner
Clallam County Board of Commissioners
223 E 4th St #4
Port Angeles, WA 98362

December 14, 2016

RECEIVED
CLALLAM CO. COMMISSIONERS

DEC 16 2016 TLAC

Dear Mr. Ozias:

Before my involvement with the TLAC, I was opposed to re-conveyance of the management of Clallam County Trust Lands from the Washington Department of Natural Resources (DNR) to the County itself. I believed that the proposed action would be expensive to taxpayers, reduce the quality of management, and result in a political scenario that would make forests even more vulnerable to extractive interests.

I still think re-conveyance is a bad idea. Changing the manager is not the solution to the economic pains felt by our junior taxing districts. We need to make more money from these lands, but not through timber harvests. There is no possible way we can harvest our way to an Economic Eden.

Forests are one of the Olympic Peninsula's finest assets. Forest conditions reflect the attitudes of the people who live in Clallam County. There is a clear and defining difference between intensively-managed and native forests. We all can see and feel this difference.

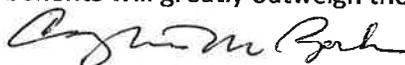
The DNR will strive to meet its fiduciary responsibilities to the County by providing Trustees with as many funds as possible through its primary means: timber harvest profits. Using this model, the harvesting actions will pre-empt all other possibilities for generating funds because NOBODY wants to visit an area that has lost its inherent, biological and aesthetic qualities.

Hence, I believe we can ask the WDNR to meet its fiduciary responsibilities to the County by refocusing efforts on carbon storage, tourism, scenic byways, visitor center development, recreation amenities, wildlife/fisheries showcases, special non-timber forest products, enhancing forest health and diversity, natural resource education centers, and community restoration programs.

I quickly came to realize that the TLAC is heavily comprised of members appointed by the timber industry. It is difficult, if not impossible, for the TLAC to be a creative think tank for possible alternatives to the status quo management of trust lands. The TLAC must be guided by a neutral facilitator and will require a re-assembly of progressive, community-minded citizens with a long-term vision for our trust lands.

At present, the TLAC playing field is a passive-aggressive confrontation between environmentalists and the timber company representatives who have re-classified their affiliations. After a year of briefings about the status of trust lands and management by the DNR, meetings have devolved into chaos and confusion. Little progress made toward developing sound recommendations for the future sustainable management of trust lands by the Agency. Recent political elections have not helped the situation.

Trust land forest management will require a new approach to solving many of the physical, social, economic and biological needs of Clallam County. The DNR will do whatever is asked of them by the County, however, emphasizing and enhancing values other than timber will require more resource specialists, planners and organizers. This approach will cost more money. But, in the long run, the benefits will greatly outweigh those of today's narrow reliance upon harvesting trees for economic gain.



Cynthia Bork
1630 Ozette Street
Forks, Washington 98331

MINORITY REPORT

~~Recommendation: Question from Block 1, #6 ^{SPECIAL} Regular Meeting of 18 November, 2016~~

~~Question #6: Should the BOCC as a minimum seek from the DNR an accurate and updated, maintained detailed resource inventory of it's FBTL to include all resources with annual update?~~

~~The Minutes of the November 18th meeting recorded the following votes.~~

~~Question #6 Yes 12; Lea, Reandean, Beauvais, Pacheco, Murray, Scott, Swanson, Doherty, Thayer, Fleck, Byrnes, Bork
Abstain 1; Paul (Sextro as Proxy)~~

~~Minority Opinion:~~ The Questions intent is to ascertain enhanced data for the purpose of ensuring that DNR meets its' fiduciary responsibility to the County. A major consideration of that includes managing the FBTL for "generational equity", the ten year harvest plan must determine what is a sustainable yield to avoid "shorting" future revenue for the taxing districts. This statement underscores a fundamental difference in the perception of the function and purpose of the DNR inventory. "Murray noted that the inventory seemed to be based on LiDAR data and so he was uncertain about the sustainable yield process. He raised questions about inventory DNR has, how the inventory is developed and collected, how habitat was designated, etc. More people on the ground would be important to various stakeholders. Industry does substantially more plots in developing inventories than the DNR".(1.) Yes Industry does things differently and for a different purpose. They are not constrained by the legislative mandates which govern DNR. The methodology and modeling which the agency employs will differ from the industry standard because it must include planning for environmental considerations under the HCP. Working together with the USFS the State includes observation of the habitat criteria for endangered species including the Northern Spotted Owl and Marbled Murrelet. Timber companies on private lands do not build inventories with those requirements. The notion of inserting criteria which is not consistent with DNR's mission and purpose would be a costly and unnecessary undertaking. At a recent TLAC meeting "Fleck noted that the sales department never put up the volume that was targeted. Why is no one within the DNR tracking the sales volumes?(2.). This comment demonstrates a marked preference for requesting a greater detailed inventory, a preference based on the goals and desires of the Timber Industry not entirely consistent with the stewardship of the DNR. Again this is reflected in this comment, "Fleck noted that the DNR had provided the members with a memo dated 13 Jul 2016 regarding the manner in which the inventory is developed and maintained. Murray noted that the inventory provided was not what he was familiar with in the forest industry. He noted that there were fundamental components to forest inventories that the DNR materials did not have ". That comment is consistent with the observation by Timber company representatives that DNR inventory is not focused on the primary business considerations which drive the performance of a private enterprise. A major advantage to such an enterprise in having a more detailed inventory, one which meets their purposes, is being able to identify forest lands they can determine would make profitable candidates for future land swaps with the DNR. The Foothills Land Exchange is an example of the type of transaction which Timber companies would like to see more of. That exchange transferred mostly raw land and stumps in exchange for mature timber. The values were the same, DNR acquired more land but the logs represented a windfall profit since they were sold for export, a significant delta from what the timber was valued at when exchanged. The County essentially lost money because those logs from public land were not milled locally, jobs were lost, taxes lost, revenue not collected for the taxing districts and since that timber was removed from auction that

created arrearage. Planned sales that were foregone in favor of more timber land that would produce more income in the future. Such a detailed inventory would be costly to the County although "Murray noted that this cost was a regular cost of doing business." (3.). Perhaps that's true for a Timber company but not relevant for the DNR. There is a disconnect between what the Timber company representatives believe DNR needs to do to successfully manage the Trust Lands and their understanding and acceptance of established performance based on DNR's metrics and sustainable yields. "Fleck felt that we could make a recommendation that the Commissioners could ask for a more detailed information. Fleck also felt that an accounting could be asked for - what is ours, what have you done with ours, and what is the status. He noted that the County lands were 92,500 acres and if you did this for 10,000 acres a year, then the costs could be about \$40k/yr"(4). Those costs will be borne by the County for a dubious purpose and outcome. This will essentially be a subsidized buyers guide enabling Timber companies to use this data for their business interests to the exclusion of benefit for the County. Coupled with the cost of hiring a forester/consultant the bill could be in excess of \$100k per year. The benefit to the County is speculative at best and not to be recommended.

Respectfully Submitted, Brian Grad

1. TLAC minutes pg.5 August 19,2016
2. TLAC minutes pg.3 October 21,2016
3. TLAC minutes pg.3 October 21,2016
4. TLAC minutes pg.5 October 21,2016

*Agree w/ some reservations.
Suzanne C Scott
Suzanne C Scott*

1. No change and continue management with DNR.
2. Clallam County cooperatively manages trust assets with DNR. DNR would take direction from County. This would take active management role with DNR. County hire a forester that would take advice from County Advisory Board and Commissioners.

This was Combination of several comments. Josey Paul asked how this was different from reconveyance? He felt that this was very similar with DNR. Cross noted that this was not the same as the reconveyance, DNR would take its cut and you would have a new position. Paul saw this as DNR taking orders from the County. Murray noted that the DNR would still manage under HCP. Paul felt that the DNR would be taking orders from the County under this proposal. Swanson noted that this was dramatically different from reconveyance. Under current system, the County gets a report from the DNR every month or quarter. In effect, the County Commissioners are passive managers/overseers. DNR is under trust mandate discussed by Kyle Blum. This adds another layer of oversight and guidance funded by the County. Disagreement may occur about whether that position should be funded as an employee or contractor. Nothing is changing at the DNR. Paul noted that the way this was worded with the DNR taking direction from the County. Scott noted that the "take direction" was a bit strong and that it uses "DNR taking direction from the County in all operations." How is that a cooperative? Diana Reaume noted that there was a discussion about a county person taking a more active involved role. Toby Thaler noted that DNR cannot change, give up, or alter its role. The use of cooperative management and taking direction do not comport with the law and would require legislative change. Also, the wording shows that these concepts are at odd. Murray noted that the TLAC could make a proposal to make legislative changes.

Cross noted that there would be a difficulty with saying the County should insert itself into the management of the lands at the same level. He noted that a person could be available to be involved, be very vocal in issues, and engaged. Murray wrote what was from what everyone said. This is a chance to rewrite these concepts. Scott felt that this alternative is not what Skagit County does. Bob Leah asked that all of the list be read and then go into a discussion about them.

Coleman Byrnes asked about the nature of the list. Murray explained he didn't write down names behind comments, but just wrote down what individuals had said. It was agreed that Murray would read through the list and then a discussion would occur.

3. County should look at other sources of revenue from trust lands such as recreation passes, carbon credits, etc.?
4. County should increase taxes to offset revenue from trust lands. Such as increase property taxes and advocate for an income tax.
5. County should increase fees to look for revenue such as toll roads for example.
6. County should seek compensation from the federal services for lost revenue from the DNR HCP.
7. County should reduce service.
8. County trust lands should be sold and the money reinvested.

Murray felt that the inventory needed to be more detailed in order to meet the DNR mandates. Fleck asked for clarification as efforts have been made to try to get information asked for and specifically inventory information. Murray noted that what he received is what DNR has and that it lacked details in the inventory already discussed. A further example of the lack of information is that there is no details between Douglas fir and hemlock in an inventory stand. Scott asked for a clarification. Murray felt that there was just not that much detail that he is used to seeing for inventories. Regarding the RPZs, those acres should be their own separate type, polygon, unit, or stand. Murray explained the level of detail that he was used to seeing from an industry perspective that he found missing from what he was given by DNR. The unit would then have information about that unit to include species, dbh, age, estimates of growth, estimates of change over time, soil types, type of area such as RPZ, commercial or non commercial. Fleck noted that DNR used the term "polygon," and Murray noted that this was a new term utilized in digitizing information.

Bork asked if the inventory that Murray was given was the same that DNR used on all types of managed lands? Murray indicated that it was the same inventory. Murray explained how the inventory information was put together from the original December request for that information. Scott felt that more information was needed about the inventory information. She noted that in the Skagit model, the County representative may have asked for more detailed information. Cross noted that the DNR uses FRIST and that was updated in 2009 by on the ground test sites. This would not allow for additions of information by individuals outside of DNR. 2009 update was created from individuals obtaining information and then DNR uses models for projections of the current inventory have been made since then. What that does is create a set of assumptions that if you had so many acres of X, then you also have so many acres of Y.

Bork - CFI? not sure? Required? Not sure? She felt it was a requirement for an actual field counting of trees as part of the inventory, as this was the standard in the Eastern USA. Murray noted that each polygon is measured but that there are various extrapolations from that based upon growth estimates, etc. It appears that there are extrapolations of like polygons. Scott noted that this could increase the likelihood of error.

Fleck noted that the DNR had provided the members with a memo dated 13 Jul 2016 regarding the manner in which the inventory is developed and maintained. Murray noted that the inventory provided was not what he was familiar with in the forest industry. He noted that there were fundamental components to forest inventories that the DNR materials did not have.

Doherty asked if there was a guess as to the cost to develop such an inventory with all of the elements Murray had referenced. Would the costs be affordable or too high and that could be a concern to the various districts. Scott asked about the cost as well noting that in order to track the return on the investment. If the inventory is much more accurate, would that result in a more accurate sales forecast that would ensure there were not inventory discrepancies, then there is a loss of revenue.

Swanson noted that the cost to maintain an inventory is trivial in comparison to the value of the resource. He felt it was a rather minor cost per acre. He asked how much was it to appraise a house for (\$10s/acre). If you live in a \$250,000 home and it costs \$500 to appraise that is a minor cost to getting the mortgage. For tax purposes and noted that the County undertakes that effort on a regular basis. Murray noted that this cost was a regular cost of doing business.

Scott added the Skagit County Model to the list. Thaler felt this was a subset of one of the items on the list. Doherty noted that there was a Natural Resources person. Fleck noted that the person interacted with the DNR and the USFS on forest issues.

(53:25)

Thaler suggested regarding number six, the issue was one of replacing or buttressing the revenue flowing to the beneficiaries and increasing the property tax is one option. Members of the environmental community feel that monetarizing carbon sequestration. That was incorporated into one of the other responses, but the feeling was this could apply in a group of these. Reaume asked a question about PILT (payment in lieu of taxes) as if there were other such examples.

Byrnes asked about the interaction between the County and DNR under this and specifically who would authorized the timber harvest level under that option. Murray felt that it would be something that would have to be developed by the County. Murray noted that the inventory seemed to be based on LiDAR data and so he was uncertain about the sustainable yield process. He raised questions about inventory DNR has, how the inventory is developed and collected, how habitat was designated, etc. More people on the ground would be important to various stakeholders. Industry does substantially more plots in developing inventories than the DNR.

Leah asked about #2 with specific regard to a 22 Apr 2016 Letter Goldmark to Chapman about the amount of money generated in the first quarter of 2016. The letter slipped by the TLAC. Is the County receiving money from the DNR at this time? Fleck noted yes the county receives money on almost a monthly basis. The letter is part of the quarterly update/report by the DNR to the Commissioners and others. This letter tells the County when it has received money from sold sales, and when it will likely receive funds in the future. Leah asked Fleck to clarify that the Quillayute School system is receiving money from the DNR timber sales.

Leah asked about the loss of the current Commissioner of Public Lands and whether the revenue would continue? Doherty indicated that this is required by legislation. Leah understood the problem to be one of the DNR not doing this because they haven't been selling timber. Fleck said that was not correct, rather DNR has not been selling what they have indicated that they will sell. Leah asked if the Port could count on getting their money for their budget. Doherty noted that there was a host of variables. Fleck noted that the first variable is whether or not the DNR hit their harvest target of 57mmbf on western Clallam County trust lands. Port receives a portion of the sales from such volume. If the harvest projection was that the Port was to get \$500,000 from the total sales volume; but, DNR only sold 22-25 mmbf, then the answer is no, they would not.

Leah asked if the system without any changes is working or isn't? If it is not, what are the likelihood of the next public lands commissioner continuing with those. Murray noted that it wasn't a matter of whether or not it was or wasn't working, but rather is it possible that it could be working better. Fleck felt it was comparable to a student getting a D, C-, C and it was known that they could get a B or B+. Thaler noted that it worked on the assumption of what was the beneficiary's goal? If there was an assumption about the volume sold and market prices received, is that a fair assumption? Thaler felt that regarding the two candidates, it really didn't matter between them as there is an amount of inertia within the process that there won't be a lot of change for years.

TRUST LANDS ADVISORY COMMITTEE

Table of motions/actions

Clallam County Trust Lands Advisory Committee

Table of Motions/Actions

No.	Motion	Maker	Second	Vote F/Ag/Ab	Type	Date
1.	Nominated Robert Lea and Joe Murray for Chair			Murray-8 Lea-6	O	18 Dec 15
2.	Nominated Robert Lea for Vice Chair			Unanimous	O	18 Dec 15
3.	Nominated Rod Fleck for Secretary			Unanimous	O	18 Dec 15
4.	Recommend to BOCC to Increase TLAC to include City of PA, OMC, Audubon, and Sierra Club	Fleck	Blum	11 – 2 - 1	O/ M/ R	18 Dec 15
5.	Creation of Executive Committee	Doherty	Lea	14-0	O	18 Dec 15
6.	Meeting day – 3 rd Friday of each month	Reaume	Thaler	13 – 0 – 1	O	18 Dec 15
7.	Allow designated alternates	Thaler	Kelly	Unanimous	O	18 Dec 15
8.	Meeting time – noon	Reandeau	Thaler	13-1	O	18 Dec 15
9.	Use of work plan frame work	Cross	Thaler	Unanimous	F	18 Dec 15
10.	January meeting focus – County trust lands	Cross	Reandeau	13- 0 – 1	F	18 Dec 15
11.	February meeting focus – restraints (SEPA, HCP, etc.); March legal trust and arrearage	Cross	Blum	Unanimous	F	18 Dec 15
12.	Recommendation to BOCC - Interim report in April 2016	Swanson	Reaume	Unanimous	R/F	18 Dec 15
13.	Adjournment	Thaler	Kelly	Unanimous	F	18 Dec 15
14.	Adopt meeting minutes as amended	Blum	Reaume	Unanimous	F	19 Jan 2016
15.	Adjournment	Cross	Scott	Unanimous	F	19 Jan 2016
16.	Adopt amended meeting minutes	Thaler	Byrnes	18-1	F	19 Feb 2016
17.	Table discussion on bylaws/rules	Kelly	Cross	Unanimous	O/ F	19 Feb 2016
18.	Move next meeting to 25 Mar 16	Thaler	Scott	Unanimous	F	19 Feb 2016
19.	Blum to make invites to Services experts on HCP for April meeting	Kelly	Scott	Unanimous	F	19 Feb 2016
20.	Adjournment	Kelly	Swanson	Unanimous	F	19 Feb 2016
21.	Adopt agenda of 25 Mar 16	Kelly	Blum	Unanimous	F	25 Mar 2016
22.	Adopt meeting minutes on the second month following the meeting	Thaler	Bork	11-5	F	25 Mar 2016
23.	Motion to set April meeting as an open discussion meeting	Paul	Lea	6-8-3	O/ F	25 Mar 2016

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Clallam County Trust Lands Advisory Committee

Table of Motions/Actions

No.	Motion	Maker	Second	Vote F/Ag/Ab	Type	Date
24.	Motion that the April meeting consist of the USFWS ESA compliance and the bylaws ; the May meeting being on the issues of County management under what conditions and process of amending the statute; and, June meeting be on a discussion on synthesis and open discussion. A friendly amendment offered by Blum that the April meeting be on ESA compliance, and the May meeting be on HCP related issues.	Fleck	Lea	14-1-1	O/F	25 Mar 2015
25.	Motion to adjourn	Kelly	Blum	Unanimous	F	25 Mar 2016
26.	Motion to adopt amended meeting minutes from 19 Feb 2016	Blum	Scott	Passed	F	15 April 2016
27.	Motion to amend Article IX, Sec 2, adding paragraph c as proposed by Ann Seiter regarding minority reports	Fleck	Blum	Unanimous	O	15 April 2016
28.	Motion to adopt Article I as written without " marks.	Cross	Blum	Unanimous	O	15 Apr 2016
29.	Motion to amend Article II, Sec 2, paragraph b. Oversee the activities of assigned county staff; and, d. Create agendas.	Thaler	Scott	Unanimous	O	15 Apr 2016
30.	Motion to amend Article II, Sec 2 to read .."an Executive Committee shall be made up of the Chair, Vice Chair, Secretary, the DNR representative to the TLAC, and an additional member approved by a majority of the TLAC."	Fleck	Thaler	Unanimous	O	15 Apr 2016
31.	Motion to adopt Article II, Sec 1 as written in its entirety.	Fleck	Cross	14-2-0	O	15 Apr 2016
32.	Motion to adopt Article II as amended.	Cross	Blum	15-1	O	15 Apr 2016
33.	Motion to adopt Article III as written and proposed. Subsequently amended as noted in 34 and 35.	Fleck	Cross	Unanimous	O	15 Apr 2016

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Clallam County Trust Lands Advisory Committee

Table of Motions/Actions

No.	Motion	Maker	Second	Vote F/Ag/Ab	Type	Date
34.	Motion to amend Article III, Sec 7 to read: "If a need arises, after giving notice to the Chair, ..."	Thaler	Fleck	15-1	O	15 Apr 2016
35.	Motion to add a new section to Article III regarding meeting minutes: <u>Section 9.</u> Meeting Minutes. a. Will be created by the Secretary through a review of recordings of the meeting; b. A draft will be sent to the TLAC via email no less than three weeks prior to consideration by the TLAC; and, c. Minutes will be reviewed and addressed two months after the occurrence of the meeting for which the minutes were created.	Bork	Thaler	Later deemed friendly and incorporated into the main motion (33)	O	15 Apr 2016
36.	Motion to remove the sentence regarding a parliamentarian in Article IV and adopt said article as amended.	Cross	Fleck	Unanimous	O	15 Apr 2016
37.	Motion to add a section regarding a designation of an alternate, person is to be same alternate, and that communicated in writing to chair and committee.	Blum	Lea	Unanimous	O	15 Apr 2016
38.	Motion to strike Article VI	Thaler	Cross	Unanimous	O	15 Apr 2016
39.	Motion to adopt Article VII with only the first sentence.	Fleck	Blum	Unanimous	O	15 Apr 2016
40.	Motion to adopt Article VIII	Fleck	Scott	Unanimous	O	15 Apr 2016
41.	Motion to adopt Article IX, with the amendments proposed earlier, adding a para d regarding adding affiliations to the TLAC report,	Blum	Thaler	Unanimous	O	15 Apr 2016
42.	Motion to adopt Article X-XIV	Blum	Fleck	Unanimous	O	15 Apr 2016

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Clallam County Trust Lands Advisory Committee

Table of Motions/Actions

No.	Motion	Maker	Second	Vote F/Ag/Ab	Type	Date
43.	Motion to adopt the Proposed Bylaws as a whole, as amended in their entirety.	Blum	Fleck	Unanimous	O	15 Apr 2016
44.	Motion to table indefinitely the adoption of rules for the TLAC.	Thaler	Fleck	Unanimous	O	15 Apr 2016
45.	Motion to adjourn	Thaler	Blum	Unanimous	F	15 Apr 2016
46.	Motion to adjourn	??	??	Unanimous	F	20 May 2016
47.	Motion to adopt the meeting minutes for March and April.	Blum	Pacheco	Unanimous	F	17 Jun 2016
48.	Motion to advise the County Commissioners to seek reconveyance of the 92,525 acres of County Forest Board Transfer Lands (State Forest Lands) to Clallam County.	Cross	Kelly	1-14, Blum and Murray abstained	R	17 Jun 2016
49.	Motion to set meeting date to 8 Jul 2016	Kelly	Bekkevar	16-1	F	17 Jun 2016
50.	Motion to adjourn	Thaler	Kelly	Unanimous	F	17 Jun 2016
51.	Motion to adopt the meeting minutes	Pacheco	Byrnes		F	8 Jul 2016
52.	Motion to adjourn	Kelly	Reaume	Unanimous	F	8 Jul 2016
53.	Motion to adjourn	Leah		Unanimous	F	19 Aug 2016
54.	Motion to adopt Jun, Jul, Aug minutes	Pachecho	Byrnes	Unanimous	F	21 Oct 2016
55.	Motion to adopt for consideration the question re: Reconveyance: <i>Should the Board of County Commissioners seek the reconveyance of State Forest Lands (Clallam County State Forest Board Lands) managed by the Department of Natural Resources back to Clallam County to be managed by the County?</i>	Scott	Fleck	Passed	F/R	21 Oct 2016
56.	Motion to adopt for consideration the question: <i>Should Clallam County BOCC continue its current role with DNR management of Forest Board Transfer Lands, without any changes?</i>	Fleck	Beauvais	Passed	F/R	21 Oct 2016

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Clallam County Trust Lands Advisory Committee

Table of Motions/Actions

No.	Motion	Maker	Second	Vote F/Ag/Ab	Type	Date
57.	Motion to adopt for consideration the question: <i>Should the BOCC seek the ability to give DNR direction in all aspects of management of FBTL, to include silviculture and forest inventory, pursuant to the DNR HCP?</i>	Fleck	Beauvais	3 – 13	F/R	21 Oct 2016
58.	Motion to adopt for consideration the question: <i>Should BOCC seek to establish via MOU or other means a collaborative means of managing with the DNR its FBTL?</i>	Fleck	Beauvais	11-4	F/R	21 Oct 2016
59.	Motion to adopt for consideration the question: <i>Should the BOCC hire a staffer/consultant with forestry experience to act as a liaison with DNR in order to monitor, engage, respond, and question DNR management of its FBTL?</i>	Fleck	Beauvais	15-1	F/R	21 Oct 2016
60.	Motion to adopt for consideration the question: <i>Should the BOCC establish a representative advisory committee, with some level of staff support that would advise the BOCC regarding DNR's management of its FBTL?</i>	Fleck	Kelly	12-4	F/R	21 Oct 2016
61.	Motion to adopt for consideration the question: <i>Should the BOCC as a minimum seek from the DNR an accurate, updated, maintained, and detailed resource inventory of its FBTL to include all resources with annual updates?</i>	Fleck	Kelly	13-3	F/R	21 Oct 2016
62.	Motion to end meeting and allow each TLAC member to send their questions to Secretary by 8 Nov for compilation.	Cross	Paul	5-9-1	F	21 Oct 2016
63	Motion to end the meeting now and continue it on the 18th.	Kelly	Cross	Failed	O/F	21 Oct 2016

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Clallam County Trust Lands Advisory Committee

Table of Motions/Actions

No.	Motion	Maker	Second	Vote F/Ag/Ab	Type	Date
64	Motion to have the TLAC seek an extension from the BOCC until 31 Mar 2017	Kelly	Cross	8-8	O/F	21 Oct 2016
65.	Motion for the next meeting the following approach: Place on agenda for consideration/vote at the November meeting the first block of questions adopted by TLAC; Place on the agenda for consideration/vote at the November meeting, after review and editing by the Executive Committee, the other questions Fleck captured from discussions; and, Place on the agenda for consideration/vote at the December meeting those questions members bring forward in a similar format for submission at the November meeting.	Fleck	Beauvais	11-3	O/F	21 Oct 2016
66.	Motion to begin the next meeting at 9 a.m. , and another at the regular time.	Swanson	Lea	9-5-1	F	21 Oct 2016
67.	Motion to adjourn	Kelly	Byrnes	Unanimous	F	21 Oct 2016
68.	Motion to adopt Sep 2016 minutes	Pacheco	Beauvais	8-0-3	F	18 Nov 2016
69.	Motion to amend adopted minutes to correct misspelling of Thaler's name	Thaler	Scott	8-0-3	F	18 Nov 2016
70.	Proposed Recommendation: <i>Should the Board of County Commissioners seek the reconveyance of State Forest Lands (Clallam County State Forest Board Lands) managed by the Department of Natural Resources back to Clallam County to be managed by the County?</i>	Byrnes	Fleck	3-9-0	R	18 Nov 2016
71.	Proposed Recommendation: <i>Should Clallam County BOCC continue its current role with DNR management of Forest Board Transfer Lands, without any changes?</i>	Beauvais	Fleck	1-9-2	R	18 Nov 2016

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Clallam County Trust Lands Advisory Committee

Table of Motions/Actions

No.	Motion	Maker	Second	Vote F/Ag/Ab	Type	Date
72.	Proposed Recommendation: <i>Should BOCC seek to establish via MOU or other means a collaborative means of managing with the DNR its management of FBTL?</i>	Beauvais	Fleck	0-10-2	R	18 Nov 2016
73.	Proposed Recommendation: <i>Should the BOCC hire a staffer/consultant with forestry experience to act as a liaison with DNR in order to monitor, engage, respond, and question DNR management of FBTL?</i>	Pacheco	Beauvais	6-5-1	R	18 Nov 2016
74.	Proposed Recommendation: <i>Should the BOCC establish a representative advisory committee, with some level of staff support that would advise the BOCC regarding DNRs management of its FBTL?</i>	Fleck	Thaler	6-7-0	R	18 Nov 2016
75.	Proposed Recommendation: <i>Should the BOCC as a minimum seek from the DNR an accurate and updated, maintained detailed resource inventory of its FBTL to include all resources with annual updates?</i>	Fleck	Beauvais	12-0-1	R	18 Nov 2016
76.	Motion to adjourn	Beauvais	Pacheco	Unanimous	F	18 Nov 2016
77.	For consideration at the December meeting; <i>Should the Board of County Commissioners establish an advisory committee composed of representatives of all entities with an interest in Clallam County trust lands to advise both the public and the staffer/consultant regarding DNR's management of Clallam County trust lands?</i>	Beauvais	Bork	10-7-0	F/R	18 Nov 2016

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Clallam County Trust Lands Advisory Committee

Table of Motions/Actions

No.	Motion	Maker	Second	Vote F/Ag/Ab	Type	Date
78.	Motion to consider at the December meeting adding to the adopted recommendation regarding the hiring of a staff/consultant the following: <i>Should the BOCC add integrated resource management to the definition of forestry experience in employing a staff/consultant?</i>	Beauvais	Bork	16-1-0	F/R	18 Nov 2016
79.	Proposed Recommendation: <i>Should the Board of County Commissioners establish a means of coordinated, regular and meaningful outreach with the trust beneficiaries and the public regarding its Forest Board Transfer Lands?</i>	Blum	Fleck	15-1-1	R	18 Nov 2016
80.	Proposed Recommendation: <i>Should the BOCC seek a trust accounting/performance audit of the DNR's management of its FBTLs?</i>	Fleck	Cross	10-5-2	R	18 Nov 2016
81.	Proposed Recommendation combining Questions 4, 5 & 6: <i>Should the BOCC seek from the DNR ways to:</i> <i>a) increase revenues from recreational uses on its FBTLs;</i> <i>b) increase fees from road use, forest products, etc., on its FBTLs; and,</i> <i>c) secure reoccurring revenues from future established carbon sequestration markets on its FBTLs?</i>	Scott	Bork	10-6-1	R	18 Nov 2016
82.	Proposed Recommendation: <i>Should the BOCC seek from the federal government compensation for lost revenues associated with how the DNR's HCP applied to its FBTLs?</i>	Cross	Beauvais	2-15-0	R	18 Nov 2016
83.	Proposed Recommendation: <i>Should the BOCC seek that its FBTLs be sold and the proceeds be reinvested?</i>	Swanson	Reandeau	0-17-0	R	18 Nov 2016

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Clallam County Trust Lands Advisory Committee

Table of Motions/Actions

No.	Motion	Maker	Second	Vote F/Ag/Ab	Type	Date
84.	Motion to hold two meetings on Dec 16 th , one starting at 9 am and one at Noon, with another meeting scheduled for Dec 29 th .	Byrnes	Lea	16-1	F	18 Nov 2016
85.	Motion to adjourn.	Beauvais	Byrnes	Unanimous	F	18 Nov 2016
86.	Proposed Recommendation: <i>Should the BOCC seek from the DNR ways to:</i> <i>a) increase revenues from recreational uses on its FBTLs;</i> <i>b) increase fees from road use, forest products, etc., on its FBTLs;</i> <i>and,</i> <i>c) secure reoccurring revenues from future established carbon sequestration markets on its FBTLs?</i>	Scott	Bork	10-6-1	R	18 Nov 2016
87.	Motion to hold two meetings on 16 Dec at 9 a.m. as a special meeting; regular meeting at noon, on 16 Dec; with another meeting scheduled for Dec 29 th .	Byrnes	Lea	16-1	F	18 Nov 2016
88.	Motion to adjourn	Beauvais	Byrnes	Unanimous	F	18 Nov 2016
89.	Amendment to the Proposed Recommendation. Replace <i>(needs clarification/defining)</i> with <i>(similar to the Trust Land Advisory Committee)</i>	Beauvais	Fleck	9-4-3	R	16 Dec 2016
90.	Proposed Amended Recommendation: <i>Should the BOCC establish an advisory committee composed of representatives of all entities (similar to the Trust Lands Advisory Committee) and an at-large position with an interest in Clallam County trust lands, to advise both the public and the staffer/consultant regarding the DNR's management of Clallam County trust land?</i>	Fleck	Beauvais	5-10-1	R	16 Dec 2016

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Clallam County Trust Lands Advisory Committee

Table of Motions/Actions

No.	Motion	Maker	Second	Vote F/Ag/Ab	Type	Date
91.	Proposed Recommendation: <i>Should the BOCC add integrated resource management to the definition of forestry experience in employing a staff/consultant?</i>	Fleck	Beauvais	10-5-1	R	16 Dec 2016
92.	Motion to adopt the meeting minutes of the October 18 th meeting subject to correcting the typos found by Thaler, Reandeau and Beauvais.	Fleck	Beauvais	16-0-1	F	16 Dec 2016
93.	Motion to Adjourn			Unanimous	F	16 Dec 2016
94.	Motion to accept the draft letter as an outline with the edits and the changes noted above.	Grad	Beauvais	Unanimous	F	16 Dec 2016
95.	Motion to adjourn.	Scott	Sextro	Unanimous	F	16 Dec 2016
96.	Motion to permit Bell to submit his report for Bekkevar as a minority report.	Thaler	Byrnes	11-2-1	R/F	29 Dec 2016
97.	Motion to have the TLAC recess into a Committee of the Whole until 10:30 to permit members to review the submitted minority report.	Fleck	Beauvais	14-0-0	F	29 Dec 2016
98.	Motion that either the alternate or the original member be the only one signature for the minority report.	Reaume	Lea	14-0-0	R/F	29 Dec 2016
99.	Motion that the minority reports be included with the supporting materials provided being made an attachment to the entire report.	Cross	Beauvais	12-2-0	R/F	29 Dec 2016
100.	Motion that the offered minority report by Grad be removed from the report as it did not meet the bylaw requirement.	Cross	Swanson	12-1-1	R/F	29 Dec 2016
101.	Motion to adopt the meeting minutes from the meetings on 18 Nov 2016.	Beauvais	Scott	14-0-0	F	29 Dec 2016
102.	Motion to adopt the meeting minutes from both meetings on 16 Dec 2016.	Beauvais	Byrnes	14-0-0	F	29 Dec 2016
103.	Motion to adjourn	Beauvais	Swanson	13-1-0	F	29 Dec 2016

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TRUST LANDS ADVISORY COMMITTEE

Attachments submitted with Minority Reports

- 1. On Question No. 2 regarding maintain current relationship with DNR, Minority Report submitted by Sextro;**
 - a. Twice Told Timber Tales; and,**
 - b. Timber Arrearage – The Real Story.**

- 2. On Combined Questions No. 4, 5, 6 regarding new or additional revenues – Minority Report submitted by Sextro and joined by Bork;**
 - a. Carbon Storage & Accumulation;**
 - b. Carbon stocks on forestland of the United States;**
 - c. Estimates of preanthropogenic carbon storage in global ecosystem types;**
 - d. The forest sector carbon budget of the United States;**
 - e. Trees: The carbon storage experts;**
 - f. Old growth forests as global carbon sinks;**
 - g. Estimates of total carbon storage in various important reservoirs;**
 - h. An inventory of data, for reconstructing 'natural steady state' carbon storage in terrestrial ecosystems;**
 - i. U.S. forest carbon and climate change; and,**
 - j. Wood products and carbon storage.**

Attachment 1-a

Twice Told Timber Tales

Twice-told timber tales

| By Dale Wilson | 2016-12-08 | 2 Comments

m Business

The true story of the TLAC has not been reported by the local (Port Angeles) media, and what has been reported is incomplete, inaccurate or out of context, mostly in ways that favor the timber industry's point of view.

We thought you deserved better.

The TLAC was originally proposed by Green Crow Corp. and its allies as a means to force re conveyance of 92,525 acres of the county's forested trust lands. Re conveyance would have changed management of the trust lands from the state Department of Natural Resources to the county, which is more vulnerable to corporate influence. Mid way through the process, the timber industry suddenly, and for reasons we don't understand, backed off its push for re conveyance, and re conveyance was voted down by all but one TLAC member.

But other issues remain, and it's likely that a handful of local timber companies will gain considerably more influence over the management of this key public resource, with the goal of converting public assets into private profits.

Perhaps the most serious issue that is already in motion is a series of initiatives by the forest-products industry. Industry-funded scientists are writing position papers that argue for accelerated logging in order to sequester carbon in wood products. This industry science is refuted by independent science, but Big Timber has politicians lined up to support these initiatives, both Democrats and Republicans. If these initiatives are successful, taxpayers will be paying large subsidies to timber companies to make global warming worse.

But that's a battle in the making. For now, the TLAC process process is in its closing days. In the following story, we give our members a fuller look at the process, the main players and the motivations behind it.

Summary:

The county's TLAC is an outgrowth of a political lobbying campaign led by Green Crow Corp. and its allies. The goal of this campaign is to boost corporate profits by forcing the county to log its public forests more aggressively.

For years, Green Crow's public voice — Rod Fleck, the city attorney of Forks and a member of Green Crow's board of directors — has orchestrated a public-relations campaign that blames the state Department of Natural Resources (DNR) for not logging the county's timbered trust lands aggressively enough, causing a loss of jobs for the community and a loss of revenue for schools, hospitals, fire districts and other public institutions.

Fleck's accusations are not true, but they have been delivered repeatedly to various community groups and reported credulously by local media. In truth, the DNR logs our public forests on a 60-year rotation, meaning that forest

stands are harvested on average every 60 years. By law, the DNR is required to treat all generations equally, meaning it cannot over-harvest forests to benefit current beneficiaries at the expense of future generations. Nor can it undercut forests at the expense of current generations.

The real problem for Clallam County's economy is the export of raw logs. In 1990, under heavy lobbying pressure by timber corporations, Congress passed and George H.W. Bush signed the Forest Resources Conservation and Shortage Relief Act. That law, and subsequent refinements, gave private timber companies the exclusive right to export raw logs. Public timber lands — those that support schools and other public institutions — were denied that right.

And because foreign buyers typically pay 25-50 percent more for logs than domestic mills, Congress, by that one act, devalued our public timber lands, reduced jobs in timber communities, cut revenue for schools and greatly enriched the owners of private timber corporations.

Timber companies became richer. Timber communities became poorer.

According to the DNR's 2014 bi-annual mill survey, the latest survey available, more than 94 MMBF (million board feet) of raw logs were shipped out of Port Angeles Harbor to mills in China, Korea and Japan. Those exports represent the loss of hundreds of high-paying mill jobs that once supported workers in Clallam County.

Between 2001 and 2013, the Olympic Peninsula has lost 3,100 jobs to China alone, representing 1.13 percent of our total employment, according to a study by the Economic Policy Institute.

Meanwhile, timber companies have been given massive tax subsidies. Private timber companies operate under more lenient environmental regulations than public forests. They pay low taxes, both locally and federally. And legal timber entities, such as Timberland Investment Management Organizations (TIMOs), allow corporations to pay no taxes while passing on profits to investors that are capped at a 15 percent taxation rate. As a result, investments in private timberland are among the most profitable of any sector on Wall Street. Green Crow itself boasts of producing returns on investment approaching 20 percent a year. And yet our communities suffer. We're shipping profits to the wealthy one percent back East and jobs to China. What could go wrong?

Through the yearlong meetings of the TLAC, no evidence was presented — much less evaluated — to show that the DNR is improperly managing out trust lands for income, although the DNR acknowledged that it has been unsuccessful in preventing the decline of salmon and other wildlife devastated by industrial forestry.

The TLAC was over-represented by large timber corporations with a vested interest in gaining increased access to county timber lands. Green Crow initiated the TLAC process, wrote the county resolution establishing the TLAC, drafted the membership, wrote the work plan and seized control of all officer positions. Nothing went on in the TLAC that wasn't under the direct control of Big Timber.

Community members on the committee were improperly denied the right to look at the DNR's environmental management or to discuss the export issue. Members representing corporate timber interests refused to sign conflict-of-interest forms.

There is no evidentiary record to support any of the TLAC recommendations to the county. And the recommendations to create a forester position and/or a permanent timber advisory committee are clearly designed to give a handful of timber corporations increased control over county government, a government that is already controlled by two timber executives: retired Rayonier manager Bill Peach and incoming commissioner Randy Johnson, who is the current chairman of Green Crow. Johnson was president of Green Crow when it began its covert initiative to create the TLAC.

Corporate timber interests have too much control over our community. And they are enjoying record profits, while timber communities suffer. They have public officials on their payroll. They control powerful community institutions, public and private, such as the Port of Port Angeles, the Clallam Co. Economic Development Corp., the Port Angeles Business Association and others.

The TLAC consumed much time and public resources, but those efforts were not designed to benefit the community.

In the Beginning: Smoke and Mirrors

Private timber companies log on a 40-year rotation. The DNR logs public lands on a 60-year rotation. So as private companies over-harvested their plantations for quick profits, they looked around for a way to gain greater access to public trees, which are two to three times larger than trees on private plantations and far more valuable.

There was another problem, too. Because foreign buyers pay much more for raw logs than domestic mills, the supply of logs to local mills was drying up. In early 2015, Green Crow had half ownership in a Port Angeles sawmill, and that mill was going bankrupt for lack of logs, even while Green Crow exported millions of board feet of raw logs to China.

Green Crow needed more logs of public lands, but the DNR already was cutting at the maximum rate under the law. What to do? Green Crow's solution was to blame arrearage, which is the total of scheduled timber sales that, for one reason or another, did not get harvested during the scheduled harvest period. That charge is misleading — and hypocritical on the part of Green Crow — as the next section will describe. But Rod Fleck, the city attorney of Forks and a Green Crow director, aggressively led the charge to gain access to county trust lands by blaming arrearage for the loss of local timber income and jobs. He was joined by a number of other Green Crow officers and allies, including Harry Bell, a freshly retired Green Crow officer still active in lobbying for the company, Jim McEntire, then a county commissioner, Phil Kitchel, a former county commissioner active in lobbying for the timber industry, and a number of others, including officers of the North Olympic Timber Action Committee (NOTAC). NOTAC is chartered as a community-service organization, but it principally acts as a lobbying group for Green Crow and other corporate timber interests in Clallam County.

The executive director of NOTAC is Carol Johnson, wife of then Green Crow President Randy Johnson. The president of NOTAC is Harry Bell, a long-time Green Crow executive. The vice president is Glenn Wiggins, a forester and former mayor of Port Angeles.

Green Crow's plan to gain access to public trees involved reinvigorating the old notion of reconveyance, an initiative that was tried and failed in the 1990s. The DNR manages 92,525 acres of forested trust land for Clallam County. Reconveyance would allow the county to take back management of those forest stands and manage timber operations on its own. Because timber companies have such outsized power over local governments and community organizations, the timber industry would be in good shape to manage or control timber sales for the county — and itself. Merely by switching from a 60- to a 40-year rotation, a windfall of logging would be in the offing, something the timber industry pressed for in the '90s. Short-term profits would rise sharply with a switch to shortened rotations, although long-term profits for future generations would fall even more sharply. And there would be more logs available — in the short term — for local mills because public logs cannot be exported.

It was an impressive plan. But the timber industry needed to cover its tracks.

In 2015, the Charter Review Commission (CRC) was in full swing. It was populated by a number of conservative allies of the timber industry, including Rod Fleck and Glenn Wiggins of NOTAC.

Unknown to CRC Chair Norma Turner, a subcommittee of the CRC chaired by Glenn Wiggins drafted a proposal for reconveyance. Rod Fleck was the chief architect. Fleck worked closely with then County Commissioner Jim McEntire and Commissioner Bill Peach, a former Rayonier manager.

The plan had two working parts. First, the county would hire Phil Kitchel, a long-time proponent of reconveyance, to draft a report for the two pro-reconveyance commissioners. The report's recommendation, of course, was not in doubt. Kitchel was given a no-bid, sweetheart contract for \$10,000 to write the report, which basically consisted of web links to documents generated by the push for reconveyance in the '90s. Because Kitchel was McEntire's friend and neighbor, McEntire had to recuse himself from granting the contract to Kitchel. However, McEntire nominated another friend, Donnie Hall, a outspoken partisan for conservative causes, to vote in his stead as a commissioner pro tem. Peach signed off on the contract with Hall. Kitchel got the contract.

The second part of the plan was to get the county to form a Trust Lands Advisory Committee (TLAC) to recommend to the Board of County Commissioners (BOCC) whether it should seek reconveyance.

After extensive planning in Wiggins' and Fleck's subcommittee, Carol Johnson of NOTAC got the ball rolling by presenting a letter to the CRC from NOTAC, dated April 6, 2015. The letter said that NOTAC recommended reconveyance. Later that month, Harry Bell and Carol Johnson delivered 14 form letters to the CRC recommending reconveyance. These petitions, all delivered by NOTAC/Green Crow, were the basis for the claim that the public was demanding reconveyance.

Green Crow's allies on the CRC voted to send a letter to the BOCC recommending the formation of the TLAC. The BOCC, controlled by McEntire and Peach, readily agreed. Fleck drafted the resolution forming the TLAC, designed the membership of the TLAC and wrote the work plan for the TLAC.

The membership roster for the TLAC was so biased in favor of timber corporations that outraged DNR officials publicly objected, forcing the county to add a handful of more community-minded members.

In response to the DNR's demands, the BOCC directed the TLAC to add several new, non-industry members as its first order of business. But that didn't happen — not first, at least. Commissioner Peach immediately took control of the new committee, and rather than add new members as the first task, he instead directed the committee to elect officers from the existing membership, which the DNR had found so objectionable.

Toby Thaler, a committee member representing the Olympic Forest Coalition, an environmental group, made a motion to ensure that the leadership was representative of the full community, not just timber companies. Peach quashed that motion without legal justification. The committee then elected Joe Murray, a forester and public face of Merrill & Ring, as chairman. Bob Lea, a retired logging supervisor for Rayonier was elected vice chair. Rod Fleck was chosen as secretary, where he could keep the official minutes. Big Timber controlled the whole show.

A motion was made by public-interest members to require all committee members to sign conflict of interest forms. Timber-company representatives and their allies voted that motion down.

Fleck's work plan left only one meeting to discuss environmental issues. When a motion was made to have fisheries biologists explain the issues salmon face with industrial logging, Chairman Murray denied the motion on the ground that no environmental regulations would be changed by re conveyance. Several authorities proved Murray's assertion wrong, but his ruling stuck, nonetheless. And so it went, with the corporate timber lobby controlling discussion topics and agendas.

After Green Crow President Randy Johnson (now chair) announced his run for a seat on the BOCC, the timber groups suddenly and unexpectedly dropped their push for re conveyance. Instead, they angled to form lobbying groups within county government, by creating a forester position and/or a permanent timber advisory group based on the Port of Port Angeles' own Timber Advisory Committee (TAC), which is comprised entirely of timber company employees, officers and their allies. That TAC became the voice of the Port for the rest of the proceedings.

When the port's Environmental Director Jesse Waknitz released Port statistics showing the quantity of raw logs being shipped to Asia, data that the timber industry tried to block at every turn, he was quickly replaced as the Port's TLAC representative by Connie Beauvais, a Port commissioner and ally of timber interests. Her campaign manager was Bill Peach.

As the meetings progressed, it was clear that no evidence was going to be presented that would show the DNR was not managing the trust lands appropriately.

And, as the next section shows, Green Crow's arrearage argument was proved false.

Arrearage vs Exports: Myth and Subterfuge

The campaign to force re conveyance — or at least to pressure the DNR into cutting public trees on an accelerated basis — was driven by the DNR management practice called arrearage.

It's a complicated issue, but in principle, it's fairly simple. Here's how it works:

The DNR cuts public timber lands on a 60-year rotation, what they consider a sustained yield. Every 10 years, the DNR plans its sustained-yield calculation for the coming 10 years. The idea is to cut, on average, the same amount of timber each year. Because of a principle called inter-generational equity, the DNR is legally required to treat all generations of trust beneficiaries equally. The amount of timber that a forest can grow in one year, when trees are allowed to grow to 60 years old, is the target.

The actual calculations are complicated, because there are forest stands that cannot be legally cut, such as stands that shade salmon rivers or provide critical nesting habitat for listed species, such as the marbled murrelet. But in simple terms, the DNR cannot cut more than the sustained yield because it would be cutting into income for future generations. It cannot cut less because it would be shortchanging current generations.

But 10 years is a long time to plan. And the timber market is cyclical. Some years, the market collapses and sales cannot go through.

Timber planned for harvest in any 10-year period that doesn't get cut is called arrearage. If the 10-year plan calls for harvesting 30 MMBF (million board feet), and only 29 MMBF are cut, the arrearage is 1 MMBF. The arrearage not cut is passed into the next 10-year period, where the trees will be older and more valuable.

For the entire 10-year period that just ended, arrearage for Clallam Co. came to 92 MMBF — or 9.2 MMBF per year. (MMBF is a million board feet. One board foot is a board one foot square and one inch thick.) This arrearage is the number that Green Crow seized upon to claim that the DNR was undercutting our trust land forests. Fleck and other Green Crow allies, including Harry Bell, Jim McEntire and Phil Kitchel, roamed the community, claiming that the DNR was costing jobs and crippling our economy by not cutting 100 percent of the sustained yield goal.

But they didn't tell the story in context. The arrearage that Green Crow officials railed against is actually called "negative arrearage." Negative arrearage is passed into the next 10-year planning period where, if eligible under forestry rules, it boosts harvest levels. Arrearage passed out of one period as negative arrearage becomes positive arrearage in the next period.

Ideally, arrearage gives flexibility to the DNR to manage lands over long periods.

Here's the kicker. The DNR testified that in the 10-year planning period just ended, positive arrearage was slightly greater than negative arrearage. As a practical matter, net arrearage was a wash. Net arrearage did not reduce timber harvests.

So where did all those jobs go? Forks shut down its last mill in July, and when the Peninsula Daily News called Fleck to find out why, he launched an attack on arrearage. As usual, the paper identified Fleck as the city attorney for Forks, but did not mention that he is a sitting board member for Green Crow. Exports have been devastating for Forks, but a boon for Green Crow and other timber companies.

The real cause behind the closing of local mills is the export of raw logs to Asia, mostly China. Because export logs fetch a premium price over what domestic mills can pay, private timber companies like Green Crow, Rayonier and Merrill & Ring export as many logs as they can. You can see those logs piled up in massive rows on Port of Port Angeles land at the airport and harbor. Those logs used to be processed in local mills, where they supported local workers who made good wages. Now those logs support workers, mills and local economies in China.

Once again, timber communities suffer while timber companies make huge profits.

So remember that negative arrearage that Green Crow fumes about was 9.2 MMBF per year in Clallam Co., and net arrearage was basically zero. In 2014, by comparison, exports of raw logs through the Port of Port Angeles ran more than 94 MMBF.

Exports cost the local economy 94 MMBF in one year and net arrearage cost the local economy nothing.

Fleck blames arrearage because his client, Green Crow, benefits greatly by exports. Even with a mill in Port Angeles failing due a shortage of logs, Green Crow continued to export millions of board feet of logs to China. Forks has suffered greatly because of exports, and Fleck is the city's lawyer. Sadly, he is a lawyer with two clients, each with competing interests. He chose to represent the interests of Green Crow over that of the people of Forks.

The publisher, editors and reporters at the PDN were all given this information, but the paper continues to report the news from the point of view of Green Crow, not the community.

The Port Angeles Business Association, which has a long history of representing the timber industry's interests, approved a "white paper" written by Bell, McEntire and Kitchel, basically blaming arrearage for the community's economic problems.

By not recognizing the true problem of exports, local business and media institutions give people false information and hold the economy back, as you'll see in the next section.

Foothills Land Exchange of 2013: More jobs to China, less jobs for Clallam Co.

Under Randy Johnson's leadership, Green Crow initiated a land transfer with the DNR. It was called the Foothills Land Exchange, and it covered more than 14,000 thousand acres of commercial forest land.

Land transfers are common, and they are a major cause of arrearage. According to the DNR, almost a third of the most recent arrearage of a little more than 1 billion board feet of timber was caused by land transfers between the DNR and private timber companies.

The Foothills Land Exchange was one of them. The public was told that the transfer allowed the company and the DNR to consolidate their lands so they would be easier to manage. The public wasn't told about the cost of jobs and loss of school income.

In the exchange, both sides traded assets worth \$18 million. But the DNR gave Green Crow mostly stands of mature timber, while Green Crow gave the DNR mostly stumps and cutover land. Basically, the trade was trees for land.

The DNR trees were slated to go to local mills, with revenue going to schools and other public institutions. The DNR cannot export logs, so public logs go to domestic mills. But private companies have the Congressional gift of being able to sell their logs for higher prices via the export market. So logs destined for domestic mills were suddenly logs eligible to go to China, taking the associated mill jobs with them.

The trade hurt local mills and local schools, but benefited Green Crow. The trees became arrearage. And right after the land transfer, Green Crow begin its public campaign to vilify arrearage. The company could get away with this hypocrisy because almost no one in the public, outside the timber industry, knew what was going on.

Jobs: The declining importance of Big Timber to timber communities

Timber has long been a key — the key — component of the local economy; and its importance is not going away anytime soon. But it's contribution to the local economy is declining fast. Exports of raw logs mean jobs are heading overseas. Tax laws make timberland extremely attractive to wealthy investors, so they have purchased huge shares of our local forests and the profits that those forests generate. Jobs go west. Profits go east. Problems stay right here in Clallam County.

Local timber employment has been sharply cut for a number of reasons. Over-cutting of forests in the '70s, '80s and '90s created a shortage of timber today. Shortened rotations on private timber lands lead to smaller trees that can be harvested by large machines, such as feller bunchers, rather than loggers. Mills that survived have been automated, costing jobs. And exports have sent hundreds of high-paying Clallam County. jobs to Asia.

Those trends are not likely to change. The US Bureau of Labor projects that employment of all types is going to grow by about 7 percent over the next 10 years, while logging employment over that same period is expected to fall by 4 percent.

In the late '90s, when re conveyance was last looked at, the state Legislature spent freely on studies, and a key conclusion recommended that timber communities begin to diversify their economies because forestry will not be sufficient in the future to promote community-wide prosperity.

A better way: A carbon park

So what to do? It's not easy to diversify the economy in an age where the United States has sent millions of manufacturing jobs to low-wage, low-regulation foreign nations. Many of our once-great cities are depopulating. In Cleveland, 8.8 percent of residential homes are vacant. Thousands are being demolished each year because they are beyond repair. Since 1950, Cleveland's population has fallen 56.6 percent.

Pittsburgh's population over that period has fallen 54.8 percent. In Detroit, the population decline is 61.4 percent. In Gary, Ind., it's 55 percent. In St. Louis, it's 67.2 percent. In Youngstown, Ohio, it's 60.6 percent. Everyone needs jobs. Clallam County doesn't have a lot to offer.

Except its forests.

The conversion of Clallam County's trust lands to a carbon park has the potential to generate far more income than these stands currently produce as commercial timberland. If fully valued for their carbon-storing potential, we could double the income these forests produce for our schools, hospitals, fire districts and other public institutions, while offsetting lost timber jobs and diversifying our economy.

One of Clallam County's most valuable resources comes from 92,525 acres of state forest transfer lands. These forest stands were acquired mostly through tax foreclosures going back to the Great Depression.

The DNR manages these lands as commercial forests for the people of Clallam County. For the past 10 years, these transfer lands have generated an average of \$6 million a year for schools, hospitals, libraries, fire districts and other taxing districts.

These working forests also provide employment for loggers, truck drivers and mill workers. It's not possible to estimate the exact amount of employment associated with these trusts lands, but it's probably about 252 direct jobs, using a job multiplier of 6.5 jobs per million board feet of harvested timber. The average annual harvest over the past 10 years has been 38.4 million board feet of timber.

However, over-cutting in the '70s, '80s and '90s, mechanization in the woods, modernization of mills and the export of raw logs to Asia have steadily cut into the number of workers that local forests — public and private combined — can support.

Employment is likely to fall further in coming years. The US Bureau of Labor projects that employment in all occupations will increase 7 percent by 2024. But during that period, logging employment is expected to decline by 4 percent.

In recent decades, Congress has given multiple subsidies to timber companies in the form of low taxes, reduced regulations and direct subsidies. In 1990, private timber companies were given the right to sell raw logs to mills in foreign nations, mostly Japan, Korea and China. Congress denied those same export rights to public timberlands.

Because export markets typically pay 25 to 50 percent more for raw logs than domestic mills can pay, private timberlands have been able to make much higher profits than public timber lands.

These Congressional subsidies to timber companies, especially the export subsidies available only to private investors and corporations, have come at a continuing cost to timber communities in the form of lost jobs and reduced economic health. In 2014, the last year of the DNR's biannual mill survey, more than 94 million board feet of raw logs from private timberlands were shipped out of the Port of Port Angeles, representing the loss of hundreds of local mill jobs.

As a result of these market pressures, investments in commercial timber lands over the past three decades have earned 50 percent higher annual returns than the typical stock on the Standard & Poor's 500 index of large corporations.

But while private timber companies have thrived with record profits, timber communities have steadily lost jobs, income and economic vitality. At the same time, aggressive timber harvests to support Asian economies have cut into jobs in tourism and recreation, while putting salmon and other important wildlife at increasing risk of extirpation or extinction. All of these trends are likely to continue.

There is a better way.

The recent Paris climate accords, agreed to by virtually every nation on earth, set in motion plans to sharply reduce carbon dioxide emissions that are destabilizing the global climate, acidifying oceans, spreading droughts, sparking forest fires, raising sea levels, destroying crops, increasing storms and putting the survival of most species of higher life — including people — at risk.

The science backing the Paris accords acknowledges that reducing carbon dioxide emissions will not be enough. The United States and the world's governments have agreed that all nations — including developed nations — must also begin to set aside forests to absorb excess levels of carbon dioxide from the atmosphere.

These concerns open the path for Clallam County to redeploy our forests for a higher good — and a more profitable purpose — as carbon sinks. Acre for acre, no ecosystem on earth comes close to the carbon-storing potential of the giant conifer ecosystem that runs along the Pacific Coast from northern California to southern Alaska. Our forests, when fully mature, can store more than 1,000 tons of carbon per hectare (2.5 acres) — at least twice as much as any other ecosystem on earth.

The election of Donald Trump and Randy Johnson make it unlikely that the federal government will follow through on its treaty obligations. President-elect Trump has promised to scrap the Paris accords, and he is putting climate skeptics in key positions of government. So Clallam County has probably lost its chance to create a carbon park for at least four years, but it's an idea that should not be dropped. Carbon emissions have destabilized the climate, and we're going to need our forests to soak up excess carbon from the atmosphere. Soon, the government will be forced

to act, and we should be ready to act quickly because it is in our best interests — and the best interests of the world — that we do so.

Here's why.

The DNR's recent survey of Clallam County's 92,525 acres of transfer lands found 2.6 billion board feet of standing timber. Forest stands in this region with that much timber will store about 200,000 tons of carbon a year in trees, other plants and forest soils. That much carbon represents the removal of 734,000 tons of carbon dioxide from the atmosphere each year. And that amount of annual sequestration will increase for hundreds of years.

The current corporate market for carbon credits is immature, fragmented and inconsistent, but generally it pays about \$12 a ton for sequestered carbon dioxide. The corporate markets count only the value of standing timber available for harvest; they do not give credit for storage of carbon in other biomass or in forest soils. These corporate carbon markets are not likely to match the timber income Clallam County currently gets, but the new world markets called for by the Paris accords will likely change the game by offering higher prices and giving credit for all the carbon a forest sequesters, not just the carbon sequestered in standing timber.

Forest soils typically store as much carbon as all the aboveground biomass. And marketable timber represents only half of the above-ground stored carbon in forests.

When a forest stand is clear cut, there is a loss of carbon in the harvested timber, in the other above-ground biomass and in the forest soils. Research shows that soils degraded by clear cut logging lose massive amounts of carbon, and those losses continue for years after the harvest. According to recent studies in the Pacific Northwest, it takes 15 to 20 years before a replanted forest begins to store carbon on a net basis. The young trees can't store carbon fast enough to offset the continuing losses of carbon from the soil. And most private timber stands are cut on a 40-year rotation.

The US government has not yet established a program to use forests to sequester carbon dioxide from the atmosphere, but it has set a value for sequestered carbon dioxide at \$36 a ton. And it has agreed to use forests for that purpose, raising the potential for Clallam County to switch its public forests from timber income to carbon income.

If the federal government pays for the full carbon-sequestration potential of our forests — timber, soils and other biomass — Clallam County would earn more than \$26 million a year, which is a much greater return than the \$5.8 million we now receive.

We could double the income to our schools, hospitals, libraries, fire districts and other junior taxing districts, and still have nearly \$15 million to offset lost timber employment for 250 timber workers, using \$50,000 a year for a full-time timber job. Most current logging jobs pay about \$36,000 a year.

The carbon income would be steady, predictable and would rise each year as our forests mature and store more and more carbon. In addition, we'd diversify our economy and restore the health of our forests and wildlife. We'd have more clean and abundant water. Tourism and recreational jobs would increase.

If congress repealed the right of private timber companies to export our mill jobs to Asia, local employment would climb even higher.

The federal government, under the obligations that it took on in the Paris climate accords, is one likely source to pay the \$36 a ton for sequestered carbon — and it would get good value for that investment. In addition to the carbon income that forests would provide, independent studies show that with each ton of sequestered carbon dioxide, our country would gain hundreds of dollars in benefits from the environmental services that intact, mature forests provide. In other words, a carbon park is an excellent investment for our future.

Because Clallam County is in the middle of the most productive carbon-storing ecosystem on earth and because the federal government has already committed itself to this approach, we have a good chance of winning federal approval — if we pursue this opportunity.

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2 Comments



Ruth Conway

2016-12-09 at 3:28 PM

I'd like to see you follow up on this Dale. Make it a regular issue for several months. Most importantly, I think it would behoove the community to have the facts and data that support your story.

For instance, if you say that Green Crow is touting upwards of 20 percent ROI, tell/show us where you got that information. Did someone say that (a quote)? Or did you read it in a prospectus or other investor information pamphlet?

You could easily break down the main points of this excellent story into many related stories with all the evidence to back it up – an exposé.



 **Just An Observer**

2016-12-09 at 3:29 PM

Another hard truth from the POC. Thank you for all that research.

Clallam citizens have got to wake up and realize who the players are, and the very small handful that aim to profit at public expense. You continue to ruin your own family's quality of life by voting for corrupt soundrels, who think NOTHING of you and your family. Why is this so difficult to see?

Attachment 1-b

Timber Arrearage – The Real Story

Timber Arrearage The Real Story by John Woolley

| By admin ; 2016-10-04 v 5 Comments

m News



What's up with all those logs at the airport and along the waterfront?

Don't blame the DNR's mismanaging of "arreage" — no matter what past and present timber execs say.

Giant log piles have become an enduring sight to anyone in Port Angeles who drives along Marine Drive past the harbor or along Edgewood Drive past the airport. Long, winding stacks of debarked logs dominate the landscape. You can't miss them. What you can miss is the loss of jobs associated with those log exports. Hundreds

of jobs. High paying jobs. Jobs being shipped to China, Korea and Japan.

Millions of board feet of logs are exported out of the Port Angeles Harbor every year. In 2014 alone, according to the Department of Natural Resources' Washington Mill Survey 2014 — the last year available for the biannual report — more than 94 MMBF (million board feet) of raw logs were exported from Port Angeles. One board foot represents a board one inch thick and one foot square. A typical logging truck carries about 4,500 board feet. Ninety-four million board feet of exported logs represent roughly 250 to 400 direct jobs, depending on the amount of processing done to them. Adding indirect jobs would push the total job loss much higher.

Statewide, more than 1.1 billion board feet or raw logs were exported in 2014.

Those exports have had a devastating effect on local jobs.

A Peninsula Daily News story published March 10 this year, documented the auctioning off of the equipment from the last mill on Clallam County's west end, the old Allen Logging Co. mill in Forks. The reporter quoted Forks City Attorney Rod Fleck as blaming the DNR's mismanaging of "arreage" for the closure. But the real cause was exports.

Arrearage is a false concept seized upon by Fleck, whom the reporter failed to identify as a board member of Green Crow Corp. Fleck and other timber company officers and agents blame arrearage as the cause of lost mill jobs.

Arrearage is a slippery and complex subject, which makes it good fodder for demagoguery. Basically, it works like this: Every ten years, the DNR sets a decade-long harvest goal for the state lands it manages. That decadal goal is never met for a number of reasons, such as a collapse in the timber market in any given year. Any planned harvests not cut during the 10-year planning period is called arrearage.

Arrearage — the trees not cut — are passed into the next 10-year planning period where they will be older and more valuable.

In the most recent 10-year planning period, arrearage in Clallam Co. averaged 9.2 MMBF a year. For the past few years, timber company representatives — including government officials either currently or previously employed by timber companies — have lambasted the DNR for creating arrearage. But it's a false concept for a couple of reasons. First, trees eligible to be cut and not cut in any 10-year period are just cut in the next 10-year period.

So each 10-year planning period benefits from arrearage passed on to it from the previous period and loses from the arrearage it passes on the the next planning period. Net arrearage is what to look for. Net arrearage balances out the gains and losses from arrearage arising from normal management of commercial forests.

In the planning period just passed, net arrearage was basically zero, meaning we gained as much as we lost from normal arrearage management. Going back to the Allen Mill, which processed 15 MMBF in 2014, arrearage didn't play a factor because net arrearage was zero. But exports played a huge role. Those 94 MMBF of raw log exports would have kept the Allen Mill and other closed mills buzzing had they not been shipped instead to mills in China, Korea and Japan.

Just a week ago, a cargo ship called the Astoria Bay docked in Port Angeles and took on 7 MMBF of raw logs from Merrill & Ring operations. Those logs are on their way to China where they will support jobs for workers there. Those logs in that one shipment would have been enough to keep the Allen Mill going for six months.

But the damage caused by exports doesn't end with lost employment in Clallam Co. The right to export raw logs is a subsidy given to private timber companies. Federal, state and municipal timber lands, as a rule, are not allowed to export raw logs because of the job losses that exports inflict on communities. But the timber industry aggressively lobbied Congress to give private timber companies alone the right to export raw logs. Exporting raw logs is a huge benefit to private timber companies because the export market pays much higher rates than domestic mills — often 25 to 50 percent more.

So Congress gave private timber companies the right to sell their logs at higher prices than what our schools, hospitals, fire districts and other public institutions can earn from selling their own raw logs.

Timber companies don't want the public to know that they receive this generous subsidy at the expense of our schools. They don't want the public to know that the exports off private timber lands are responsible for the loss of hundreds of high-paying local jobs.

Instead, they deflect the discussion to arrearage, which is why in 2015 Green Crow Corp. used the Charter Review Commission to create the Timber Lands Advisory Committee, which is designed to look at how the DNR manages trust lands in Clallam Co.

The original idea was to have Clallam Co. manage its own trust lands, a management shift called reconveyance that would give timber companies greater influence in how public forests are cut. After Randy Johnson, then president and now chair of Green Crow, announced his candidacy for county commissioner, Green Crow abruptly changed its tactics and urged the TLAC to vote against reconveyance.

One timber company official, Joe Murray of Merrill & Ring, then floated an alternative idea: get the county to sell its trust lands to private industry. If private timber companies can gain control of public forests, they will be able to shorten harvest rotations from the DNR's 60-year rotations to the private industry's 40- year rotations.

As private lands, the timber will be eligible for exports, making the timber more valuable but further reducing mill employment. In addition, shortening harvest rotations makes mechanized harvests more attractive, further cutting timber employment in the county.

If Randy Johnson wins election, he and former Rayonier executive and current county Commissioner Bill Peach will be in a position to push the timber industry's agenda at the expense of the community.

A better plan for Clallam County's trust lands would be to convert our commercial forests to long-rotation forestry, which would increase timber production on a per-year, per-acre basis, improve the quality of the wood produced, better protect the environment and increase employment.

But regardless of forest management, if we continue to export raw logs and jobs to China, Clallam County will suffer. Exports help private timber companies. Exports hurt timber communities. We will hurt our community even more if we continue to accept the revolving door practice of shifting officials between government service and timber company boardrooms.

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5 Comments

 ***I want a better PA***

2016-10-04 at 10:30 AM

Attachment 2-a

Carbon Storage & Accumulation

United States
Department of
Agriculture

Forest
Service

General
Technical
Report WO-59

Carbon Storage and Accumulation in United States Forest Ecosystems



United States
Department of
Agriculture

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Carbon Storage
and Accumulation
in United States
Forest Ecosystems

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August 1992

Acknowledgements

The author wishes to acknowledge the contributions of Karen Waddell of the Pacific Northwest Research Station, Syble Kincannon of the Washington Office of the Forest Service, and American Forest student intern Matthew Persons. Their help in retrieving and transforming data and preparing graphics was indispensable.

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Introduction

Historically, assessments of the forest resource situation have focused on timber supply, and the data used to support the assessments came from traditional forest inventories designed to provide reliable estimates of timber volume, growth, removals, and mortality (U.S. Department of Agriculture, Forest Service 1982). The most recent assessment included data and analysis of forest resources other than timber, including wildlife, range, water, recreation, and other resources associated with the Nation's forest lands (U.S. Department of Agriculture, Forest Service 1989). Future forest resource assessments will include expanded analyses of environmental issues such as the effects of acid deposition on forest health, the prospective effects of global warming on forests, and the impacts of prospective strategies to mitigate or adapt to changing environmental conditions.

A key issue analyzed in the 1989 Resources Planning Act (RPA) Assessment is the impact of climate change on America's forests (Joyce and others 1990). Another issue undergoing intense analysis at this time but not included in the 1989 RPA Assessment is the evaluation of forestry opportunities for mitigating the effects of global warming. Analysis of forestry opportunities requires knowledge of carbon storage and accumulation in forest ecosystems. It is the purpose of this publication to provide estimates of carbon storage and accumulation for U.S. forests. Because it takes years to design and conduct detailed inventories of U.S. forest lands, the only way to satisfy current, expanding information needs is to integrate the best available data from the national inventory sample with data from special studies of selected forest ecosystems.

Forests and the Global Carbon Cycle

Carbon dioxide in the atmosphere has been increasing steadily since at least 1958 (Keeling 1984). Predictions of future climate change as a consequence of increasing atmospheric carbon dioxide vary widely. Under a scenario of equivalent doubling of atmospheric carbon dioxide by the middle of the next century, most predictions show an increase in average global temperature of between 2 and 5 degrees centigrade and an increase in average global precipitation of between 7 and 15 percent (Schneider 1989). These prospective changes have generated interest in strategies to reduce emissions of carbon dioxide to the atmosphere, or to offset emissions by storing additional carbon in forests.

The total amount of carbon in the atmosphere has been estimated at 720 billion metric tons, the total amount of carbon in terrestrial biomass is about 560 billion metric tons, and the total amount of carbon in terrestrial soils is about 1,500 billion metric tons (Solomon and others 1985). Although oceans store a far greater amount of carbon than terrestrial ecosystems, our ability to manage terrestrial ecosystems is greater and likely to have a greater mitigation effect.

Forest ecosystems are capable of storing large quantities of carbon in solid wood and other organic matter. Forests may add to the pool of carbon dioxide in the atmosphere through burning of forest lands, deforestation, or decomposition of wood products and byproducts. Forests may also reduce the amount of carbon dioxide in the atmosphere through increases in biomass and organic matter accumulation. Young, growing forests take up carbon at high rates, while carbon uptake in mature forests is balanced by carbon release from decaying vegetation. The end use of timber harvested from forests is an important factor in evaluating the contributions of forestry to the global carbon cycle. If the end uses of forest products are in long-term durable goods such as furniture or timber bridges, the carbon is stored in those materials. If the end use is for paper products that are rapidly used and discarded to decay, then the carbon is released to the atmosphere. Carbon in waste from the manufacturing process and discarded wood products may be sequestered in landfills for long periods of time. When forest biomass is burned for energy it may be substituted for fossil fuels, which is an effective way to reduce the depletion of nonrenewable fossil carbon.

Because of the relation between forests and atmospheric carbon dioxide, there are opportunities to manage forests in ways that would result in storage of additional carbon and thus reduce atmospheric carbon dioxide. Major forestry opportunities include increasing forest area, increasing the productivity of existing forest lands, reducing forest burning and deforestation, increasing biomass production and utilization, planting trees in urban environments, and increasing use of wood in durable products.

Estimation Methods

Carbon storage was estimated separately for several forest ecosystem components: trees, soil, forest floor, and understory vegetation. The definitions of these components were broad enough to include all sources of organic carbon:

<u>Forest Component</u>	<u>Definition</u>
<i>Trees</i>	<i>All above- and below-ground portions of all live and dead trees, including the merchantable stem; limbs, tops, and cull sections; stump; foliage; bark and rootbark; and coarse tree roots (greater than 2 mm).</i>
<i>Soil</i>	<i>All organic carbon in mineral horizons to a depth of 1 meter, excluding coarse tree roots.</i>
<i>Forest floor</i>	<i>All dead organic matter above the mineral soil horizons, including litter, humus, and coarse woody debris.</i>
<i>Understory vegetation</i>	<i>All live vegetation except that defined as live trees.</i>

Carbon storage was estimated in a four-stage process corresponding to these four major forest ecosystem components. Separate estimates were generally made at the State level and for major forest types and plantation species in 8 geographic regions (fig. 1). The general approach was to estimate the volume of growing stock from forest inventories, to derive factors from biomass studies and other sources to convert the volume of growing stock to carbon, and to derive estimates for the other ecosystem components from models.

Several principal data sources were used to make estimates of carbon storage in forest trees. Statewide forest inventories, such as those conducted periodically by the USDA Forest Service, typically involve estimation of timber volume, growth, removals, mortality, and forest biomass for the purpose of analyzing current and prospective timber supplies. Data from these inventories were the basis for estimating carbon storage in forest trees. The data were supplemented by information from a special study to estimate the amount of carbon in tree roots and the conversion of volume to carbon (Koch 1989). Because regional forest inventories are based on a statistical sample designed to represent the broad range of forest conditions actually present, estimates of carbon storage in forest trees are representative of the true average values, subject to sampling errors, estimation errors, and errors in converting data from one reporting unit to another. Because of the complexity of making the estimates of tree carbon, the magnitude of the error has not been estimated, but it is likely quite small since the forest inventories used to derive the estimates have very small sampling errors over large areas.

Estimates of carbon storage in the soil, forest floor, and understory vegetation were developed through the use of models based on data from forest ecosystem studies. Although these studies include all of the key forest ecosystem components, they are valid only for the specific ecosystem studied. Uncertainty is introduced into the estimation process by assuming that the results of specific ecosystem studies are representative of regional or national averages without being part of a statistical sample that represents a large geographical area. Therefore, estimates of carbon storage in the soil, forest floor, and understory vegetation are subject to the following errors: bias from applying data from past studies that do not represent all forest conditions, modelling errors (imperfect assumptions), and errors in converting estimates from one reporting unit to another. No attempt has been made to estimate the magnitude of these errors.

Details of the modeling and estimation process for estimating carbon storage are presented in appendix 1.

Estimates of changes in carbon storage over time were limited to estimating carbon changes in live trees. One could assume that carbon changes in trees are correlated with changes in the whole forest ecosystem, since an increasing quantity of tree biomass is likely associated with an increase in soil and forest floor carbon because litter from trees is one of the main inputs of organic matter to the forest floor and soil (Raich and Nadelhoffer 1989; Vogt and others 1986). Carbon changes in live trees were estimated using the same procedures as in estimating carbon storage, but the starting

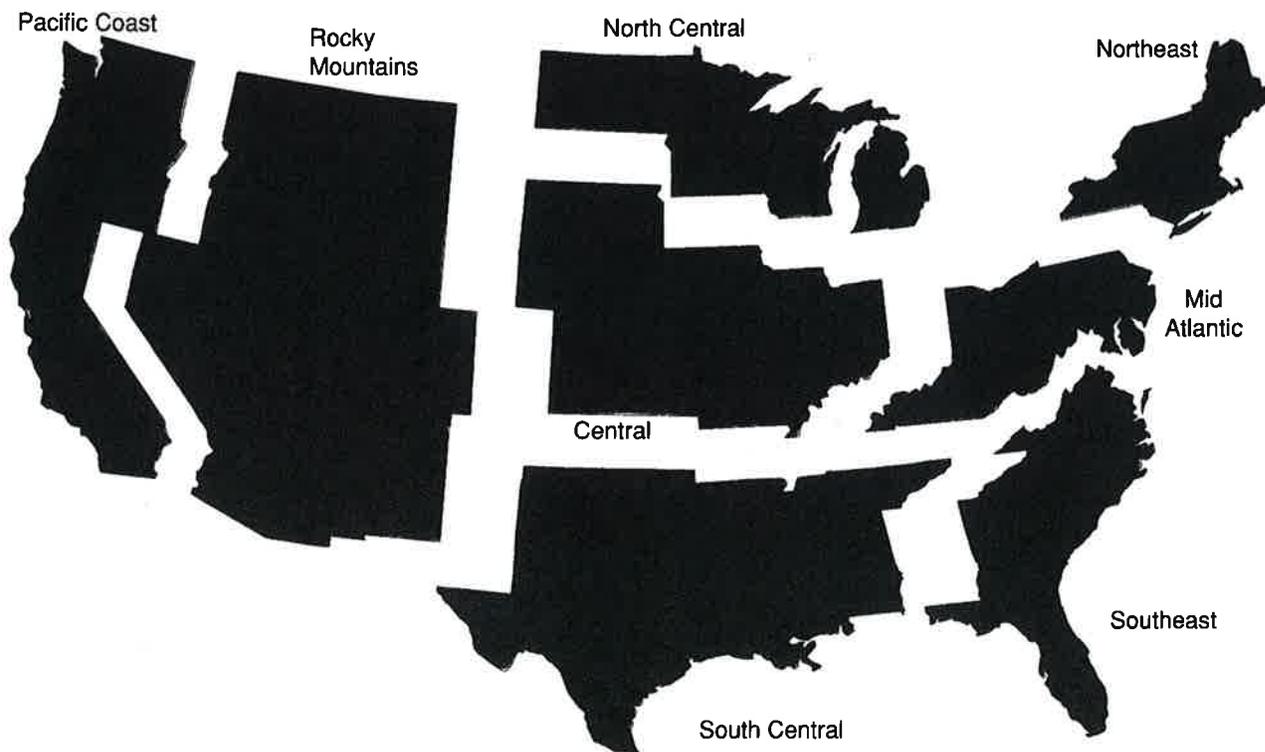


Figure 1—Broad geographical regions used to report estimated carbon storage.

estimates were volume growth, removals, and mortality rather than timber volume. The same conversion factors that were used to convert volume to carbon storage were used to convert volume growth, removals, and mortality to carbon accumulation, removals, and mortality.

Estimates of carbon storage and accumulation for reserved forest land and other forest land (all forest land except that classified as timberland) were made in order to include the entire forest land base of the United States. Forest inventories are less comprehensive for these lands, and volume, growth, removals, and mortality estimates are not routinely aggregated to regional or national totals. Carbon storage in trees on reserved timberland was assumed to equal the average carbon storage on unreserved timberland for each State. Carbon storage in trees on other forest land was based on inventory statistics reported in a variety of Resource Bulletins issued by Forest Service experiment stations, using the conversion process outlined in appendix 1. Estimates for carbon storage in other forest ecosystem components were made using the procedures outlined in appendix 1.

Carbon Storage and Accumulation in U.S. Forests

All of the estimates presented in this section were derived from the detailed tables presented in appendix 2. The tables in appendix 2 were prepared by the methods outlined in previous sections and in appendix 1.

Carbon Storage in the United States

Forest ecosystems in the United States contain approximately 57.8 billion tons (52.5 billion metric tons) of carbon above and below the ground. This is about 4 percent of all the carbon stored in the world's forests (Ajtay and others 1979). The area of U.S. forests is 731 million acres, or 5 percent of the world's forest area.

The average forest in the United States contains 158 thousand pounds per acre (17.7 kg/m²) of organic carbon. Trees, including tree roots, account for 31 percent of all forest ecosystem carbon (fig. 2). Live and standing dead trees contain 17.7 billion tons (16.1 billion metric tons) of carbon, or an average of 49 thousand pounds per acre (5.5 kg/m²). Of this total, 51 percent is in live tree sections classified as growing stock volume, 24 percent is in other live solid wood above the ground, 17 percent is in the roots, 6 percent is in standing dead trees, and 3 percent is in the foliage.

The largest proportion of carbon in the average U.S. forest is found in the soil, which contains 59 percent of the carbon in the forest ecosystem, or approximately 93 thousand pounds per acre (10.4 kg/m²). About 9 percent of all carbon is found in litter, humus, and coarse woody debris on the forest floor, and about 1 percent is found in the understory vegetation. By adding carbon in tree roots to the carbon in the soil, the average proportion of carbon below the ground in the United States is estimated to be 64 percent.

Carbon Storage by Region

The quantity of carbon varies considerably between regions, with Pacific Coast States containing 205 thousand pounds per acre (23.0 kg/m²) and South Central States containing 117 thousand pounds per acre (13.1 kg/m²) in the average forest (fig. 3). Of the total 57.8 billion tons (52.5 billion metric tons) of carbon in U.S. forests, 22.6 billion tons (20.5 billion metric tons), or 39 percent, is found in Pacific Coast forests, far more than in any other region (fig. 4). The Rocky Mountains and the Northeast each contain about 15 percent of U.S. forest carbon. The Southeast, South Central, and North Central regions each contain about 10 percent of U.S. forest carbon.

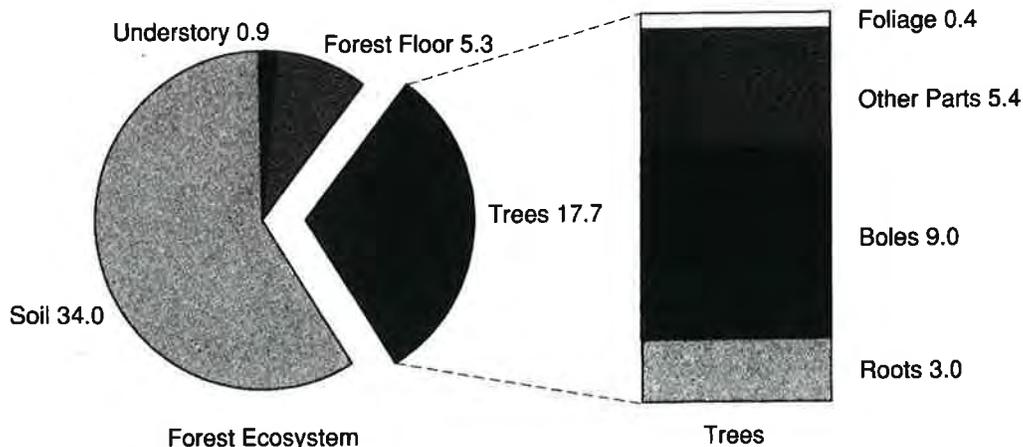


Figure 2—Carbon storage in U.S. forest ecosystems by forest ecosystem component (in billion tons). Total storage in the United States is 57.8 billion tons—about 4 percent of all the carbon stored in the world's forests.

Thousand pounds/acre

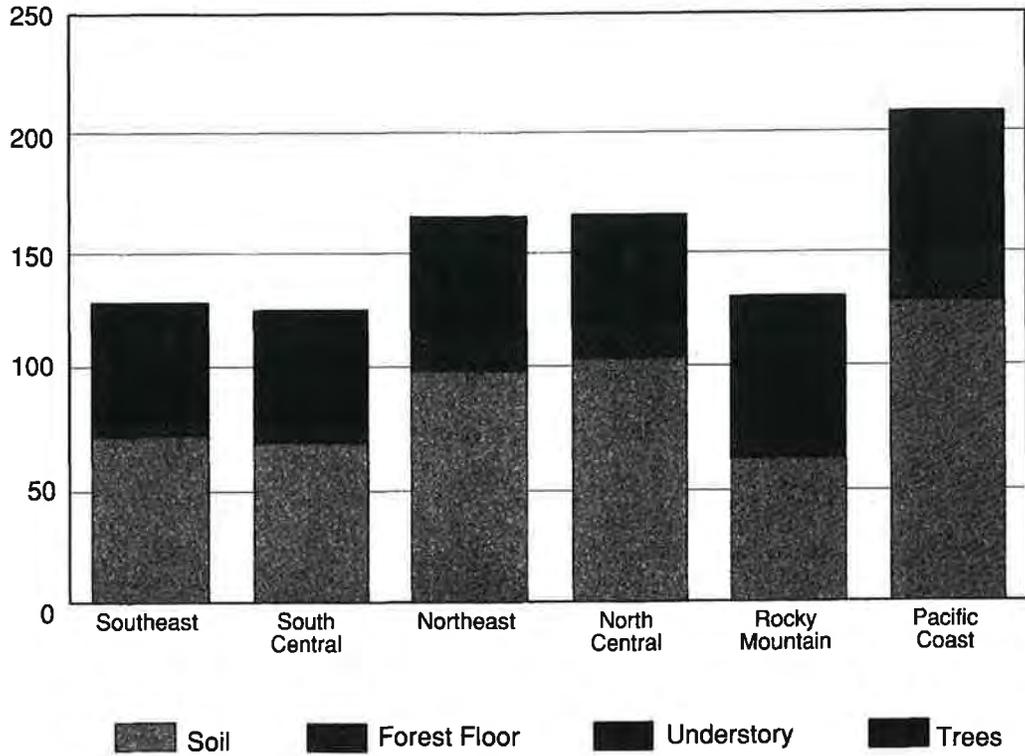


Figure 3—Average carbon storage in U.S. forest ecosystems by forest ecosystem component and region.

Region

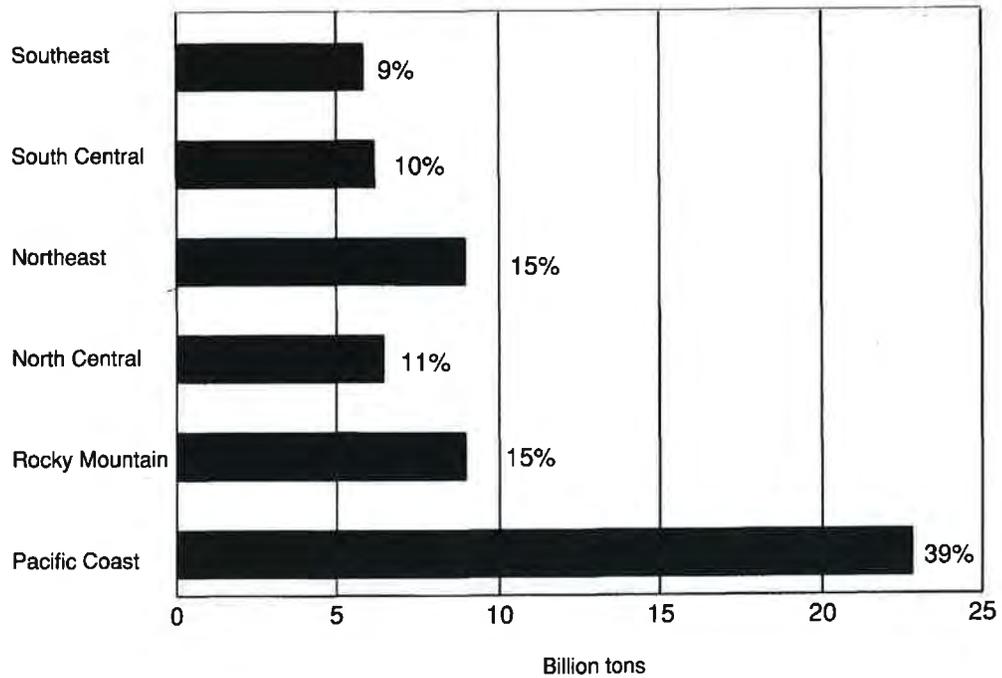


Figure 4—Total carbon storage in U.S. forest ecosystems by region. Total storage in the United States is 57.8 billion tons.

Pacific Coast States, including Alaska, contain the highest average carbon in forest soils, 64 percent of the total. The lowest proportion of soil carbon is found in the Rocky Mountain States, with 49 percent of the total. Soil carbon is closely related to temperature and precipitation, with higher amounts of soil carbon found in regions with cooler temperatures and higher precipitation. The cooler temperatures slow the oxidation of soil carbon, while higher rainfall tends to produce more vegetation and thus the fine roots and litter that are the main sources of organic soil carbon.

Carbon in the forest floor varies by region in a way similar to carbon in the soil. Western and Northern States contain the most carbon on the forest floor, and Southern States contain the least.

There is a clear pattern of increasing forest carbon from Southern to Northern States (fig. 5). The two main factors are climate and average age of the forests. The cooler, wetter climates favor higher retention of carbon on the forest floor and in the soil, and northern forests tend to be older and less frequently disturbed than forests in the South.

Carbon Storage by Forest Type

There are significant differences in carbon storage among forest types. For example, selected eastern softwood types show large differences in total carbon storage and the

relative storage by forest ecosystem component (fig. 6). Loblolly pine plantations are younger on average, so there is less carbon in the trees, and since they are mostly located in the South, the soil carbon is lower. Spruce - fir, common in the Northeast, has higher total carbon as a result of the large amount of carbon stored in the soil. Douglas - fir contains the highest average carbon because of the large quantity stored in the trees. Pinyon - juniper has the lowest amount of carbon because it occurs in dry climates that support lower vegetation densities.

Changes in Carbon Storage

U.S. forests are constantly changing. The total area of forest land declined by 4 million acres between 1977 and 1987 (Waddell and others 1989). Most of the loss was from forest clearing for urban and suburban development, highways, and other rights-of-way. Many more million acres were cleared for agricultural use, but this loss was roughly balanced by agricultural land that was planted with trees or allowed to revert naturally to forest. In addition to land-use changes, each year about 4 million acres of timberland are harvested for timber products and regenerated to forests, 4 million acres are damaged by wildfire, and 2.5 million acres are damaged by insects and diseases (estimates based on various unpublished Forest Service data sources). And of course, all forest lands change continually as trees and other vegetation germinate, grow, and die.

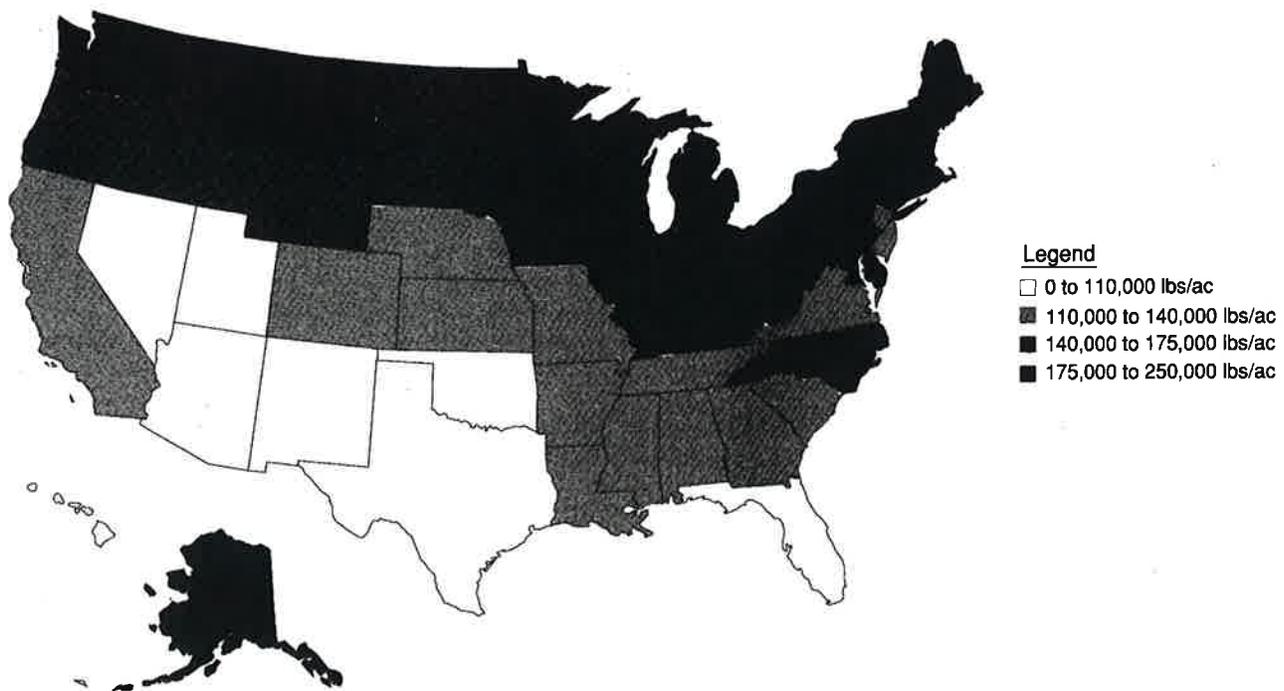


Figure 5—Average carbon storage per acre of forest land in the United States.

Forest type

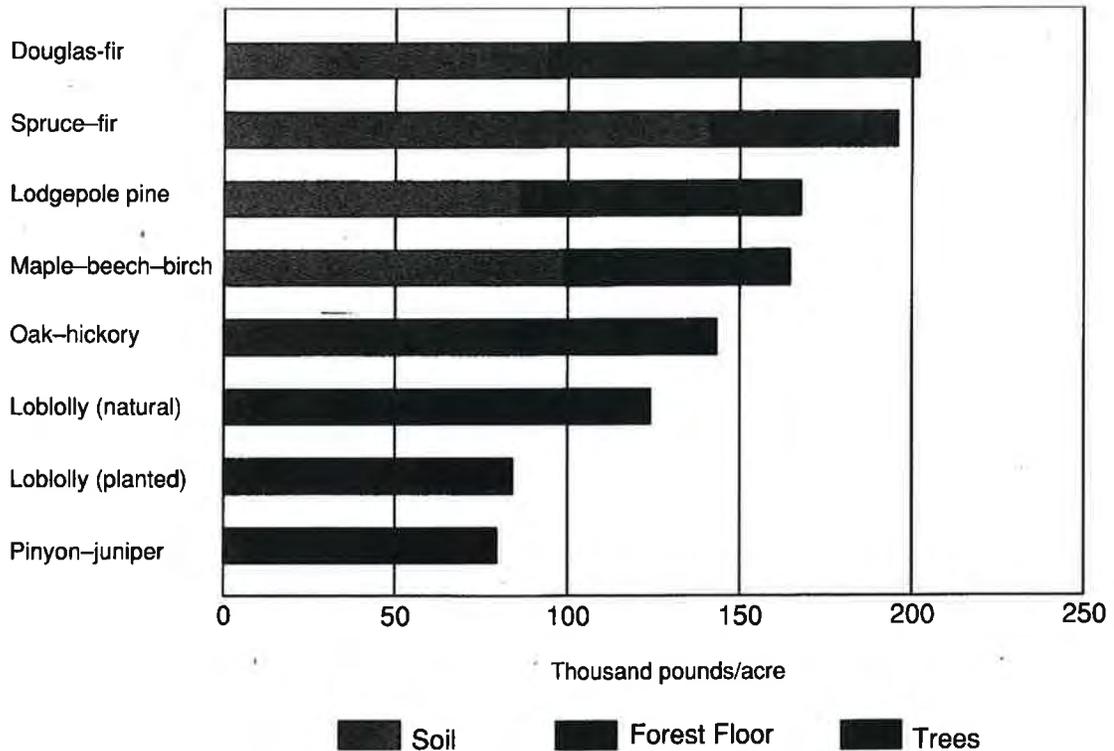


Figure 6—Average carbon storage in the soil, forest floor, and trees for selected forest types.

Changes in carbon storage in the forest ecosystem are primarily related to changes in carbon storage in live trees. The rate of accumulation of carbon in live trees is greatest in the forest areas where trees typically have the fastest volume growth, the Southeast and the Pacific Northwest (fig. 7). On average, live trees are accumulating carbon at a rate of 1,252 pounds per acre per year (0.14 kg/m²/yr), a rate of increase of 2.7 percent of the amount stored in live trees.

The accumulation of carbon in live and dead trees totals 508 million tons (461 million metric tons) per year, while the total removal of tree carbon from U.S. forests resulting from timber harvest, landclearing, and fuelwood use amounts to 391 million tons (355 million metric tons, fig. 8). A comparison of accumulation and removal suggests that U.S. forest trees are storing additional carbon at a rate of 117 million tons (106 million metric tons) per year. This is equivalent to about 9 percent of the annual U.S. emission of carbon to the atmosphere (1.2 billion metric tons) per year (Boden and others 1990).

Trees dying annually because of insects, diseases, fire, and weather contain about 83 million tons (75 million metric tons) of carbon. Only a portion of tree mortality was deducted

from accumulation in the comparison of accumulation and removal since much of the carbon remains in the forest ecosystem for some time as standing dead trees, coarse woody debris on the forest floor, and eventually other organic matter in the forest ecosystem.

There are significant regional differences in relative and total estimates of carbon accumulation, removal, and mortality. For softwoods, Pacific coast forests are accumulating the most carbon annually, followed by the Southeast, South Central, and Rocky Mountain regions (fig. 9). Because softwood removal is so low relative to growth in the Rocky Mountains, the increase in carbon storage in softwood species is much greater there than elsewhere. Mortality is the highest in the Rocky Mountains and on the Pacific coast. In the South Central region, tree removal is causing a net loss of carbon storage in softwood trees.

Most of the hardwood resource is located in the Eastern United States. The Northeast has the largest excess of hardwood carbon accumulation over removal, but there are also large increases in hardwood carbon storage occurring in the Southeast and on the Pacific coast (fig. 10).

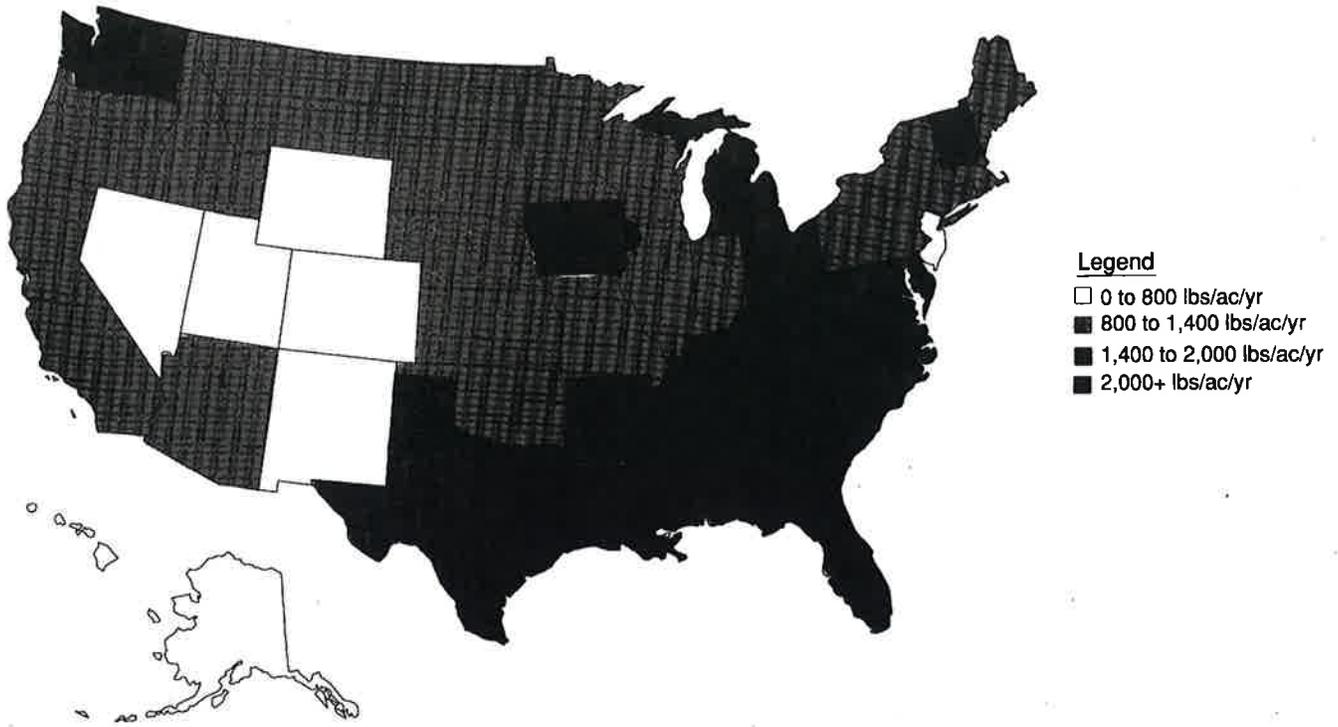


Figure 7—Average carbon accumulation in live trees on forest land in the United States.

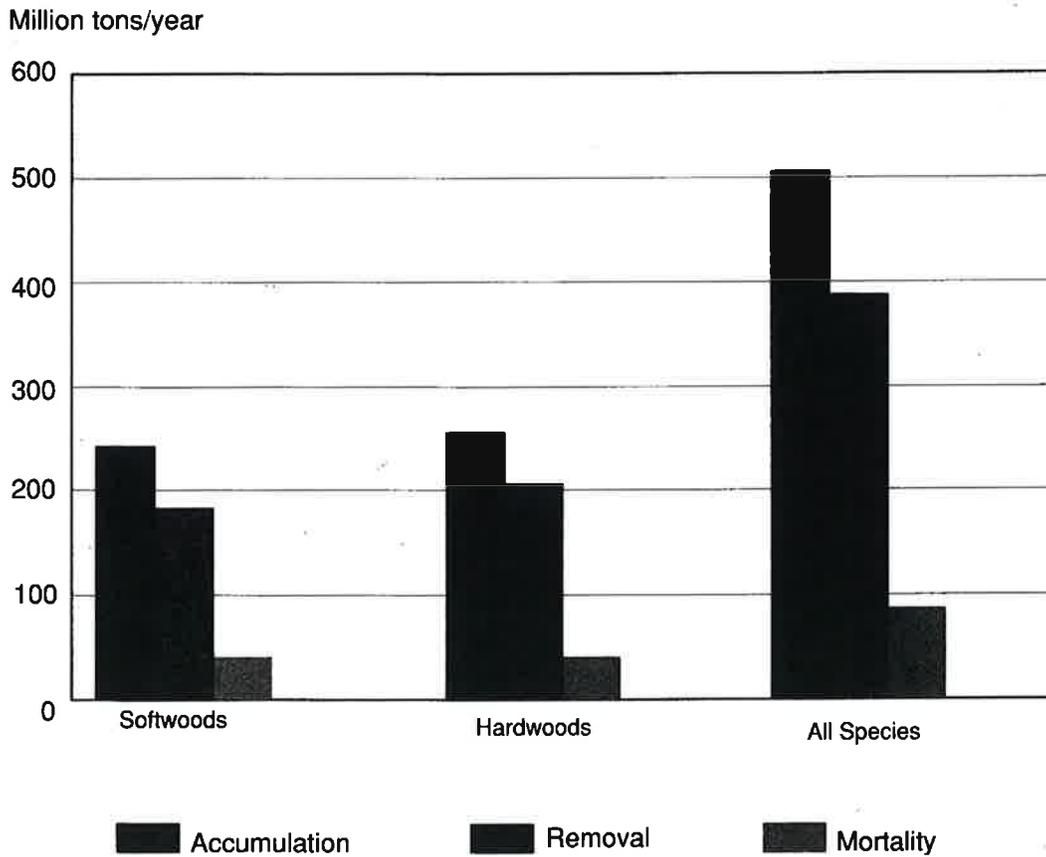


Figure 8—Annual changes in carbon storage in live trees on all forest land by softwoods and hardwoods.

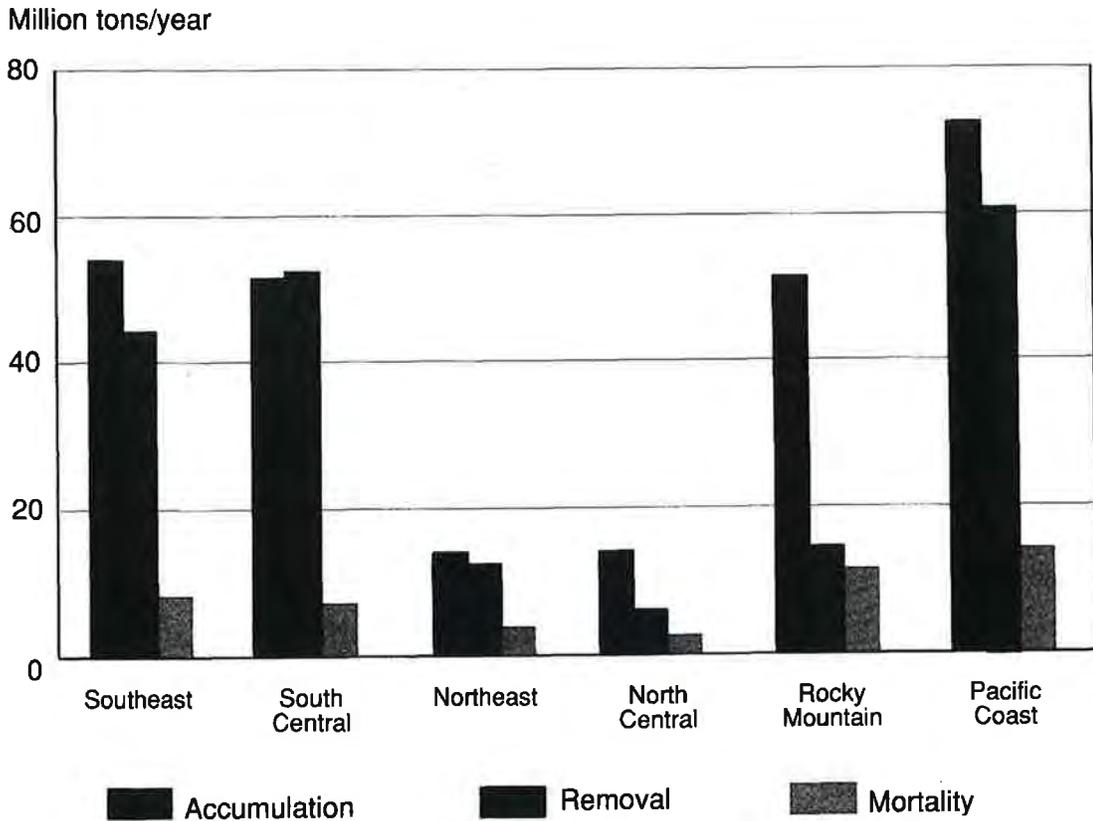


Figure 9—Annual changes in carbon storage in live softwood trees on all forest land by region.

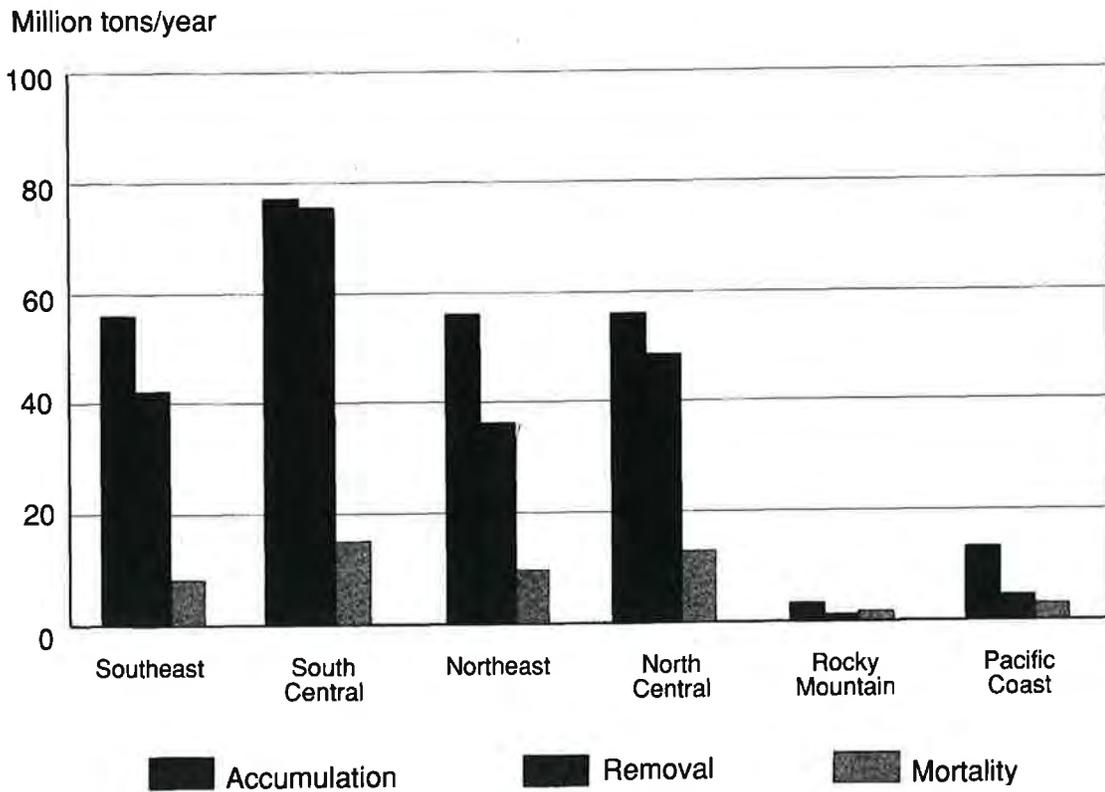


Figure 10—Annual changes in carbon storage in live hardwood trees on all forest land by region.

Glossary

Annual mortality—The volume of sound wood in trees that died from natural causes during a specific year.

Annual removals—The net volume of trees removed from the inventory during a specified year by harvesting, cultural operations such as timber stand improvement, or land clearing.

Cull tree—A live tree, 5.0 inches in diameter at breast height (d.b.h.) or larger, that is unmerchantable for saw logs now or prospectively because of rot, roughness, or species. (See definitions for rotten and rough trees.)

Forest land—Land at least 10 percent stocked by trees of any size, including land that formerly had such tree cover and that will be naturally or artificially regenerated. Forest land includes transition zones, such as areas between heavily forested and nonforested lands that are at least 10 percent stocked with forest trees and forest areas adjacent to urban and built-up lands. Also included are pinyon-juniper and chaparral areas in the West and afforested areas. The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas are classified as forest if less than 120 feet wide.

Forest type—A classification of forest land based on the species presently forming a plurality of the live-tree stocking.

Major eastern forest-type groups:

White-red-jack-pine—Forests in which eastern white pine, red pine, or jack pine, singly or in combination, make up a plurality of the stocking. Common associates include hemlock, aspen, birch, and maple.

Spruce-fir—Forests in which spruce or true firs, singly or in combination, make up a plurality of the stocking. Common associates include white-cedar, tamarack, maple, birch, and hemlock.

Longleaf-slash pine—Forests in which longleaf or slash pine, singly or in combination, make up a plurality of the stocking. Common associates include other southern pines, oak, and gum.

Loblolly-shortleaf pine—Forests in which loblolly pine, shortleaf pine, or southern yellow pines, except longleaf or slash pine, singly or in combination, make up a plurality of the stocking. Common associates include oak, hickory, and gum.

Oak-pine—Forests in which hardwoods (usually upland oaks) make up a plurality of the stocking, but in which pine or eastern redcedar makes up 25–50 percent of the stocking. Common associates include gum, hickory, and yellow-poplar.

Oak-hickory—Forests in which upland oaks or hickory, singly or in combination, make up a plurality of the stocking except where pines make up 25–50 percent, in which case the stand is classified as oak-pine. Common associates include yellow-poplar, elm, maple, and black walnut.

Oak-gum-cypress—Bottomland forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, make up a plurality of the stocking except where pines make up 25–50 percent, in which case the stand is classified as oak-pine. Common associates include cottonwood, willow, ash, elm, hackberry, and maple.

Elm-ash-cottonwood—Forests in which elm, ash, or cottonwood, singly or in combination, make up a plurality of the stocking. Common associates include willow, sycamore, beech, and maple.

Maple-beech-birch—Forests in which maple, beech, or yellow birch, singly or in combination, make up a plurality of the stocking. Common associates include hemlock, elm, basswood, and white pine.

Aspen-birch—Forests in which aspen, balsam poplar, paper birch, or gray birch, singly or in combination, make up a plurality of the stocking. Common associates include maple and balsam fir.

Major western forest-type groups:

Douglas-fir—Forests in which Douglas-fir makes up a plurality of the stocking. Common associates include western hemlock, western redcedar, the true firs, redwood, ponderosa pine, and larch.

Hemlock-Sitka spruce—Forests in which western hemlock or Sitka spruce, or both, make up a plurality of the stocking. Common associates include Douglas-fir, silver fir, and western redcedar.

Redwood—Forests in which redwood makes up a plurality of the stocking. Common associates include Douglas-fir, grand fir, and tanoak.

Ponderosa pine—Forests in which ponderosa pine makes up a plurality of the stocking. Common associates include Jeffrey pine, sugar pine, limber pine, Arizona pine, Apache pine, Chihuahua pine, Douglas-fir, incense-cedar, and white fir.

Western white pine—Forests in which western pine makes up a plurality of the stocking. Common associates include western redcedar, larch, white fir, Douglas-fir, lodgepole pine, and Engelmann spruce.

Lodgepole pine—forests in which lodgepole pine makes up a plurality of the stocking. Common associates include alpine fir, western white pine, Engelmann spruce, aspen, and larch.

Larch—Forests in which western larch makes up a plurality of the stocking. Common associates include Douglas-fir, grand fir, western redcedar, and western white pine.

Fir-spruce—Forests in which true firs, Engelmann spruce, or Colorado blue spruce, singly or in combination, make up a plurality of the stocking. Common associates include mountain hemlock and lodgepole pine.

Western hardwoods—Forests in which aspen, red alder, or other western hardwoods, singly or in combination, make up a plurality of the stocking.

Pinyon-juniper—Forests in which pinyon pine or juniper, or both, make up a plurality of the stocking.

Growing stock—A classification of timber inventory that includes live trees of commercial species meeting specified standards of quality or vigor. Cull trees are excluded. When associated with volume, includes only trees 5.0 inches d.b.h. and larger.

Hardwood—A dicotyledonous tree, usually broad-leaved and deciduous.

Industrial wood—All commercial roundwood products except fuelwood.

Net annual growth—The net increase in the volume of trees during a specified year. Components include the increment in net volume of trees at the beginning of the specific year surviving to its end, plus the net volume of trees reaching the minimum size class during the year, minus the volume of trees that died during the year, and minus the net volume of trees that became cull trees during the year.

Net volume in cubic feet—The gross volume in cubic feet less deductions for rot, roughness, and poor form. Volume is computed for the central stem from a 1-foot-high stump to the point where the diameter of the outside bark equals 4 inches, or to the point where the central stem breaks into limbs.

Nonstocked area—Timberland less than 10 percent stocked with growing stock trees.

Other forest land—Forest land other than timberland and reserved timberland. It includes available and reserved unproductive forest land that is incapable of producing annually 20 cubic feet per acre of industrial wood under natural conditions because of adverse site conditions such as sterile soils, dry climate, poor drainage, high elevation, steepness, or rockiness.

Other removals—Unutilized wood volume from cut or otherwise killed growing stock, from nongrowing stock

sources on timberland (for example, precommercial thinnings), or from timberland clearing. Does not include volume removed from inventory through reclassification of timberland to reserved timberland.

Other sources—Sources of roundwood products that are nongrowing stock. These include salvable dead trees, rough and rotten trees, trees of noncommercial species, trees less than 5.0 inches d.b.h., tops, and roundwood harvested from nonforest land (for example, fence rows).

Productivity class—A classification of forest land in terms of potential annual cubic-foot volume growth per acre at culmination of mean annual increment in fully stocked natural stands.

Reserved timberland—Forest land that would otherwise be classified as timberland except that it is withdrawn from timber utilization by statute or administrative regulation.

Rotten tree—A live tree of commercial species that does not contain a saw log now or prospectively primarily because of rot (that is, when rot accounts for more than 50 percent of the total cull volume).

Rough tree—(a) A live tree of commercial species that does not contain a saw log now or prospectively primarily because of roughness (that is, when sound cull due to such factors as poor form, splits, or cracks accounts for more than 50 percent of the total cull volume) or (b) a live tree of noncommercial species.

Softwood—A coniferous tree, usually evergreen, having needles or scalelike leaves.

Stocking—The degree of occupancy of lands by trees, measured by basal area or number of trees by size and spacing, or both, compared to a stocking standard; that is, the basal area or number of trees, or both, required to fully utilize the growth potential of the land.

Timberland—Forest land that is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. (Note: Areas qualifying as timberland are capable of producing in excess of 20 cubic feet per acre per year of industrial wood in natural stands. Currently inaccessible and inoperable areas are included.)

Unreserved forest land—Forest land that is not withdrawn from use by statute or administrative regulation.

Weight—The weight of wood and bark, oven-dry basis (approximately 12 percent moisture content).

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Appendix 1. Methods To Estimate Carbon Storage and Accumulation

Carbon Storage in Trees

Estimates of growing-stock volume in a forest area were converted to estimates of carbon storage in trees in a two-stage process. First, growing-stock volume was converted to total forest tree volume by multiplying by a ratio to account for the additional tree volume excluded from estimates of growing-stock volume: tops and branches, foliage, rough and rotten trees, small trees (less than 5.0 in. dbh), standing

dead trees, stump sections, roots, and bark (table 1.1). Separate ratios were computed for softwoods and hardwoods to account for differences in the average proportion of total volume to growing-stock volume. Ratios were derived from two principal sources: a new nationwide biomass study prepared by the USDA Forest Service containing the latest estimates of above-ground biomass by tree component (Cost and others 1990), and a special report prepared by Koch (1989) containing estimates of the proportion of tree volume that is below the ground. Separate ratios were derived for each of the regions to account for differences in tree form and to be consistent with the data used to estimate growing-stock volume. The validity of this method rests on the assumption that the ratio of total above-ground biomass to merchantable biomass (estimated in dry weight units) is equivalent to the ratio of total above-ground volume to growing-stock volume.

There is considerable variation in the ratios of total volume to growing-stock volume among regions and species groups (table 1.1). For the United States as a whole, the average ratio of total volume to growing-stock volume is 1.91 for softwoods and 2.44 for hardwoods.

The second step involved converting total tree volume in cubic feet to carbon in pounds. Separate factors were developed for major forest types, for softwoods and hardwoods within each forest type, and for broad geographical regions (table 1.2). The volume-to-carbon conversion factor was computed in two steps. First, volume in cubic feet was converted to biomass in dry pounds by multiplying the number of cubic feet times the mean specific gravity times the weight of a cubic foot of water (62.4 lbs.). A weighted mean specific gravity for softwoods or hardwoods was estimated from the relative frequency of the three predominant hardwood and softwood species in each forest type and region. The second step was to multiply the biomass in dry pounds by a factor to account for the average carbon content of the tree. Estimates of the carbon content of trees used in past studies have generally ranged from 45 to 50 percent (Houghton and others 1985); however, Koch (1989) found that, for the United States as a whole, the average percent carbon for softwoods was 52.1 and for hardwoods was 49.1, with some slight regional variations. The final factors used to convert volume to carbon ranged from 11.41 to 17.76 for softwoods, and from 11.76 to 19.82 for hardwoods (table 1.2).

Carbon Storage in the Soil

To estimate carbon storage in forest soils, a regression model was developed to relate soil carbon in relatively undisturbed, secondary forests to temperature and precipitation. The method was an extension of the model developed by Burke and others (1989) for soil organic carbon in cropland and pasture in the Central Plains grasslands and adjacent areas.

The data in Post and others (1982) were used to estimate regression coefficients for forest lands. They used published

sources of data to estimate mean soil carbon density for all of the life zone groups of the Holdridge life zone system (Holdridge 1967). To estimate regression coefficients for forest lands, the mean soil carbon densities were associated with the average precipitation and biotemperature for each of the life zone groups as read from the Holdridge life zone chart.

To apply the regression equations to the United States, temperature and precipitation averages for timberland and other forest land within each State were estimated from published weather records (Ruffner and Bair 1987). Separate estimates for timberland and other forest land allowed some sensitivity to the wide variation within some large States. For example, eastern Texas is largely covered with timberland and has a climate different from that of western Texas, where forests are primarily classified as other forest land. State-level estimates of temperature and precipitation were aggregated to the regional level by weighting the individual State estimates by the areas of timberland and other forest land (table 1.3).

For developing estimates of soil carbon for regional aggregates of forests with different age classes, it was necessary to make some assumptions about when forests reached the level of development represented in the data by Post and others (1982). It was assumed that these levels would be reached at age 50 in the South and at age 55 elsewhere. Then the average per-acre estimate of soil carbon for a State or a region was adjusted to reflect the actual age structure of the forests. This was accomplished by first determining the average age distribution by age classes, and then converting the distribution to percent and computing a weighting factor by comparing the age distribution with a model of soil carbon changes over time. On average, eastern forests are younger than the reference age of 50 or 55, and western forests are older than the reference age. The weighting factor was multiplied by the initial estimate of soil carbon for a State or region to obtain the final estimate used in the tables.

Carbon Storage on the Forest Floor

Estimates of the amount of carbon or organic matter on the forest floor are available for very broad forest classifications (Schlesinger 1977, Vogt and others 1986) and for very specific ecological types. These sources were used to estimate carbon in the forest floor for reference age classes. For State or regional carbon yields, the estimates of Vogt and others (1986) for broad forest ecosystems were applied to the broad forest types common in the area (table 1.4). These reference estimates were assumed to be representative of relatively undisturbed secondary forests.

As was done in estimating soil carbon, a weighting procedure was used to account for the general composition and relative age structure of the State or regional forests. First, area estimates were compiled for hardwood timberland, softwood timberland, reserved timberland, and other forest land for each State. Then the estimated carbon on the forest

floor from Vogt and others (1986) was used for timberland, and other sources were used for other forest land. Then a weighted average for all forest land was computed for each State. The weighted average was multiplied by a factor to account for the actual age distribution of forests within the State. The factor was derived in the same way as the age factor for soil carbon.

Carbon Storage in Understory Vegetation

The understory has such a small percentage of the total carbon stock in forests that it is often ignored or added to the trees in estimates of all live vegetation. Estimates of understory biomass are generally available only from published results of ecological studies of specific forest

ecosystems (e.g., Messina and others 1983, Ohmann 1984, Switzer and Nelson 1972, Turner and Long 1975).

It was assumed that there was no carbon in the understory at age 0, and that understory biomass peaked at age 5 for all regions and forest types. It was assumed that understory biomass declined to a reference level by age 50 in the South and age 55 elsewhere. Reference levels were defined as 2 percent of the carbon in the overstory, except for Douglas-fir and red pine, for which a value of 1 percent was used. The distribution of values by age class was compared with the actual age-class distributions of forest land by forest type to estimate a weighted average value for carbon in the understory vegetation in each State.

Table 1.1—Ratio of total volume¹ to merchantable volume²

Region	Above-ground ratio ³		Below-ground proportion ⁴		Ratio ⁵	
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Southeast	1.408	1.793	.163	.197	1.682	2.233
South Central	1.495	2.304	.163	.1971	.7862	.869
Northeast	1.820	1.808	.170	.155	2.193	2.140
Mid Atlantic	1.820	1.808	.170	.155	2.193	2.140
North Central	2.087	2.043	.170	.155	2.514	2.418
Central	2.159	2.240	.170	.155	2.601	2.651
Rocky Mountain	1.898	1.871	.158	.155	2.254	2.214
Pacific Coast	1.410	1.926	.158	.155	1.675	2.279

¹ Volume of all above- and below-ground tree biomass for all live and dead trees, including main stem, branches and twigs, foliage, bark, roots, and root bark.

² The gross volume of the central stem from a 1-foot stump to a minimum 4.0 inch top diameter outside bark, or to the point where the central stem breaks into limbs; less deductions for rot, roughness, or poor form; for live trees of commercial species at least 5.0 inches d.b.h., and meeting specified standards of quality.

³ The ratio of total above-ground tree biomass to merchantable tree biomass from Cost and others (1990) and other Forest Service reports.

⁴ The proportion of total above- and below-ground biomass below the ground (Koch 1989).

⁵ The ratio of total volume to merchantable volume = data column 1 or 2 adjusted for the below-ground proportion (e.g., col. 5 = col. 1 ÷ [1 - col. 3]).

Table 1.2—Factors to convert tree volume (cubic feet) to carbon (pounds)

Region	Forest type	Specific gravity ¹		Percent carbon ²		Factor ³	
		Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Southeast and South Central	Pines	.510	.639	.531	.497	16.90	19.82
	Oak–hickory	.536	.639	.531	.479	17.76	19.82
	Oak–pine	.523	.639	.531	.497	17.33	19.82
	Bottomland hardwoods	.460	.580	.531	.497	15.24	17.99
Northeast and Mid-Atlantic	Pines	.378	.543	.521	.498	12.29	16.87
	Spruce–fir	.369	.525	.521	.498	12.00	16.31
	Oak–hickory	.374	.636	.521	.498	12.16	19.76
	Maple–beech–birch	.384	.600	.521	.498	12.48	18.65
	Bottomland hardwoods	.460	.580	.521	.498	14.96	17.99
North Central and Central	Pines	.421	.530	.521	.498	13.69	16.47
	Spruce–fir	.351	.480	.521	.498	11.41	14.92
	Oak–hickory	.416	.632	.521	.498	13.52	19.64
	Maple–beech	.372	.576	.521	.498	12.09	17.90
	Aspen–birch	.370	.465	.521	.498	12.03	14.45
	Bottomland hardwoods	.460	.580	.521	.498	14.96	17.99
Rocky Mountain and Pacific Coast	Douglas-fir	.473	.380	.512	.496	15.11	11.76
	Ponderosa pine	.416	.380	.512	.496	13.29	11.76
	Fir–spruce	.349	.380	.512	.496	9.80	10.67
	Hemlock–Sitka sp.	.434	.433	.512	.496	12.17	12.16
	Lodgepole pine	.423	.380	.512	.496	11.86	10.67
	Larch	.508	.433	.512	.496	14.26	12.16
	Redwoods	.416	.580	.512	.496	11.68	16.29
	Hardwoods	.424	.384	.512	.496	11.90	10.77

¹ Weighted average specific gravity of the three most common (in terms of volume) softwood or hardwood species within the forest type.

² From Koch (1989).

³ Factor = specific gravity times the weight of a cubic foot of water (62.4 lbs) times percent carbon.

Table 1.3. *Estimates of organic soil carbon in relatively undisturbed secondary forests in the United States, by region¹*

Region	Soil carbon	
	(Kg/m ²)	(Lbs/ac)
Southeast	7.74	69,044
South Central	7.58	67,626
Northeast	16.21	144,703
Mid-Atlantic	11.56	103,173
North Central	13.09	116,791
Central	8.33	74,302
Rocky Mountain	8.02	71,571
Pacific Coast	9.77	87,191

¹ Data from Post and others (1982).

Table 1.4—*Estimates of organic matter and carbon on the forest floor¹ by region and forest type*

Region	Forest type	Organic matter ²	Carbon ³
		(Kg/ha)	(Lbs/ac)
Southeast	Pines	20,026	10,361
	Oak-pine	15,132	7,829
	Oak-hickory	10,237	5,296
	Bottomland hardwood	11,480	5,939
South Central	Pine	20,026	10,361
	Oak-pine	16,375	8,472
	Oak-hickory	12,723	6,582
	Bottomland hardwood	11,480	5,939
Northeast and Mid-Atlantic	Pines	44,574	23,061
	Spruce-fir	44,693	23,122
	Hardwoods	32,207	16,663
North Central and Central	Pines	44,574	23,061
	Spruce-fir	44,693	23,122
	Oak-hickory and bottomland hardwoods	23,282	12,045
	Maple-beech and Aspen-birch	32,207	16,663
Rocky Mountain and Pacific Coast	Douglas - fir, Redwoods, Larch, Ponderosa pine	44,574	23,061
	Fir-spruce	88,520	45,797
	Lodgepole pine	25,922	13,411
	Hemlock-Sitka spruce	27,490	14,222
	Hardwoods	32,207	16,663

¹ All dead organic matter above the mineral soil horizons, including litter, humus, and other woody debris (excludes standing dead trees).

² Most entries from Vogt and others (1986), based on summaries of ecological studies grouped by broad forest ecosystem (e.g., warm temperate deciduous).

³ Carbon (lbs/ac) = organic matter (kg/ha) x .58 (percent carbon) x .892.

Appendix 2. Basic Carbon Storage and Accumulation Tables

Table 2.1—Area of forest land in the United States by region, State, and forest land class, 1987

Table 2.2—Average storage of carbon in the United States by region, State, and forest ecosystem component, 1987

Table 2.3—Total storage of carbon in the United States by region, State, and forest ecosystem component, 1987

Table 2.4—Average and total storage of carbon in live trees in the United States by region and State, 1987

~~Table 2.5—Average and total storage of carbon in live trees on timberland in the Southeast, by forest type and productivity class, 1987~~

~~Table 2.6—Average and total storage of carbon in live trees on timberland in the South Central, by forest type and productivity class, 1987~~

~~Table 2.7—Average and total storage of carbon in live trees on timberland in the Northeast and Mid-Atlantic, by forest type and productivity class, 1987~~

~~Table 2.8—Average and total storage of carbon in live trees on timberland in the North Central and Central, by forest type and productivity class, 1987~~

~~Table 2.9—Average and total storage of carbon in live trees on timberland in the Rocky Mountains, by forest type and productivity class, 1987~~

Table 2.10—Average and total storage of carbon in live trees on timberland in the Pacific Coast, by forest type and productivity class, 1987

Table 2.11—Annual average and total accumulation of carbon in live trees in the United States by region and State, 1987

~~Table 2.12—Annual average and total accumulation of carbon in live trees on timberland in the Southeast, by forest type and productivity class, 1987~~

~~Table 2.13—Annual average and total accumulation of carbon in live trees on timberland in the South Central, by forest type and productivity class, 1987~~

~~Table 2.14—Annual average and total accumulation of carbon in live trees on timberland in the Northeast and Mid-Atlantic, by forest type and productivity class, 1987~~

~~Table 2.15—Annual average and total accumulation of carbon in live trees on timberland in the North Central and Central, by forest type and productivity class, 1987~~

~~Table 2.16—Annual average and total accumulation of carbon in live trees on timberland in the Rocky Mountains, by forest type and productivity class, 1987~~

Table 2.17—Annual average and total accumulation of carbon in live trees on timberland in the Pacific Coast, by forest type and productivity class, 1987

Table 2.1—Area of forest land in the United States by region, State, and forest land class, 1987, continued

Region and State	Forest land class			
	All forest land	Unreserved timberland	Reserved timberland	Other forest land
(1,000 acres)				
North Central and Central:				
Illinois	4,266	4,030	236	0
Indiana	4,439	4,296	143	0
Iowa	1,562	1,459	76	27
Kansas	1,358	1,207	23	128
Michigan	18,221	17,364	623	234
Minnesota	16,583	13,571	1,178	1,834
Missouri	12,523	11,996	224	303
Nebraska	722	536	23	163
North Dakota	460	337	0	123
South Dakota	1,690	1,447	22	221
Wisconsin	15,319	14,727	261	331
Total	77,143	70,970	2,809	3,364
Rocky Mountain:				
Arizona	19,384	3,789	1,090	14,505
Colorado	21,337	11,739	1,714	7,884
Idaho	21,818	14,533	3,051	4,234
Montana	21,910	14,736	1,396	5,778
Nevada	8,927	221	1	8,705
New Mexico	18,527	5,181	1,399	11,947
Utah	16,233	3,078	346	12,809
Wyoming	9,966	4,332	2,943	2,691
Total	138,102	57,609	11,940	68,553
Pacific Coast:				
Alaska	129,045	15,763	5,292	107,990
California	39,381	16,712	2,940	19,729
Hawaii	1,748	700	113	935
Oregon	28,057	22,084	1,777	4,196
Washington	21,857	16,848	2,765	2,244
Total	220,088	72,107	12,887	135,094
U.S. total	731,381	483,313	34,536	213,532

Table 2.2—Average storage of carbon in the United States by region, State, and forest ecosystem component, 1987, continued

Region and State	Forest ecosystem component				
	Total	Trees	Soil	Forest floor	Understory
	Lbs/ac				
North Central and Central:					
Illinois	158,103	55,978	89,088	11,645	1,391
Indiana	168,576	59,215	95,870	12,100	1,391
Iowa	152,392	50,835	88,442	11,724	1,391
Kansas	123,201	39,007	71,571	11,232	1,391
Michigan	179,724	46,107	115,262	17,238	1,117
Minnesota	178,618	37,470	123,825	16,206	1,117
Missouri	122,662	40,639	68,238	12,394	1,391
Nebraska	139,336	40,933	84,102	12,911	1,391
North Dakota	161,225	33,563	113,466	13,070	1,117
South Dakota	149,313	40,839	87,809	19,273	1,391
Wisconsin	165,950	41,327	106,537	16,695	1,391
Total	162,948	43,446	102,957	15,279	1,266
Rocky Mountain:					
Arizona	106,218	44,658	49,227	11,256	1,077
Colorado	124,993	44,405	62,536	16,975	1,077
Idaho	148,190	60,961	64,417	21,735	1,077
Montana	185,368	67,902	95,732	20,657	1,077
Nevada	83,099	42,658	32,608	6,755	1,077
New Mexico	90,610	30,643	45,790	13,100	1,077
Utah	107,586	38,459	58,225	9,824	1,077
Wyoming	150,012	47,034	81,892	20,009	1,077
Total	128,040	48,316	62,941	15,706	1,077
Pacific Coast:					
Alaska	238,185	39,075	171,994	23,682	3,434
California	127,372	55,672	53,224	15,042	3,434
Hawaii	96,733	8,066	75,253	9,980	3,434
Oregon	172,749	64,469	82,976	21,870	3,434
Washington	202,655	83,073	93,911	22,237	3,434
Total	205,363	49,405	130,871	21,653	3,434
U.S. total	158,225	48,667	92,811	14,456	2,291

Table 2.3—Total storage of carbon in the United States by region, State, and forest ecosystem component, 1987, continued

Region and State	Forest ecosystem component				
	Total	Trees	Soil	Forest floor	Understory
	1,000 metric tons				
North Central and Central:					
Illinois	305,933	108,319	172,388	22,533	2,692
Indiana	339,428	119,229	193,035	24,363	2,801
Iowa	107,972	36,017	62,662	8,307	986
Kansas	75,889	24,027	44,086	6,919	857
Michigan	1,485,400	381,070	952,627	142,471	9,232
Minnesota	1,343,553	281,845	931,406	121,900	8,402
Missouri	696,764	230,844	387,616	70,402	7,901
Nebraska	45,632	13,405	27,543	4,228	456
North Dakota	33,640	7,003	23,675	2,729	233
South Dakota	114,459	31,306	67,312	14,774	1,066
Wisconsin	1,153,116	287,162	740,282	116,007	9,665
Total	5,701,786	1,520,228	3,602,634	534,633	44,290
Rocky Mountain:					
Arizona	933,916	392,653	432,826	98,968	9,469
Colorado	1,209,722	429,764	605,245	164,289	10,424
Idaho	1,466,560	603,299	637,502	215,100	10,659
Montana	1,842,233	674,826	951,409	205,294	10,703
Nevada	336,485	172,733	132,039	27,353	4,361
New Mexico	761,463	257,516	384,808	110,089	9,051
Utah	792,172	283,184	428,722	72,336	7,930
Wyoming	678,131	212,619	370,192	90,451	4,869
Total	8,020,682	3,026,594	3,942,744	983,879	67,466
Pacific Coast:					
Alaska	13,941,916	2,287,208	10,067,502	1,386,200	201,005
California	2,275,231	994,463	950,732	268,694	61,341
Hawaii	76,698	6,395	59,667	7,913	2,723
Oregon	2,198,481	820,460	1,055,990	278,328	43,703
Washington	2,009,159	823,603	931,049	220,462	34,045
Total	20,501,485	4,932,130	13,064,941	2,161,596	342,817
U.S. total	52,490,999	16,145,324	30,790,047	4,795,639	759,989

Table 2.4—Average and total storage of carbon in live trees in the United States by region and State, 1987, continued

Region and State	Average carbon storage in trees				Total carbon storage in trees			
	All forest land	Unreserved timberland	Reserved timberland	Other forest land	All forest land	Unreserved timberland	Reserved timberland	Other forest land
	Lbs/aC				1,000 metric tons			
North Central and Central:								
Illinois	54,243	54,243	54,243	38,764	104,961	99,154	5,807	0
Indiana	57,378	57,378	57,378	33,503	115,532	111,810	3,722	0
Iowa	49,258	49,429	49,429	39,581	34,900	32,711	1,704	485
Kansas	37,870	39,369	39,369	23,473	23,327	21,554	411	1,363
Michigan	44,462	44,589	44,589	34,710	367,474	351,189	12,600	3,684
Minnesota	36,168	36,883	36,883	30,418	272,051	227,039	19,708	25,305
Missouri	39,379	39,617	39,617	29,785	223,686	215,567	4,025	4,094
Nebraska	39,549	40,966	40,966	34,686	12,952	9,960	427	2,565
North Dakota	32,586	34,400	34,400	27,614	6,799	5,258	0	1,541
South Dakota	39,006	39,305	39,305	37,018	29,901	25,798	392	3,711
Wisconsin	39,929	40,155	40,155	29,702	277,451	268,238	4,754	4,459
Total	41,983	42,504	42,028	30,936	1,469,034	1,368,279	53,550	47,205
Rocky Mountain:								
Arizona	37,910	47,142	47,142	34,805	333,322	81,022	23,308	228,992
Colorado	37,695	40,344	40,344	33,176	364,825	214,818	31,365	118,641
Idaho	51,749	55,692	55,692	35,378	512,138	367,122	77,072	67,944
Montana	57,642	62,415	62,415	44,316	572,858	417,189	39,522	116,147
Nevada	36,212	42,472	42,472	36,053	146,632	4,258	19	142,355
New Mexico	26,013	31,491	31,491	22,996	218,604	74,005	19,983	124,616
Utah	32,648	36,893	36,893	31,513	240,394	51,509	5,790	183,095
Wyoming	39,927	41,262	41,262	36,320	180,492	81,078	55,081	44,333
Total	41,015	49,405	46,556	32,999	2,569,265	1,291,001	252,141	1,026,123
Pacific Coast:								
Alaska	36,968	61,891	61,891	32,109	2,163,868	442,517	148,563	1,572,788
California	52,670	65,141	65,141	40,247	940,835	493,794	86,869	360,172
Hawaii	7,793	16,756	16,756	0	6,179	5,320	859	0
Oregon	60,877	66,064	66,064	31,382	774,750	661,771	53,250	59,729
Washington	78,519	81,060	81,060	56,313	778,453	619,470	101,664	57,319
Total	46,720	67,963	66,925	33,454	4,664,085	2,222,873	391,205	2,050,008
U.S. total	45,720	50,727	54,065	33,039	15,167,738	11,120,744	846,949	3,200,045

Table 2.10—Average and total storage of carbon in live trees on timberland in the Pacific Coast, by forest type and productivity class, 1987

Forest type and productivity class	Area of timberland	Volume of growing stock		Volume of solid wood		Average carbon storage in trees	Total carbon storage in trees
		Softwood	Hardwood	Softwood	Hardwood		
	(1,000 ac)	(1,000,000 cu ft)		(1,000,000 cu ft)		(Lbs/ac)	(1,000 metric tons)
Douglas-fir							
85 +	13,723	51,448	3,449	80,224	6,367	93,705	583,285
50 to 85	3,632	14,073	431	21,964	817	93,933	154,751
20 to 50	1,938	5,189	111	8,116	212	64,501	56,701
Total	19,294	70,709	3,991	110,302	7,395	90,809	794,727
Ponderosa pine							
85 +	2,548	6,925	740	10,888	1,441	63,444	73,327
50 to 85	4,081	6,841	335	10,694	651	36,705	67,945
20 to 50	4,340	6,153	127	9,618	246	30,118	59,290
Total	10,968	19,920	1,201	31,201	2,336	40,314	200,561
Western white pine							
85 +	12	12	0	19	0	18,550	102
50 to 85	0	0	0	0	0	0	0
20 to 50	2	3	0	5	0	25,593	26
Total	14	15	0	23	0	20,088	128
Fir-spruce							
85 +	3,827	15,868	613	24,911	1,196	76,253	132,371
50 to 85	5,230	16,293	398	25,517	775	56,144	133,191
20 to 50	6,791	9,245	1,545	14,913	4,777	32,759	100,908
Total	15,850	41,406	2,556	65,341	6,748	50,973	366,471
Hemlock-Sitka spruce							
85 +	6,800	37,098	686	59,525	1,357	123,910	382,192
50 to 85	1,528	7,074	66	11,459	167	105,331	73,005
20 to 50	1,168	4,995	8	8,017	22	95,303	50,496
Total	9,497	49,165	761	78,997	1,549	117,391	505,692
Larch							
85 +	523	1,511	63	2,362	114	76,222	18,083
50 to 85	284	636	1	994	2	5,6873	7,327
20 to 50	45	74	0	115	0	41,341	846
Total	852	2,221	65	3,471	117	67,966	26,267
Lodgepole pine							
85 +	157	487	3	763	5	66,009	4,701
50 to 85	534	1,011	1	1,583	2	40,050	9,701
20 to 50	1,488	2,153	7	3,355	14	30,539	20,612
Total	2,179	3,651	11	5,701	21	35,426	35,015

Table 2.10—Average and total storage of carbon in live trees on timberland in the Pacific Coast, by forest type and productivity class, 1987, continued

Forest type and productivity class	Area of timberland	Volume of growing stock		Volume of solid wood		Average carbon storage in trees	Total carbon storage in trees
		Softwood	Hardwood	Softwood	Hardwood		
	(1,000 ac)	(1,000,000 cu ft)		(1,000,000 cu ft)		(Lbs/ac)	(1,000 metric tons)
Redwood							
85 +	1,064	5,740	686	9,032	1,339	135,403	65,351
50 to 85	37	52	18	82	35	46,284	780
20 to 50	0	0	0	0	0	0	0
Total	1,102	5,792	704	9,114	1,374	132,294	66,130
Other softwood types							
85+	176	59	91	92	250	23,985	1,916
50 to 85	104	32	25	50	47	11,944	565
20 to 50	211	83	19	135	60	12,008	1,151
Total	491	174	133	278	354	16,216	3,611
Western hardwood types							
85 +	5,329	4,994	9,820	7,815	18,484	61,042	147,551
50 to 85	978	441	1,181	693	2,415	38,899	17,258
20 to 50	4,738	772	2,988	1,248	9,245	26,733	57,454
Total	11,046	6,207	13,989	9,756	30,142	44,359	222,256
Non-stocked timberland							
85 +	508	88	83	137	152	7,200	1,659
50 to 85	143	26	0	41	0	3,850	250
20 to 50	164	14	0	22	0	1,802	134
Total	815	125	83	195	152	5,448	2,014
All timberland							
85 +	34,667	124,229	16,236	195,767	30,708	89,702	1,410,538
50 to 85	16,552	46,479	2,457	73,077	4,914	61,904	464,772
20 to 50	20,888	28,678	4,804	45,538	14,572	36,689	347,619
Total	72,107	199,386	23,496	314,381	50,191	67,963	2,222,873

Table 2.11—Annual average and total accumulation of carbon in live trees in the United States by region and State, 1987, continued

Region and State	Average carbon accumulation in trees				Total carbon accumulation in trees			
	All forest land	Unreserved timberland	Reserved timberland	Other forest land	All forest land	Unreserved timberland	Reserved timberland	Other forest land
	Lbs/ac/yr				1,000 metric tons/yr			
North Central and Central:								
Illinois	1,060	1,060	1,060	699	2,051	1,937	113	0
Indiana	1,379	1,379	1,379	838	2,777	2,688	89	0
Iowa	1,828	1,839	1,839	1,196	1,295	1,217	63	15
Kansas	1,026	1,082	1,082	489	632	592	11	28
Michigan	1,549	1,557	1,557	981	12,804	12,260	440	104
Minnesota	1,223	1,266	1,266	872	9,197	7,795	677	725
Missouri	1,279	1,290	1,290	860	7,267	7,018	131	118
Nebraska	913	966	966	730	299	235	10	54
North Dakota	882	967	967	650	184	148	0	36
South Dakota	968	972	972	938	742	638	10	94
Wisconsin	1,318	1,328	1,328	867	9,156	8,869	157	130
Total	1,326	1,348	1,336	855	46,404	43,397	1,702	1,305
Rocky Mountain:								
Arizona	847	909	909	826	7,446	1,562	449	5,434
Colorado	613	625	625	593	5,935	3,328	486	2,120
Idaho	1,112	1,244	1,244	561	11,002	8,203	1,722	1,077
Montana	1,151	1,284	1,284	781	11,443	8,584	813	2,046
Nevada	315	516	516	310	1,275	52	0	1,223
New Mexico	667	791	791	600	5,609	1,858	502	3,249
Utah	463	513	513	450	3,411	717	81	2,614
Wyoming	586	599	599	552	2,651	1,178	800	674
Total	779	975	896	593	48,772	25,482	4,853	18,436
Pacific Coast:								
Alaska	472	478	478	471	27,622	3,417	1,147	23,057
California	986	1,287	1,287	685	17,606	9,760	1,717	6,129
Hawaii	28	60	60	0	22	19	3	0
Oregon	1,357	1,494	1,494	580	17,272	14,965	1,204	1,103
Washington	2,193	2,313	2,313	1,146	21,739	17,673	2,900	1,166
Total	844	1,401	1,193	513	84,261	45,833	6,972	31,456
U.S. total	1,252	1,566	1,188	553	415,513	343,375	18,607	53,532

Table 2.17—Annual average and total accumulation of carbon in live trees on timberland in the Pacific Coast, by forest type and productivity class, 1987

Forest type and productivity class	Area of timberland	Net annual growth of growing stock		Net annual growth of solid wood		Average carbon accumulation in trees	Total carbon accumulation in trees
		Softwood	Hardwood	Softwood	Hardwood		
	(1,000 ac)	(1,000,000 cu ft/yr)		(1,000,000 cu ft/yr)		(Lbs/ac/yr)	(1,000 metric tons/yr)
Douglas-fir							
85 +	13,723	1,406,206	109,585	2,192,913	200,239	2,584	16,084
50 to 85	3,632	191,455	11,460	298,985	21,596	1,313	2,162
20 to 50	1,938	100,524	1,949	157,216	3,580	1,246	1,096
Total	19,294	1,698,185	122,994	2,649,115	225,415	2,210	19,342
Ponderosa pine							
85 +	2,548	171,859	13,406	270,226	26,053	1,530	1,768
50 to 85	4,081	130,327	6,852	204,007	13,307	703	1,301
20 to 50	4,340	120,434	2,499	188,277	4,804	590	1,161
Total	10,968	422,619	22,757	662,508	44,164	850	4,230
Western white pine							
85 +	12	622	0	970	0	963	5
50 to 85	0	0	0	0	0	0	0
20 to 50	2	8	0	13	0	68	0
Total	14	631	0	984	0	844	5
Fir-spruce							
85 +	3,827	228,324	275	358,691	515	1,047	1,817
50 to 85	5,230	229,853	592	360,079	1,113	770	1,827
20 to 50	6,791	122,460	17,298	196,818	56,828	422	1,299
Total	15,850	580,636	18,166	915,586	58,457	687	4,943
Hemlock-sitka spruce							
85 +	6,800	567,297	21,985	894,382	40,977	1,902	5,868
50 to 85	1,528	19,816	1,591	31,237	3,278	312	216
20 to 50	1,168	42,325	160	66,711	321	795	421
Total	9,497	629,383	23,736	992,240	44,576	1,510	6,504
Larch							
85 +	523	45,555	1,940	71,223	3,495	2,300	546
50 to 85	284	15,834	95	24,705	169	1,420	183
20 to 50	45	1,500	0	2,330	0	838	17
Total	852	62,889	2,035	98,258	3,665	1,929	746
Lodgepole pine							
85 +	157	11,892	345	18,640	614	1,648	117
50 to 85	534	24,877	27	38,935	48	985	239
20 to 50	1,488	37,962	2	59,164	4	537	362
Total	2,179	74,733	373	116,742	664	727	718

Table 2.17—Annual average and total accumulation of carbon in live trees on timberland in the Pacific Coast, by forest type and productivity class, 1987, continued

Forest type and productivity class	Area of timberland	Net annual growth of growing stock		Net annual growth of solid wood		Average carbon accumulation in trees	Total carbon accumulation in trees
		Softwood	Hardwood	Softwood	Hardwood		
	(1,000 ac)	(1,000,000 cu ft/yr)		(1,000,000 cu ft/yr)		(Lbs/ac/yr)	(1,000 metric tons/yr)
Redwood							
85 +	1,064	144,332	23,487	227,113	45,821	3,610	1,742
50 to 85	37	1,096	627	1,725	1,224	1,209	20
20 to 50	0	0	0	0	0	0	0
Total	1,102	145,428	24,114	228,837	47,045	3,526	1,763
Other softwood types							
85+	176	3,021	864	4,715	1,566	468	37
50 to 85	104	937	289	1,474	539	253	12
20 to 50	211	475	998	764	3,279	233	22
Total	491	4,433	2,152	6,954	5,386	322	72
Western hardwood types							
85 +	5,329	204,215	344,663	319,244	634,046	2,224	5,376
50 to 85	978	15,536	35,747	24,365	74,011	1,236	548
20 to 50	4,738	15,923	82,434	25,667	251,025	702	1,510
Total	11,046	235,673	462,840	369,275	959,073	1,484	7,433
Non-stocked timberland							
85 +	508	4,241	2,891	6,591	5,287	299	69
50 to 85	143	506	0	789	0	75	5
20 to 50	164	833	4	1,305	7	108	8
Total	815	5,143	2,895	8,000	5,294	210	78
All timberland							
85 +	34,667	2,787,511	519,439	4,364,621	958,610	2,126	33,429
50 to 85	16,552	629,999	57,282	985,929	115,289	868	6,514
20 to 50	20,888	441,082	105,345	696,130	319,850	622	5,895
Total	72,107	3,858,590	682,065	6,046,677	1,393,747	1,401	45,833

Attachment 2-b

Carbon stocks on forestland of the United States

Carbon stocks on forestland of the United States, with emphasis on USDA Forest Service ownership

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Abstract. The U.S. Department of Agriculture Forest Service (USFS) manages one-fifth of the area of forestland in the United States. The Forest Service Roadmap for responding to climate change identified assessing and managing carbon stocks and change as a major element of its plan. This study presents methods and results of estimating current forest carbon stocks and change in the United States for public and private owners, consistent with the official 2010 U.S. greenhouse gas inventory, but with improved data sources for three states. Results are presented by National Forest System region, a major organizational management unit within the Forest Service, and by individual national forest. USFS forestland in the United States is estimated to contain an average of 192 Mg C/ha (megagrams carbon per hectare) on 60.4 million ha, for a total of 11,604 Tg C (teragrams C) in the year 2005. Privately-owned forestland averages 150 Mg C/ha on 173.8 million ha, with forestland of other public owners averaging 169 Mg C/ha on 43.1 million ha. In terms of change, private and USFS ownerships each sequester about a net 150 Tg CO₂/yr, but an additional 92 Tg CO₂/yr is stored in products from private harvests compared to about 3 Tg CO₂/yr from harvest on USFS land. Emissions from other disturbances such as fires, as well as corresponding area estimates of disturbance are also important, but the needed datasets are not yet available. Recommendations are given for improving the estimates.

Key words: carbon density; carbon in HWP; forest carbon accounting; Forest Inventory and Analysis; greenhouse gas inventory; National Forest System; uncertainty analysis.

Received 11 October 2010; revised 6 December 2010; accepted 7 December 2010; **published** 19 January 2011.
Corresponding Editor: D. P. C. Peters.

Citation: Heath, L. S., J. E. Smith, C. W. Woodall, D. L. Azuma, and K. L. Waddell. 2011. Carbon stocks on forestland of the United States, with emphasis on USDA Forest Service ownership. *Ecosphere* 2(1):art6 doi:10.1890/ES10-00126.1

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INTRODUCTION

Forty-four percent of the area of forestland of the United States is in public ownership. The Federal Government controls one-third of all U.S. forestland, with the USDA Forest Service (USFS) managing one-fifth of all U.S. forestland, making it the primary owner of Federal forestland in the United States (Smith et al. 2009). Thus, management of these forests can substantially affect the

total forest carbon stocks and change in the United States. Recognizing this, the second of four strategic goals of the 2010–2015 USDA strategic plan (USDA 2010) is to ensure national forests and private working lands are conserved, restored, and made more resilient to climate change, including mitigation considerations. To help implement this plan, the USFS roadmap for responding to climate change (USDA FS 2010a) identified assessing and managing carbon stocks

and change as a major element of its plan. Joyce et al. (2008) discuss potential adaptation approaches and mitigation tradeoffs that the USFS might adopt to help achieve its goals, but carbon estimates are not included.

Estimates of carbon stocks and change are also important for other ownerships. The USDA Strategic Plan (USDA 2010) includes the idea of an “all-lands” approach to U.S. forest management, which means considering the context of other ownerships across the landscape when making management decisions on USFS land. It has long been known that forest conditions can differ significantly by ownership, and that landowner behavior will continue to affect future conditions (e.g., Nabuurs et al. 2007), including forest carbon stocks and change. Ownership may also play a factor in carbon finance, with a popular discussion treating publicly owned land differently than private (e.g., Olander et al. 2010).

The goal of this study is to derive and present estimates of forest carbon stocks and change in the United States by major ownership, with a focus on USFS forestland to help meet the needs of the USFS climate change roadmap. The estimates are consistent with the 2010 official U.S. greenhouse gas (GHG) inventory, which is important because having several sets of “official” estimates raises doubts about their accuracy. The U.S. GHG inventory is published annually by the U.S. Environmental Protection Agency (USEPA) for all sectors including the forest sector (e.g., USEPA 2010). For forests, these inventories include forest carbon stocks in units of carbon, as well as net sequestration in units of carbon and also in units of carbon dioxide equivalent. The inventories have been required since the United States ratified the United Nations Framework Convention on Climate Change in the early 1990s. By signing, the United States agreed to provide an annual inventory of carbon stocks and carbon change, with base year 1990. The protocols and guidance have evolved over time (IPCC 2003, 2006) based on experience, evolving policy interests, and new technology and scientific information. For more information about the overall U.S. GHG forest inventory, also see Heath et al. (*in press*) or USEPA (2010).

Older state-level estimates are available (e.g., USDA 2008), but estimates have not been derived previously by major ownership by major USFS

organizational unit. Forest carbon stocks for USFS forestland can be calculated using the COLE suite of web tools (Van Deusen and Heath 2010a), such as reported in Ingerson and Anderson (2010). However, COLE uses a different algorithm for statistical analysis (Van Deusen and Heath 2010b) than that currently used in the official GHG inventories, and the tool does not yet provide change estimates and uncertainties. The USFS Forest Inventory and Analysis (FIA) program also has tools (USDA FS 2010b) which can provide forest carbon stocks by individual national forest unit. These tools also do not produce needed estimates because they include newer algorithms that have not been incorporated into the official GHG inventories such as biomass equations by Heath et al. (2008), do not include carbon change for all states, or focus on annualized data so that not all needed data are included.

Although baseline forest stock estimates are important, information about the source and fate of harvested wood carbon, such as carbon stored in products or wood burned for energy, can also be important when considering carbon benefits from forests. For instance, Heath et al. (*in press*) note that a recent average 205 teragrams carbon dioxide (Tg CO₂) has been emitted from wood burned for energy (see last five years of USEPA GHG inventories). If this wood had been left standing in the forest, forest carbon stocks would increase, but an additional equivalent amount of emissions could have been released instead if more fossil fuel was burned as the substitute source of the needed energy. Studies of future actions to increase carbon mitigation benefits should consider all sectors related to forests, as well as life cycle assessments to inform management actions. Given the lack of baseline forest carbon stock information for National Forest System (NFS) land and recent improvements in methodologies and updates in FIA plot data, in this study we focus on baseline forest carbon stocks and net sequestration, but also provide a rudimentary estimate of carbon contributions from harvested wood products (HWP) for a more thorough understanding of the carbon system. Explicit information about emissions from other disturbances such as fire, and their corresponding area disturbed, are also important, however data sources were not quite yet

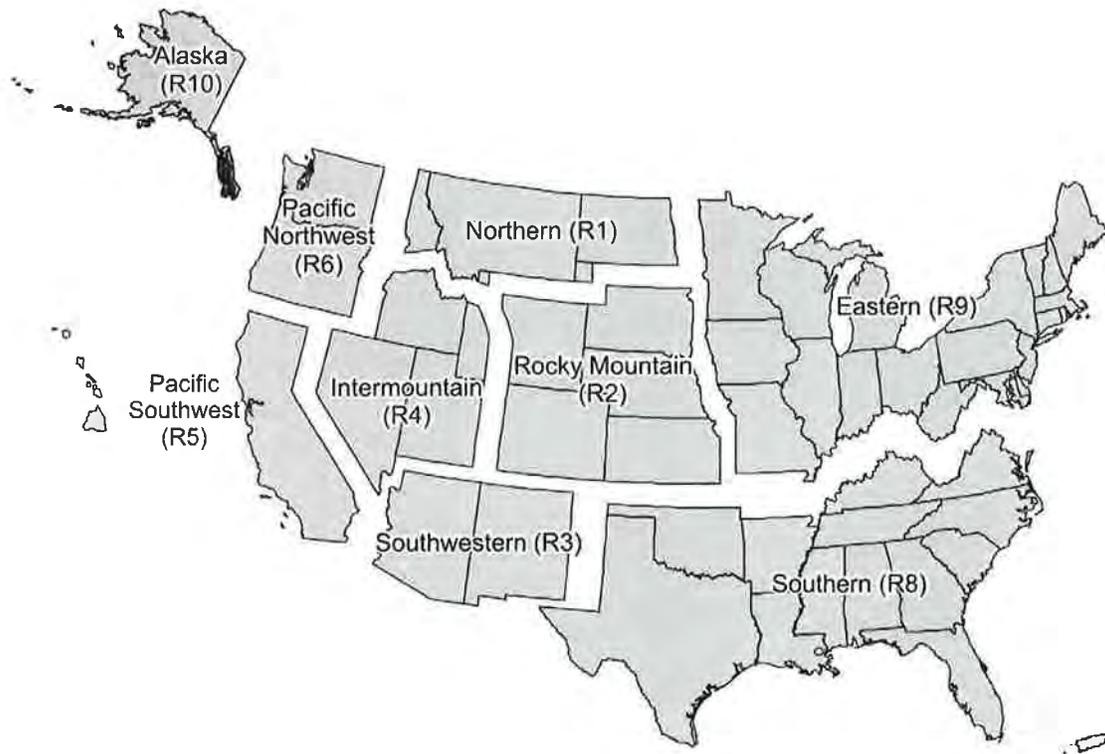


Fig. 1. Map of USDA Forest Service, National Forest System regions.

available for this study.

METHODS

Definitions and units

Forestland as defined here is “Land at least 36.6 meters wide and 0.405 hectare in size with at least 10% cover (or equivalent stocking) by live trees of any size, including land that formerly had such tree cover and that will be naturally or artificially regenerated” (Smith et al. 2009). All carbon pools on forestland are included (Smith et al. 2006): above- and belowground live tree biomass, understory vegetation, standing dead trees, down dead wood, forest floor, and soil organic carbon to the depth of one meter. (See Appendix A: Table A1 for definitions of component pools.) Carbon in HWP is the sum of changes in products in use, and changes in carbon in landfills. For reporting carbon change, we convert carbon to units of carbon dioxide by multiplying by 44/12 (the molecular weight of CO₂/C) because change in greenhouse gas

inventories is reported in terms of CO₂. Indeed, the GHG inventories use units of carbon dioxide equivalents, CO₂e, which is a way to report on emissions for all types of GHGs, but we use the label CO₂ for CO₂e. In terms of signs, a negative CO₂ change means carbon is taken out of the atmosphere and carbon is increased in forests; a positive CO₂ change means carbon is added to the atmosphere by forest-related emissions. This sign convention is used for consistency with national and international GHG reporting. We present stocks in terms of carbon, but when we present change we use units of CO₂ to indicate how atmospheric CO₂ is affected by changes in forest carbon.

This study focuses on administrative NFS regions (Fig. 1), rather than strictly ecologically-based areas, because management responses will be implemented by these regions. Regions are a major organizational unit within the Forest Service, and information summarized by region is important for implementation and interpretation. Individual national forest units within these

regions are also important for executing carbon management activities. Forest carbon stocks, change and uncertainties are presented by NFS region by three major ownership categories: USFS, other public (all other publicly-owned lands including other federal ownerships, states, and municipalities), and privately-owned land. These groupings were chosen because we wanted a minimum number of broad categories which covered all owners.

Forest Inventory and Analysis survey

The FIA program is the primary source for information about the extent, condition, status and trends of forest resources across all ownerships in the United States (Smith 2002). FIA applies a nationally consistent sampling protocol which began implementation in the late 1990s covering all forestland in the nation following an annualized design (Bechtold and Patterson 2005). An annualized design means a statistically valid subset of plots is measured every year in a state. Several years of data may be required to include all measurements on all forested plots within a state. The complete set of plot data provides for a greater level of precision geographically, but the aggregated data lose temporal specificity. On each permanent inventory plot, field crews collect data on more than 300 variables, including land ownership, forest type, tree species, tree size, tree condition, and other site attributes (e.g., slope, aspect, disturbance, land use) (Smith 2002; Woudenberg et al., *in press*). Plot intensity for measurements is approximately one plot for every 2,400 ha of land (130,000 forested plots nationally). These data are compiled, and are publicly available via the Internet (USDA FS 2010c).

The FIA data are collected on all ownerships in the 48 conterminous states, coastal Alaska, and territories. This study does not include forestland in interior Alaska and Hawaii because FIA plot data have either not been collected or are not yet available. Puerto Rico data were not available at the time of this analysis. FIA plot data available before the annualized implementation were surveyed periodically, and may only be available at the plot level rather than the tree level. To calculate change, an approach must include a way to use these older data such that they are comparable to the newer data.

Approach

The current FIA survey was not designed nor was it funded as a carbon inventory. Our approach is based on data taken from FIA surveys (Bechtold and Patterson 2005), but augmented by a set of basic models which are either ecologically process-based or statistical carbon conversion models (USEPA 2010; Heath et al., *in press*). Smith et al. (2010) describes the methods used for estimating the density of carbon component pools, as well as the approach for calculating carbon change. In general, our approach is to calculate carbon stocks derived from the augmented FIA plot data by multiplying area estimates by estimates of carbon density for that area. For example, estimates of carbon per hectare for the permanent inventory plots labeled as NFS ownership are multiplied by the appropriate expansion factors, and then summed over the total area of interest, such as national forest. Privately-owned land occasionally occurs within national forest boundaries; an FIA plot on private lands is labeled as privately-owned and is summed in the private ownership. Change in carbon (also called net sequestration) is calculated as the difference between consecutive stocks (each from a specific inventory), which is then divided by the number of years in the period between the stocks. This approach provides a net annual difference and is known as the stock-change approach.

We used procedures from the computer application of Smith et al. (2010), although we duplicated the code in SAS (SAS Institute 2003) to produce consistent estimates by ownership for NFS regions and for individual national forests. An additional step was included to review the data for consistency in terms of ownership and national forest designation. About 0.1% of the USFS field plots did not include a valid national forest designation, but these were assigned based on state or county codes. Methods and data sources are the same as those in USEPA (2010) with one exception. Data from the Integrated Database (IDB, Waddell and Hiserote 2005) were used for the older forest inventories for California, Oregon, and Washington in place of the corresponding data used for those states as identified in USEPA (2010). Previously, we had focused on using national-level datasets, but we recently recognized that the older data in the IDB

were more consistent with the current annualized data for these states, which is a crucial consideration for the inventory-based methods used for change (Smith et al. 2010). Recent GHG reporting (USEPA 2010, and similar previous reports) included notable differences in forestland between past and current inventories for California, although analyses could not attribute the differences to any specific cause. Incorporating data from the IDB into the GHG inventory removed this apparent discontinuity. We applied additional updates to the publicly available IDB on parts of 63 plots in eastern Oregon that were predominantly the juniper forest type because guidelines for classifying these plots had changed over the last 12 years. The modification made the older data more comparable with current inventories in terms of the basis for determining forestland.

We do not include the soil pool when presenting carbon change because changes in the land base can result in transfers of large amounts of soil carbon to other land use which will appear to be losses to or gains from the atmosphere. Thus, we use and report the term nonsoil carbon which includes all pools (live tree and standing dead tree, down dead wood, understory, and forest floor) except soil. We recognize that soil carbon on forestland remaining forestland may be emitting or sequestering GHGs, but this study assumes no change in that pool. We emphasize that both forestland area change and carbon density (carbon per area) change can affect total carbon (Smith and Heath 2010). That is, an increase in forestland area will result in increased carbon sequestration if the average carbon density is not declining. An increase in carbon density will result in increased carbon sequestration even if area of forestland is constant. A decrease in forestland area with an increase in carbon density can result in an increase or decrease in carbon sequestration, depending on the amount of change in each factor.

Carbon in harvested wood products

Carbon removed from forests as harvested wood can also remain stored rather than returning to the atmosphere for a long time, depending on the mix of wood products produced or burned as a substitute for fossil fuels. Carbon in

HWP continues to provide carbon benefits, which can be an appreciable part of the overall forest carbon budget (Heath et al., *in press*). The net annual contribution to the total forest carbon budget depends on harvest, allocation to product, life-span, and methods of disposal (Skog 2008). Analyses can also be performed to determine the carbon value chain including accounting for emissions in manufacturing (Heath et al. 2010a), but the focus of this study is carbon inventories. For comparison between ownerships, we provide estimates of net annual stock change of carbon in harvested wood disaggregated and associated with forests from the three major ownerships. The estimates were derived by multiplying national estimates of carbon in harvested wood (Skog 2008, USEPA 2010) by proportions of harvested wood associated with ownerships from the base scenario for an empirically-based U.S. forest assessment over the same interval (Haynes et al. 2007, Heath et al. 2010b).

Uncertainty

Estimates of uncertainty in total forest carbon stocks and change are based on Monte Carlo simulations (IPCC 2006) of the stock-change methods from Smith et al. (2010), which were modified for estimates corresponding to owner by NFS region and individual national forest unit. The resulting confidence intervals represent the bounds of the central 95% of the distribution produced from numerical simulations. For ease of comparison, we present the bounds as average percentages about the mean. Uncertainty includes inventory-to-carbon conversion factors and sampling error. Uncertainties about plot-level carbon conversion factors are defined as probability densities defining carbon density (megagrams carbon per hectare, Mg C/ha) by pool (Smith and Heath 2001, USEPA 2010) and aggregated to national forest, or other population totals, by iterative sampling.

Sampling error is estimated according to Bechtold and Patterson (2005) by population of interest. Mean carbon and uncertainty estimates were produced for Forest Service forestland on each national forest by state. Totals for forests extending over more than one state are simply the sum of the population estimates of each of the states, because the state estimates were assumed

Table 1. Forest carbon statistics by ownership for the 48 conterminous states and coastal Alaska.

Ownership	Mean measurement year	Forest C density (Mg C/ha)	2.5, 97.5 percentiles of plot C density (Mg C/ha)	Forest area (million ha)	Total forest C stock \pm 95% CI as percentage of mean (Tg C \pm %)
USFS	2004.8	192	56, 514	60.4	11,604 \pm 1.4
Other Public	2004.9	169	52, 434	43.1	7,268 \pm 1.5
Private	2005.0	150	55, 326	173.8	26,058 \pm 0.6
All	2005.0	162	54, 394	277.3	44,931 \pm 0.5

Note: Estimates calculated using FIA data and methods consistent with U.S. greenhouse gas inventory estimates (Smith et al. 2010).

to be independent for purposes of combining the simulated uncertainties. The same process was followed for other ownerships or regional totals. These quantities do not account for all uncertainties. For example, the U.S. GHG inventories require a base year of 1990; inventory data prior to about the year 2000 were collected under a periodic inventory system, and in some states may have not included the entire forestland base now being surveyed. Although we have made comparisons and adjustments between these datasets to reduce error (e.g., such as for the state of Oregon with the change to and adjustments to the IDB), there may be other area-based mismatches, as well as additional uncertainties.

RESULTS AND DISCUSSION

Forest carbon stocks and uncertainties

Relevant U.S. carbon statistics include average year of measurement, forestland areas, average carbon stock per hectare (carbon density), and total carbon and uncertainties estimated from the most recent FIA inventory for each ownership (Table 1). The carbon stocks (and their corresponding forestland areas) are based on data from different survey years, but the mean survey year is 2005. That is, 2005 represents the overall average year of data collected by field crews over the large number of permanent inventory plots maintained by FIA. USFS forestland features greater carbon density, on average 28% more per forested hectare, than that of private land. Results further indicate that the range of carbon density is also notably greater: 514 Mg C/ha compared to 326 Mg C/ha on private land at their respective 97.5 percentile values, with the value for other public ownership in the middle (434 Mg C/ha). The values on the low end of this interval (2.5 percentile) are about the same for all

ownerships, about 55 Mg C/ha.

Within each region, Forest Service forestland features greater carbon density than other ownerships (Fig. 2) with the exception of other public ownership being greater in the Pacific Northwest region, and other public and USFS carbon densities being similar in the Southern region. In spite of differences in magnitude, the pattern of carbon density arranged by largest to smallest by region within each ownership is quite similar. Carbon densities in the Alaska and Pacific Northwest regions rank highly, with the largest depending on owner, followed by carbon densities of the Eastern and Pacific Southwest regions. The Southwestern and Intermountain regions exhibit the least carbon stock density in all ownerships, respectively. The order varies in the remaining regions of intermediate values, but these regions have similar magnitudes.

These similar patterns across regions indicate the importance of regional effects such as soil, forest type, and underlying climatic drivers, on carbon stocks. Land use history can also affect broad regions. In the Eastern region, for instance, national forests were established on cutover land, whereas in the West, many areas were inaccessible and the forests relatively unused when they were designated as national forests. Thus, although the land use history of both areas is quite different, intra-regional differences are minor. Carbon stocks of the coastal Pacific Northwest and coastal Alaska regions occur in areas of mostly publicly owned land, with tree species large at maturity, low decay and disturbance rates, and a history of limited deforestation and active management so large carbon stock densities are expected. In the Southwest region, the less productive growing conditions with greater likelihood of disturbance will generally feature lower forest carbon stocks on average.

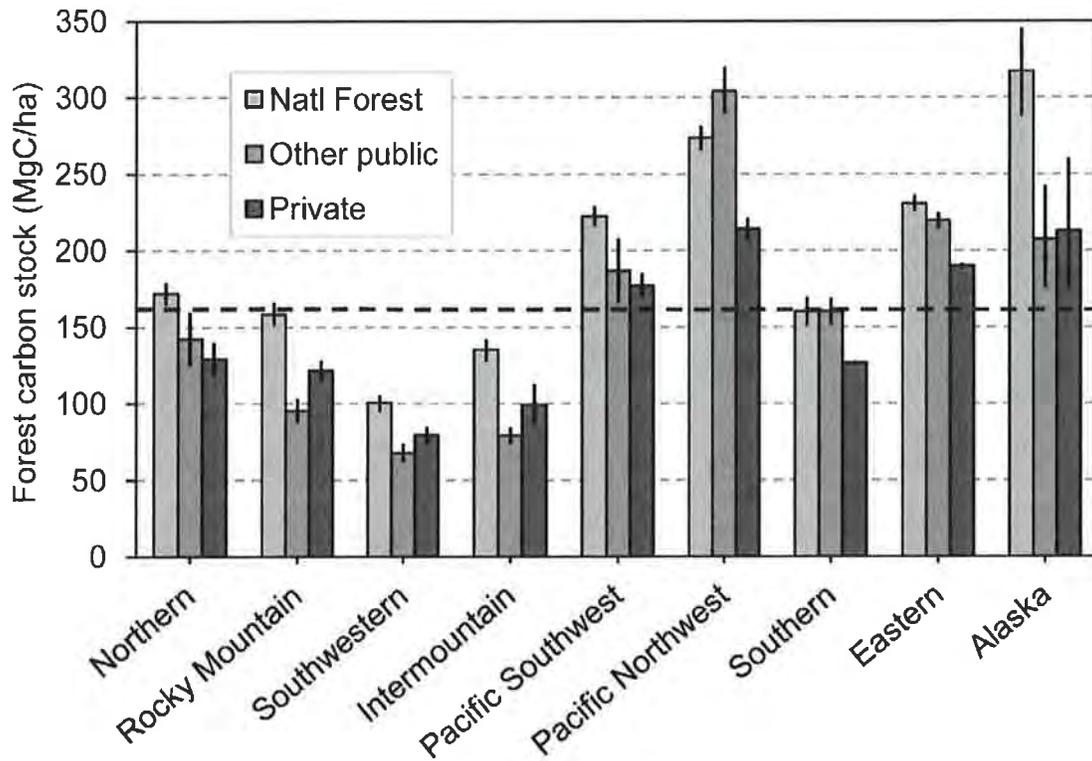


Fig. 2. Mean forest carbon density (Mg C/ha) by ownership by National Forest System region, 2005. Horizontal dashed line represents the overall average carbon stock on U.S. forestland, 162 Mg C/ha. Error bars indicate a 95% confidence interval of uncertainty about the regional average, from carbon conversion factors and sampling error.

In contrast to carbon densities, total forest carbon is 2.2 times greater (26,058 Tg C compared to 11,604 Tg C; Table 1) for privately-owned land, largely because of the almost three-fold difference in forestland area (173.8 Mha (million hectares) private compared to 60.4 Mha USFS; Table 1). At the national level, about 63%, 22%, and 15% of forestland area (Table 1) is in private, USFS, and other public ownership. There are large regional differences in ownership patterns, with notably more area of forestland in private ownership in the Eastern and Southern regions (Fig. 3), and least in Alaska (this is a survey of only coastal Alaska), and in the Intermountain region. If all forestland in Alaska were surveyed, there would be substantially more forestland area in private and other public ownerships.

Within USFS forestland only (Table 2), the Pacific Northwest region has the largest area of

forestland (9.1 Mha), followed closely by the Intermountain and Northern region, with Alaska the least (4.4 Mha). The carbon stocks (and their corresponding forestland areas) from different states are likely based on data from different survey years, but the mean survey year of most regions is similar to the mean for all USFS land, 2004.8, which we round up for this discussion to year 2005. That is, 2005 represents the overall average of data collected by field crews over the large number of permanent inventory plots maintained by FIA. The exception to similar year of data collection is the Southwestern region with mean survey year of 2001 (rounded up from 2000.8). Considering the ecological conditions in the Southwest, the difference in results due to the four-year average lag time is likely minor. In terms of uncertainties, the percent uncertainty ranges from $\pm 1\%$ for all USFS forestland up to 6% for USFS forestland in one region only.

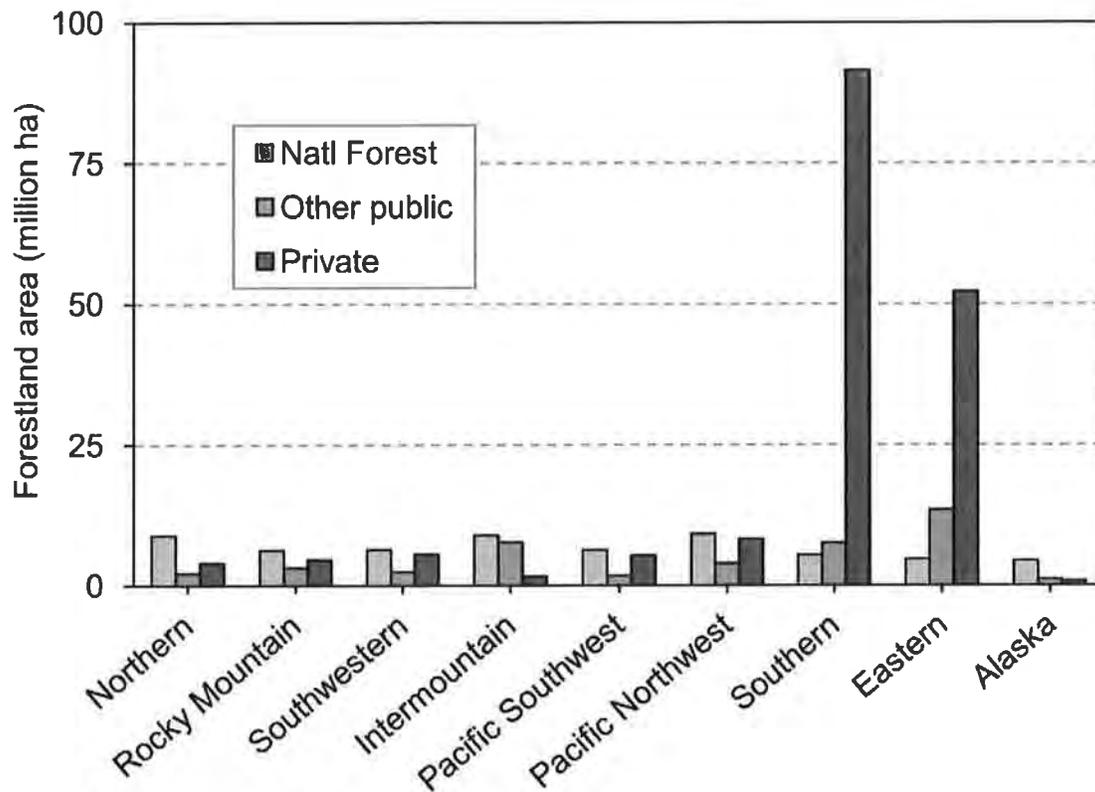


Fig. 3. Forestland area (million hectares) by ownership summed by National Forest System region, 2005. Error bars for a 95% confidence interval of sampling error for forest area are not included because they are too small for the resolution of the figure.

Table 2. Forest carbon and area statistics for USDA Forest Service forestland only by National Forest System region.

National Forest System region	Mean measurement year	Forest C density (Mg C/ha)	2.5, 97.5 percentiles of plot C density (Mg C/ha)	Forest area (1000 ha)	Total forest C stock \pm 95% CI as percentage of mean (Tg C \pm %)
Northern	2006.2	172.0	76, 328	8,896	1,530 \pm 3
Rocky Mountain	2004.5	158.6	56, 306	6,265	993 \pm 4
Southwestern	2000.8	100.6	49, 254	6,371	641 \pm 4
Intermountain	2004.9	135.3	54, 286	8,964	1,213 \pm 4
Pacific Southwest	2005.0	222.4	63, 548	6,331	1,408 \pm 2
Pacific Northwest	2005.2	273.3	94, 689	9,107	2,493 \pm 2
Southern	2005.1	160.2	74, 280	5,423	869 \pm 4
Eastern	2005.6	230.7	111, 392	4,652	1,073 \pm 2
Alaska	2006.2	317.1	101, 607	4,363	1,384 \pm 6
All USFS	2004.8	192.1	56, 514	60,372	11,604 \pm 1

Note: Estimates calculated using FIA data and methods consistent with U.S. greenhouse gas inventory estimates (Smith et al. 2010).

Uncertainty estimates should be interpreted carefully. In this case, one percent (116.04 Tg C) of the all USFS carbon stock is still greater in magnitude than 6% (83.04 Tg C) of the Alaska region USFS carbon stock. Forests in the Alaska region have the greatest

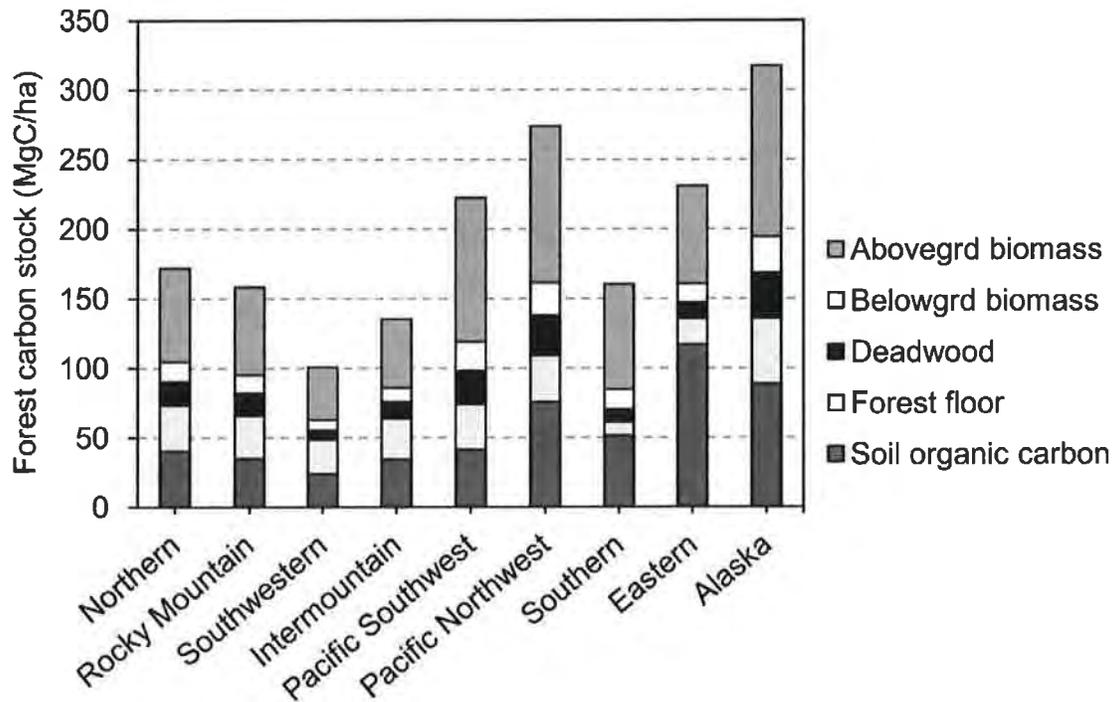


Fig. 4. Mean forest carbon density (Mg C/ha) by component pools for USDA Forest Service forestland only by National Forest Service region, 2005. Biomass includes live trees and understory vegetation.

carbon density for all pools averaging 317.1 Mg C/ha, whereas the Southwest and Intermountain regions have the least carbon densities, at 100.6 Mg C/ha and 135.3 Mg C/ha, respectively (Fig. 4). The greatest percentage of aboveground live biomass carbon is in the Southern region (47%), and lowest (30%) in the Eastern region. The Eastern region has the highest relative soil carbon (51%), followed by the Southern region (30%), with a number of regions in the western United States in the 20–30% range. The relatively high proportion of forest carbon in forest floor in the Southwest region is thought to be due to the use of regional models for dead wood and forest floor pools for hardwood woodland forest types.

Within most regions (Fig. 5), forest carbon stock densities from individual national forests are relatively similar (e.g., Southern), with distinct patterns emerging in others. (See Appendix B for carbon stock statistics including uncertainties for USFS forestland by individual national forest.) For instance, as might be expected, the carbon densities on the west side of the Cascades in Oregon and Washington are

large due to the forest types, older forests, and relatively lush growing conditions, but on the eastern side with less favorable growing conditions, carbon densities are relatively smaller. The Pacific Southwest region appears to show the greatest distinctions between forests within a region. The highest carbon densities per national forest are in the Pacific Northwest and Pacific Southwest regions, and the least in the semi-arid areas in the Intermountain and Southwest regions. Some forested plots fall within national grasslands or other USFS administered lands, and these are included (as additional USFS areas in Appendix B.)

National forest units are not randomly located across the landscape (Fig. 5). For example, the forests are bunched together in much of the West, in mountainous terrain where forests are more likely to occur or where land had not yet been settled upon before establishment of the national forests. In the Southern region, only 5% of the forestland is in USFS ownership, with 88% in private ownership varying from highly productive forestland intensively managed for timber

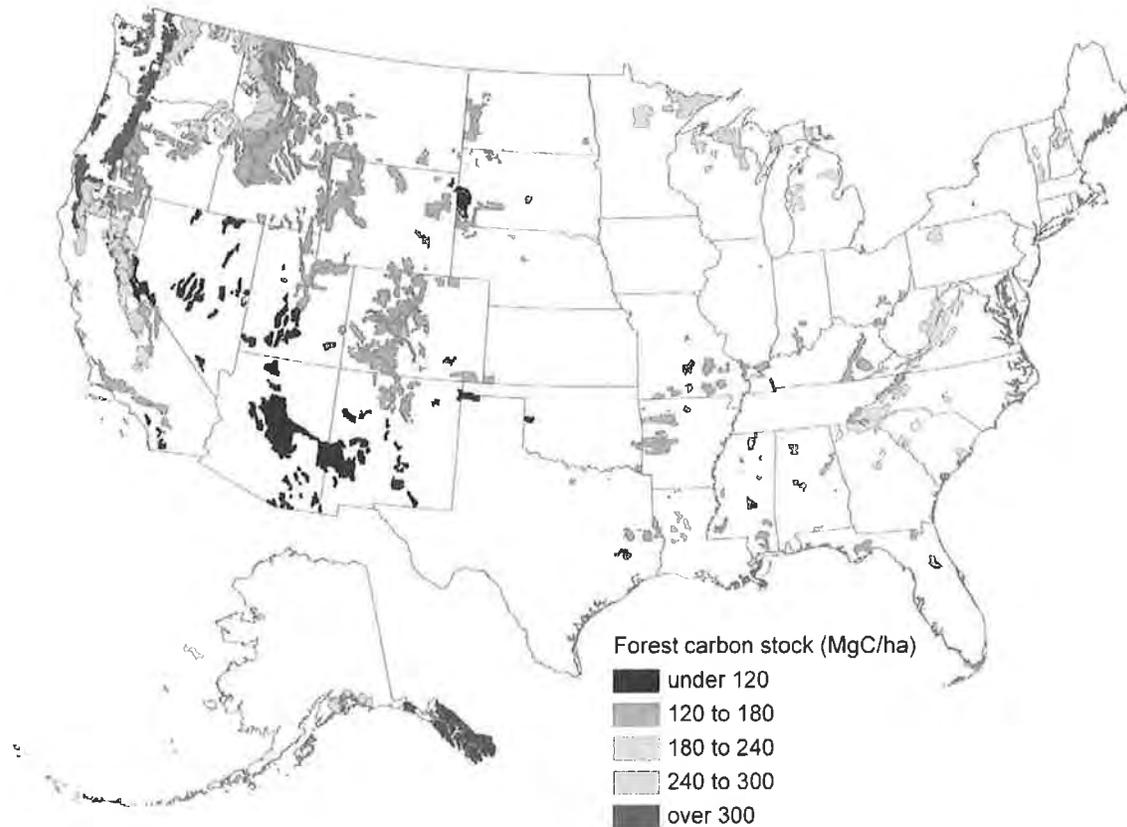


Fig. 5. Mean forest carbon density (Mg C/ha) by individual USDA Forest Service unit, 2005. Shaded areas indicate national forest or grassland administrative boundaries, and color indicates carbon stock density (Mg C/ha) category on the Forest Service owned forestland within those areas. Data are not available for Hawaii; data for Puerto Rico were not available at the time of this analysis.

production, to areas of woodlands in west Texas managed predominantly for grazing. Given this diversity of forest ecosystems, climate, productivity, ownership patterns and local preferences, effective, preferred management activities to increase carbon benefits will likely need to differ regionally if not by individual forest.

Net CO₂ change and carbon in harvested wood products

Over the period 2000–2008, private and USFS forests sequester about 30% of total average annual nonsoil net CO₂, with other public forestland accounting for 38% (Table 3). Most of the statistically significant net sequestration on NFS land is occurring in the Pacific Northwest and Southern regions, with net sequestration on

other public and privately owned forestland higher in the Eastern and Southern regions (Fig. 6). Error bars of 95% confidence indicate relative large uncertainties with estimates for a number of the regions not significantly different from zero. Change is not calculated for forestland units smaller than regions because the carbon changes on smaller areas will likely not be significantly different from zero.

The increase on other public forestland is due in large part to the estimated increase in forestland (0.45 million ha/yr) over this period. Additional data exploration (results not shown) did not identify specific regions of the United States or unusual circumstances for this increase. USFS forest area also increased although the rate of increase was almost one-quarter of that of

Table 3. Average net forest ecosystem and products carbon stock change by ownership over the period 2000–2008.

Ownership	Nonsoil forest ecosystem net carbon stock change (Tg CO ₂ /yr)	Uncertainty of net stock change (95% CI as percentage of mean, %)	Carbon in harvested wood products net change (Tg CO ₂ /yr)	Mean annual change in forest area (1000 ha/yr)
USFS	-147.3	±40	-2.9	107.1
Other Public	-184.6	±28	-6.1	449.0
Private	-149.2	±41	-92.1	-77.2
All	-481.1	±22	-101.1	478.9

Notes: Negative net carbon change indicates less CO₂ in the atmosphere and more in the forest. Negative area change indicates decreasing forest area. Estimates calculated using FIA data and methods consistent with U.S. greenhouse gas inventory estimates (Smith et al. 2010).

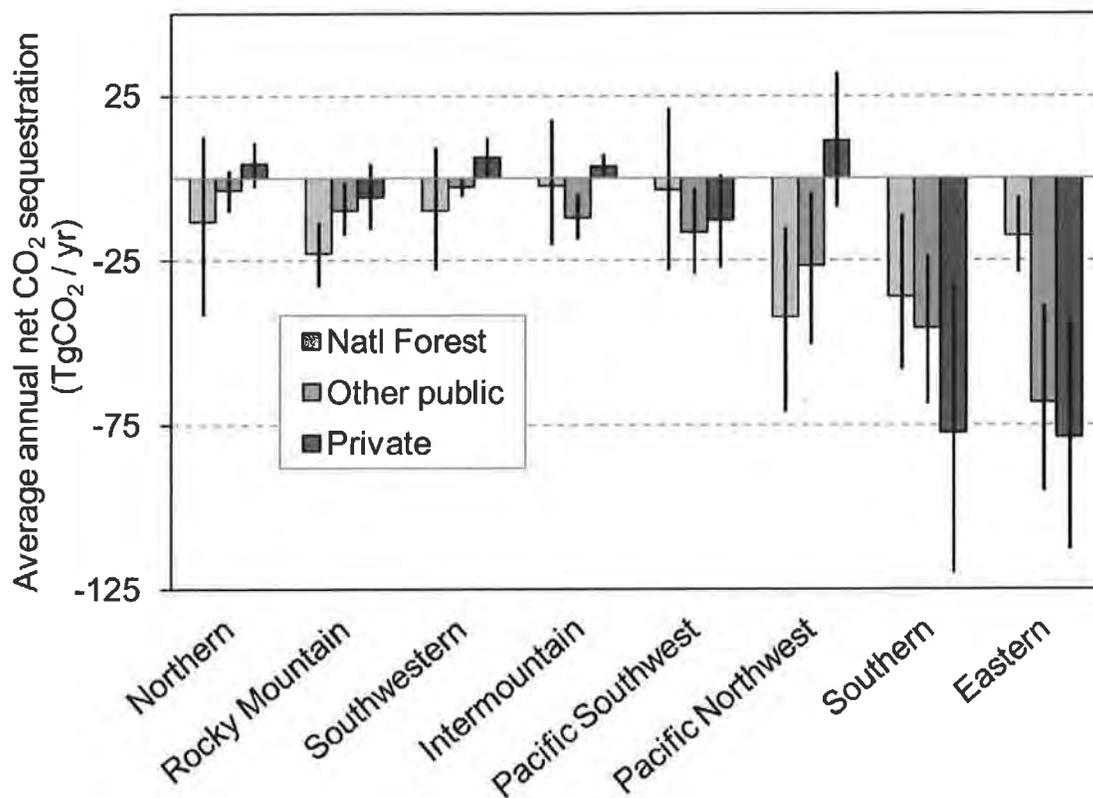


Fig. 6. Average annual net sequestration (Tg CO₂/yr) in forests by ownership and National Forest System region over the period 2000–2008. Note that negative values indicate more CO₂ is being sequestered by forests than is being emitted to the atmosphere. Error bars indicate a 95% confidence interval of uncertainty about the regional average, from carbon conversion factors and sampling error. (Data values listed in Appendix C.)

other public land. Some of this increase may be due to definitional changes in the FIA survey over this period, or an artifact of the change from the periodic to the annualized survey emphasizing the need to have reconciled FIA datasets

available for analysis of trends.

Net nonsoil change over 2000–2008 of -481 Tg CO₂/yr (Table 3) is about 8% lower than the corresponding USEPA (2010) 9-year average of -522 Tg CO₂/yr. A minor part of this difference is

the effect of disaggregating the stock-change calculations beyond the structure defined in Smith et al. (2010) to include the three ownerships. However, most of the difference from the results of the USEPA (2010) report is the effect of using data from the IDB (Waddell and Hiserote 2005) for the Pacific Coast states.

Beyond the forest boundary, additional carbon continues to be stored in HWP, with notable amounts attributed to harvest on privately owned land (Table 3; total carbon sequestered in forests and stored in HWP on average is estimated by summing columns 1 and 3). Products from harvests on private land continue to store an additional 62% of the net carbon sequestration on private forestland, whereas the increase is 3% at most on publicly owned land. Including the continued storage in HWP results in private forestland (and their harvested wood products) contributing to 41% of total forest sector carbon sequestration, with USFS at 26% and other public dropping to 33%. Although carbon in HWP from USFS land is minor, considering this pool is important in the context of landscape-scale management because ceasing harvests in one large area often results in increasing harvests elsewhere, if demand for products remains the same.

Other fates of forest carbon can also be substantial. We do not present change estimates from carbon benefits from harvested carbon that was burned for energy as a substitute for fossil fuel which can be notable for some ownerships. That is, trees harvested for this purpose have been subtracted from the amount in the forest, but we have not recognized that this loss may have positive benefits of substituting for fossil fuel emissions. Emissions of CO₂ from forest wildfires and prescribed burning on average rival those from emissions from wood burned for energy, but we currently do not have these emissions partitioned by ownership, or by land cover (e.g., forestland or rangeland).

Uncertainty

The relative uncertainties for total forest carbon stocks are much larger for the individual national forests (usually in the range 8–25%) as compared to the regional uncertainties (2–6%), especially those with a smaller area of forestland or small total carbon. The larger uncertainties are

mainly due to the smaller sample size on smaller areas, but may also be due to uncertainty of data sources. For ease of comparisons, we report tabular summaries of uncertainties (Table 2; Appendix B tables) as though the bounds are symmetric, which would be unlikely. However, asymmetry is small, less than 2% off of the mean for the largest percentages (Table 2) and asymmetry averages under 0.5% off of the mean for individual national forests in the Appendix B tables.

By comparison, the percent uncertainty about estimates of net sequestration are relatively large. One aspect of this uncertainty is the sensitivity of small change between relatively large stocks. For example, an additional annual increment of stock equivalent to only 0.1% of current nonsoil carbon stock in the Pacific Southwest region (data not shown) would produce a response of a 33% increase in calculated stock-change (Fig. 6). A contributing factor to the large percentage difference in this example is that the change is relatively close to zero, which further emphasizes the importance of consistent forest and carbon stock representation between successive inventories when examining inventory trends.

Discussion of methodology and possible improvements

Forest carbon estimates based on augmented FIA data have long been considered the standard for landscape level and larger forestland (e.g., Pacala et al. 2001, Smith et al. 2006, USEPA GHG inventories, Climate Action Reserve 2010). Advantages of using FIA data are: it has a national-level statistically sound design, the data are publicly available (with some exceptions related to precise location and specific owner), the data are collected in partnership with state forestry agencies and all major forest components which relate to carbon are measured or sampled. However, the survey was not designed specifically for carbon estimation, so additional work is needed to ensure an efficient framework for carbon stocks and GHG changes. Further, sample precision was designated for state-level reporting, thus, using these data to represent smaller areas such as individual national forests results in higher uncertainties. Consequently, even moderate increases in carbon benefits from management activities may not differ statistically from

zero.

A number of near-term improvements could be made to the existing framework for use in future U.S. GHG inventories to reduce uncertainties and align estimates more closely with measured data. These include: using recent measurements from a subset of the plots of non-live tree pools such as standing dead trees, down dead wood, as well as samples of forest floor carbon and soil organic carbon; using a more recent tree biomass equation approach based on regional net volume estimates (Heath et al. 2008) for trees that was recently adopted in FIA's national publicly available database (USDA 2010c; Woudenberg et al., *in press*); accounting for results from FIA field data recently available for the national forest in Puerto Rico; and delivering the information produced by the computer application CCT (Smith et al. 2010) used in the U.S. GHG inventories via an online tool. The resulting well-documented online site could then automatically produce forest carbon stock and change estimates for areas chosen by users. One challenge in these improvements is that the carbon changes for the U.S. GHG inventories are required to begin with 1990 carbon change, and older surveys generally do not include non-tree measurements. It is crucial that carbon estimates for these older surveys be derived to be consistent with newer data. Furthermore, some of the older data are only available at the plot-level, so biomass carbon estimates for the older surveys are also needed that are comparable with the newer tree-level data.

In the longer-term, as FIA plots continue to be remeasured, change estimates for most national forests in the future should become available at a precision that allows for change to be detected with increased precision. Remeasured plots will allow for gross growth sequestration to be calculated, which is information that will revolutionize the use of FIA field plots in analysis. However, these data will still be limited temporally with remeasurements occurring 5 or 10 years apart, such that growth cannot be attributable to a specific year. Coupling these growth measures with the use of geospatially-specific datasets (which are under development) will be especially powerful for explicitly accounting for disturbances. One annual dataset under development by the Monitoring Long-Term Burn

Severity project (Eidenshenk et al. 2007) will allow forest wildfire emissions to be calculated explicitly by cover type and ownership. Another relevant dataset is the National Land Cover Dataset (MRLC 2010), available for the years 1991 and 2002, with work ongoing for the year 2006. One important lesson learned from this analysis is that, no matter what sources are used, data should be carefully screened for impacts of changing definitions. Using the dataset tailored for the three Pacific Coast states changed national net sequestration by 8%, a notable amount.

Although this study focused on forestland, management activities on all lands are capable of emitting or sequestering GHGs, including non-CO₂ gases. For instance, wetlands or peatlands in particular can feature much higher carbon densities than forests. Monitoring all land covers and uses with activities that cause significant GHG emissions or sequestration should be considered. We have not discussed livestock emissions, but USFS land (and land under other ownerships) can include grazing. Significant livestock activity should be considered for base GHG emissions. Finally, because land management can produce multiple environmental benefits on the same land area, the process for making any inventory and monitoring improvements for carbon should also consider other important benefits.

CONCLUSIONS

Forestland under USFS ownership features the largest average carbon density among ownerships, approximately 192 Mg C/ha in the year 2005, which is about 28% greater than that of private forestland. All carbon component pools are included: live and dead standing trees, down wood, forest floor and soil. In terms of total carbon stocks, however, private forests contain more carbon: 58%, 26% and 16% of the total forest carbon is in private, USFS, and other public ownership, reflecting the fact at the national level the majority ownership of area of U.S. forestland is private, about 63% compared to 22% and 15% for USFS and other public.

However, over the period 2000–2008, USFS and private lands have similar total net carbon sequestration in forests (not including soil carbon effects), sequestering about –148 Tg CO₂/yr each,

with 40% uncertainty. If carbon in HWP is also accounted for, private lands contribute to an additional $-92 \text{ Tg CO}_2/\text{yr}$ sequestered compared to an additional $-3 \text{ Tg CO}_2/\text{yr}$ from USFS lands. Other public ownerships indicate a larger total net sequestration of $-185 \text{ Tg CO}_2/\text{yr}$, heavily influenced by an estimated notable increase in forest area over the period. We could not pinpoint any specific reason or particular region for this estimated forest area increase, so we look to future studies for more information about this unexpected increase.

In spite of differences between ownerships, the pattern of carbon density arranged by largest to smallest by region within each ownership is quite similar. This shows the importance of regional effects such as soil and forest type, and underlying climatic drivers. However, the pattern of total average annual sequestration by ownership by region differs because totals are influenced greatly by amount of forest area. The largest net sequestration rates are in the Eastern and Southern regions for private and other public ownerships, whereas the largest net rates in the Pacific Northwest followed by the Southern and then Rocky Mountain region for USFS ownership. Due to the large uncertainties in change calculations, change for most of the other regions is not statistically different from zero.

The greatest gains in mitigation effects minimize net carbon dioxide emissions to the atmosphere. Because forest carbon has carbon benefit effects beyond forestland boundaries, managing simply to maximize forestland carbon density is not necessarily the same as minimizing forest emissions to the atmosphere (or maximizing net sequestration) during the time frame of interest. That is, a strategy focusing on only increasing forestland carbon density on a limited area over time may produce limited carbon benefits compared to a more comprehensive strategy.

These carbon densities and forest areas by NFS region and individual national forest (Appendix B) could be used as preliminary base estimates for planning adaptation and mitigation activities. To consider the effects of specific silvicultural regimes, a tool such as the Forest Vegetation Simulator (Crookston and Dixon 2005) could be used to project plots into the future; carbon in forests and harvested wood products is an

output (Hoover and Rebaun 2008). A variety of management activities will be needed to increase carbon benefits in USFS lands across the matrix of ecological, physical, and social conditions, especially when management needs for adaptation are a primary concern. However, demands and management choices on other ownerships should be a consideration in enhancing carbon benefits. A national-level forest futuring analysis that includes carbon outputs such as Heath and Birdsey (1993) and USEPA (2005), as well as climate change effects (Joyce et al. 1995), and global trade (Ince et al. 2007) would help ensure the major effects of large-scale processes are included.

ACKNOWLEDGMENTS

We thank Elizabeth LaPoint, USDA Forest Service, National FIA Spatial Data Services, Durham, NH, for her expertise in FIA data and map making, and three internal reviewers. We acknowledge the work of many excellent field crews, information management specialists, and analysts of the USDA Forest Service, Forest Inventory and Analysis for their daily dedication to providing quality data. Without their efforts, this study would not have been possible.

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APPENDIX A

Table A1. Forest ecosystem carbon pool definitions (Smith et al. 2006).

Pool	Definition
Live trees	Live trees with diameter at breast height (d.b.h., 1.37 m) of at least 2.5 cm, including carbon mass of coarse roots (greater than 0.2 to 0.5 cm, published distinctions between fine and coarse roots are not always clear), stems, branches, and foliage.
Standing dead trees	Standing dead trees with d.b.h. of at least 2.5 cm, including carbon mass of coarse roots, stems, and branches.
Understory vegetation	Live vegetation that includes the roots, stems, branches, and foliage of seedlings (trees less than 2.5 cm d.b.h.), shrubs, and bushes.
Down dead wood	Woody material that includes logging residue and other coarse dead wood on the ground and larger than 7.5 cm in diameter, and stumps and coarse roots of stumps.
Forest floor	Organic material on the floor of the forest that includes fine woody debris up to 7.5 cm in diameter, tree litter, humus, and fine roots in the organic forest floor layer above mineral soil.
Soil organic carbon	Belowground carbon without coarse roots but including fine roots and all other organic carbon not included in other pools, to a depth of 1 meter.

APPENDIX B

Table B1. USFS Northern Region (R1) forest carbon statistics for USFS forestland by individual national forest.

National Forest	Average measurement year	Forest carbon density (Mg C/ha)	2.5, 97.5 percentiles of plot C density (Mg C/ha)	Forest area (1000 ha)	Total forest C \pm 95% CI as percentage of mean (Tg \pm %)	Aboveground live tree C density (Mg C/ha)
Beaverhead-Deerlodge	2006.1	170.8	77, 304	1,146	196 \pm 8	68.1
Bitterroot	2006.3	155.5	71, 280	605	94 \pm 13	54.0
Clearwater	2006.7	196.8	88, 385	721	142 \pm 16	80.2
Custer	2006.0	121.1	67, 268	286	35 \pm 23	33.8
Flathead	2006.2	167.6	84, 308	849	142 \pm 12	59.0
Gallatin	2006.0	167.3	70, 266	659	110 \pm 12	60.9
Helena	2006.1	165.4	75, 317	373	62 \pm 19	66.0
Idaho Panhandle	2006.4	188.1	85, 366	927	174 \pm 11	73.8
Kootenai	2006.1	177.5	76, 311	921	163 \pm 10	68.7
Lewis and Clark	2006.2	158.3	70, 311	686	109 \pm 13	56.8
Lolo	2006.1	158.9	73, 280	850	135 \pm 12	56.6
Nez Perce	2006.6	195.8	85, 411	838	164 \pm 14	80.5
Additional USFS†	2006.3	122.0	76, 171	36	4 \pm 45	21.5
Regional total	2006.2	172.0	76, 328	8,896	1530 \pm 3	65.2

Note: Estimates calculated using FIA data and methods consistent with U.S. greenhouse gas inventory estimates (Smith et al. 2010).

† Includes the Little Missouri National Grassland and administrative areas identified as "Other NFS Areas."

Table B2. USFS Rocky Mountain Region (R2) forest carbon statistics for USFS forestland by individual national forest.

National Forest	Average measurement year	Forest carbon density (Mg C/ha)	2.5, 97.5 percentiles of plot C density (Mg C/ha)	Forest area (1000 ha)	Total forest C \pm 95% CI as percentage of mean (Tg \pm %)	Aboveground live tree C density (Mg C/ha)
Arapaho-Roosevelt	2005.4	150.8	60, 271	491	74 \pm 14	62.0
Bighorn	2000.6	151.3	55, 318	298	45 \pm 15	61.1
Black Hills	2005.5	118.3	68, 183	478	57 \pm 6	37.3
Grand Mesa- Uncompahgre- Gunnison	2005.6	164.1	60, 327	901	148 \pm 11	63.9
Medicine Bow-Routt	2003.7	157.8	55, 306	859	136 \pm 10	61.3
Nebraska†	2006.7	121.2	68, 171	17	2 \pm 37	33.0
Pike and San Isabel	2005.6	146.7	53, 278	738	108 \pm 12	54.7
Rio Grande	2005.6	170.3	57, 292	558	95 \pm 12	65.4
San Juan	2005.6	179.9	65, 358	664	119 \pm 13	74.3
Shoshone	1999.4	156.6	53, 307	600	94 \pm 12	60.7
White River	2005.7	174.8	70, 287	662	116 \pm 12	68.3
Regional total	2004.5	158.6	56, 306	6,265	993 \pm 4	61.5

Note: Estimates calculated using FIA data and methods consistent with U.S. greenhouse gas inventory estimates (Smith et al. 2010).

† Consists of the Buffalo Gap, Fort Pierre and Oglala National Grasslands, and the Nebraska and Samuel R. McKelvie National Forests.

Table B3. USFS Southwestern Region (R3) forest carbon statistics for USFS forestland by individual national forest.

National Forest	Average measurement year	Forest carbon density (Mg C/ha)	2.5, 97.5 percentiles of plot C density (Mg C/ha)	Forest area (1000 ha)	Total forest C \pm 95% CI as percentage of mean (Tg \pm %)	Aboveground live tree C density (Mg C/ha)
Apache-Sitgreaves	2005.1	105.3	50, 235	677	71 \pm 14	39.8
Carson	1998.8	132.0	53, 285	522	69 \pm 14	50.2
Cibola	1997.5	86.5	49, 177	568	49 \pm 12	28.0
Coconino	2004.7	97.0	49, 196	613	59 \pm 14	35.0
Coronado	2004.6	83.0	49, 209	515	43 \pm 16	17.8
Gila	1994.4	95.4	49, 242	1,180	113 \pm 8	34.3
Kaibab	2004.9	100.6	51, 216	526	53 \pm 15	38.0
Lincoln	1997.8	97.1	47, 267	391	38 \pm 15	33.6
Prescott	2005.1	70.4	47, 167	259	18 \pm 23	17.9
Santa Fe	1998.6	146.1	51, 315	593	87 \pm 12	62.4
Tonto	2004.8	78.5	49, 172	527	41 \pm 15	20.0
Regional total	2000.8	100.6	49, 254	6,371	641 \pm 4	35.4

Note: Estimates calculated using FIA data and methods consistent with U.S. greenhouse gas inventory estimates (Smith et al. 2010).

Table B4. USFS Intermountain Region (R4) forest carbon statistics for USFS forestland by individual national forest.

National Forest	Average measurement year	Forest carbon density (Mg C/ha)	2.5, 97.5 percentiles of plot C density (Mg C/ha)	Forest area (1000 ha)	Total forest C \pm 95% CI as percentage of mean (Tg \pm %)	Aboveground live tree C density (Mg C/ha)
Ashley	2004.5	138.0	53, 251	389	54 \pm 15	49.1
Boise	2006.5	151.9	67, 295	686	104 \pm 15	53.1
Bridger-Teton	1999.3	158.0	53, 309	969	153 \pm 9	60.0
Caribou-Targhee	2006.1	148.0	72, 305	839	124 \pm 12	48.0
Dixie	2004.5	111.3	52, 257	584	65 \pm 13	38.3
Fishlake	2004.5	108.3	52, 271	448	48 \pm 14	33.3
Humboldt-Toiyabe	2005.1	92.2	53, 225	1,458	135 \pm 16	30.7
Manti-La Sal	2004.6	120.3	53, 280	441	53 \pm 16	42.2
Payette	2006.6	147.9	71, 313	747	110 \pm 15	49.0
Salmon-Challis	2006.6	151.1	81, 282	1,250	189 \pm 10	50.7
Sawtooth	2006.4	176.3	78, 367	451	79 \pm 19	67.3
Uinta	2004.4	134.7	57, 278	283	38 \pm 18	44.8
Wasatch-Cache	2004.4	142.5	60, 263	417	59 \pm 14	50.0
Additional USFS†	2005.9	64.9	65, 65	2	0 \pm 126	17.1
Regional total	2004.9	135.3	54, 286	8,964	1213 \pm 4	46.7

Note: Estimates calculated using FIA data and methods consistent with U.S. greenhouse gas inventory estimates (Smith et al. 2010).

† Forested area of the Desert Range Experiment Station.

Table B5. USFS Pacific Southwest Region (R5) forest carbon statistics for USFS forestland by individual national forest.

National Forest	Average measurement year	Forest carbon density (Mg C/ha)	2.5, 97.5 percentiles of plot C density (Mg C/ha)	Forest area (1000 ha)	Total forest C \pm 95% CI as percentage of mean (Tg \pm %)	Aboveground live tree C density (Mg C/ha)
Angeles	2005.1	135.6	57, 319	87	12 \pm 37	47.2
Cleveland	2006.8	95.0	65, 162	7	1 \pm 83	20.3
Eldorado	2004.9	281.9	91, 526	232	65 \pm 20	135.4
Inyo	2005.1	138.9	55, 353	456	63 \pm 15	52.6
Klamath	2004.8	264.2	66, 558	638	169 \pm 12	126.2
Lake Tahoe Basin	2005.3	200.5	90, 847	75	15 \pm 49	86.0
Lassen	2005.0	213.9	71, 499	420	90 \pm 15	91.2
Los Padres	2005.1	125.8	54, 330	304	38 \pm 20	47.6
Mendocino	2005.1	221.6	68, 529	307	68 \pm 19	104.6
Modoc	2004.7	142.9	73, 391	517	74 \pm 15	38.8
Plumas	2004.8	252.2	82, 563	454	114 \pm 13	116.5
San Bernadino	2005.0	156.2	62, 314	110	17 \pm 32	60.1
Sequoia	2005.1	203.6	63, 593	393	80 \pm 17	88.6
Shasta-Trinity	2005.1	256.2	75, 551	838	215 \pm 10	122.0
Sierra	2004.9	244.3	72, 581	455	111 \pm 14	115.5
Six Rivers	2004.9	308.8	80, 806	391	121 \pm 13	166.2
Stanislaus	2004.9	235.3	62, 560	320	75 \pm 18	106.5
Tahoe	2005.0	242.1	82, 548	327	79 \pm 17	111.1
Regional total	2005.0	222.4	63, 548	6,331	1408 \pm 2	100.5

Note: Estimates calculated using FIA data and methods consistent with U.S. greenhouse gas inventory estimates (Smith et al. 2010).

Table B6. USFS Pacific Northwest Region (R6) forest carbon statistics for USFS forestland by individual national forest.

National Forest	Average measurement year	Forest carbon density (Mg C/ha)	2.5, 97.5 percentiles of plots (Mg C/ha)	Forest area (1000 ha)	Total forest C \pm 95% CI as percentage of mean (Tg \pm %)	Aboveground live tree C density (Mg C/ha)
Colville	2005.5	221.1	107, 389	418	92 \pm 11	71.7
Deschutes	2005.0	167.4	86, 389	578	97 \pm 14	55.4
Fremont	2004.7	170.7	89, 394	417	71 \pm 17	56.3
Gifford Pinchot	2005.4	393.1	121, 763	501	197 \pm 11	181.1
Malheur	2004.9	172.9	85, 295	532	92 \pm 13	53.9
Mt. Baker-Snoqualmie	2005.3	387.0	124, 743	608	236 \pm 12	176.4
Mt. Hood	2005.0	380.2	112, 779	420	160 \pm 12	170.7
Ochoco	2005.3	158.7	86, 296	316	50 \pm 20	44.8
Okanogan	2005.5	209.0	101, 435	636	133 \pm 15	64.9
Olympic	2005.6	397.6	165, 752	244	97 \pm 14	172.8
Rogue River	2004.9	328.3	98, 651	260	86 \pm 20	150.8
Siskiyou	2005.2	346.9	114, 828	400	138 \pm 16	146.3
Siuslaw	2005.2	395.2	153, 888	256	101 \pm 21	178.7
Umatilla	2005.3	195.0	86, 366	512	100 \pm 17	63.6
Umpqua	2005.0	418.6	141, 911	381	160 \pm 16	198.2
Wallowa-Whitman	2005.0	187.6	85, 381	717	134 \pm 12	57.4
Wenatchee	2005.8	241.4	97, 518	820	199 \pm 13	87.5
Willamette	2005.0	420.9	133, 944	622	262 \pm 10	195.6
Winema	2005.1	183.6	86, 459	434	80 \pm 16	66.3
Additional USFS†	2005.2	176.6	118, 382	34	6 \pm 59	37.2
Regional total	2005.2	273.3	94, 689	9,107	2493 \pm 2	109.6

Note: Estimates calculated using FIA data and methods consistent with U.S. greenhouse gas inventory estimates (Smith et al. 2010).

† Includes the Columbia River Gorge National Scenic Area and the Crooked River National Grassland.

Table B7. USFS Southern Region (R8) forest carbon statistics for USFS forestland by individual national forest.

National Forest	Average measurement year	Forest carbon density (Mg C/ha)	2.5, 97.5 percentiles of plot C density (Mg C/ha)	Forest area (1000 ha)	Total forest C \pm 95% CI as percentage of mean (Tg \pm %)	Aboveground live tree C density (Mg C/ha)
Chattahoochee-Oconee	2005.9	180.8	92, 261	343	62 \pm 15	87.3
Cherokee	2005.8	174.3	79, 288	259	45 \pm 17	94.0
Daniel Boone	2003.7	162.1	84, 272	278	45 \pm 16	85.9
El Yunque	†	†	†	†	†	†
Francis Marion-Sumter	2005.4	181.2	97, 329	219	40 \pm 20	64.1
George Washington	2005.9	182.0	90, 284	442	80 \pm 13	90.9
Jefferson	2005.9	179.7	78, 292	321	58 \pm 16	92.2
Kisatchie	2003.5	150.8	64, 278	279	42 \pm 18	68.9
NFS in Alabama	2005.6	138.0	69, 231	305	42 \pm 17	60.8
NFS in Florida	2004.9	163.1	79, 315	452	74 \pm 15	34.5
NFS in Mississippi	2006.6	146.5	67, 242	537	79 \pm 13	66.4
NFS in North Carolina	2005.3	187.6	77, 348	480	90 \pm 14	95.1
NFS in Texas	2005.8	154.2	89, 231	279	43 \pm 17	72.8
Ouachita	2003.1	132.1	66, 195	675	89 \pm 9	58.1
Ozark and St. Francis	2004.8	144.9	77, 219	460	67 \pm 13	71.1
Additional USFS†	2005.1	142.6	48, 255	95	14 \pm 44	67.6
Regional total	2005.1	160.2	74, 280	5,423	869 \pm 4	72.9

Note: Estimates calculated using FIA data and methods consistent with U.S. greenhouse gas inventory estimates (Smith et al. 2010).

† Includes administrative areas identified as "Other NFS Areas."

‡ Data for Puerto Rico were not available at time of this analysis.

Table B8. USFS Eastern Region (R9) forest carbon statistics for USFS forestland by individual national forest.

National forest	Average measurement year	Forest carbon density (Mg C/ha)	2.5, 97.5 percentiles of plot C density (Mg C/ha)	Forest area (1000 ha)	Total forest C \pm 95% CI as percentage of mean (Tg \pm %)	Aboveground live tree C density (Mg C/ha)
Allegheny	2004.3	215.2	99, 318	210	45 \pm 8	90.5
Chequamegon-Nicolet	2006.1	262.9	157, 413	579	152 \pm 4	60.2
Chippewa	2006.2	251.2	156, 396	227	57 \pm 9	52.6
Green Mountain	2005.6	221.8	146, 316	166	37 \pm 9	88.0
Hiawatha	2004.8	276.8	143, 443	340	94 \pm 5	63.2
Hoosier	2006.4	178.0	82, 270	78	14 \pm 11	88.4
Huron-Manistee	2004.9	224.1	125, 386	364	82 \pm 5	61.4
Mark Twain	2006.2	151.4	79, 218	612	93 \pm 4	70.2
Monongahela	2006.2	229.3	144, 345	368	84 \pm 12	106.9
Ottawa	2004.8	284.6	172, 446	366	104 \pm 5	76.2
Shawnee	2005.9	171.2	87, 250	117	20 \pm 11	86.1
Superior	2006.3	251.3	145, 391	798	201 \pm 5	39.5
Wayne	2004.6	175.4	86, 295	92	16 \pm 10	75.1
White Mountain	2004.8	223.4	132, 308	326	73 \pm 7	85.3
Additional USFS†	2005.7	183.8	118, 219	11	2 \pm 85	65.5
Regional total	2005.6	230.7	111, 392	4,652	1073 \pm 2	68.4

Note: Estimates calculated using FIA data and methods consistent with U.S. greenhouse gas inventory estimates (Smith et al. 2010).

† Includes the Midewin Tallgrass Prairie and administrative areas identified as "Other NFS Areas."

Table B9. USFS Alaska (R10) forest carbon statistics for USFS forestland by individual national forest.

National Forest	Average measurement year	Forest carbon density (Mg C/ha)	2.5, 97.5 percentiles of plot C density (Mg C/ha)	Forest area (1000 ha)	Total forest C \pm 95% CI as percentage of mean (Tg \pm %)	Aboveground live tree C density (Mg C/ha)
Chugach	2006.3	260.1	98, 571	442	115 \pm 31	94.2
Tongass	2006.2	323.5	105, 610	3,921	1269 \pm 6	123.0
Regional total	2006.2	317.1	101, 607	4,363	1384 \pm 6	120.0

Note: Estimates calculated using FIA data and methods consistent with U.S. greenhouse gas inventory estimates (Smith et al. 2010).

APPENDIX C

Table C1. Data for text Fig. 6. Average annual net CO₂ sequestration in forests (Tg CO₂/yr; not including changes in soil) by ownership and National Forest System region for the period 2000–2008.

NFS region	National Forest			Other public			Private		
	2.5	Mean	97.5	2.5	Mean	97.5	2.5	Mean	97.5
Northern	-41.5	-13.3	12.9	-10.2	-3.8	2.4	-2.7	4.3	11.1
Rocky Mountain	-32.8	-22.8	-13.4	-17.3	-9.7	-1.2	-15.6	-5.7	4.5
Southwestern	-27.8	-9.7	9.6	-5.5	-2.6	0.4	-0.2	6.2	12.4
Intermountain	-20.3	-2.2	17.9	-18.7	-12.0	-5.1	-0.2	3.5	7.5
Pacific Southwest	-28.1	-3.5	21.4	-29.1	-16.3	-3.2	-27.1	-12.8	1.1
Pacific Northwest	-71.0	-42.3	-14.9	-50.5	-26.7	-4.3	-8.7	11.5	32.3
Southern	-58.2	-35.9	-11.2	-68.8	-45.5	-23.3	-120.2	-77.4	-32.3
Eastern	-28.7	-17.4	-5.6	-95.3	-68.1	-38.4	-113.0	-78.7	-43.3

Notes: The 2.5 and 97.5 columns are the respective percentile value for a 95% confidence interval of uncertainty about the regional mean stock-change estimates from carbon conversion factors and sampling error. Negative values indicate more CO₂ is sequestered by forests than is being emitted to the atmosphere.

Attachment 2-c

**Estimates of preanthropogenic carbon storage in
global ecosystem types**

an [INQUA Terrestrial Carbon Commission](#) resource

Estimates of preanthropogenic carbon storage in global ecosystem types.

Compiled by Jonathan Adams, Environmental Sciences Division, Oak Ridge National Laboratory, TN 37831, USA

Link to [Introduction to the carbon storage inventory](#)

References directly cited in these pages (does not at present include secondary citations)

This section of the inventory aims to give information and opinion on per-unit-area carbon storage for specific ecosystem types in their 'natural', relatively non-anthropogenic state such as existed up until the mid-Holocene in many areas. Under each broad ecosystem type the present range of opinion is discussed, and a 'recommended' value is put forward. The recommended value is that which, on the grounds of this discussion and repeated checking with authors, is suggested by the present author as being the most plausible for the preagricultural/Late Quaternary state of each biome. Note that the purpose here is *not* to estimate 'present actual' (i.e. 1997) carbon storage, but instead the most likely state at various times in the prehistoric past. This is a state that present-day areas of anthropogenically disturbed ecosystems may tend to return to (even with climatic changes and alterations in the natural disturbance regime) if they are left unmanaged over future decades and centuries. Such estimates are important, therefore, in understanding the future potential fluxes of carbon into terrestrial biomes; they need to be taken into account in the carbon budgeting of planting and forest management policies, in long-term planning of fuelwood resources, etc.

Units

Units are presented here in tonnes of carbon per hectare (t/ha C). This unit is standard in the forestry and forest ecology literature, and is also often used in ecology in general. For conversion into Kg/m² (a unit quite widely used in soil carbon studies, and in non-forest vegetation carbon studies), divide by 10.

Ecosystem components

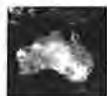
For each ecosystem category, the values are broken down as follows; litter and debris (dead trees, dead roots, fallen wood, dead fallen leaves and twigs) t/ha C, vegetation (leaves, stems, trunks, branches, roots) t/ha C, and soil (organic matter below the litter layer and excluding living or dead roots and underground stems) t/ha C.

Each of the vegetation types is described in relation to categories used in the Olson et al. (1983) ecosystems map, although many modifications to this framework have been necessary.

Maps of hypothetical potential ecosystem distribution for present climates in the absence of anthropogenic disturbance (compiled by Jonathan Adams from a range of sources).



[Africa present-potential vegetation](#)



[Australasia present-potential vegetation](#)



[Eurasia present-potential vegetation](#)



[Europe present-potential vegetation](#)



[North& Central America present-potential vegetation](#)



[South America present-potential vegetation](#)

[Key to the vegetation classification system used in this inventory and in the above maps](#)

[Link to Olson et al.'s map of present-actual ecosystem distribution and carbon storage](#)

[Version of the Olson et al. map with 'zoom-in' option](#)

[WCMC's map of present-actual global forest distribution](#)

[Key to the vegetation classification system used in this table and in the above maps](#)

A summary of suggested average carbon storage in preanthropogenic ('prehistoric') ecosystems. Note that modern-day ecosystems are often depleted in carbon relative to this reconstructed state, due to agriculture and wood-cutting. An error range of approximately +/- 30% is suggested on each value.

Ecosystem type	Vegetation tC/ha	Soils tC/ha	Litter/Debris tC/ha	Total tC/ha
1. Tropical Rain Forest	210	100	10	320
2. Monsoon Forest	150	100	10	260
3. Tropical Woodland	85	70	10	165
4. Tropical Thorn Scrub	40	21	4	65
5. Tropical Semi-Desert	5	14	0	19
6. Tropical Grassland	12	42	0	54
7. Tropical Desert	1	0	0	1
8. Savanna/Forest Mosaic				

9. Tropical Savanna	35	55	0	90
10. Warm Temperate Forest	190	145	36	371
11. Giant Conifer Forest	350	256	120	726
12. Tropical Montane Forest	130	130	15	275
13a) Mediterranean Forest	100	80	8	188
13b) Mediterranean Scrub	40	60	5	105
14. Cool Temperate Forest	160	140	25	325
15. Southern Taiga	140	135	15	290
16. Main Taiga	82	219	15	320
17. Open Boreal Woodland	50	129	15	194
18a) Temperate Woodland	95	97	15	207
18b) Temperate Scrub	45	45	5	95
19a) Montane/Dry Tundra	5	50	0	55
19b) Lowland Tundra	10	210	0	220
20a) Steppic Steppe-tundra	5	55	0	60
20b) Tundric Steppe-tundra	5	55	0	60
21. Polar/Montane Desert	1	0	0	1
22. Temperate Desert	1	0	0	1
23. Temperate Semi-Desert	4	56	0	60
24a) Moist Steppe	10	250	0	260
24b) Dry Steppe	6	70	0	76
25. Forest Steppe	10	220	11	241
26. Forest-Tundra	11	166	20	197
27. Bog/Swamp	20	N.A.	0	20 (+ peat)

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Attachment 2-d

The forest sector carbon budget of the United States



The Forest Sector Carbon Budget of the United States: Carbon Pools and Flux Under Alternative Policy Options



SECTION 4. RESULTS AND DISCUSSION

A. Current pools

Over half of the total timberland carbon is in the mineral soil (Figure 4.1). Tree carbon, which includes coarse roots, is the next largest component at 31%, followed by woody debris (11%), forest floor (6%), and understory (1%). Total carbon storage in living trees on timberland in the US was estimated at 11.1 Pg-C. This quantity conforms with the estimate identified in Box 6, which is based on biomass factors derived from Cost et al. (1990) and Koch (1989). The comparable estimates of Birdsey (1992a) was 11.4 Pg-C. The addition of woodlands carbon, as described in Section 9.B, brings the total for all forests in the US to 11.6 Pg-C.

Privately-owned forests contain 64% of timberland carbon. In terms of the regional distribution, the Northeast and South Central regions have the largest absolute quantities of carbon (Figure 4.2). A different pattern is seen for the average quantity of carbon per unit area, with the highest average found in the Pacific Northwest West and the lowest in the South Central region (Figure 4.3).

The relatively large pool of woody debris demonstrates that consideration of this pool is necessary for a comprehensive analysis of forest carbon. Recently harvested stands may have large quantities of woody debris in the form of dead roots, stumps, and logging residue. Relatively old stands contain large quantities of woody debris because of the accumulation of snags and fallen logs. Because of the limited availability of inventory data on woody

debris, we have relied on a modeling approach in the present study to estimate woody debris pools (Section 3.A.1). Better inventory data on variability in the woody debris pool among forest types and age classes is needed and would allow for more refined analyses.

The uncertainties in the pool estimates for private timberlands have been discussed (Section 3.A, 9.A) and relate in part to the intensity and frequency of sampling by the FIA surveys. For public lands, we have depended on area and volume inventories, primarily provided by the USDA Forest Service, which vary widely in their reliability. The relatively limited availability of data regarding forest stand age class distributions on public lands suggests the need for additional study. Satellite remote sensing holds considerable promise for both vegetation classification and evaluation of forest structure (Iverson et al. 1989; Loveland et al. 1991; Turner et al., in press). Research efforts in this area are underway at the US EPA Environmental Research Laboratory, Corvallis, Oregon, and may provide new evaluations of forest condition on public lands in the western US as well as verification of USDA Forest Service inventory data.

B. Current flux

1. Base year biologically driven carbon flux

The estimates of carbon flux derived from the stand-level carbon budgets indicate a common sequence over the time course of the analysis (Figure 4.4).

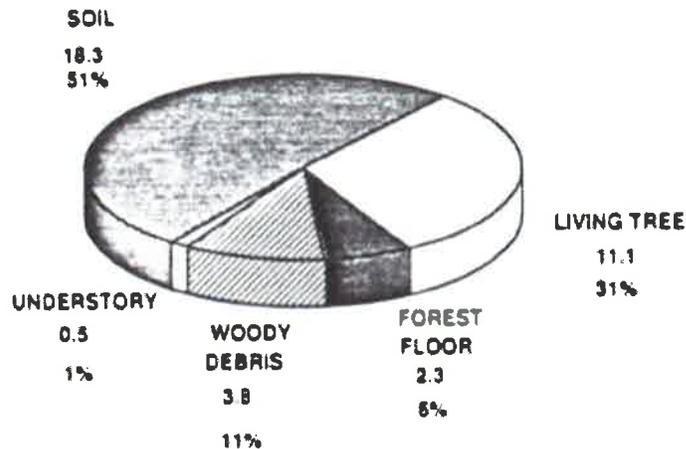


Figure 4.1. Relative contribution of carbon pools (Pg-C) to total carbon for US timberland.

Early in stand development the net ecosystem productivity (NEP), or net change in the total carbon pool, is negative because of carbon loss to the atmosphere associated with decomposition of the woody debris pool. Near the time of canopy closure, the rate of carbon accumulation associated with tree growth begins to exceed the rate of carbon emissions from woody debris, and the system as a whole is a carbon sink. For older age classes the NEP decreases again because greater maintenance respiration costs and other physiological or anatomical constraints decrease growth in the living tree pool. Also, microbial respiration from decay of woody debris increases in old stands. The time course of the fluctuations in NEP varies with forest

type (Figure 4.4). NEP in the Southeast planted pine forest type peaks much earlier than in the Pacific Northwest West Douglas-fir and Northeast Maple-Beech-Birch forest types.

The overall net flux of carbon driven by biological processes was 286 Tg-C yr^{-1} moving from the atmosphere into forest stands. Private timberlands accounted for 78% of the total US uptake. The two southern regions had the highest absolute uptake (Figure 4.5) followed by the two northern and four western regions. The net uptake per unit area (Figure 4.6) was also highest in the South East and South Central regions (0.18 to $0.21 \text{ kg-C m}^{-2} \text{ yr}^{-1}$), followed by the Pacific Northwest West, the Northeast, and the Pacific Southwest ($0.14 \text{ kg-C m}^{-2} \text{ yr}^{-1}$).

Attachment 2-e

Trees: The carbon storage experts

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Trees: The Carbon Storage Experts



One half the dry weight of wood is carbon.

The heat is on. Global warming has speeded up, yet debates continue about the best way to slow the increase of carbon dioxide that is trapping heat in the Earth's atmosphere. Carbon needs to be pulled out of the atmosphere and put into long-term storage elsewhere. This process is called carbon sequestration, and high-technology ways to accomplish it are being explored worldwide.

However we don't have to wait for high tech sequestration. We can increase carbon sequestration now by working with some experts. They're called trees, and they have almost 350 million years' experience in sequestering carbon. Trees, like other green plants, use photosynthesis to convert carbon dioxide (CO₂) into sugar, cellulose and other carbon-containing carbohydrates that they use for food and growth. Trees are unique in their ability to lock up large amounts of carbon in their wood, and continue to add carbon as they grow.

Although forests do release some CO₂ from natural processes such as decay and respiration, a healthy forest typically stores carbon at a greater rate than it releases carbon.

The actual rate of carbon sequestration will vary with species, climate and site, but in general, younger and faster growing forests have higher annual sequestration rates. Considering that one half of the weight of dried wood is carbon, trees in a forest hold a lot of carbon. When the enormous amount of carbon stored in forest soils is added to the trees' carbon, it becomes obvious that forests are major carbon storage reservoirs.

The main strategies for using forests for carbon sequestration are listed below in order of their potential for carbon sequestration in New York:

- **Active forest management** - enhancing forest growth through sustainable forestry
- **Avoided deforestation** - reducing the loss of forested land by promoting smart growth and less sprawl.
- **Forest preservation** - leaving forests undisturbed as is done in the 3 million acres of the Adirondack and Catskill Forest Preserve.
- **Afforestation** - adding forest to previously unforested land, as was done on State Forest land during the Great Depression .

Active Forest Management

Working forests are a critical component of a sustainable future for New York State. They reduce atmospheric CO₂ by carbon sequestration, and they produce wood products and alternative energy. Although it may seem counterintuitive to manage a forest for both carbon sequestration and energy production, it can be done with New York's abundant post-agricultural forests. Many people do not realize how fast trees can grow in New York's climate. An abandoned farm field can be covered with a forest of good-sized trees within 50 years. Proper management of these second and third growth forests for wood products and energy production actually enhances their ability to sequester carbon by enabling the remaining trees to grow more vigorously. By mimicking the effects of natural forest events such as fire and windstorms that create beneficial openings, timber harvesting can be used to open crowded canopies and encourage the growth of specific species such as oaks.

Active forest management enhances a forest's carbon sequestration capacity by keeping the trees healthy and promoting vigorous growth. Strong healthy trees are more resistant to pests and diseases, and may also be better able to adapt to the stresses of a changing climate and are growing more vigorously and sequestering more carbon.

DEC has more than 760,000 acres of State Forests which are managed for timber production, as well as for wildlife habitat, recreation and biodiversity.

More than 62% of New York State is forest land, which amounts to 18.6 million acres, or 29,000 square miles, of land covered by trees. More than 80%, 14.8 million acres, is privately owned. About 1 million acres of this is industrial forest land owned by large timber or investment companies and actively managed for timber production.

To encourage sustainability of non-industrial private forest land, New York's Forest Stewardship Initiative helps private landowners develop forest management plans. The Forest Tax law provides incentives for managed forest lands. Many landowners have worked with

Department of Environmental Conservation (DEC) Lands & Forest's Private Forest Management staff to develop management plans for their land. Almost 2 million acres of private forest land is managed under the Forest Stewardship Program and about 650,000 acres are covered by the Forest Tax Law program. But there are more than 10 million acres of private forest land outside these programs. Much of this land is left un-managed, but could contribute significant carbon sequestration under active forest management.

Avoided Deforestation

Significant land disturbance is a major source of CO₂ emissions. Human disturbance has much more impact on forests than natural disturbances such as fires or hurricanes. When forested land is converted to agriculture or development, soils are typically ploughed, graded, compacted or excavated, and then often left exposed to erosion. Natural disturbances, other than landslides, rarely cause deep damage to soil structure. Some of the CO₂ given off from forest disturbance comes from decay, but the biggest source is from the disturbed soil. Although they accumulate carbon much more slowly than trees, forest soils ultimately become storehouses for enormous amounts of carbon, over twice as much as is stored in the wood of the trees.

When forest soils are disturbed, they can lose carbon rapidly from the fast decay of organic material. In parts of the Pacific Northwest, a clear-cut replanted with conifer seedlings can continue to emit CO₂ for as long as 20 years. Even though the young trees are sequestering carbon, the accelerated rate of soil decay caused by disturbance gives off carbon at a higher rate than the young trees can take up.

While some land must be cleared in order to build, too often everything is stripped off leaving only bare soil. Although it is possible to save many mature trees during development, it is cheaper to get the trees out of the way by stripping the site. A land use study of upstate New York showed a 30 % increase in land development between 1982 and 1997, but only a 2.6 % growth in population during the same period. The study was appropriately titled *Sprawl Without Growth*.

There is ultimately a high price for poor development practices, a price that ends up being paid for by the community and taxpayers rather than the developer. Once the trees are gone, the many benefits, or ecosystem services, which they provided, are also gone. These benefits include reduced storm run-off, clean water, clean air and natural cooling, as well as carbon sequestration. The adverse impacts of the cleared land include increased run-off, which can overload stormwater systems, soil erosion, water pollution, and, of course, adding more CO₂ to the atmosphere.

Saving trees and planting additional trees are vital for water resource management alone, but along with the use of Smart Growth and green infrastructure for developments, could ultimately lead to better communities where trees can make a much greater contribution to improving the environment.

Forest Preservation

One forest-based carbon sequestration strategy is to preserve forests in their natural state, as has been done in the Adirondack and Catskill Forest Preserve. These forests will never be

actively managed or cut. These mature late succession forests hold vast amounts of carbon in their wood, and even more in their undisturbed organic soils. They may sequester carbon at lower rates than do managed forests with younger trees, because older trees usually grow more slowly. In un-managed forests, only natural disturbances such as storms and fire, will provide clearings where young trees can get enough sun for rapid growth. Although mature trees which generally dominate undisturbed forests don't grow as fast as young trees, they too can take advantage of the added light from natural clearings. Depending on the species, even mature trees can put on surprising growth spurts under favorable conditions.

The forests of New York's Forest Preserve lands, State Unique Areas, State Parks and other protected lands, represent substantial carbon reservoirs, particularly in their soils. They are also vital for water quality, biodiversity, wildlife habitat, preservation of very old forests, and as genetic reservoirs for the future.

Afforestation

Since the mid-nineteenth century, New York, along with most of the Northeastern states, has undergone major afforestation as millions of acres of abandoned farmland, which were covered with forest in pre-colonial times, have reverted back to forest. Consequently there are relatively limited opportunities for new, large scale additions of forest cover.

The largest potential for adding forest cover is probably in urban areas. Although urban forests may not be as effective at sequestering carbon as managed forests, they do have some sequestration capacity. However, their bigger role in greenhouse gas reduction is reducing energy used for air conditioning. Trees provide both shade and evaporative cooling which helps reduce the temperature both inside and outside a building. Increasing the amount of urban forest goes beyond just planting additional trees. The use of vines for green walls provides many of the same benefits in places where there may not be room for shade trees. Studies have shown that many plants, such as fast-growing vines, respond dramatically to higher levels of CO₂ by growing faster and taking up CO₂ at an increased rate.

Greater use of plants in cities not only helps save energy, but also benefits human health by improving air quality. Trees are effective at capturing particulate pollution from the air and also help lower concentrations of other air pollutants such as ozone and nitrous oxide. Trees and other plants help reduce excess runoff and water pollution by capturing and filtering stormwater. Adding green to a city can also produce direct economic benefits, such as increased tourism, and also job creation in plant-based industries, such as green roof installation.

Forests Are Truly a Green Way to Reduce CO₂

Increasing the carbon sequestration capacity of New York's forests can be started now. DEC is working on policies and programs to encourage wider use of these strategies to increase forest carbon sequestration:

- Promote stewardship of private forest lands.
- Reduce unnecessary deforestation.
- Add forest, especially in urban areas.
- Increase the use of sustainable forest management.

The costs are comparatively low, and there are minimal environmental impacts. But the biggest advantage of increasing forests for carbon sequestration capacity is that there are so many environmental benefits from forests that it would be worth increasing them anyway - even if they weren't so effective at sequestering carbon.

Although forests alone can't sequester all of the excess carbon added by burning fossil fuels, they can make a difference, especially if we help and encourage them. Wisely managed forests can sequester carbon and also provide a sustainable source of fuel and lumber, help clean our air and water, preserve wildlife habitat, provide recreation opportunities and preserve the beauty of trees in their natural home for generations to come.

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Attachment 2-f

Old growth forests as global carbon sinks

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Letter

Nature **455**, 213-215 (11 September 2008) | doi:10.1038/nature07276;

Received 18 January 2008; Accepted 7 July 2008

Old-growth forests as global carbon sinks

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Old-growth forests remove carbon dioxide from the atmosphere^{1,2} at rates that vary with climate and nitrogen deposition³. The sequestered carbon dioxide is stored in live woody tissues and slowly decomposing organic matter in litter and soil⁴. Old-growth forests therefore serve as a global carbon dioxide sink, but they are not protected by international treaties, because it is generally thought that ageing forests cease to accumulate carbon^{5,6}. Here we report a search of literature and

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databases for forest carbon-flux estimates. We find that in forests between 15 and 800 years of age, net ecosystem productivity (the net carbon balance of the forest including soils) is usually positive. Our results demonstrate that old-growth forests can continue to accumulate carbon, contrary to the long-standing view that they are carbon neutral. Over 30 per cent of the global forest area is unmanaged primary forest, and this area contains the remaining old-growth forests². Half of the primary forests (6×10^8 hectares) are located in the boreal and temperate regions of the Northern Hemisphere. On the basis of our analysis, these forests alone sequester about 1.3 ± 0.5 gigatonnes of carbon per year. Thus, our findings suggest that 15 per cent of the global forest area, which is currently not considered when offsetting increasing atmospheric carbon dioxide concentrations, provides at least 10 per cent of the global net ecosystem productivity⁸. Old-growth forests accumulate carbon for centuries and contain large quantities of it. We expect, however, that much of this carbon, even soil carbon⁹, will move back to the atmosphere if these forests are disturbed.

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Estimates of total carbon storage in various important reservoirs.

Compiled by Jonathan Adams, Environmental Sciences Division, Oak Ridge National Laboratory, TN 37831, USA

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The following tables present some of the estimates for carbon reservoir sizes that have been put forward during the last twenty years or so. Some of these figures appear to be based on *ad hoc* studies and on extrapolation from very small amounts of data, but most seem to be based on fairly thorough work.

In general, the total range of all estimates published over the years for each reservoir should not be regarded as an indicator of the current range of uncertainty. In each case as more and more work has been done, so the general accuracy of the estimates has probably improved. Thus, the later-published estimates should generally be taken more seriously than the older ones. Nevertheless there is still always the possibility that some important aspect of any reservoir has been overlooked or poorly estimated, so that even the most recent estimates might eventually turn out to be in serious error.

It is important to distinguish between estimates that are intended to represent 'present-actual' carbon storage, and those intended to represent the 'present-potential' or past state. The present-potential is an elusive and hypothetical concept representing the distribution of vegetation types which it is thought would exist under presently existing climate conditions, if humans had not begun extensively modifying the environment through agriculture and forestry during the late Holocene. Sometimes it is taken to refer to the immediate pre-industrial era, but more often as a rough indicator of conditions about 4,000 years ago, just before the main anthropogenic deforestation phase.

Table 2:1a Previous global carbon storage estimates for vegetation. Note that some of these citations are secondary citations; these are marked (s.). Units are in gigatonnes of carbon (1 Gt = 1 billion tonnes = 1 Petagram = 1×10^{15} g).

Storage (Gt C)	Reservoir type	Author(s)
827 Gt (1.)	Present actual land vegetation	Whittaker & Likens (s.)

560 Gt (2.)	Present actual land vegetation	Olson et al. (1983)
550 Gt (3.)	Present actual (1980s) vegetation	IPCC (1990) (s.)
610 Gt (3.)	Pre-industrial (pre-1700) vegetation	IPCC (1990) (s.)
1080 Gt (4.)	Land vegetation, 'prehistoric' times	Bazilevich et al. (1971)
924 Gt	Present potential ('prehistoric') vegetation	Adams et al. (1990)
343 Gt (5.)	Last Glacial Maximum vegetation	Adams et al. (1990)
787 Gt (6.)	Forest vegetation and soils (present day)	Dixon et al. (1984)
110 Gt (7.)	Global 'short-lived' biota (present day).	Macdonald (1982)
450 Gt (7.)	Global 'long-lived' biota (present day).	Macdonald (1982)
350 Gt	Coarse woody debris (present potential)	Harmon (pers. comm.)
591 Gt (8.)	Present-actual land vegetation	Ajtay et al. (1975) (s.)

(1.) in Whittaker 1975, citing earlier work by Whittaker & Likens (s.).

(2.) 'Medium' value of 560 Gt, 'low' value 460 Gt, 'high' value 665 Gt. Based on a thorough study. For 'present actual' vegetation, these values are probably the most accurate to date.

(3.) From Siegenthaler & Sarmiento 1993, in a box model summary, using numbers approximating to 1990 IPCC assessment (s.).

(4.) Of this, several hundred Gt (240 Gt) released on forest clearance (Olson 1974 (s.), cited in Olson et al. 1983), at an average rate of upto 0.1 Gt per year.

(5.) Based on palaeovegetation maps of ecosystem areas.

(6.) Note that this estimate excludes non-forest ecosystems, but includes forest soil carbon.

(7.) Presumably derived from Olson et al. (1983), but source not specified. Presumably by 'short-lived' biota they mean herbaceous plant parts, fine roots, fruits etc.

(8.) Cited by Olson et al. (1983).

Table 2:1b: carbon storage totals for global soils. Note that some of these citations are secondary citations, marked by (s.).

Storage (Gt C)	Reservoir type	Author(s)
1115 Gt	Soils, present potential ('prehistoric')	Adams et al. (1990)
1395 Gt (1.)	Peats + soils, present potential	Adams et al. (1990)
1400 Gt (2.)	Soils (?present-day)	Macdonald (1992)
1640 Gt (2.)	Soils + peat + litter	Macdonald (1992)
1405 Gt (3.)	Soils, present-day	Bazilevich (1974) (s.)
3000 Gt (4.)	Soils (+peats ?), present-day	Bohn (1978) (s.)
1672 Gt (3.)	Soils, present-day	Bolin et al. (1979) (s.)

1477 Gt (5.)	Soils, present-day	Buringh (1983) (s.)
1515 Gt (6.)	Soils (+peatlands?) present-day	Schlesinger (1984)
787 Gt	Forest soils only (+fine debris)	Dixon et al. (1993)
1500 Gt (7.)	Soils, in 1989	IPCC (1990) (s.)
1560 Gt (7.)	Soils, in 'preindustrial' era.	IPCC (1990) (s.)
860 Gt (8.)	Peats, present-day	Bohn (1976) (s.)
300 Gt (8.)	Peats	Sjors (1980) (s.)
202 Gt (8.)	Peats	Post et al. (1982)
377 Gt (8.)	Peats	Bohn (1976,82)
500 Gt (8.)	Peats	Houghton et al. (1985) (s.)
249 Gt (8.)	Northern peatlands	Arm.& Men. (1986). (s.)
210 Gt (8.)	Boreal peatlands	Oeschel (1989) (s.)
180-227 Gt (8.)	Peats	Gorham (1990) (s.)
461 Gt (9.)	Subarctic and boreal peat	Gorham (1992)
1576 Gt (10.)	Global soils (present-day)	Eswaran et al. (1993)
500 Gt (11.)	Global peats	Markov et al. (1988) (s.)

(1.) incorporating 280 Gt for peats, a rough mid-way estimate from the range of sources in the literature (see below).

(2.) 1400 Gt in soils, plus 180 Gt in peat, plus 60 Gt in litter = 1640 Gt total. Figure of uncertain derivation.

(3.) Value cited by Schlesinger (1985); original reference not consulted.

(4.) Value cited by Schlesinger (1985). Based on extrapolation from data on South American soils. Generally viewed as too high a value by other authors. An estimated 300 Gt C was lost from soils since mid 1800s.

(5.) Value cited by Schlesinger (1985). With 537 Gt lost from soils since pre-history.

(6.) Based on a range of IBP and other data. With 36 Gt lost from soils since the mid-1800's.

(7.) Siegenthaler & Sarmiento 1993, in a box model summary, using numbers approximating to 1990 IPCC assessment.

(8.) Values cited by Schlesinger (1985).

(9.) Of the estimates for global peatland, the recent one of 461 Gt compiled by Gorham (1992) is generally seen as the most robust by experts in the field whom I have spoken to (e.g. R. Clymo, C. Kreminetski). It was based on a wide range of data sources including much recently gathered data, and compiled using a GIS-based approach. However, the latest estimates currently emerging from studies on Canadian peatlands (C. Kreminetski pers. comm., May 1994) seem to suggest figures of around 200 Gt for Canada alone, and if one takes the Russian and Scandinavian peatlands as together containing about twice this amount of carbon (a conservative estimate) this would give a total of

around 600 Gt. This figure also does not include any tropical peatlands, which might well contain 100 Gt or more of peat carbon (H. Faure, unpublished calculations).

(10.) Eswaran et al. (1993) produced a revised set of estimates based on currently available data on soils, classified using the FAO-UNESCO system. However, their definition of 'soils' (meaning soils and peats) includes histosols (peats) only to a depth of 1m, which clearly greatly underestimates the size of the soil+peat reservoir.

(11.) Cited from the Russian by C. Kreminetski (Acad. of Sciences, Moscow), who regards this as a conservative estimate and probably an underestimate.

Table 2a:3 Marine, geologic and atmospheric reservoirs of carbon.

Storage	Reservoir type	Author(s)
750 Gt (1.)	In atmosphere, CO ₂ , CH ₄ (1990)	IPCC (1990) (s.)
11,500 Gt (2.)	Methane clathrates	Macdonald (1992)
38,725 Gt (3.)	Dissolved or in suspension in oceans	IPCC (1990) (s.)
700 Gt (4.)	Dissolved organic C; intermediate & surface waters	IPCC. (1990) (s.)
4,000 Gt (5.)	Fossil fuel	Johns. & Ker. (s.)

(1.) currently increasing by 3 Gt per year (1ppm CO₂ in atmosphere = 2.1286 Gt carbon).

(2.) Buried in seafloor, under permafrosts. A controversial figure. Considered much too high by many.

(3.) 38,725 Gt in oceans; 725 Gt (25 Gt organic, 700 Gt inorganic) in surface waters, 38,000 Gt (1,000 Gt organic, 37,000 Gt in inorganic form) in deep waters.

(4.) 1000 Gt total (organic and inorganic carbon) in surface ocean waters. D.O.C. 700 Gt. 38,000 Gt in intermediate and surface waters. Siegenthaler & Sarmiento 1993, in a box model summary, using numbers approximating to the 1990 IPCC assessment.

(5.) cited by Siegenthaler & Sarmiento (1993).

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Attachment 2-h

An inventory of data, for reconstructing 'natural steady state' carbon storage in terrestrial ecosystems

[Link to Richard Olson and Jonathan Scurlock's global NPP network of study sites](#)

an INQUA Terrestrial Carbon Commission Resource

NEW! [Lioubimtseva's forthcoming keynote conference presentation on soil carbon](#)

AN INVENTORY OF DATA, FOR RECONSTRUCTING 'NATURAL STEADY STATE' CARBON STORAGE IN TERRESTRIAL ECOSYSTEMS.

Jonathan Adams, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA

[Data tables for global carbon reservoirs](#)

[Data tables for specific ecosystem categories](#)

[References directly cited on these pages \(does not at present include secondary citations\)](#)

Summary

'Post-anthropogenic' carbon storage. The equilibrium carbon storage that ecosystems will eventually achieve if left undisturbed by humans is a major unknown in terms of quantifying future carbon sinks into global forests and other ecosystem types. In the present world, for instance, most temperate forests are clearly well below their potential per-unit-area carbon storage. To make predictions of future CO₂ rise, it is important to understand how great a sink the world's forests are likely to be before they eventually 'saturate' and stop taking up further carbon, aside from any issues of direct CO₂-fertilization. It is of course possible that disturbance regimes will change significantly under warmer 'greenhouse effect' climates. It seems that there would have to be a very major increase in disturbance frequency to significantly depress potential biomass in many key ecosystems (e.g. tropical and temperate forests), whilst other ecosystems (e.g. taiga) may already be strongly limited in their carbon storage by present-natural frequencies of disturbance events. The latter sets of ecosystems are the most likely to undergo changes in potential steady state carbon storage in a greenhouse world.

'Pre-anthropogenic' carbon storage. It is also necessary to take terrestrial carbon storage changes into account to understand the history of the carbon cycle over recent geological history. There have been various published attempts to estimate the organic carbon fluxes in to and out of land ecosystems since the Last Glacial and pre agricultural Holocene. However, previous calculations

have all been based on *ad hoc* and uncritical use of data from the present-day world, without any allowance for the possible 'pre agricultural' state of vegetation and soils.

Here, a range of published data and opinion on carbon storage in natural vegetation, soils and peatlands is summarised under headings approximating to the vegetation scheme used by Olson et al. (1983). Wherever possible, a critical analysis is made on the derivation and accuracy of each set of figures, and on this basis a 'recommended' Last Glacial-to-mid Holocene carbon storage value is given for each major land ecosystem type.

It appears that very often, the pre-historical carbon storage of woody ecosystems would have been much higher than one would suggest from studying the present-day world, where anthropogenic activity is almost ubiquitous. This seems to be the case even if one allows for the background of natural disturbance effects such as wind throw, fire and landslides. Existing widely-used databases of carbon storage often do not give proper emphasis to this fact. The general effect of strong direct-CO₂ effects on long term carbon storage remains a major uncertainty.

Aside from issues of disturbance regime *per se*, the standard database of soil carbon storage presented by Zinke et al., although serving as an important basis for much useful work, is to some extent out-of-date in the carbon storage values which it gives; an attempt is made to point out its possible inaccuracies, giving alternative figures where new data are available.

Whilst the figures given here are preliminary, it is evident from this analysis that background changes in anthropogenic disturbance regime need to be taken into account in estimates of carbon storage changes over future decades and centuries, and in reconstructing carbon storage in the past.

Furthermore, some of the standard per-unit area carbon storage data used for present-day calculations of soil and ecosystem carbon storage appear to be based on unrepresentative sampling or incorrect assignment of ecosystem categories due to ambiguities in description. Such problems are particularly evident in the case of present-day desert soils.

Contents of the introductory section

- The aims of this data inventory
- The collection of carbon storage data from the present-day world
- Conversion from organic matter to carbon storage
- Sources of vegetation data
- Soil and peat carbon
- Natural disturbance of vegetation
- 'Naturalness' in vegetation carbon storage; can the present be representative of the past?
- No-analogue communities in the past and future

- Direct carbon dioxide effects in the past and future
 - Human intervention in the past
 - Broad scale disequilibrium in the past
-

The aims of this data inventory.

1) ***Predicting future changes in sinks and sources*** . There is presently a great deal of interest in the sinks and sources which may affect the rising CO₂ level in the Earth's atmosphere. To make the most accurate predictions of *future* changes in carbon storage over coming decades and centuries, it will be necessary to bear in mind that many ecosystems that we see today are in a transitional form, resulting from high intensities of artificial disturbance. In other cases, a more intensive natural disturbance regime (e.g. by fire) may have been suppressed by humans. This inventory aims to reconstruct the 'potential' ecosystem carbon storage that would result, in a natural disturbance regime, without human influence. It will be of considerable relevance to the many cases in the present-day world (mainly the temperate zones) where humans are attempting to withdraw from forests and to afforest greater areas as a carbon sink. If the influence of logging and other disturbance is decreased in parts of the tropics over coming decades, these ecosystems will also tend towards a more 'natural' state whose average carbon storage is unknown. It is hoped that this inventory will focus attention on the need to discuss such 'post-anthropogenic' aspects of global ecosystem carbon storage.

2) ***Recent and geological history of the carbon cycle***. Many ecologists and biogeochemists are interested in reconstructing the recent geological history of changing carbon storage on the Earth's land surface. In addition to the hope that this may add to the understanding of 'missing sinks' for carbon dioxide in the contemporary world, there is also the challenge of understanding the CO₂ and climate oscillations that have occurred during the Quaternary Period (the last 2.4 million years of the Earth's history).

In the context of trying to improve understanding of the Quaternary carbon cycle, there has been a flurry of papers by different groups attempting to reconstruct LGM and Holocene land carbon storage (e.g. Prentice & Fung 1990, Adams et al. 1990, Prentice et al. 1992, Van Campo et al. 1993, Peng 1994). Various methods have been used to reconstruct land vegetation / ecosystem distribution for the prehistoric Late Quaternary, but a limitation that all of these estimates have in common is a fundamental dependence upon contemporary field-based data listings of per-unit-area carbon storage. In many of these calculations of long term changes in carbon storage, published figures of per-unit-area carbon storage are used uncritically to represent past ecosystems, despite the strong possibility that they represent anthropogenically degraded areas. Furthermore, many of the published figures for per-unit-area carbon storage are based on confusing and misleading vegetation definitions, and have been gathered using poor field sampling procedures. There is a need to sift through this mass of data and critically examine it with the specific task in mind. So far, amongst all the papers published on long-term changes in carbon storage, only Adams et al. (1990) have made any declared attempt to select data from the less anthropogenically altered sites. Even their selection of data was exceedingly *ad hoc*, and their selection procedure was not explained in any detail in their brief paper.

The present summary of data is a preliminary attempt at the task of providing a careful, reasoned set of per-unit-area values that might be used for calculating carbon storage changes in forest and other ecosystems on historical or geological time scales.

The collection of carbon storage data from the present-day world.

Disagreements within the literature over carbon storage values. Looking at any sample of the literature on carbon storage, it is immediately obvious that there is considerable disagreement over the 'representative' per-unit-area carbon storage values presented for each recognised vegetation and soil type. For instance, some recent estimates of boreal forest carbon density are as low as one third of the values obtained in earlier studies (Apps et al. 1993, Dixon et al. 1994). Magri (1994) has gone so far as to question whether there is any point at all in trying to present overall 'representative' values of carbon storage for particular biomes, noting that the value found for different individual forest site studies may range over as much as an order of magnitude. However, this view of Magri's seems unduly pessimistic. Whilst it is true that large variability can be found from one patch of forest to another, it is also remarkable how much overall consistency there is in the values obtained for carbon storage. One has only to look down a list of the carbon storage figures obtained for individual site studies in a particular biome type, even from far flung parts of the world (for example, see some of lists of values given in this data summary), to see that they usually cluster strongly around a particular mean value which differs markedly from other biomes. Site-to-site variability is always present, and sometimes it is very large if the area has recently been disturbed by a storm or landslide, or if a particular sample point in an arid grassland region falls within a swampy oxbow lake. But it is the overall pattern that one must look for, and while the outer limbs of variability are long, most of the values cluster in towards the mean to give what seems like a fair set of estimates.

In addition to the variability caused by differences from one local set of site conditions to another, part of the reason that different authors tend to get such different results may lie in the methods which they have been using to add up carbon storage in their field sites. When ecologists measure total organic matter directly in the field, there is often uncertainty as to how far down into the ground one should go to gather up roots and organic carbon, or how much of the soil 'litter' layer to include in with soil organic matter. When they use indirect methods of calculation of vegetation biomass, based on such parameters of basal area of tree trunks per unit area of forest, ecologists can apply any one of several different algorithms which will yield differing results. The conversion from raw biomass or soil organic matter into pure carbon mass is also an area of disagreement, bringing with it another small set of errors (see below).

Some of the disagreement within the literature may also be caused by ambiguity in the definitions of vegetation types. Data on soil and vegetation carbon storage must be compiled from diverse sources, which may use different ways of defining each ecosystem type. For example, it is well to remember that one author's 'forest' may be another's idea of 'scrub', and what is called 'scrubland' in one part of the world is called 'desert' in other places. There is also the obvious but easily forgettable fact that the world's vegetation actually consists of continua and mosaics, which must usually be divided up or lumped together in order that one can work with them. If carbon storage follows a gradient across a particular vegetation zone, it is difficult to know which value to take as the overall average of this gradient. Certainly, if more data are gathered in the future it may one day be possible to plot carbon storage as a continuum against environmental factors or particular vegetation attributes. This has already been attempted to some extent on a very coarse global scale in a diagram given by Post et al. (1982), and for certain well-studied grassland regions (J. Guiot, Universite Aix-Marseille, pers. comm.). However, if this approach is to be generally applied and in a reliable way, much more work will need to be done.

Hence, in this data summary it has been necessary to divide up the world into manageable, workable biome categories, which in some cases are further subdivided where the dataset is sufficient to warrant this. The categories used here are tailored to fit in with the traditional ways of thinking in

ecology, with the world divided according to major biomes such as 'tropical rainforest' and 'temperate deciduous forest'.

In trying to estimate global carbon storage, there are further problems due to the difficulty of selecting representative sites from within the spatial heterogeneity that is present in all vegetation. It is now beginning to appear that many of the earlier published estimates of present-day carbon storage (such as some of the IBP measurements used by Olson et al. 1983) were based on selective samples of vegetation stands which were unusually high in biomass, perhaps based on the assumption that these represented the 'true' natural vegetation undisturbed by humans or natural disturbance events.

In fact, it is difficult to know what the real reasons are for the differences in total carbon storage suggested by different authors for each particular vegetation type. No doubt the disagreements in the literature over the 'representative' carbon storage value for each ecosystem are the summative result of several error factors, each rather small in itself but together multiplying up into a much bigger error.

Conversion from organic matter to carbon storage. All vegetation and soil carbon storage data are ultimately calculated from raw organic matter, converted into carbon storage equivalents by a conversion factor. Different authors use different conversion factors, some using a figure of 0.50 or 0.51 and others using 0.45. Many published figures have already been converted into carbon storage by a conversion factor deemed appropriate by those who publish them, usually between 0.45 and 0.51. Such figures are derived from the proportion of carbon in cellulose (0.40) and the somewhat higher proportion of carbon in lignin (about 0.51), which together comprise most of the organic matter in plant tissue (J. Grace, University of Edinburgh, pers. comm.). Where raw dry weight biomass figures (not already converted into carbon storage equivalents) are given by the sources cited here, these are converted into carbon storage through multiplication by a 'compromise' figure of 0.475.

For soil organic matter, the proportion of lignin and lignin-like compounds is greater, so a conversion factor of 0.50 - 0.55 is generally used to derive carbon storage from dry organic matter. However, in the case of soils authors usually tend to present their data already converted into carbon mass.

Sources of vegetation data. The vegetation carbon storage figures presented in this inventory are for plant parts both above and below ground level, and they include all the 'living' (i.e. still functional, or at least connected to functional parts) pieces of plants, unless otherwise stated. Most of the data in the literature on forest biomass include only trees and woody vines that are over a certain size limit, usually defined in terms of their stem girth. For forest vegetation, the smaller woody plants, herbaceous plants or the understory biomass in general tends to be ignored by most authors as being either relatively insignificant, too difficult to measure, or simply irrelevant to the study. Some attempt has been made here to bring in estimates of litter and understory carbon storage, although there is far less information available in the literature on these. For simplicity, vertebrate biomass is ignored in this study, because all studies of land ecosystems show that it is equivalent to no more than a tiny fraction of 1% of plant biomass (Olson et al. 1983), much smaller than the intrinsic errors in assessing plant biomass alone. Probably, most microarthropod biomass below ground is included in with measurement of soil dead organic matter (see below).

A major source of data on carbon storage in vegetation is the classic study by Olson et al. (1983), which represents the compilation of a massive amount of information gathered mainly under the International Biological Programme (IBP) studies of the late 1960s and 1970s. Note that the aim of

the Olson et al. study was to present data on the contemporary (around the year 1978) level of carbon storage in vegetation around the world, using broad vegetation and ecosystem categories irrespective of the subtleties of anthropogenic interference in many of these vegetation types.

There has been a recent resurgence of interest in finding representative values of actual and natural carbon storage in vegetation. This is because of the uncertainty surrounding rapid fluxes in carbon dioxide from vegetation and soils over the past few centuries, and its influence on atmospheric levels of carbon dioxide. Whilst major uncertainties remain, it does seem likely that understanding has advanced significantly since Olson et al.'s work at the beginning of the 1980's.

When Olson et al. published their carbon storage inventory, they also published a global vegetation map and accompanying description scheme that set out in broad terms the vegetation definitions that they were referring to. In the present inventory, the categories of global vegetation types used generally correspond to the structural-taxonomic ones of Olson et al. (1983), although in certain cases these categories have been 'lumped' where carbon storage values in two different vegetation types are generally very similar, and 'split' where there is evidence of a recognisable sub-type of vegetation with distinct carbon storage characteristics. A more refined scheme, or one based only on climate-zone characteristics, would not be useful in the context of the aim of this inventory, which is to present data for use against direct and indirect palaeoecological indicators of past vegetation cover types. There is little point in having a highly sub-divided scheme if there is actually no hope of being able to distinguish between the distribution of these minor vegetation categories in the past, since this is after all an inventory intended for the past world and not the present.

Soil and peat carbon. On a global scale, soils are a more important reservoir of organic carbon than the living vegetation that roots into them. Other than the 'living' plant parts within soils (which are here included with vegetation biomass), the major store of carbon is in the form of heterogeneous organic humic compounds that are derived by decay of plant materials. The living biomass of bacteria and fungi may also be a major carbon reservoir in soils, but in practice the methods of measuring soil organic carbon (through loss on combustion) mean that this reservoir is automatically included along with the humic substances.

Soil carbon data for the world's biomes have been summarised by Post et al. (1982), and substantially improved upon in Zinke et al. (1984). These figures represent the outcome of a database of thousands of standardised samples, taken from all around the world. For the convenience of ecologists taking a vegetation-related biome approach, the figures were 'slotted into' the vegetation scheme used by Olson et al. (1983) and the bioclimatic scheme of Holdridge (1967). Some might criticise this approach as an inappropriate way of presenting information on soils, which vary in their own ways not always related to the overlying vegetation. However, although soil type and soil carbon do not necessarily follow vegetation structure in any simple way, there is at least a noticeable relationship which Zinke et al. have noticed and emphasised. Certainly, it is much simpler to reconstruct vegetation and soil carbon from a single set of historical or palaeovegetation maps than to try to reconstruct soil distributions separately.

In fact, in the context of reconstructing past carbon storage it might be possible to reconstruct the distribution of the standard soil categories for the last glacial period or early Holocene from the information on palaeoclimate and vegetation conditions, combined with a knowledge of such factors as underlying geology and slope angles. However, this represents too great an undertaking for the present, and it would require the application of specialist knowledge that is beyond my own scope.

For now, the only realistic way forward is to use a more ad hoc method, treating vegetation types and the soils underneath them as linked units.

Thus, in this inventory, the soil carbon storage figures represent the organic matter in the soils found under each vegetation type and do not refer to any sort of separate soil units (except in the case of peat bogs). The carbon storage figures for soils do not include the litter layer of fallen leaves and branches, which is instead dealt with separately.

Usually in field studies, the organic carbon is measured down to one metre depth in the soil profile, unless (as in peat bogs) large amounts of organic material clearly go down deeper than this. There is in fact considerable ambiguity in many studies on global or local carbon storage as to where the category of 'peat' ends and that of 'soil' begins. One gets the impression that without enough care and understanding they might easily be dealt with in either an overlapping or incomplete way, so that when an estimate for global soil carbon storage is added to an estimate for global peat carbon storage, some of the areas could be counted twice or not at all. One widely accepted definition for peat is a pure organic layer at least 20 cm in thickness, and this was used by the widely cited studies by Post et al. and Zinke et al.. However one can take as another example the study of Canadian peatland areas by Tarnocai (1980), which defines peatlands as having peat depths (i.e. an organic matter layer) greater than 40cm, and mineral wetlands as having an organic matter layer of less than 40cm. The recent wide-ranging study of northern peatlands by Gorham (1992) used a minimum figure of 30cm organic matter as its dividing line between peat and non-peat, so there is no sign of a true consensus emerging!

In peatlands there are also often areas of open water, which the definition does not include. In fact, the proportion of the total surface of a landmass covered by small lakes and pools (which is very substantial in the northern latitudes of Canada, Scandinavia and Siberia) and by streams and rivers, is something that needs to be allowed for more rigorously in global carbon storage calculations. Many previously published studies of prehistoric carbon storage have not even attempted to take this factor into account.

Natural disturbance of vegetation. Humans are not the only disturbance factor tending to reduce carbon storage in vegetation and soils. Many areas of the world are subject to periodic fires or storms which disrupt natural ecosystems, and (as already mentioned) large grazers are sometimes very destructive of vegetation at their natural population densities. If one uses only data from areas that have escaped recent natural disturbances - perhaps due to protection from humans against fires or natural grazers - then the carbon storage values observed at present will tend to be higher than would normally have been the case in the 'natural' state

However, it is perhaps too easy to get an exaggerated picture of the importance of some natural disturbance processes. Such dramatic events as the felling of coastal rainforests by hurricanes may be catastrophic on a local scale, but most areas of tropical forest are never subject to hurricanes (Bose et al. 1994). Even in those areas that do experience violent storms, the really severe damage may occur only once every few centuries. A few centuries may give more than enough time for the rainforest vegetation to approach its maximum potential biomass; consider the rapid regeneration of forest over Maya temples and volcanic islands (however, the evidence that many large neotropical forest emergent trees are between 400 and 1,300 years old, suggests that even very infrequent disturbance on this timescale would be enough to suppress carbon storage; Chambers et al. 1998) Chambers J.Q., Higuchi N. & Schimel J.P. 1994. Ancient trees in Amazonia. *Nature* v.391 p.135-136).

Even in a relatively windy climate such as Britain's, a really destructive storm such as that which hit Kent and Surrey in October 1987 had not occurred before in at least the previous 150 years, and this storm left most areas of high forest largely intact (it was the isolated trees, ridgetops and anthropogenically created woodland edges which suffered badly; personal observations by the author). In North America, the indications from historical and meteorological records are that hurricane, tornado damage and fire damage to the pre-colonial temperate forests was very infrequent (Whitney 1994). Except for certain coastal and dry marginal areas where these events were liable to recur more than once a century, an average patch of forest would have been destroyed by a severe disturbance event only once every several hundred to several thousand years (Tallis 1990, Whitney 1994). Tornadoes can cause quite severe damage locally in forests in parts of the eastern USA, but the return time for a tornado damaging a particular precise point is of the order of several centuries or more. Even then, many large trees will survive (though in a damaged state) being hit by a tornado (personal observations by the author). Indian populations at the time of European colonisation may have been sufficient to suppress forest biomass in some areas, but in the mid Holocene and earlier it seems that agriculture was sparse or non-existent throughout the American forests (Whitney 1994, and see Appendix 1 of this thesis). 19th century pictures and photographs (e.g. Sears 1994) of colonial 'virgin' forests in the eastern USA seem to support the impression that the American forests were infrequently disturbed (though perhaps returned to this state by the early genocide of the previous Indian populations); such images generally show a dense canopy with a considerable proportion of moribund and standing dead trees.

There are also some areas of the world (e.g. the lower montane forest belt of the Andes) where landslides are very common due to a combination of rapid weathering and high rainfall combined with tectonic uplift of the landscape; however, even in these particularly unstable areas it is hard to imagine that any individual patch of forest would be swept away by a landslide more often than once every few centuries or even every few thousand years. Colinvaux (1994) suggests that lowland tropical forests in general might also be subject to relatively high frequencies of disturbance due to shifting river channels, but again it seems unlikely that the true incidence of these events is more than once every few centuries for a given patch of forest (though see the results of the study by Chambers et al., cited above).

On the other hand, the importance of certain other disturbance factors may have been underestimated in most estimates of carbon storage. For example, in the boreal forests and in other forest types dominated by resinous trees, there is a natural fires are often started by lightning during periods of drought (Tallis 1990, Whitney 1994). The return period of fires in natural boreal spruce forests may be as little as 80-100 years (Wein & McClean 1983), presumably enough to suppress overall carbon storage (although the severity of fire is more significant than its frequency; a crown fire will be much more destructive than a ground layer fire). In recent times, large areas of forest (e.g. in parts of Canada) have been deliberately protected from fires, and thus measurements of carbon storage from within these protected areas may be unrepresentative of the early-to-mid Holocene state (Apps et al. 1993). Apps et al. (1993) suggest a higher return rate of destructive events than Wein & MacLean (1983), concluding that in fact the true overall state of biomass of boreal forests uninfluenced by man would be far lower than is normally supposed, because lightning-induced fires and insect outbreaks are so frequent.

The true significance of natural fires in suppressing boreal forest biomass remains a controversial area. S.P. Payette, (Univ. Laval, pers. comm., July 1994), and other Russian and Canadian boreal forest ecologists whom I have spoken to, all feel that Apps et al. are likely to be incorrect in this view. The available record of estimates of forest fire frequency since 1918 (Auclair et al. 1996) suggests

that there was about a ten-fold decline in the volume of wood lost to forest fires in the USA between about 1920 and the 1960's onwards. However, for Canada there appears to be less of a decline, and for the former USSR there is no clear trend in loss of wood to fires over the same period. Since the latter two regions contain most of the boreal forest mass in the world, this may suggest that the decline in fire disturbance of boreal forests is more a USA-based than a global phenomenon. The same summary graph does show however that there was a dip in fire losses during the period between 1950 and 1970 when much of the important early work on forest biomass was being carried out in the USSR and Canada, perhaps tending to lead to inflated estimates in studies which looked at forest areas where forest fires had already been suppressed for several decades. Unfortunately, there has not yet been sufficient time for this matter to be taken up and discussed in the published literature.

There is evidence that natural crown (canopy) fires occurred on the timescale of centuries in the warm temperate pine forests of the southeastern USA, especially on the relatively drought-susceptible sandy soils of the coastal plain (Christensen 1978), where some areas of natural scrub-savanna seem to have been maintained by occasional fires. In these areas, it would seem, there would indeed have been a significant effect of natural fire frequency in suppressing carbon storage. It is not clear whether occasional fires have ever been frequent enough to suppress carbon storage in other parts of the eastern USA forest zone. Christensen suggests that ground fires, or even the occasional crown fire on the timescale of centuries, were important even in the moist cove forests of the southern Appalachians.

In general, it appears that natural broad-scale disturbance events would not have been frequent enough to rival the effects of man in lowering the vegetation carbon storage of many areas of forest. It seems more appropriate to look to 'protected' old-growth areas of temperate and tropical forest as representative of the late Quaternary character of these biomes. However, this assumption of stability may turn out to be unjustified for many boreal forests, with their greater susceptibility to burn events, and for tropical woodland areas with their high natural populations of large herbivores.

Making allowance for the past.

'Naturalness' in vegetation carbon storage; can the present be representative of the past? There of course is no prospect of gaining direct access to the world of the past. The most direct information that one can obtain about the per-unit-area carbon storage of past ecosystems is gathered from the present-day world. Yet it is obvious that there are certain important ways in which the ecology of the present world differs from even the recent geological past. Most importantly, the vegetation that exists at present has largely been modified and degraded by modern populations of humans, through agriculture or wood cutting. When making estimates about the actual present-day carbon storage it is important to consider how this differs from the state that once existed in the past, 5000 years or more ago (and might exist once again if humans were to vanish off the face of the Earth). Yet the published data on per-unit-area carbon storage have often made little effort to distinguish different degrees of degradation in the carbon storage of vegetation, even though such data could also be very useful for calculating future carbon fluxes under different scenarios.

No-analogue communities in the past and future. When dealing with past vegetation it is always necessary to bear in mind that very often, the plant communities (the species that tended to occur together) were different from those existing at present. Sometimes, even the boundaries between what we perceive as discrete 'biomes' were blurred in the past, by particular species crossing over from one biome to another. Many examples of these no-present-analogue communities are described in the

palaeobotanical literature, and perhaps the most obvious instance is the steppe-tundra that covered the northern latitudes during the Last Glacial Maximum (21,000 years ago), combining species of both steppe and tundra environments into a single vegetation type. Other examples include the abundant occurrence of certain montane trees in lowland tropical forests during the LGM, and during the Holocene the combination of temperate tree species that do not have closely overlapping ranges at present (Tallis 1990). In terms of reconstructing the carbon storage of such ecosystems, the unfamiliar combinations of species are disconcerting. For instance, for the steppe-tundra, was the carbon storage value more like that of present-day steppe, or present-day tundra, or like neither? The possible causes of no-analogue communities are many and various, including changes in carbon dioxide level (see below), climatic parameters, herbivore abundance, and the ongoing processes of broad-scale succession (Tallis 1990). In many cases, one can only hope to make progress in reconstructing the actual carbon storage of the unusual communities and mixed biomes of the past by assuming that their carbon storage was similar to that of the present-day biome which they most resemble, or a simple mean of the two or three biomes which they seem most similar to at present.

We are also likely to lose our present-day familiar assemblages of species and see new ones appear if global climate change occurs over the coming decades and centuries. One of the lessons of the palaeoecological record for the future is that species assemblages and even biomes as we see them in present-day world are actually a fairly transitory phenomenon on the timescale of millennia. As climate changes, each plant species will move independently according to the climatic opportunities open to it, and the migration routes available. This will make estimation of future potential carbon storage even more difficult than it would be if the plants had just stayed still.

Direct carbon dioxide effects. A particularly striking problem in terms of understanding both past and future ecosystem carbon storage is the possible influence of direct-CO₂ effects. In future decades and centuries, CO₂-levels will be much higher than they are now. In past centuries and millennia, CO₂ levels were much lower than they are at present.

For most of the last 10,000 years, carbon dioxide levels stood at around 270-280 ppm (Alley et al. 1993), around a third less at present. 21,000 calendar years ago during the last glacial maximum, the CO₂ level was even lower, at about 200 ppm (Alley et al. 1993). Since CO₂ is a key factor in the growth of all green plants, these changes in its concentration must have had some effect on plant growth and carbon storage. The difficulty is in estimating how large this effect actually was. Many experiments have been performed on plants growing at higher-than-present levels of CO₂ (usually double either the pre-industrial or the present-ambient CO₂ level), in order to predict the future effects of the present phase of rapid CO₂ increase. The plants are grown in closed or open-topped chambers, and growth-response models are produced on the basis of these results (e.g. Allen et al. 1987). However, the results in terms of CO₂-responses are complex and sometimes strongly conflicting, and no-one is sure how such limited (and patently artificial) experiments could translate into the future long-term functioning of real ecosystems on a global scale (Koerner & Arnone 1992, Mooney & Koch 1995, McConnaughey et al. 1993). Generally, the strongest responses to CO₂ changes are found in closed systems with crop plants growing for a single season under high nutrient levels without any herbivores or pathogens being present. Experiments on more realistic vegetation microcosms (e.g. tree seedlings and saplings on unfertilized soils, enclosed saltmarsh vegetation) usually reveal a significant positive response, often a 30-40% increase in biomass accumulation rate, though this tends to decline over a period of several years. The experiments often suggest that even a doubling of the present CO₂ level has little or no detectable effect on biomass carbon storage beyond an initial burst of growth and an increase in turnover rate of leaves and roots (Mooney & Koch 1995,

Wullshetger et al. 1995). There is at present no simple and consistent quantitative pattern. In certain cases, however, there has been a very strong and lasting CO₂ fertilization effect despite the plants having been grown quite a nutrient-deficient soil and exposed in open-topped chambers to the normal array of pests and diseases.

The wide variability of the results in CO₂-doubling experiments is worrying, as is the fact that no-one has yet had the chance to take a CO₂-fertilized plant community to equilibrium over the timescale of decades or even centuries that we know is important in ecological processes. Many effects in the longer term (e.g. nutrient cycling, diseases and herbivory, internal shading of the growing forest canopy) might either magnify or cancel out the CO₂ fertilization effect on carbon storage observed in shorter term experiments lasting several years (Wullshetger et al. 1995).

Despite certain bold attempts to model CO₂ effects on the present-day and future biosphere (Esser 1984, 1987), there are grounds for considerable scepticism that at our present state of knowledge we can even approximately quantify the effects of the present anthropogenic phase of CO₂ increase on broadscale ecosystem processes (Mooney & Koch 1994, Wullshetger et al. 1995, Amthor & Koch 1996).

And if there are problems in knowing how the future CO₂ increase will affect plants, there is even less understanding of the biological effects of the 80ppm change in CO₂ levels between glacial and interglacial conditions. It appears that so far no experiments at all have been run to explore how plants might have coped on a year-to-year timescale at a continuous mean level of 200ppm CO₂ in the world of the LGM, or at 280 ppm in the pre-industrial Holocene (F.A. Bazzaz, Harvard University, pers. comm. 1995). Observations of transient photosynthetic rates of the leaves of crop plants under short-term CO₂ depletion in growth chambers have been used to argue that there would have indeed been significant differences in water use efficiency under the lower LGM CO₂ levels, favouring C₄ plants over C₃ plants (Johnson et al. 1993), but these were transient effects on very artificial high-nutrient systems; and in any case their results were not translated into effects on overall biomass. Combining the data from various sources of evidence, one can perhaps glean a tentative picture of how a lowered CO₂ might have affected the LGM vegetation as compared to the Holocene (Robinson 1990). Robinson (1990) has back-extrapolated from the biomass effects of raised CO₂ levels in closed chamber experiments, to suggest that at 200ppm CO₂ the experimental grassland 'communities' which she was studying would have stored 20% less carbon than corresponding types growing in the present-day (350ppm) world, under otherwise identical climatic and soil conditions. A 20% depletion certainly seems quite a major effect, but there is a great need for caution both in interpreting back-extrapolation, and in accepting the results of a few (highly artificial) closed-chamber experiments as relevant to the global history of vegetation.

Robinson (1994) and Boreshkov (1994, published in Russian according to E. Lioubimtseva, Moscow State University, pers. comm.) have each suggested on theoretical grounds - from back-extrapolation of curves of plant physiological responses to CO₂ concentration - that the peculiar combination of species in the 'steppe-tundra' vegetation which existed across Eurasia at around the LGM was largely a product of lower CO₂ levels. Many other no-analogue communities have been described from the world of the LGM, and it is possible that they too might have been partly the product of the changed ecological relationships which existed under lower CO₂ conditions.

Various other observations have been suggested as indicating that the difference in CO₂ levels caused significant differences in plant ecology between the LGM and Holocene. For example, C₄ plants may have been more abundant in many tropical plant communities during the LGM. Aucour et al. (1994) have suggested that the dominance of C₄ plant species in a peatbog in Burundi during the LGM was

due to lower CO₂, favouring these plants over the less CO₂-efficient C₃ species. The plants in this bog were growing under conditions (lower temperatures, but apparently almost constant water table conditions relative to the interglacial) that would instead have been expected to favour a shift towards C₃ plants relative to the present (R. Bonnefille pers. comm.). This shift towards C₄ plants under conditions that would be expected to particularly favour C₃ plants seems difficult to explain without invoking some sort of direct-CO₂ effect on plant ecology. Similar trends are noted for glacial-interglacial changes in the proportion of C₄ plants growing around the shores and shallows of high-altitude lakes on Mount Kenya and Mount Elgon in east Africa (Street-Perrott et al. 1997).

Other observations have been taken as indicating the effect which lower CO₂ levels were having on plant growth during the Last Glacial Maximum. It is generally accepted that stomatal indices (the relative frequency of stomatal guard cells in leaf surfaces) responded to past Quaternary CO₂ changes, although this does not in itself show what effect (if any) this had on biomass and vegetation structure. From a study of stomatal density and delta-13C of subfossil *Pinus flexilis*, Van der Water et al. (1994) have suggested that water use efficiency by this tree species was 15% lower under LGM CO₂ levels than under Holocene CO₂ levels. Thus, it does at least seem *plausible* that the 80ppm change in CO₂ from LGM to Holocene conditions would have had a significant effect (at least several %) on overall carbon storage by vegetation. However, this does not mean that there is necessarily enough evidence to confidently extrapolate major CO₂ effects on vegetation for the LGM, as several recent modelling studies have done.

If the 70-80ppm LGM-to-Holocene shift in CO₂ levels was significant in terms of plant ecology and carbon storage, one would expect to find at least some signs that the subsequent 80-90 ppm increase that has occurred over the past 200 years has also had noticeable effects on plant growth. Although there seem to have been effects on stomatal density in various plant species (e.g. Woodward 1987), there is no firm evidence for any significant changes in global plant growth rate or biomass resulting from direct-CO₂ effects on plant physiology (Adams & Woodward 1992, Wullschetger et al. 1995). Such evidence would in fact be difficult to obtain convincingly, but it certainly does not leap out from the data on tree rings and other indicators of plant growth and biomass.

The extensive and carefully standardised findings of Phillips & Gentry (1994) on tropical tree turnover rates initially implied that something dramatic was happening at present in forest communities throughout the tropics, perhaps as a direct result of the rising CO₂ levels (though it is important to note that Phillips & Gentry found an increase in tree growth rate and death rate, not in biomass). Recent analysis of Phillips & Gentry's work (Sheil & Phillips 1995) suggests in any case that their result may be no more than a statistical artefact caused by changes in sampling intervals and by sampling error. In experiments on artificial tropical plant communities fertilised with twice-the-present CO₂ levels, Koerner & Arnone (1992) found no response in terms of plant biomass or leaf area, and similar results have been found in many cases for experiments on high-latitude ecosystems (see discussion in McConnaughay et al. 1993).

As mentioned above, various growth-response models (e.g. Esser 1984, 1987) have been used by other authors to model past and future carbon storage (e.g. Freidlingstein et al., Prentice et al., Peng et al., Jolly et al., Bird et al.). Such physiological modelling attempts suggest that during the LGM the direct-CO₂ effect on both soils and vegetation would have been very major, perhaps exceeding the effects of climatic differences on global land ecosystem carbon storage (e.g. Friedlingstein et al. 1992, Peng 1994, Peng et al. in press, Bird et al. 1994, Farquahar 1997). Yet at present (considering the rather unclear results obtained so far from the various CO₂ fertilisation experiments on artificially constructed ecosystems and on semi-artificial enclosed ecosystem studies), such heavy reliance on extrapolated models seems unwarranted. The vegetation growth response models (such as the much-

used model of Esser 1984, 1987) utilise a CO₂ effect based on back-extrapolation from short-term photosynthetic responses, or from growth experiments which inevitably offer a drastic simplification of a very complex world. For this reason, extrapolation from their results to 'real' ecosystems on a global scale, equilibrating over centuries, may be unwarranted. Recent reviews (e.g. Wullschetger et al. 1995, Amthor & Koch 1995) voice considerable scepticism that useful *beta* (direct-CO₂ fertilization) factors can be forecast for a future CO₂ doubling; even greater scepticism should surely be applied to published attempts to quantify similar effects for the recent geological past.

Bearing all these perplexing uncertainties in mind, I have not attempted to estimate direct-CO₂ effects on biomass in the 'recommended' values given here. It is frustrating to have to admit that, given the possible importance of this factor, it is actually almost anyone's guess as to how much lower the per-unit-area biomass would have been due to direct-CO₂ effects in the past. Analogous problems should perhaps be admitted for forecasting direct-CO₂ effects on future ecosystem carbon storage

Overall, given the current state of the evidence for longer term direct-CO₂ effects in natural and semi-natural ecosystems, one gets the impression that there is presently a great deal of wishful thinking, in terms of both the forecasting and reconstruction of direct CO₂ effects on ecosystem processes. It is assumed by many vegetation modellers that strong direct-CO₂ effects on biomass 'must' be present in natural ecosystems in both the past and the future, even if the available evidence offers only tentative support. It is also generally assumed that the question 'must' be answerable and quantifiable by the current relatively short-term experimental approaches; there is little thought given to the (rather defeatist) possibility that questions concerning the magnitude of direct CO₂ effects might actually be unanswerable by present experimental and monitoring techniques, due to the spatial and temporal scaling difficulties involved in quantifying direct CO₂ effects over broad areas on the timescale of decades to centuries. The problems are surely even greater for attempts to quantify such direct-CO₂ effects for thousands of years in the past, when it is so difficult to disentangle the effects of past climate changes. It is not my intention here to discourage the important and necessary work on direct-CO₂ effects (if the experiments and monitoring studies are not done, we will *certainly* not know the answer), but only to add a small amount of healthy scepticism to the interpretation of results, and to suggest that some of the more adventurous modellers are more careful, by adding and *emphasizing* all the necessary caveats to accompany their bold extrapolations.

Direct CO₂ effects on soil carbon. Similar (but even greater) problems to those which occur with understanding direct-CO₂ effects on past vegetation carbon storage values also apply to soil carbon storage. Some clues to the way in which lower past CO₂ levels might have affected soil processes can be gleaned indirectly from discussion in the literature on the effects that future raised CO₂ levels might have on soils (e.g. Wullschleger et al. 1995). Under lower-than-present CO₂ levels during glacial periods, and during the preindustrial Holocene, a lower photosynthetic rate of vegetation could have meant changes in the net flux of primary production reaching the soil as dead leaves, roots, branches etc. Quite possibly, even where there was no change in living plant biomass, the result of lower CO₂ in terms of slower turnover time of plant organs such as roots would constitute a substantial reduction in the amount of organic carbon to the soil, without any corresponding increase in microbial decomposition rates. For example, some experiments on CO₂ fertilisation in artificial tropical microcosms have found that lower (present-day) CO₂ levels give slower turnover rates of fine roots than under CO₂ levels above 600ppm (Mooney & Koch 1994). Many experiments on both tropical and temperate plants (Mooney & Koch 1994) also indicate that at lower CO₂ levels, the root mass is reduced much more than the aboveground material; this might have implications for the supply rate of organic matter directly into the soil from dead root material.

Subtle changes in the carbon-to-mineral ratios in the plant materials reaching the soil surface could also have had far reaching effects on the levels of long-lived carbon in soils. There might for instance have been a lower ratio of carbon to minerals in the soil litter (due to relative carbon starvation of the plants), promoting more rapid fungal and bacterial decomposition. This would in turn have given soils that were poorer in carbon, giving a lower global soil LGM carbon storage than one would expect simply from mapping the past ecosystem distribution and applying present-day soil carbon storage values. However, such scenarios are only a matter of pure speculation on my part. In truth we can have very little idea of what the effect might have been. Experimental systems that manipulate CO₂ levels seem to give little clear indication of what we should expect to have happened to soil carbon storage. For example, in their experiment on several artificial tropical ecosystems exposed to high CO₂ levels, Koerner & Arnone (1992) found a decrease in soil carbon at higher-than-present CO₂ concentrations (i.e. lower CO₂ = more soil carbon), suggesting an effect opposite to that which would generally be expected.

Various more ambitious experiments are currently under way around the world to simulate the responses of particular ecosystems to raised CO₂ levels of 600ppm or more (Wullschleger et al. 1995), but the short-term results in terms of soil carbon storage seem equivocal. Furthermore, there is no relevant evidence in the literature on the effects on soil carbon of these past increases in CO₂, either the preindustrial-to-the-present or the LGM-to-the-preindustrial-Holocene. Ecologists have enough trouble struggling to understand the effects of past or future changes in CO₂ levels on vegetation growth, and they appear to know even less about the long-term effects on soil carbon density (indeed the problem does not even seem to have been explicitly discussed within the literature). All that one can say is that there *may* have been a significant effect from the low CO₂ levels, lowering LGM soil carbon storage relative to Holocene carbon storage, but that we do not know how large this influence was.

Everything taken together, it does seem quite likely that the direct physiological effect resulting from an 80ppm glacial-to-interglacial or a preindustrial-to-present change in CO₂ did cause a substantial change in both biomass and in soil carbon storage. However, it also seems quite likely that it had almost no effect on these ecosystem attributes. The evidence, at present, is simply inconclusive and it is unfortunate that this is not more openly admitted and discussed by many of the modellers when they put forth their global extrapolations.

Human intervention. It is generally accepted that the intensity of human interference in most ecosystems has increased enormously over the past several millennia, and especially the last 3,000 years (Tallis 1990). Sifting through reports of carbon storage data for soils and vegetation as a source of data for an earlier mid-Holocene or late-glacial state, it is important to focus on sites in areas that have apparently not fallen under the plough or axe within recent centuries. Where no such data are available, old relatively undisturbed sites must be studied. However it is also important to bear in mind that all ecosystems are subject to natural disturbance. In this sense the 'oldest' undisturbed sites are not necessarily representative of the preanthropogenic state which existed in the past, if they have been artificially protected from all major disturbance factors. The aim is to find a representative point somewhere between these two, but the process of finding it may require a fair amount of intelligent guesswork.

In a sense, one is searching for 'natural' vegetation, but the very concept of 'naturalness' is itself elusive and confused. For example, if humans have lived in an area for hundreds of thousands of years, are they a natural feature of the ecosystem? Archaeological evidence in many parts of the world

shows that there must have been at least some direct or indirect human influence throughout the late Quaternary. In some areas (e.g. Africa, Australia), humans seem likely to have been modifying the vegetation by burning for tens of thousands of years, and possibly more than a million years in the case of Africa (Tallis 1990). Historical records show that African, Australian and North American aboriginals used fire as an important aid to hunting at the time of first documented contact with Europeans (and so had in all probability been using it for many thousands of years beforehand) (Stewart 1956).

Present-day 'natural' vegetation may also be lacking another indigenous component of the system, in the form of dense populations of natural herbivores which would have grazed the vegetation and kept its biomass down. For instance, non-anthropogenically influenced elephant and rhino populations may have a very destructive effect on the woody vegetation where they live (Kortlandt 1982). Over large areas of the world (e.g. Eurasia, North and South America), most of the herbivores which would have existed during the last glacial phase are now completely extinct (possibly driven extinct as a result of human hunting) (Martin & Klein 1986). These past populations of herbivores might have had an important role in maintaining glades and other open areas within forests and woodlands, thus reducing overall biomass and soil carbon storage. For instance, one can speculate that by analogy with present-day Africa, the forest, woodland and steppe-tundra elephants that existed in North and South America and Eurasia during the LGM and up until the earliest Holocene were important in keeping reducing woody cover and creating patches of bare ground (Martin & Klein 1986, Owen-Smith 1988, Tallis 1990). However, in at least some areas the 'natural' herbivores may now have been replaced in approximately equal measure by herded domesticated animals (Owen-Smith 1988).

Humans can also play a more direct role in other, quite surprising ways. For instance, the subtle influence of indigenous peoples of South America in encouraging the establishment of groves of useful forest trees is becoming increasingly clear (L. Rival pers. comm., G. Mombiot pers. comm.; 1994. work as yet unpublished), and in Central America fruit trees are still unusually abundant in the forests of the lowlands abandoned by the Maya several hundred years or more ago (F.A. Street-Perrott, pers. comm. 1995). Yet it is doubtful that overall carbon storage would have been much affected by such processes, except perhaps in the initial rebound phase after a dry episode when the forest is gradually spreading back again over large areas of grassland.

If the aim of one's work is only to reconstruct carbon storage for particular time intervals during the late Quaternary, the dilemma about 'naturalness' should in principle vanish. If for example humans were burning the vegetation 18,000 years ago, then all well and good, one can incorporate that influence into the calculation for vegetation carbon at the LGM. Thus there is no need to be concerned about whether it is 'natural' or not. Yet in practice, such questions of 'naturalness' remain all-important because one must often guess at how strongly this effect has varied over time without human influence in the 'modern' sense. In fact, the inventory compiled here may tend to make automatic allowance for such pre agricultural disturbance factors, because the areas that are currently referred to as 'natural' do sometimes retain a low element of disturbance by indigenous human populations.

The importance of relatively recent intensification of the human disturbance regime is only just beginning to be appreciated. As Harmon & Hua (1992) have found, temperate forests that have not been felled for several centuries accumulate surprisingly large quantities of carbon in dead and moribund trees. Yet, almost all of the temperate forests we see in the present world, from which published carbon storage values are derived, have been subject to wood extraction certainly for hundreds and more probably thousands of years. The same may be true of many areas of tropical forest; Brown et al. (1991) and Brown & Lugo (1992) find evidence of a subtle but very significant depletion of the standing biomass of rainforests and dry forests over much of south-east Asia as a

result of centuries of shifting cultivation and selective logging. They also suggest (Brown & Lugo 1992) that many forests in relatively accessible parts of Amazonia which had been thought of as being pristine have in fact been selectively logged during the past few centuries, so that biomass inventories from these forests give a misleadingly low impression of the carbon stock of more 'natural' precolonial forest.

In this inventory, the figures given for the temperate and tropical forest zones are all for stands known to be over a century old since the last clear cutting or major disturbance event. Thus, many of the vegetation types which are presented as if they are still more-or-less natural (in whatever way one chooses to define 'natural', whether in historical terms or not - see above) according to IBP data sources are undoubtedly significantly altered from their natural state, in terms of species composition, age structure of trees, and the amount of organic debris. For example, it is almost a truism to state that virtually all of the surviving temperate forest communities of Europe and North America have been greatly altered by their history of woodcutting and arboriculture; over large areas of forest it is hard to find any trees approaching old age (pers. obsv.n by the author). Likewise, in many areas around the Mediterranean Basin, humans are known to have greatly increased the frequency of destructive fires during the past few millennia, changing the woody cover from mainly deciduous forest to evergreen scrub and scrub-woodland (Laval et al. 1991, Willis & Bennett 1994).

For such reasons it has been necessary here to go back to some of the primary sources of data, and also to use data sources which have been published since Olson et al.'s (1983) work, to critically select those particular forest sites where there is reasonable historical evidence of a low intensity of human disturbance over the last century or more. This might give the superficial appearance of overlap in the use of the literature; some of the data sources and results cited in detail here will already have been included in Olson et al.'s survey of the literature. Their inclusion as separate citations here is partly intended to emphasise those sources which are likely to more closely reflect 'mid Holocene' rather than recent forms of anthropogenic vegetation.

For many other biomes, similar uncertainties remain within the Olson et al. figures. Again, data has been selected from sites which appear to have a long history relatively free from anthropogenic disturbance (although not necessarily free from natural disturbance, such as natural grazing or fires, see below).

Broad-scale disequilibrium in soil and vegetation carbon storage. Just as small-scale disturbances tend to throw back the process of carbon accumulation in ecosystems, one can imagine global-scale changes in both the past and the future having a similar effect. There is some circumstantial evidence of this from Quaternary vegetation history. Disequilibrium in species migrations and in soil development may have been important in producing some of the 'no-present-analogue' species assemblages (discussed above) that occurred during the late glacial and early Holocene (Adams & Woodward 1992), when the Earth's climates and ecology were changing fastest. Ecological disequilibrium in vegetation, particularly in forest vegetation, may have prevented maximum vegetation carbon storage from being reached for thousands of years after the climate initially became suitable for it in many areas of the world, in both temperate and tropical environments (Adams & Woodward 1992).

The lasting effects of anthropogenic disturbance on soil carbon storage have already been touched upon here. Likewise, there is evidence from well-dated studies that there may be a *natural disequilibrium in soil carbon lasting thousands of years* following climatic changes or other more localised disturbances in the environment (Schlesinger 1990). In addition to the examples of

increasing carbon storage cited by Schlesinger, another more recent example found by Schwartz (1991) shows how the 'imprint of the past' can persist in a soil's carbon reservoir for thousands of years. Schwartz found that central African savanna soils still contain some carbon at depth that bears the isotopic imprint of forest vegetation. From dating this carbon it seems that these areas were covered by forest during the early Holocene, and that this relatively small deep soil reservoir still persists thousands of years later after the forest has retreated. One should ideally take into account the possibility that the soil carbon density we observe in natural sites nowadays might differ greatly from the levels back at 8,000 years ago or 5,000 years ago, when the soil carbon might not have had as much chance to equilibrate with the vegetation conditions. A similar situation could exist in a future scenario of climate change. Likewise, at the LGM there might have been some form of disequilibrium in soil development that would have affected its carbon content. One should consider however that the slide into glacial conditions took thousands of years, and that at least part of the climatic amelioration towards interglacial conditions began well before the start of the Holocene proper.

Despite such concerns about disequilibrium in soil carbon storage following past or future environmental change, it seems that at many sites most of the humic carbon entering such soils does so within the first millennium after formation (Schlesinger 1990, and see discussion in Adams & Woodward 1992), and very often within the first few decades. Thus the longer-term lag will probably not be especially great as a proportion of the total carbon in a soil. This general picture of a very rapid initial build-up of soil organic matter following a change in circumstances is found in a great many studies from around the world, in many different sorts of vegetation.

To take just one fairly representative example, in the classic Rothampstead experiments in England where arable land was allowed to revert to deciduous temperate woodland, soil organic carbon increased 300-400% from around 20 t/ha to 60-80 t/ha in less than a century (Jenkinson & Rayner 1977). The rapidity with which organic carbon can build up in soils is also indicated by examples of buried steppe soils formed during short-lived interstadial phases in Russia and Ukraine. Even though such warm, relatively moist phases usually lasted only a few hundred years, and started out from the skeletal loess desert/semi-desert soils of glacial conditions (with which they are inter-leaved), these buried steppe soils have all the rich organic content of a present-day chernozem soil that has had many thousands of years to build up its carbon (E. Zelikson, Russian Academy of Sciences, pers. comm., May 1994).

However, there is some circumstantial evidence that the slowness of soil development may have retarded vegetation colonisation of many formerly glaciated or barren areas, for as long as hundreds or even thousands of years. Possible clues to the importance of this effect include the surprisingly slow rate of recolonisation of deglaciated landscapes by local tree populations after sudden warming events in northern Europe and North America at around the beginning of the Holocene (Pennington 1977). As was mentioned above, Magri (1994) has found slow exponential rises in pollen input to an enclosed lake basin in central Italy, for relatively constant species composition, taking thousands of years during which the sites were apparently being recolonised by vegetation following disturbance events. She suggests that this pattern might be due to lags in vegetation build-up resulting from slow soil maturation and nutrient limitation (Magri 1994). It is also important to bear in mind that carbon storage could have been affected by more subtle and undetectable differences in vegetation structure that might have persisted in many ecosystems that formed on previously barren surfaces in the high and low latitudes following the last glacial cold period.

There can be no doubt that disequilibrium in carbon storage is especially significant in the case of peat build-up. There is abundant evidence that this process can continue at more-or-less the same rate

for many thousands of years, adding incrementally to a waterlogged column of almost pure organic matter which can reach many metres in thickness (Clymo 1984).

Trying to bring together all the factors that can affect such time-related changes in carbon storage is a virtually impossible task, and one has to stop somewhere. It seems most reasonable to suggest that in the late Quaternary a broad state of equilibrium in vegetation and non-peat soil carbon storage with the then existing climate had been reached by around 8,000 years ago (early Holocene), with carbon values broadly equivalent to those for present-natural ecosystems. At least, the evidence does not strongly point to most terrestrial ecosystems being a long way from a general 'equilibrium' (albeit an equilibrium representing the average of many small disturbance events, against the background of a continually fluctuating climate) in terms of biomass and soil carbon (although the story for peatlands is a very different matter). This is based on the assumption that in most regions of the world where forest recolonisation had taken place there had been enough time at least for several tree generations to pass, and also on the observations such as Schlesinger's (1990) that soil carbon maturation curves tend to 'plateau out' after a couple of thousand years. Even so, it is necessary to bear in mind that North America 8,000 years ago still had very large and rapidly retreating ice masses which seem to have given a broad band of relatively immature vegetation and soil carbon storage in the zone around their perimeters, where recolonisation and ecosystem development was still taking place (Harden et al. 1992). Given that the previously published prehistoric global soil carbon storage estimates for the Holocene focus on time intervals where climate and general vegetation structure had already been relatively stable for well over a millennium (at 8,000 years ago or later), it seems reasonable to suggest that in most areas soil organic carbon was more-or-less in the equilibrium state that we would define on the basis of undisturbed soils we see today.

The resulting errors. Many of the factors discussed above bring with them uncertainties which one must be aware of in trying to quantify past or future changes in carbon storage.

Because of the difficulties of allowing for no-analogue factors such as changed CO₂ levels or different combinations of climatic parameters, the estimates given here are based only on the likely potential steady-state carbon storage under 'present-day' conditions. For the 'present-day' world, the potential role of natural disturbance factors are not at all easy to allow for, although (as I have argued above) in terms of the biomass of many forest types certain factors can be dismissed as relatively unimportant in terms of affecting steady-state carbon storage (e.g. large-scale wind disturbance events) whilst others remain to trouble us (e.g. carbon dioxide effects, the influence of natural and anthropogenic burning, the ambiguities in definition of vegetation types). For working purposes, an error limit of +/- 30% is suggested. Note that this figure is not based on any actual statistical calculation, due to the difficulties of quantifying the effects of the various uncertainty factors. A +/- 30% error would give a total range, for a 'preferred' estimate of 100 tC/ha, of around 60 tC/ha (extending from 70 to 130 tC/ha); clearly a wide error bar. However, in a changed no-analogue world of the past or the future fact it might not be broad enough. In the end, each reader must read the linked data tables and text to form his or her opinion on whether I have properly allowed for such factors in the final values that I recommend for potential ecosystem carbon storage.

[Visit the OEN Atlas of Quaternary global ecosystem maps](#)

[Data tables for global carbon reservoirs](#)

[Data tables for specific ecosystem categories](#)

"Who the heck is this Jonathan Adams, anyway?"

○ You can contact Jonathan Adams at; jadams@arts.adelaide.edu.au

Attachment 2-i

U.S. forest carbon and climate change



**U.S. Forest
Carbon and
Climate
Change
Controversies and
Win-Win Policy
Approaches**

SCIENCE FROM



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Analysis

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Since 1935, **The Wilderness Society** has worked to preserve America's unparalleled wildland heritage and the vast storehouse of resources these lands provide. From the threatened tupelo and cypress forests of the Southeast to critical grizzly bear and wolf habitat in the Yellowstone-to-Yukon corridor to the incomparable, biologically rich Arctic, The Wilderness Society has forged powerful partnerships with members and friends across the country to conserve interconnected landscapes for our nation. We want to leave a legacy rich in the biological diversity and natural systems that nurture both wildlife and humans alike.

Headquartered in Washington, D.C., the Society also maintains nine regional offices where our staff address on-the-ground conservation issues linked to local communities. Since spearheading passage of the seminal Wilderness Act in 1964, we have been a leading advocate for every major piece of Wilderness legislation enacted by Congress, work that is supported by an active membership of more than 200,000 committed conservationists. Our effectiveness stems from a team approach to conservation, which links our scientists, policy experts, and media specialists to thousands of grassroots activists — creating a potent force to promote change.

Building the case for land preservation with tactical research and sound science is the key to successful environmental advocacy and policy work. Nearly a quarter century ago, The Wilderness Society helped pioneer strategies that incorporated expert economic and ecological analysis into conservation work. Today, through focused studies, state-of-the-art landscape analysis — and diligent legwork by our many partners who provide us with on-site data — our **Ecology and Economics Research Department** is able to serve the needs of the larger conservation community.

Legislators, on-the-ground resource managers, news reporters, our conservation partners, and — most importantly — the American people must have the facts if they are going to make informed decisions about the future of this nation's vanishing wildlands. The answers to the pressing legal, economic, social, and ecological questions now at issue are the stepping stones to that understanding and, ultimately, to achieving lasting protection for the irreplaceable lands and waters that sustain our lives and spirits.



U.S. Forest Carbon and Climate Change

Controversies and Win-Win Policy Approaches

by
Ann Ingerson



THE WILDERNESS SOCIETY

Acknowledgments

The author and The Wilderness Society thank the Johnson and Johnson Family of Companies for making this report possible. Thanks also to the many forestry and carbon policy experts who provided information and interpretation and reviewed earlier drafts, including: Linda Heath and Richard Birdsey of the USDA Forest Service, Laurie Wayburn of Pacific Forest Trust, John Perez-Garcia of the University of Washington, Thomas Peterson of the Center for Climate Strategies, Rob Bryan of the Maine Audubon Society, Bob Perschel of the Forest Guild, and Ellen Hawes of Environment Northeast. Any remaining errors are the author's responsibility alone.

Thanks also to many colleagues at The Wilderness Society who provided guidance, critiques, and encouragement, including: Tom Bancroft, Linda Lance, Greg Aplet, Tom DeLuca, Joe Kerkvliet, Wendy Loya, Stan VanVelsor, and Tom Gilbert. A special appreciation to Katherine Birnie, 2006 Hewlett Environment Fellow at The Wilderness Society, who conducted extensive research into carbon markets that helped inform this report.

And finally, thanks to Sarah DeWeerd and Mitchelle Stephenson who with infinite patience, attention to detail, and efficiency molded this report into its final form.

Citation

Ingerson, Ann L. 2007. *U.S. Forest Carbon and Climate Change*. Washington, D.C.: The Wilderness Society.

Editor: Sarah DeWeerd

Design/format:
Mitchelle Stephenson

Printed in the
United States of America
by The Printing Network
on recycled paper.

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July 2007

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This science report is one of a series that stems from conservation research studies conducted by The Wilderness Society's Ecology and Economics Research Department. Other reports and briefs in the series that focus on issues relevant to this report include:

- **Environmental Benefits and Consequences of Biofuel Development in the United States: a Science and Policy Brief**
- **Fragmenting Our Lands: The Ecological Footprint from Oil and Gas Development (A Spatial Analysis of a Wyoming Gas Field)**
- **Energy & Western Wildlands: A GIS Analysis of Economically Recoverable Oil and Gas**
- **Wildlife at a Crossroads: Energy Development in Western Wyoming**

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Preface

The United States is blessed with a rich tapestry of forested landscapes—from the shade-dappled hardwood stands of New England to the open pinelands of the Southeast and towering firs of the Pacific Northwest coast. Woodland habitats shelter thousands of wildlife species and provide a treasure trove of recreation opportunities for the American people. In addition, our forests store vast amounts of carbon in tree trunks, roots, leaves, dead wood, and soils—a service that is becoming ever more essential as the threat of global climate change mounts due to the buildup of human-generated carbon dioxide and other greenhouse gases in the atmosphere.

Although investments in energy efficiency and clean energy will provide the only permanent solutions to climate change, forest sequestration can buy us time to develop those alternatives. U.S. forests currently capture the equivalent of about one-tenth of the nation's greenhouse gas emissions. They have the potential to contribute even more to climate change mitigation. But this potential will only be realized if we move carefully, with properly designed policies to increase forest carbon stores.

The Wilderness Society's report, *U.S. Forest Carbon and Climate Change*, examines various policy options to promote the role of forests in carbon sequestration. After a thorough review of the available data measuring and accounting for the amount of carbon stored in and moving through forest ecosystems, author Ann Ingerson presents persuasive evidence about the challenges inherent in many current proposals. Some frequently discussed solutions are much more complex than they first appear. Others such as carbon markets, for example, may present risks around the issues of permanence and measurement, which could hamper their effectiveness as tools for meeting the climate challenge long-term. Several strategies, if adopted without careful consideration of their full carbon-cycle effects, could actually *decrease* the amount of carbon stored in our forests.

Fortunately, several simple and broadly supported policy approaches for increasing forest carbon stores also exist. Protecting the forests we have, replanting depleted landscapes, and managing forests for longer rotations and larger volumes of standing timber will all help ensure these critical wildlands play an ongoing role in climate change mitigation. A host of related benefits will accrue from such policies, including habitat for species, recreation opportunities, and key public values such as water filtration. One way to begin to address the global warming issue is to look to these strategies first to increase forest carbon stores. This approach may also provide the vehicle for bringing together some unusual allies—from environmental NGOs to private forestland owners and the wood products industry—ready to find common solutions to the climate problem that threatens us all.



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Acronyms and Abbreviations

CO₂e Carbon dioxide equivalent
 DOE U.S. Department of Energy
 EPA GHG U.S. Environmental Protection Agency Greenhouse Gas Inventory
 FIA Forest Inventory and Analysis (program of the U.S. Forest Service)
 MMT Million metric tons (teragrams)
 NGO Non-governmental organization
 NRI National Resources Inventory (program of the U.S. Department of
 Agriculture)
 USDA U.S. Department of Agriculture

Executive Summary

As consensus grows about the serious impacts of global climate change, the role of forests in carbon storage is increasingly recognized. Terrestrial vegetation worldwide currently removes about 24 percent of the greenhouse gases released by industrial processes. Unfortunately, this contribution is approximately cancelled out by carbon released as a result of global deforestation and other ecosystem changes. Slowing or halting the rate of deforestation is thus one of the prime strategies to mitigate global climate change.

The U.S. situation differs from the global one in several ways. Since both forest acres and average biomass per forest acre are currently increasing, as U.S. forests recover from past clearing or heavy harvest, our forest carbon stores are growing larger over time. However, our high rate of industrial emissions means that only about 10 percent of the carbon released from burning fossil fuels in the United States is captured by our forests. Moreover, net U.S. forest carbon sequestration has begun to slow in recent years as reforestation reaches its limits and development sprawls into more rural forested areas. U.S. forests could possibly capture a much higher portion of our industrial emissions, but only if we prevent forest conversion and development and manage our forests to maximize carbon stores.

How can we develop effective policies to protect and enhance forest carbon stores? A first step is to understand the magnitude of carbon emissions and storage. International discussions about global climate change have led governments at national and state levels to document greenhouse gas emissions and stores through economy-wide inventories or voluntary registries, most of which include special provisions for the forest sector. The next step would be to enact policies that encourage increased forest sequestration. Widely publicized carbon markets under the Kyoto Protocol have tended to focus policy discussions rather narrowly on the sale of forest-based carbon offsets to greenhouse gas emitters under a cap-and-trade scheme. But before forest-based offsets can become a tradeable commodity, several issues need to be addressed, including the need for a consistent and verifiable accounting system, the need to prove “additionality” over some well-defined baseline, and the need to guarantee “permanence” of carbon storage.

Given the uncertainties about offsets as a tradeable commodity, other public policies to enhance forest carbon stores may be a better option. One approach might be to maintain a large carbon “bank” on public forestland; another would be to subsidize private landowners who increase carbon storage on their forestland.

Whether we use marketable offsets or other public policies as tools, managing forest carbon to mitigate climate change is a complex business that requires understanding the entire carbon cycle over long time periods. Three strategies often proposed as forest-based climate change solutions illustrate some of these underlying complexities:

- 1) **Does replacement of old, slow-growing forests with young, intensively managed plantations speed carbon sequestration?** Since net biomass growth rates slow down in mature forests, keeping forests in a young, fast-growing state through

In this report, we explore:

1. the role of forests in sequestering carbon dioxide—thus mitigating global climate change—and the state of the U.S. forest carbon “bank account;”
2. the complexities of measuring forest carbon, particularly using such tools as inventories and registries;
3. some potential pitfalls of cap-and-trade programs, markets for forest-based carbon offsets, and subsidies to boost forest carbon;
4. the complexities of three specific forest-based strategies often proposed for mitigating climate change: managing for fast-growing young forests, increasing carbon stored in wood products, and increasing use of woody biomass fuels; and
5. policy approaches to boosting forest carbon that have many secondary benefits for the public and the environment as well: forest preservation, restoration, and sustainable management.

short-rotation harvests would seem a reasonable strategy for enhancing carbon sequestration. However, only a full accounting will determine whether a regenerating forest fixes more carbon than the mature forest it replaces. Rather than simply comparing live-tree carbon fixed annually by old and young trees, we need to compare *all* carbon flows over time for a mature forest (including accumulations in dead woody biomass and soil) to *all* flows associated with a harvested forest (including harvest-related emissions and wood products carbon losses).

- 2) **Does converting trees into long-lived wood products increase carbon stores?** Forestland owners would like to claim credit for carbon harvested and stored off-site in long-lived wood products. Though intuitively appealing, this approach presents several unresolved questions, including how to account for emissions related to harvest and processing, the uncertainty of permanent stores not controlled by the landowner, and how to credit emissions reductions due to substituting wood for other building materials. With multiple decision-makers dispersed throughout the national and even global marketplace, tracking the fate of harvested carbon is a challenge.
- 3) **Is woody biomass a carbon-neutral fuel?** It is often argued that woody biomass sequesters as much carbon while growing as it releases when burned, and hence should be eligible for offset credits when it replaces fossil fuel use. To assure carbon neutrality, however, the source forest must be protected from conversion and managed so as to replace all carbon released by burning. Even with such management, energy conversion losses and emissions from harvest, transport, and chipping will pull the ratio of carbon fixed to carbon released below 1:1.

As we work to better understand the long-term carbon impacts of forest management decisions, it makes good sense to start with strategies for increasing forest carbon that also provide secondary public benefits. Forest preservation and reforestation maintain or increase forested area, and also provide habitat for forest-dependent species, improve water quality, and regulate floodwaters that may become more severe as the climate changes. Lengthening rotations and increasing standing timber volumes enhance scarce late-successional habitat, provide more high-quality timber, and create forest surroundings that are attractive for remote hiking, fishing, and other back-country recreation. Beginning with these low-risk approaches will help achieve consensus about the contributions of forests to moderating climate change and build support for public policies that protect and enhance their role.

Forests and the Global Carbon Cycle

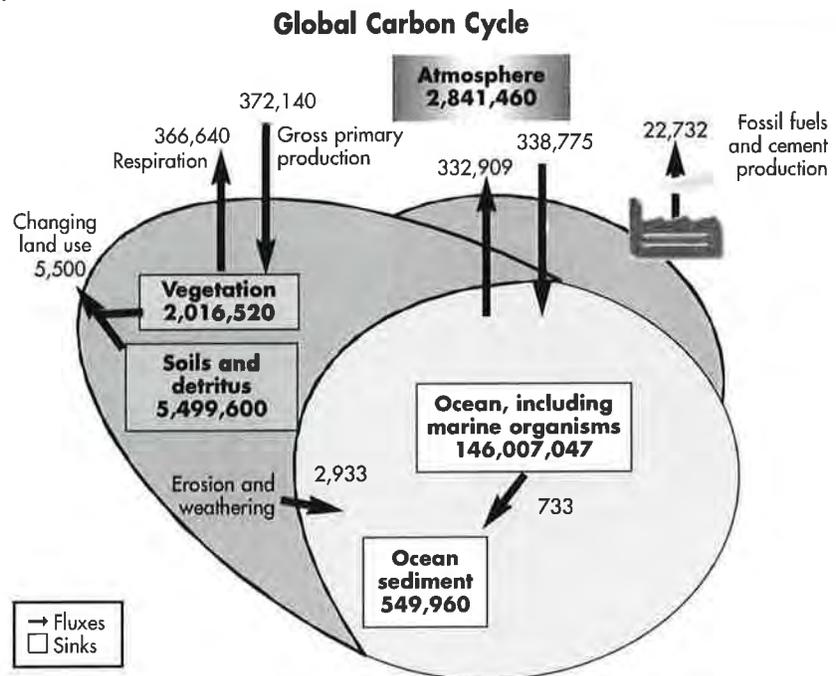
Societies around the globe are beginning to address the threat of severe climate change through policies aimed at reducing the buildup of greenhouse gases. Natural ecosystems, including forests, are a critical link in the global carbon cycle and must play a vital role in the mitigation of global warming. Forests are important both for their large *existing reservoirs* of carbon (often called “pools” or “sinks”) and because of the *ongoing net flow* of carbon from the atmosphere into that forest reservoir (often called “flux”). Figure 1 shows the major global sources, sinks, and annual fluxes of carbon.

Currently, land-based stores of carbon dioxide equivalent¹ are about 7,516,120 million metric tons (MMT) worldwide. This carbon “bank account” is continuously built up or depleted by photosynthesis, respiration, and erosion, and also through restoration, destruction, or change of various landscape types. For all lands that support plant growth (forests, croplands, wetlands, etc.), the carbon dioxide removed from the atmosphere by photosynthesis—372,140 MMT/year—generally exceeds that released through respiration by plants and decomposer organisms—366,640 MMT/year—meaning that

growing plants and associated fungi and bacteria remove a net 5,500 MMT of carbon dioxide from the atmosphere each year (about 24 percent of the carbon released by industrial processes).

Photosynthesis will continue to exceed respiration overall, however, only with proper management of existing landscapes. Clearcutting a forest, for instance, boosts respiration (releasing CO₂) and suppresses photosynthesis (reducing biological fixation of CO₂) for several years or decades—even when land is replanted or allowed to regenerate

FIGURE 1.

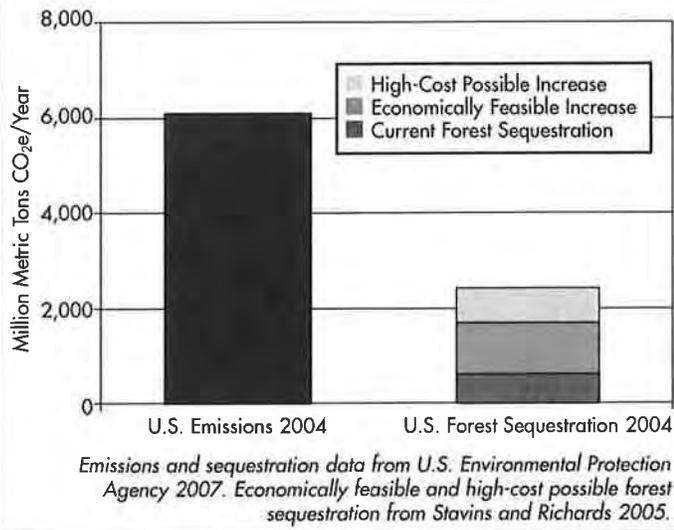


All figures given in millions of metric tons CO₂e.

Adapted with permission from Oak Ridge National Laboratory. Source figure available from http://cdiac.ornl.gov/pns/graphics/c_cycle.htm. 1992-1997 data.

¹ Carbon budgets can be confusing because of the variety of units utilized. Millions of metric tons (teragrams) is fast becoming the standard unit of measurement, but some sources report the mass of elemental carbon stored, while others use the mass of CO₂ (3.6664 times the mass of C) or include all greenhouse gases as CO₂ equivalents (often abbreviated CO₂e). This last unit is important because, though CO₂ is the main gas responsible for global warming, other gases make an even greater contribution to the greenhouse effect. Methane (CH₄), for instance, is about 21 times as potent as CO₂ pound-for-pound and over time, and N₂O is 310 times as potent. In order to gauge the capacity of forests to offset emissions, we will express carbon quantities in CO₂e (primarily millions of metric tons) through the rest of this paper.

FIGURE 2.
U.S. Industrial Greenhouse Gas Emissions and
Current and Potential Forest Sequestration



trees. Large existing stores of carbon are released into the atmosphere when land is converted to other uses. Since more land is developed, drained, or otherwise converted annually than is restored to its natural

cover, land use changes release about 5,500 MMT of CO₂ each year, essentially negating the entire contribution of plants to the land-based carbon sink.

U.S. Forests as Carbon Sinks

U.S. forests store about 152,236 MMT CO₂e, representing about 2 percent of global terrestrial carbon stores. An additional 8,781 MMT CO₂e are stored in wood products in use and in landfills (U.S. Environmental Protection Agency 2007). Though deforestation is occurring much more rapidly than forest growth globally, forests in the United States currently remove substantially more carbon from the atmosphere than they emit, so our forest-related carbon sink is increasing by about 699 MMT CO₂e annually (a growth rate of 0.4 percent).² In the eastern United States, land formerly cleared for farming is growing back naturally to woods or is being replanted through conservation assistance programs like the USDA Conservation Reserve Program. In the Pacific Northwest, forestlands are recovering

from intensive harvesting during the mid-to-late 20th century, and are rebuilding large carbon stores in the form of living trees above and below ground, shrubs, snags and coarse woody debris, soil, and forest floor litter.

The United States, with 4 percent of the world's population, is responsible for nearly one-quarter of global carbon emissions. As our nation develops a long-overdue strategy to reduce our climate change impact, we must protect our existing stores of forest carbon and also enhance the capacity of our forests to fix additional carbon in the future. Figure 2 compares estimated annual U.S. industrial emissions of greenhouse gases with net annual carbon sequestration by U.S. forests. Our forests currently sequester about 10 percent of U.S. industrial emissions of CO₂-equivalent gases; given the right policies that proportion could reach as high as 36 percent, though high costs make it unlikely we will ever reach that goal. Although investments in energy efficiency and clean energy will provide the only permanent solutions to climate change, forest sequestration can buy us time to develop those alternatives. Relatively low-cost policies to increase forest carbon stores include protection of existing forestland from development, restoration of deforested or degraded lands, and management to increase carbon stores on existing forestland.

An Uncertain Future for U.S. Forest Carbon Stores

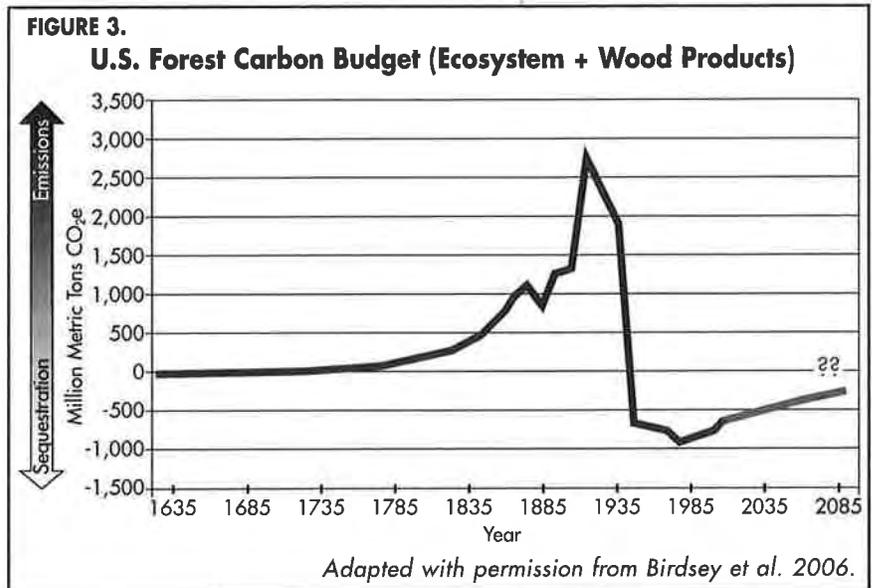
Though U.S. forests currently help offset our industrial carbon emissions and could potentially contribute even more, the ability of our forests to continue providing this important service is in question. Our total stores of forest carbon are still increasing each year, but at an ever-slower rate. Figure 3 shows historic carbon fluxes to and from forests in what is

² Since the increase in our forest carbon sink is based solely on the difference between starting and ending inventory, it does not reflect the contribution of woody biomass replacement of fossil fuels to reducing greenhouse gas emissions.

now the United States (including both the forested ecosystem and the carbon derived from it but stored off-site in wood products). Note that positive numbers in the figure represent emissions, and negative numbers represent sequestration. European settlement and accompanying deforestation made our forests net sources of carbon emissions by the mid-1700s, a trend that peaked in the early 1900s. By the mid-1900s, regrowth of forests on abandoned farmland and cut-over timberlands began to replenish our national carbon bank account. In recent years, however, net annual flows of carbon out of the atmosphere and into the forest ecosystem and wood products pools have begun to decline once more. If recent trends continue (red line), our forests may cease to sequester net carbon by the end of this century.

Forest carbon stores are threatened by both reduced forest acreage and reduced carbon density (tons of carbon stored per acre). The U.S. Forest Service's Forest Inventory and Analysis (FIA) Program provides information about trends in forest acreage. Though FIA data show gains in forest acreage for the United States as a whole in recent years, these gains are not uniform and in fact 23 of the 48 coterminous U.S. states lost forest acreage between 1997 and 2002 (Figure 4).

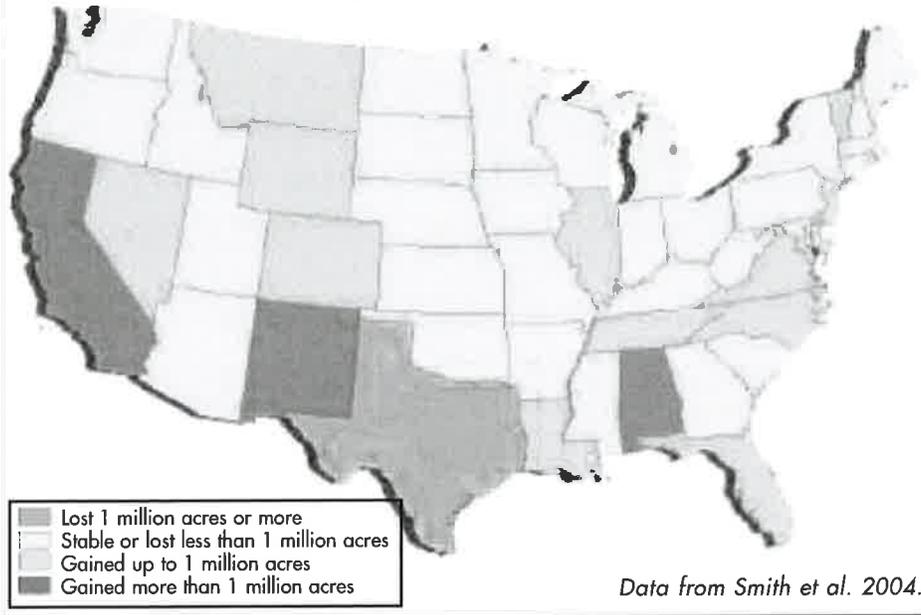
There is much uncertainty regarding the accuracy of these acreage figures, which are derived from periodic sampling and suffer from occasional changes in the definition of forestland. For example, some of the data on which calculations of forestland losses for 1997-2002 are based were collected as far back as the early 1990s, and probably fail to accurately reflect recent changes in forestland acres. Data are also from samples rather than complete land cover analysis, and sampling errors are relatively high. However, these are the best data currently available on a nationwide basis. Efforts are underway to improve estimates of forest area changes.



Gross acreage changes also mask the fact that acreage gains often apply to early regrowth of abandoned farmland that is severely depleted in carbon stores, while losses may occur in high-carbon mature forests at the suburban sprawl frontier. The U.S. Department of Agriculture's National Resources Inventory (NRI) allows us to track conversion between specific land cover types (U.S. Department of Agriculture 2000). Though recent changes cannot yet be assessed due to a change in sampling methods, NRI data indicate a net increase of 3.6 million acres of forestland nationwide from 1982 to 1997. Over this period more than 8 million acres of forest were converted to agricultural uses and 12 million acres were developed or converted to "other rural land," while 23 million acres of new forest began to grow on former farmland. Overall, this exchange of acres would cause a net loss of forest carbon.

Estimates of carbon released through land conversion vary widely, as some kinds of low-density development may keep forests nearly intact. But many sources agree that carbon losses due to forest conversion are significant. The Pacific Forest Trust (Gordon 2006) estimates that "probably, upwards of 25 tons

FIGURE 4.
Estimated Change in Forestland Area, 1997-2002



of carbon emission per acre [83 metric tons CO₂e] can be prevented for each acre not converted from forest to another use,” and that 1.5 million acres of forest lost every year to development in the United States release 275 million metric tons of CO₂e (Pacific Forest Trust 2007). In the Northeast, roughly 150 tons of CO₂e are released for every forested acre developed.³ Moreover, when forestland is converted to other uses, not only is CO₂ released but the land’s future capacity to continue drawing carbon dioxide out of the air may be diminished or lost.

³ According to the North East State Foresters Association (2002), the forests of New York and New England contain, on average, 106 metric tons of total carbon (388 metric tons CO₂e) per acre, with about one-third in live trees. Environment Northeast (Stoddard and Murrow 2006) estimates that 50-67 percent of above-ground carbon and 22-25 percent of soil carbon are released on conversion. Putting these figures together yields 139 to 178 metric tons CO₂e emitted per acre converted in the Northeast.

Measuring Forest Carbon

Protecting and enhancing forest carbon is an effective way to reduce greenhouse gases, but its use as a public policy tool will require careful documentation. Official national inventories and voluntary registries at national and state levels are designed to track carbon stores and changes in those stores. A brief look at these tools shows that our capacity to measure all pools of carbon associated with forests is very limited, and we need much better information to manage this resource to its full potential.

The official national inventory of carbon stocks (pools) and average annual changes (fluxes) in greenhouse gases across the entire U.S. economy is the Environmental Protection Agency's

annual Greenhouse Gas Inventory (EPA GHG). Policymakers turn to this comprehensive national record to assess U.S. contributions to climate change and will use it in the future to evaluate the effectiveness of mitigation measures. The USDA Forest Service is tasked with developing forest carbon numbers for the Land Use and Land Use Change segment of this inventory. Figure 5, developed by Linda Heath of the USDA Forest Service, illustrates the complexity of tracking forest carbon. Table 1 shows the most recent EPA GHG estimates of changes in forest carbon stores in the United States.

Most of the data in the EPA GHG Inventory comes from the Forest Inventory and Analysis Program. The FIA provides the only nationwide infor-

FIGURE 5.

Forest Sector Carbon Pools and Fluxes

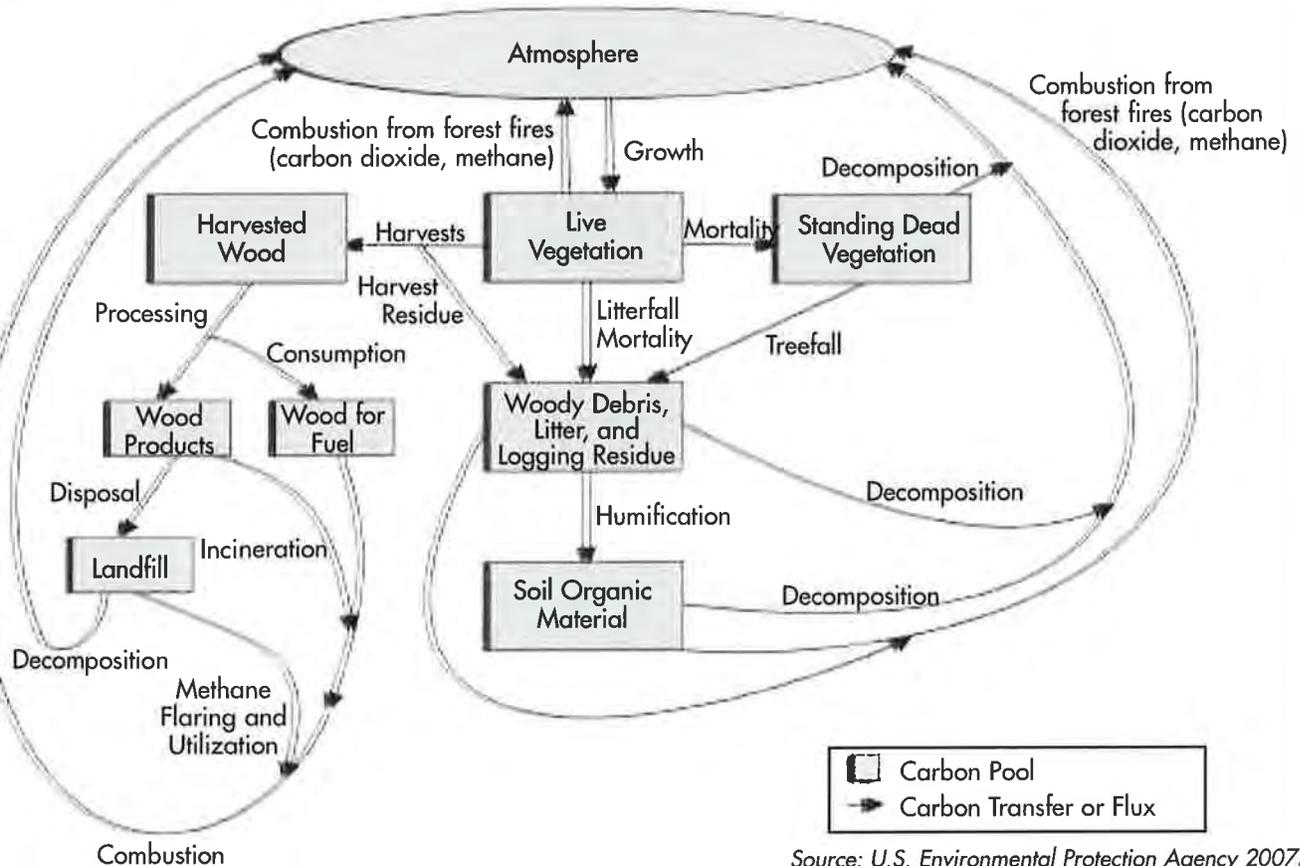


TABLE 1.

EPA Greenhouse Gas Inventory Estimates of Changes in Forest Carbon Stores

Carbon Pool	1990	1995	2000	2001	2002	2003	2004	2005
Forest	(466.5)	(602.0)	(529.4)	(555.5)	(595.3)	(595.3)	(595.3)	(595.3)
Aboveground Biomass	(251.8)	(331.0)	(347.1)	(360.4)	(376.4)	(376.4)	(376.4)	(376.4)
Belowground Biomass	(63.9)	(69.8)	(73.9)	(76.4)	(79.5)	(79.5)	(79.5)	(79.5)
Dead Wood	(36.7)	(60.9)	(48.2)	(50.0)	(52.4)	(52.4)	(52.4)	(52.4)
Litter	(65.6)	(49.5)	(35.8)	(47.1)	(52.2)	(52.2)	(52.2)	(52.2)
Soil Organic Carbon	(48.5)	(90.8)	(24.5)	(21.6)	(34.8)	(34.8)	(34.8)	(34.8)
Harvested Wood	(132.0)	(115.5)	(109.3)	(90.2)	(92.8)	(91.7)	(102.0)	(103.4)
Wood Products	(63.1)	(53.5)	(46.2)	(31.2)	(34.1)	(33.4)	(43.3)	(44.4)
Landfilled Wood	(68.9)	(62.0)	(63.1)	(59.0)	(58.7)	(58.3)	(58.7)	(59.0)
Total Net Flux	(598.5)	(717.5)	(638.7)	(645.7)	(688.1)	(687.0)	(697.3)	(698.7)

Note: All figures given in units of MMT CO₂. Forest C stocks do not include forest stocks in Alaska, Hawaii, or U.S. territories, or trees on non-forest land (e.g., urban trees, agroforestry systems). Parentheses indicate net C sequestration (i.e., a net removal of C from the atmosphere). Total net flux is an estimate of the actual net flux between the total forest C pool and the atmosphere. Harvested wood estimates are based on results from annual surveys and models. Totals may not sum due to independent rounding.

Source: U.S. Environmental Protection Agency 2007.

mation about forest resources over time, and it was originally designed to track commercial timber resources, not to measure carbon. As a result FIA data suffers from many limitations (though plans are underway to address most of them if funding permits):

- FIA has only recently begun to measure biomass, forest floor debris, and other variables important for assessing carbon stocks. Soil carbon is not monitored and so estimates are based on broad forest types regardless of land use history.
- FIA inventories for some states are 15 to 20 years old and early sampling protocols varied from state to state. Lack of frequent updates forces researchers to interpolate between sampling dates, resulting in anomalies like the constant forest data for 2002 through 2005 in Table 1.
- Limited inventory data for Alaska means that important state is excluded altogether.
- The EPA GHG Inventory excludes altogether any measures of the impact of development and land

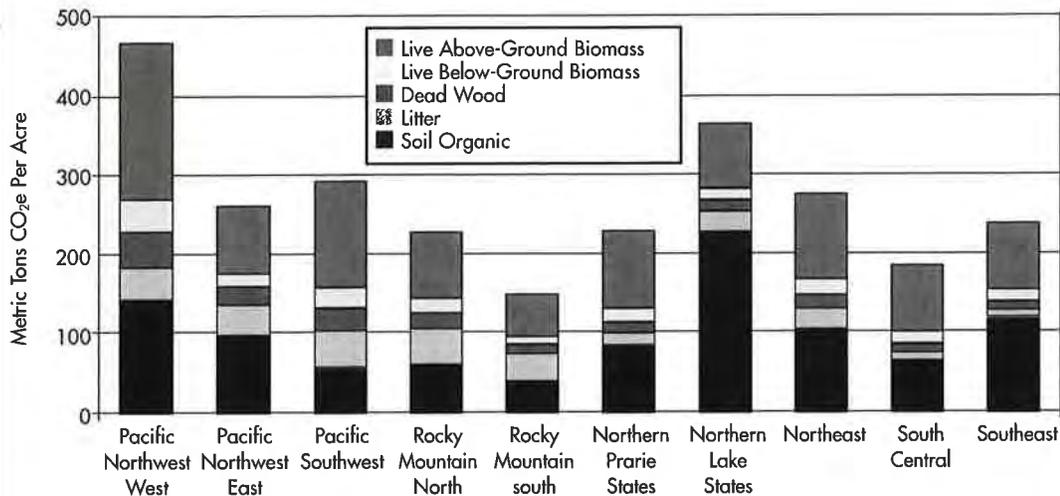
use change on forest carbon stores, citing a lack of adequate data on land use changes.

Figure 6 illustrates why the lack of information about soil organic matter, dead wood, and litter might matter. These nonliving components make up a substantial fraction of total forest carbon in all regions—from a low of 45 percent in the Pacific Southwest to a high of 73 percent in the Northern Lake States. These are the ecosystem components that tend to be most depleted under intensive management, particularly in forests regenerating from cleared agricultural lands. Managing forests to restore natural levels of these components could yield substantial carbon sequestration benefits.

In addition to the nationally aggregated EPA GHG inventory, another compendium of information on forest carbon stocks is the U.S. Department of Energy's voluntary registry that allows individual entities to report their own emissions and sequestration of greenhouse gases. This national registry is often called 1605(b) for the section of the Energy Policy Act of 1992 that required its

FIGURE 6.

Forest Carbon Density by U.S. Region



Regions: PNWW (Western OR and WA); PNWE (Eastern OR and WA); PSW (CA); RMN (ID, MT); RMS (AZ, CO, NM, NV, UT, WY); NPS (IA, IL, IN, KS, MO, ND, NE, SD); NLS (MI, MN, WI); NE (CT, DE, MA, MD, ME, NH, NJ, NY, OH, PA, RI, VT, WV); SC (AL, AR, KY, LA, MS, OK, TN, TX); SE (FL, GA, NC, SC, VA).

Data from Smith and Heath 2006.

establishment. Some states and several private organizations have also developed registries, each with its own system of accounting for carbon stores, emissions, and sequestration. For example, registries may differ in:

- Reporting by entity versus by project (a single tree planting project may be undercut by increased timber cutting by the same company elsewhere)
- Which carbon pools must be measured (increases in wood products

carbon might eventually result in depleted soil carbon pools)

- Method of monitoring (models or look-up tables may be less reliable, but also more affordable, than on-the-ground sampling)

Registry standards determine to what extent a forestland owner or a forest sequestration project can claim credit for mitigating climate change. Therefore, establishing a uniform method of accounting is key to making registries work in the future.

Policies to Protect and Enhance Forest Carbon

Mitigating climate change is a classic public good, with benefits that are non-exclusive (if one person benefits, we all do) and non-competitive (one person's enjoyment of a more natural climate regime in no way diminishes others' enjoyment of the same). Policy mechanisms to provide public goods can be either market-based or government-run, or some combination of the two. In the case of greenhouse gas reductions, market solutions in the form of cap-and-trade mechanisms have received much attention, due to their prominent role in the Kyoto Protocol. However, trading of forest-based carbon offsets presents several challenges, and other policy alternatives should also be considered.

Cap-and-Trade Programs and Offsets

Cap-and-trade is a flexible regulatory tool in which a maximum emissions allowance (cap) is set for regulated sources of greenhouse gases. The system then allows those sources to meet their cap either by reducing their own emissions, or by purchasing excess reductions or carbon sequestration offsets from others (trade). Marketed forest-based offsets face all of the same monitoring and measurement issues as voluntary registries described above. But in addition, once a carbon credit carries a market value and is legally equivalent to documented emissions reductions, two further issues rise to the fore—*additionality* and *permanence*.

Additionality refers to the certainty that a forest offset results in new carbon fixation, rather than simply subsidizing “business as usual.” Demonstrating *additionality* requires:

- A *baseline* against which new carbon stores can be measured. A projection of what would occur *over time* in the absence of project activities is the only acceptable

baseline. Using a single pre-project quantity as a baseline might reward offset providers for sequestration that would have occurred in any case. Natural regeneration of abandoned farmland, for instance, could be used to offset continued fossil-fuel emissions, undercutting greenhouse gas reduction goals.

- Accounting for *leakage*, sometimes referred to as *secondary effects* or *displacement*. Leakage occurs when a project indirectly causes increased emissions outside the defined boundaries of the project itself. If an offset buyer pays to preserve forestland that is in imminent danger of paving over, for instance, but the development merely moves to a neighboring parcel, no net sequestration results. When exact measurements are impractical, leakage is often addressed by discounting, requiring that an offset seller fix more carbon than the quantity purchased in order to compensate for likely losses elsewhere.

Permanence is an issue because reduced emissions from a power plant or vehicle are by definition permanent. If fossil fuel remains unburned, the carbon it contains will never find its way into the atmosphere. If a sequestration project is to be considered fully equivalent to emissions reduction, it must fix carbon just as permanently. For forest offsets, *permanence* is complicated by the dynamic nature of ecosystems. Carbon stores ebb and flow during forest succession and with normal disturbance regimes, sometimes unpredictably in the case of fire, insect outbreak, or windthrow. However, *permanence* may be addressed through one of several mechanisms:

- Permanent easements on the land may impose a “lien” obligating the owner to maintain a guaranteed level of carbon stores indefinitely or for a contracted period of time.

- Offsets may be subject to a standard discount based on the risk of catastrophic carbon release.
- Offset contracts may be designed as short-term “leases,” with payments made only so long as the carbon remains in place. When the contract expires, the buyer would need to replace this offset with an equivalent one.

In the absence of regulated markets, voluntary carbon trades are already occurring, with at least a dozen entities offering carbon offset services for a fee. Organizations are reducing or offsetting their “carbon footprint,” and conferences are offering to offset attendees’ air travel. The quality of such unregulated trades varies widely. It is tempting to see these voluntary trading systems as harmless, but they could establish misleading precedents for how a market might operate.

Other Policy Tools

It remains to be seen whether the issues with cap-and-trade systems can be resolved at a reasonable cost, allowing forest-based offsets to become tradeable commodities. In light of these uncertainties, we must also explore alternative policy options for increasing forest carbon stores. One approach to supplying public goods is for government agencies to produce them directly. For example, our national forests and other public lands might add carbon storage to the set of multiple uses they provide as a public service to the nation, through practices that accumulate carbon in old-growth forests, large woody debris, and forest soils.⁴

With 63 percent of our nation’s forests privately owned, however, carbon-friendly management of public forestland will not be enough. A second policy approach would be for federal or state

agencies to encourage private landowners to maintain or increase carbon stores through conservation payments channeled through the Wildlife Habitat Incentive Program (WHIP), Conservation Reserve Program (CRP), or Environmental Quality Incentives Program (EQIP). Such payments would help counter the tremendous financial incentives that favor forestry practices such as short rotations, high grading, and liquidation harvests, all of which yield maximum present value for timber while damaging long-term forest productivity and depleting carbon stores.

A third policy option is a sort of hybrid between a market and a public subsidy. Along with carbon markets, markets for wetlands, habitat, and water quality are emerging across the United States. Through these mechanisms, private restoration activities help mitigate damage from development activities. In the face of high transaction costs and low trading volume, some states use “in lieu fee” programs as an alternative to market trading, and these programs might offer viable models for forest carbon. In these programs, a state agency collects fees from those who damage wetlands, critical habitat, or water quality and uses the funds to finance restoration by private contractors, often accepting competitive bids. Similarly, a “no net loss” forest carbon policy could impose taxes or penalties on those who emit fossil-fuel carbon or release existing forest carbon stores, and use the revenue to subsidize increased forest carbon storage elsewhere. Already, Oregon requires new utilities to offset a portion of their carbon emissions, and many are purchasing offsets from The Climate Trust, a public-private entity that takes competitive bids from offset providers. Vermont’s energy efficiency utility,

⁴ The carbon cycle of naturally fire-prone forests needs more investigation. Forests that naturally burn frequently might accumulate less carbon in the understory and on the forest floor, but more in large fire-resistant trees and long-lived charcoal.

which offers assistance with efficiency investments financed through surcharges on utility bills, offers a similar model for a public-private solution.

Forest Carbon Controversies

Before we launch into either trading of forest carbon offsets or subsidies to boost forest carbon, we should be certain that the measures we pay for deliver the promised reductions in greenhouse gases. The questions discussed below concern three strategies that are often proposed as forest-based global climate change solutions: managing for fast-growing young forests, increasing carbon stored in wood products, and increasing use of woody biomass fuels. Any of these strategies, if employed without considering their full carbon-cycle impacts, could actually reduce carbon stores instead of increasing them.

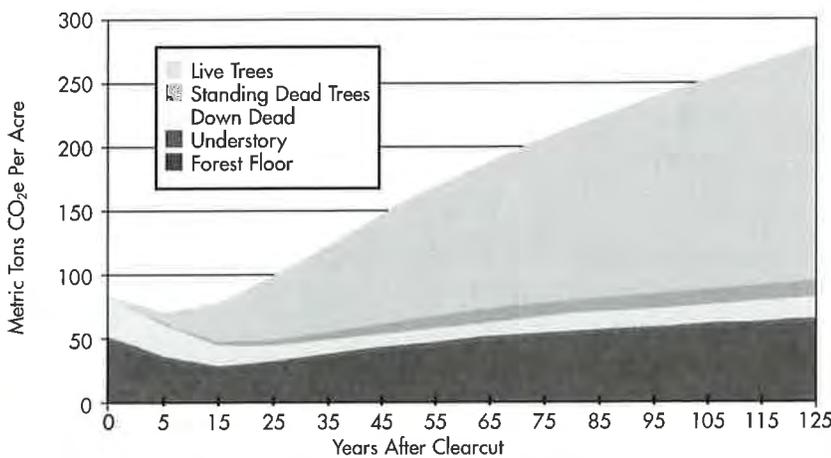
1: Does replacement of old, slow-growing forests with young, intensively managed plantations speed carbon sequestration?

Old forests represent large carbon sinks that need to be maintained as part of our nation’s common infrastructure, much as we maintain our highways or our wet-

lands. Figure 7 shows the dynamics of carbon stores in a northeastern spruce-fir forest after an initial clearcut: an undisturbed forest continues to build new carbon stores well past a stand age of 125 years (the end point for this model though far short of the time required to create the complex structural conditions of old growth). Even though the rate of carbon sequestration may be faster in younger stands (the slope of the total carbon curve is steepest between 25 and 35 years post-clearcut), older forests do continue to add substantial carbon stores each year (the total carbon line is still rising rapidly at 125 years) and total carbon stored in the forest will be much higher with extended rotation ages. Under true old-growth conditions, windthrow and other natural disturbances will create patches of younger trees, but more carbon will likely be present in dead and downed material than would be found after commercial harvest. Additional research is needed to help us better understand carbon cycles under different forest types and management regimes.

Moving beyond abstract models to practices on the ground, harvesting methods clearly matter. Single-tree or small-group selection—which removes slow-growing trees, releases well-established but suppressed potentially vigorous trees, avoids soil damage, and leaves a high volume of standing trees—may in fact increase both live and dead carbon stores within a few years post-harvest. Conversely, a heavy cut that promotes regeneration-suppressing brambles or ferns, or a harvest that releases soil and litter carbon through erosion or accelerates respiration due to intense exposure, will likely suppress carbon fixation for several years or even decades. For the forest modeled in Figure 7, forest floor carbon declines for 15 years and down dead carbon for 45 years after a clearcut; regrowth of live trees and replacement of standing dead trees is also slow in early decades. Total carbon

FIGURE 7.
Non-Soil Forest Carbon, Northeast Spruce-Fir Stand



Data from Smith et al. 2006.

present in all five pools actually drops below the severely depleted levels present after a clearcut (year 0) for more than 20 years after the harvest.

Conversion of natural forests to intensively managed plantations may likewise release soil carbon as a byproduct of cultivation, burning, and soil drainage, and fertilizers that get new crops of seedlings off to a rapid start may release nitrogen oxides that are greenhouse gases several times more potent than CO₂.

As Figure 5 illustrates, it is important to measure carbon system-wide, and not just in the forest itself. There would be no advantage to rapid carbon uptake by a young plantation if that carbon were quickly released once the trees were cut. Essentially each harvest shifts carbon from in-forest pools (“live vegetation” and “woody debris” pools in Figure 5—which continue to fix more carbon over time, though at a declining rate) to off-forest pools (“wood products” and “land-fill” pools—which see slow, steady losses). To assess which strategy is more effective, it is important to track the whole system over time, including soil and dead biomass carbon in the forest and wood products outside the forest, which brings us to a second forest carbon controversy.

2: Does converting living trees into long-lived wood products increase carbon stores and reduce emissions?

Many forestland owners would like to operate their forests as carbon-fixation assembly lines, allowing trees to convert atmospheric carbon to wood, removing the live-tree carbon and storing it off-site, and releasing other trees from competition so that their growth and carbon storage rates increase. At face value, this claim seems convincing. However, a number of complexities underlie this simple explanation.

First, not all harvested carbon makes it into a finished wood product (Figure 8). Assume that a live tree containing 1 metric ton of CO₂e is cut (such a tree would contain about 0.27 metric tons of pure carbon or about 0.54 metric tons of dry material total). About 0.54 metric tons of CO₂e are in the bole, the portion transported to the mill (the exact proportion varies widely by region, forest type, and even market, and is generally lower in the Northeast). The remaining 0.46 metric tons CO₂e (the “harvest residue” flux in Figure 5 above) are left to rot and will do so fairly rapidly because they are stored in the smaller branches, leaves, and severed roots that now lie resting on or just under the forest floor. After passing through the primary mill and secondary processing facilities, ultimately about 60 percent of the bole, or 0.324 metric tons CO₂e, will be transformed into wood products. Like the logging slash left in the woods, the 0.216 metric tons of CO₂e in the slabs and sawdust will degrade fairly rapidly, likely either burned for fuel at the mill (“consumption” flux shown in Figure 5) or sold as garden mulch or animal bedding (part of the “wood products” pool in

FIGURE 8.

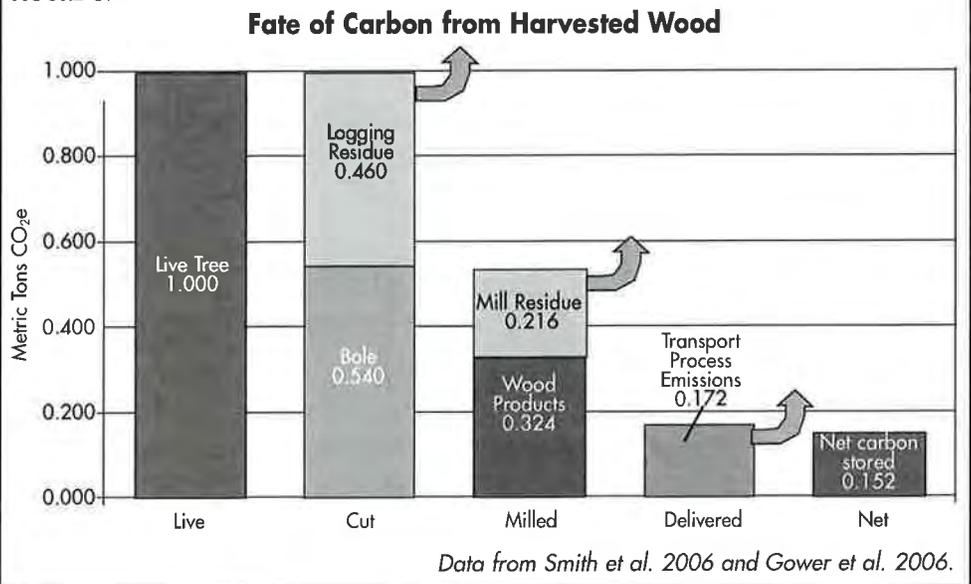
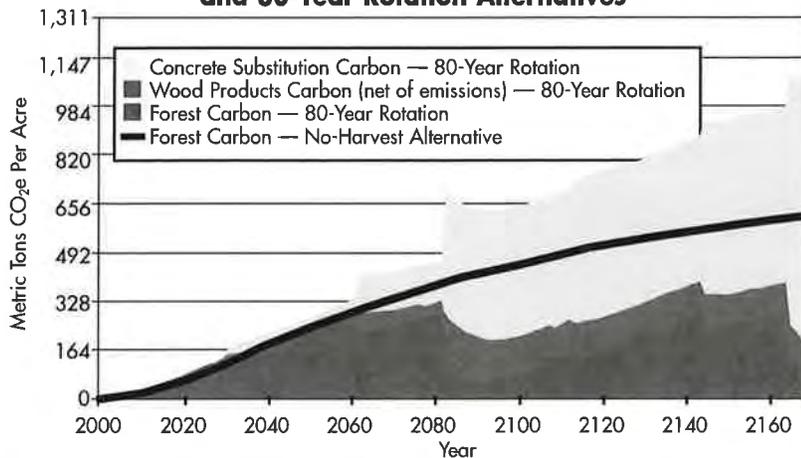


FIGURE 9.
Forest Ecosystem and Wood Products Carbon Under No-Harvest
and 80-Year Rotation Alternatives



Adapted from Wilson 2006, data from Perez-Garcia et al. 2005.

Figure 5, but with a very short storage life). Emissions from both logging and mill residue take place over time, and the rate of release will vary with harvest methods, mill processes, and whether these parts of the tree decompose or are burned, but residence times in these pools are short relative to live trees or long-lived wood products.

Additional emissions of about 0.172 metric tons CO₂e result from harvest, transport, and processing,⁵ mostly from burning of fossil fuels to run equipment, but also from less obvious sources like volatilization of finishes (the “processing” flux in Figure 5 should have an associated emissions flux to represent these costs of storing carbon in wood products). If burning of wood byproducts displaces fossil fuels in some processing and transport steps, as it does in many mills that use wood waste as an energy source, then this portion of emissions may be considered “carbon neutral” (see below, however, for some caveats). With losses at each step of the chain, the net gain in

carbon stores may be little as 0.152 metric tons CO₂e—15.2 percent of the carbon originally stored in the live tree.

Depending on the type of wood product, carbon stores will continue to decay over time, with product half-lives ranging from 6 to 100 years (California Climate Action Registry 2007). If harvested wood products decay faster than standing or downed dead wood left in the forest (and the larger the tree, the slower the on-site decay), then harvesting wood is unlikely to increase carbon stores over time. Leaving trees to mature and die in place, making space and fertility for faster growth by their live neighbors, may in fact be a better carbon sequestration strategy.

Some of the most thorough research on wood products carbon has been conducted by the Consortium for Research on Renewable Industrial Materials (CORRIM), originally formed to analyze the life-cycle environmental impacts of wood compared to alternative building materials. Figure 9, developed by CORRIM researchers, provides one comparison of the “storage-on-the-stump” strategy with the “storage-in-wood-products” strategy. The figure shows projected carbon stores in a Pacific Northwest forest regenerated in the year 2000 under a no-harvest regime (black line) and an 80-year rotation with two thinnings (solid areas).

The no-harvest alternative (black line) clearly stores more carbon over time in the forest than the 80-year rotation. Under the harvested system, forest carbon (green area) fluctuates with standing timber volume, but never rises above 2,000 metric tons CO₂e per acre. Carbon in wood products (brown area) does accumulate over time, but slowly since many products decay by the end of each 80-year rotation.

⁵ Gower et al. (2006) found that nearly 1 ton of CO₂e is released for each ton of wood products produced. One ton of wood products contains about 0.5 tons of carbon, or 1.8332 tons CO₂e. So processing of wood emits about 53 percent as much CO₂e as is contained in the end products. Figure 8 reflects these losses, as processing results in emissions of 0.172 metric tons CO₂e in order to produce wood products that store 0.324 metric tons CO₂e.

The “storage-in-wood-products” strategy appears superior only if benefits include the substitution of wood for concrete in construction (tan area). Concrete manufacturing releases vast amounts of CO₂e, due to both fossil fuel used for heat and carbon released by the chemical transformation of lime to make cement. As Figure 9 illustrates, substituting wood for concrete would reduce CO₂e emissions dramatically; conversely, if management to boost forest carbon stores reduces the availability of wood for construction, it could inadvertently cause more emissions if builders turn to concrete or fossil-fuel-based plastics as substitutes.

However, adding concrete substitution benefits to forest and wood products stores on a single graph implies that one hundred percent of the wood harvested will displace concrete, a highly unlikely scenario since only 17.9 percent of new U.S. homes in 2005 used concrete in above-ground applications where wood substitution would be possible (Portland Cement Association 2006). A forest landowner who reports carbon sequestration benefits due to concrete substitution as part of a registry or who offers an offset sale that includes those benefits would need to prove that substitution actually takes place.

Once processing emissions and verified materials substitution are accounted for, credit for wood products carbon increases may be claimed by only one link in the chain—a chain that extends from the owner of the forestland where carbon was originally removed from the atmosphere, to the wholesaler, retailer, builder, and home-buyer, all of whom can claim they have reduced emissions by choosing wood over cement, steel, or other greenhouse-gas-emitting material. If increases in wood products carbon stores are to receive market payments or public subsidies, ownership of the credits will need to be clarified to avoid double counting.

3: Is woody biomass a carbon-neutral fuel?

Another wood product often promoted for its carbon sequestration benefits is woody biomass fuel. Many argue that woody biomass is by *definition* a carbon-neutral fuel because growing trees once fixed all the carbon that is eventually released by burning. The critical issue for carbon neutrality, though, is not past sequestration of carbon embodied in fuels, but whether releases are offset by *future* carbon stores. After all, fossil fuels too embody previously sequestered carbon in amounts equal to that released through burning. If climate change policy aims to moderate *future* concentrations of greenhouse gases, we should choose our renewable energy technologies for their *future* impacts.

Those who claim that woody biomass is by *definition* a carbon-neutral fuel make an unspoken assumption that the forest/generator system is maintained in a steady state. In a steady state, the amount of CO₂ released by harvesting and burning biomass would equal the amount fixed by the source forest over a period of time sufficient for the harvested trees to regrow. As always, however, the devil is in the details. How much fossil fuel is burned to harvest, chip, and transport the fuel? How severely and for how long is carbon fixation suppressed due to the impact of mechanized harvesting? How quickly do leaves, needles, and small branches left on-site rot and release their carbon stores? How quickly does residual vegetation respond with a spurt of rapid new growth?

Woody biomass can indeed be managed as a relatively carbon-neutral fuel. Just as wood may be a better option than concrete for use in building construction, substituting wood for fossil fuel use can be an important component of a national policy to mitigate climate change. In particular, emerging cellulosic ethanol technologies promise better ratios of energy output to input than convention-

al ethanol. But acceptance of tradeable carbon offsets based on substituting woody biomass for fossil fuels, or government subsidies for these fuels justified by their climate benefits, must require *continued* management of the source forest to fully replace the carbon removed, burned, and released. Once fixed, that carbon must remain stored (as living and dead forest material or as long-lived wood products) or must continue to offset fossil fuels in energy production. Furthermore, processing emissions must be accounted for. At some point in the future, as fossil fuels cease to be the norm for generating electricity, the "business as usual" baseline will change and there will be no further justification for trading offsets or offering subsidies for woody biomass.

Aside from complete and long-term accounting, standards for defining carbon neutrality of woody biomass fuel should incorporate common sustainable forestry practices to avoid unintended negative consequences. Vigorous biomass chip markets could provide perverse incentives to manage for the lowest common denominator in wood value. Operators bent on speedy processing of massive volumes of generic biomass are unlikely to use careful crop tree selection or directional felling to avoid residual stand damage. The Forest Stewardship Council and similar third-party certification systems already favor protection of a full suite of forest values, and it would be relatively straightforward to add carbon-neutrality of fuels derived from forests to their standards.

Win-Win Forest Carbon Strategies: Restoration, Preservation, Sustainable Management

Given the difficulties with some proposals for boosting forest carbon, it seems prudent to support approaches that have few environmental drawbacks and many collateral benefits. Preventing forest conversion, replanting or restoring cleared or degraded forests, and lengthening rotations enjoy support from a wide variety of stakeholders, as these strategies also protect biodiversity, open space, water quality, remote recreation, and other increasingly threatened public values.

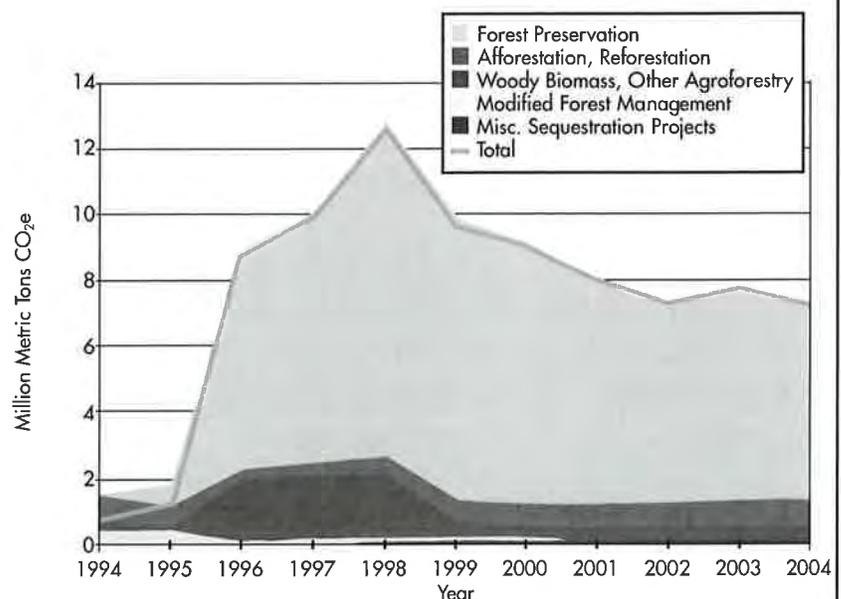
Forest preservation accounts for the great majority of carbon sequestration reported in DOE's 1605(b) registry, as Figure 10 shows. Registry guidelines permit preservation projects to claim 1/100th of the total CO₂e present in all carbon pools at the time of easement or fee purchase, plus report incremental carbon gains each year thereafter, so large quantities of sequestered carbon are registered immediately on project completion. Project sponsors must provide a permanent guarantee of forest cover through easements or other mechanisms, but are not required to prove that these lands would have been converted to other uses as strict additionality would require, so the CO₂ reductions attributed to forest preservation likely far exceed actual emissions reductions compared to a status quo baseline. However, where land conversion trends are well documented, this type of project provides tremendous potential for preventing carbon release due to forest losses.

Restoration—carbon sequestration through tree planting or regeneration (often called afforestation if land is naturally treeless or reforestation if temporarily cleared)—is the most easily documented means of boosting forest carbon stores, and the most commonly traded in

the voluntary offsets marketplace. Eighty-three percent of the sequestration projects reported under the U.S. Department of Energy's 1605(b) program in 2004 involved tree planting (U.S. Department of Energy 2006). Figure 10 shows CO₂e sequestration reported to this registry in 2004; since reforestation project sponsors report the CO₂ sequestered in the reporting year, and tree-planting projects fix very little carbon in the early years, the large number of reforestation projects is not fully reflected in Figure 10.

Many reforestation projects are sponsored by electric utilities, which view forest offsets as a viable low-cost strategy to cope with coming climate change regulation. For example, two large-scale riparian forest restoration efforts sponsored by electric utilities have replanted bottomland hardwoods in the lower Mississippi River Valley. UtiliTree Carbon Company, founded by Edison Electric Institute and 41 utilities in 1995, has replanted 1,000 acres so far (some overseas) with a goal of sequestering 3 million metric tons of CO₂e. PowerTree

FIGURE 10.
Sequestration Projects Reported to U.S. Department of Energy



Data from U.S. Department of Energy 2006.

Carbon Company, formed by 25 power companies and several NGO partners in 2003, has spent \$3.4 million to replant 3,600 acres and fix 2 million metric tons of CO₂e. Many of the “retail” carbon sequestration opportunities offered to individuals who want to offset personal carbon emissions also fund tree-planting programs. In the absence of national regulations, the quality of these programs varies tremendously. Valid reforestation offsets must include long-term verification that trees are alive and continue to grow.

Carbon sequestered through changes in forest management is perhaps the most difficult form of forest carbon enhancement to document, but it also holds great promise for secondary benefits to wildlife, water, and recreation. According to the North East State Foresters Association (2002), “management strategies that encourage larger trees, employ harvest methods that reduce waste and damage to residual trees, and minimize soil disturbance during harvest all improve carbon sequestration activities.” The Pacific Forest Trust (Gordon 2006) estimates that “if managed over longer rotations [northeastern forests] can accumulate significantly more carbon, perhaps as much as 20 more tons (67 metric tons CO₂e) per acre. Neil Sampson (2004) estimates that improved forest practices such as longer rotations and higher stocking could increase CO₂e by 0.3 to 4.6 metric tons per acre per year in U.S. forests. Longer rotations could temporarily reduce wood supply and promote a shift to carbon-intensive substitutes, and this effect would need to be carefully monitored. But over time, harvest volume from such forests would recover and could even increase.

Potential for New Collaborations

As high fossil fuel use is the ultimate cause of human-induced global climate

change, the ultimate solution depends upon reduced use of those fuels through energy efficiency and renewable substitutes. Given our addiction to oil, coal, and natural gas, however, that transition will be costly and time-consuming, and restoring forest carbon stores can help buy time. A national policy to enhance forest carbon stores offers an opportunity for collaboration among unusual allies—regional, national, and international environmental NGOs; small woodlot owners; the National Forest system; forest ecologists; and foresters, logging contractors, and the wood products industry. These groups have a shared interest in moderating climate change, protecting forestland from conversion, understanding the dynamics in natural forest systems, maintaining timber stocks in working forests, and promoting use of long-lived wood products.

Because of this congruence of diverse interests, forest carbon sequestration will likely be an important part of an emerging national climate change policy for the United States. Yet if forests are to make a significant and lasting contribution, and if we are to avoid unintended damage to other natural processes and values, it is critical for both accounting systems and policy measures to be designed with great care. We need improved carbon monitoring techniques, at both national inventory and project levels. Then we should begin to test and study forest sequestration with projects that provide broadly acknowledged secondary public benefits and few possible drawbacks. Overall, we need to keep forests as forests, restore them to a state of health, and manage them to maintain high volumes of above- and below-ground carbon. As an added bonus, these measures will help promote a more resilient forested ecosystem, better able to withstand the climate changes that have already begun.

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COVER PHOTOS:

Top: Hearts Content Scenic Area, Allegheny National Forest, Pennsylvania.

Globally, forest losses account for nearly one-quarter of greenhouse gases released due to human activities. Efforts to reduce our climate impacts need to include protection for forest carbon stores like those in this rare eastern old-growth stand.

Photo by Donald L. Gibbon

Left: Fossil fuel combustion is the primary source of excessive greenhouse gases in the atmosphere, and coal-fired power plants are still on the increase.

Photo: Corbis Images



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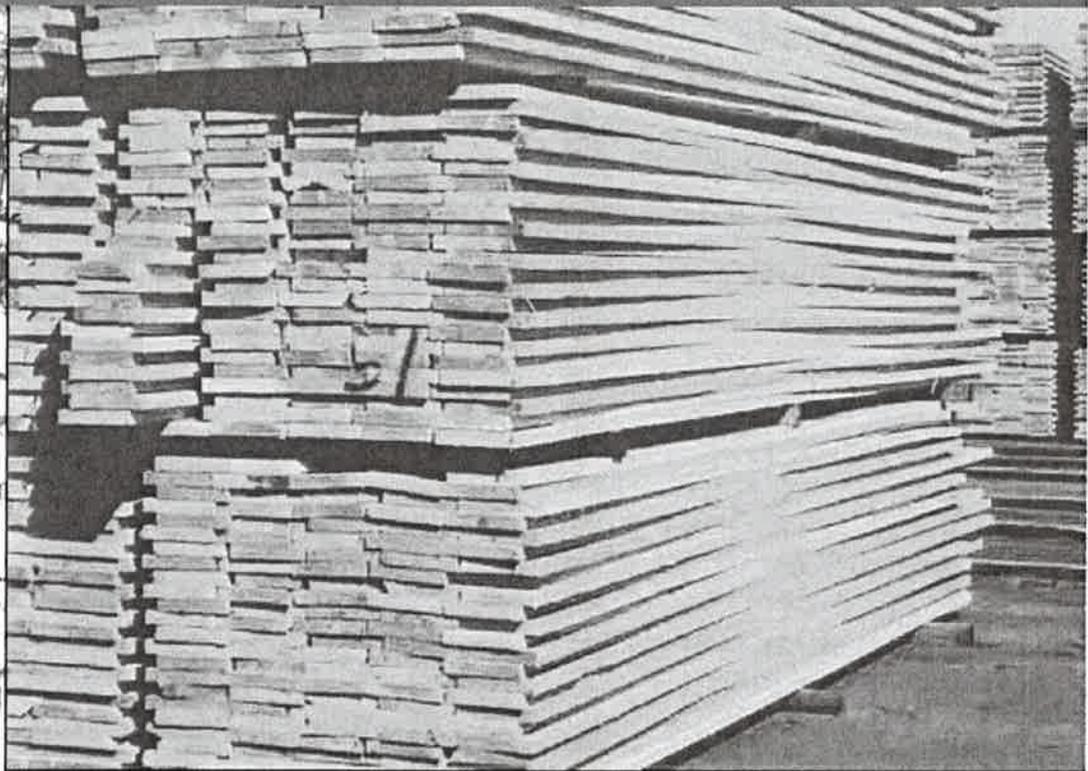
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Wood products and carbon storage



**Wood Products and
Carbon Storage:
Can Increased Production
Help Solve the
Climate Crisis?**

**Analysis
Economic**

SCIENCE FROM



THE
WILDERNESS
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About the Wilderness Society

The Wilderness Society's mission is to protect wilderness and inspire Americans to care for wild places. Founded by prominent naturalists and biologists, including Robert Marshall and Aldo Leopold, the organization played an important role in helping pioneer science-based conservation advocacy and policy making. The Society remains dedicated to the concept that careful, credible science, combined with bold advocacy, and unswerving vision is the key to conservation success.

Headquartered in Washington, D.C., The Wilderness Society maintains twelve regional offices where our staff address on-the-ground conservation issues linked to local communities. Since spearheading passage of the seminal Wilderness Act in 1964, we have been a leading advocate for every major piece of Wilderness legislation enacted by Congress. Our effectiveness stems not only from our passion for protecting America's most special places, but also from the sound scientific research that underpins every aspect of our work.

About the Ecology and Economics Research Department

The Wilderness Society's Ecology and Economics Research Department (EERD) consists of experts in economics, ecology, and landscape analysis, including 12 Ph.D.-level scientists. This outstanding team provides the science to answer pressing questions about mineral exploration and development, forest and fire management, climate change, and many other issues affecting public lands. This information is key to understanding often complicated environmental issues, and ultimately making the right choices toward achieving lasting protection for the resources and places that sustain us and our ways of life. EERD provides science to inform not only The Wilderness Society's own conservation campaigns, but also the decisions being made by communities, land managers, legislators, and others about the future of America's wild places.

The Wilderness Society is a national non-profit organization and was founded in 1935.



Wood Products and Carbon Storage: Can Increased Production Help Solve the Climate Crisis?

by
Ann Ingerson

April 2009



Acknowledgments

Many thanks to several reviewers who helped clarify (some repeatedly) the purpose of this report and the presentation of information: Tom DeLuca and Pete Morton of The Wilderness Society, Ken Skog of the USDA Forest Service, ecological economist Paula Swedeen of the Pacific Forest Trust, Christopher Galick of the Nicholas Institute at Duke University, Jerry Jenkins of the Wildlife Conservation Society Adirondack Program, and Adam Sherman of the Biomass Energy Resource Center. These reviewers do not necessarily endorse any conclusions in this report, and any remaining errors are solely the responsibility of the author. Sarah DeWeerd and Michelle Stephenson worked their usual magic with editing and graphic design and I thank them for their clear vision and long hours. Many thanks to Christine Soliva for shepherding this report through to completion. Thanks also to the Merck Family Fund for their generous financial support.

Citation

Ingerson, A. 2009 Wood Products and Carbon Storage: Can Increased Production Help Solve the Climate Crisis? Washington, D.C.: The Wilderness Society.

This science report is one of a series that stems from conservation research studies conducted by The Wilderness Society's Ecology and Economics Research Department. Other reports in the series that focus on similar issues include:

U.S. Forest Carbon and Climate Change: Controversies and Win-Win Policy Approaches; Economic Analysis, July 2007, Ingerson.

Measuring Forest Carbon: Strengths and Weaknesses of Available Tools; Science and Policy Brief, April 2008, Ingerson and Loya.

Environmental Benefits and Consequences of Biofuel Development in the United States; Science and Policy Brief, May 2007, DeLuca.

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March 2009
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Foreword

Global discussions around climate change recognize the critical importance of maintaining land-based carbon sinks as part of a comprehensive policy to address this burgeoning crisis. Internationally, the first priority is to protect the tropical rainforests that are the true champions of carbon sequestration. Within the United States, the temperate rainforests of the Pacific Northwest and southeast Alaska serve as our own carbon storage champions. But other forests found across the country also play a significant role in the climate equation.

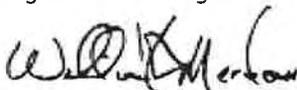
Experts predict, however, that without further protection, up to one million acres of U.S. forestland per year—along with much of their carbon—may be lost to development over the next fifty years. Yet rather than prioritize forest protection, much attention has been focused on the potential for wood products and wood fuels to store carbon or reduce fossil emissions. At its most extreme, this approach suggests that cutting down forests is the best preemptive move to prevent carbon losses due to fires or insect infestations. The tactic might work if 1) carbon was transferred, intact, and without any energy use, from the forest to its final resting place, 2) the carbon remained indefinitely locked away, and 3) a new forest immediately sprung up to replace the old one. The reality is, of course, a much more complex and very different scenario.

In The Wilderness Society's report, *Wood Products and Carbon Storage: Can Increased Production Help Solve the Climate Crisis?* author Ann Ingerson draws on a variety of sources to illuminate the greenhouse gas impacts of wood products and wood biomass fuels throughout their life-cycles. While detailed analyses are rare, the picture is complete enough to show the variability of the processing path followed by different types of trees in various parts of the country. Taking the entire life-cycle of these products into account, it becomes clear that an increased use of wood fuels and lumber will have very little net effect on climate change. To the contrary, the impact is as likely to be negative as positive.

Our report also takes a closer look at one particular policy mechanism, which could reward wood products carbon storage: the use of forest-carbon offsets in voluntary (market-based) or regulatory programs. Because such offsets are expected to balance emissions from other sources, it is important that the additional carbon sequestration be real. This document outlines several criteria for carbon offset standards to account for the full effects of harvested wood carbon.

Regardless of whether the greenhouse gas impacts of wood products and wood fuels are positive or negative, continuing to focus on these minor effects only distracts us from the larger task at hand. Our nation must transform an economy based on centuries of inexpensive fossil energy into one that will operate on a truly sustainable, renewable basis. The wood products industry can contribute to this goal by increasing processing efficiency, reducing energy use, extending product life, reusing and recycling wood materials, and promoting wood energy that is clean, efficient, and based on sound forest practices.

By implementing such transformative strategies and keeping America's forests as forests, the U.S. forestry community will make an invaluable contribution to mitigating climate change.



William H. Meadows
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"What's the use of a fine house if you haven't got
a tolerable planet to put it on?"

— Henry David Thoreau, 1860

BOG

Key Points

1. When wood is removed from the forest, most of it is lost during processing. The amount lost varies tremendously by region, tree species and size, and local infrastructure.
2. The majority of long-term off-site wood carbon storage occurs in landfills, where decomposing wood gives off significant amounts of methane, a gas with high global warming potential.
3. In addition to wood processing losses, fossil fuels are required to turn raw logs into finished products and ship them from forest to mill to construction site to landfill.
4. Once wood losses and fossil emissions are accounted for, the process of harvesting wood and turning it into products may release more greenhouse gases than the emissions saved by storing carbon in products and landfills.
5. Biomass is often considered a "carbon-neutral" fuel, but its true climate impact depends upon management of the source forest and efficiency of use.
6. Under cap-and-trade programs designed to reduce greenhouse gas emissions, forest offsets are often proposed as a low-cost option for reducing atmospheric carbon dioxide, while providing abundant collateral benefits.
7. Wood products in use and especially in landfills do keep carbon out of the atmosphere, but proposals to assign credit for that carbon through offset projects require first solving a whole host of conundrums.
8. If wood products are credited in offset projects, project carbon accounting must reflect the characteristics of the unique processing chain followed by that project's logs.
9. Properly managed, wood can be a renewable source of building materials and fuels, but solving the climate crisis will require reducing the use of all materials and energy.



PHOTO BY EBGETS PASS FOREST WATCH

Removal of trees for processing into wood products affects carbon storage at every step — from the forest through processing to final disposal.

The Role of Forests in Addressing the Climate Crisis

Forest protection is a critical component of climate policy, both globally and within the United States. Forested ecosystems, including soils, store more carbon than is currently present in the atmosphere. In many places, these important reserves of carbon are threatened by forestland conversion or degradation. Globally, about 20% of recent anthropogenic greenhouse gas emissions can be traced to deforestation, a larger percentage of emissions than originates from the transportation sector. Continuing conversion of forests to other uses represents a significant climate threat that is well recognized by the public, the scientific community, and policy makers.



PHOTO BY BOB KEEFER PHOTOGRAPHY/WWW.BKPIX.COM

Beyond the broad consensus in favor of keeping forests as forests, however, when it comes to considering the best way to manage those forests, opinions diverge. The treatment of harvested wood as a carbon reservoir is particularly controversial. This report outlines the major issues surrounding carbon storage in harvested wood products, summarizing data from multiple sources. It also discusses the climate impacts of woody biomass fuels as an additional use for harvested wood. Because of intense interest in these topics, new research is constantly emerging that could modify the tentative conclusions reached here, but our hope is that the general framework will contribute to understanding of these complex issues.

Forest and wood product carbon accounting might be used to answer two related but distinct questions. First, what are the overall greenhouse gas (GHG) impacts of harvesting trees and converting them to wood products or burning them for fuel? Second, should climate policies encourage *increasing* timber harvest and wood products production to help *reduce* GHG emissions? Much controversy over the role of wood product carbon storage arises when these two distinct questions are tangled together, so we present them sequentially here.

The first question can be answered through life-cycle analysis, which is the subject of the first section of this report. This type of analysis seeks to understand the impacts of an activity "from cradle to grave," or in this case "from stump to dump." Life-cycle analysis raises inevitable questions about appropriate system boundaries and what effects are significant enough to measure. In addition, while tracking wood losses at each step is fairly simple, tracking fossil energy use and other GHG emissions associated with those steps is more complex. Moreover, tracking the indirect effects of wood use on the

Forested ecosystems, including soils, store more carbon than is currently present in the atmosphere. Old growth forests, like Willamette National Forest's Delta Grove shown above, are especially rich in carbon reserves.

source forest and on markets for end-use products and alternative materials can twist the analyst in knots. Despite this complexity, however, the questions are essentially factual—what are the GHG flows associated with decisions to harvest timber for conversion to wood products or for burning to produce energy?

The second major question asked by this paper is more about policy choices than facts alone. Would increased wood products manufacturing be an effective and otherwise desirable approach to help mitigate global warming? Here the facts about whether GHG reductions *could* be achieved provide only a partial answer. Would changes have occurred anyway, without special incentives? What alternative actions might also achieve reductions? What secondary effects make each option more or less desirable? Choices about how to treat wood products and biomass as part of a GHG reduction strategy will ultimately affect land owners, loggers, nonhuman forest species from salamanders to redwoods, backcountry recreationists, wood product manufacturers and their employees, makers of wood substitutes, wood product consumers, etc. Policy choices require a complex balancing of interests to set public priorities.

Currently, a great deal of attention centers on carbon offsets as one policy mechanism that could influence carbon storage in forests and harvested wood. Under a cap-and-trade system, society chooses which sectors must comply with an emissions cap. In climate change mitigation policy, uncapped sectors often include agriculture and forestry, since their emissions are difficult to monitor and their lands often sequester more greenhouse gases than they release. Entities in these sectors may market GHG reductions or sequestration that are beyond “business as usual” to capped sectors as substitutes for required emissions reductions, or offsets. Since offsets under a cap-and-trade system derive their value from public policy, questions about the definition of “business as usual” and what counts as a saleable offset go beyond the technical and touch on public values, property rights, and equity. These complex issues associated with accounting for wood products carbon stores as part of forestry offset projects under a cap-and-trade climate policy are discussed in the second section of this report.

Carbon Losses and Energy Emissions Associated with Wood Products

Before following carbon through a wood products life cycle, it is important to understand the distinction between a greenhouse gas *inventory* and a *life-cycle analysis*. Inventories, like the U.S. Environmental Protection Agency (EPA) annual Inventory of U.S. Greenhouse Gas Emissions and Sinks, provide comprehensive measures of net greenhouse gas emissions across the economy as a whole, and may be useful to gauge the overall success of national or regional GHG-reduction efforts. Inventories are not particularly useful, however, in determining the GHG impacts of distinct parts of the economic system, because inventory information is divided into sectors with no indication of how one sector affects another. For example, carbon stored in wooden houses and landfilled wood is reported in the Land Use, Land Use Change, and Forestry sector of the EPA Inventory, while emissions from fossil fuels used to make, move, and dispose of those products are reported in the Energy sector, and emissions from decomposition at the landfill are reported in the Waste sector. For the same reasons, an inventory cannot assess the potential for one product to reduce overall emissions by substituting for a higher-emissions alternative. (One example of this type of question, the potential for wood products to lower GHG emissions by replacing concrete or steel, is treated later in this paper.) A life-cycle analysis, on the other hand, can illuminate the critical connections between sectors to predict the overall GHG impacts of a particular activity or policy.

A life-cycle analysis for wood products begins with the decision to harvest trees and ends with the disposal of wood products made from those trees. Two parallel and related streams of GHG impacts result *directly* from the harvesting, processing, use, and disposal of wood products. First, carbon is lost at each step of the processing chain due to the physical breakdown of wood, releasing carbon dioxide, methane, and other byproducts.¹ Second, the transportation of wood to mills, transformation into a variety of products, and delivery to customers and eventually to landfills requires energy, a large proportion of which is derived from fossil fuels. Gower (2003) clearly describes the importance of including these GHG fluxes in a wood products analysis:

It is extremely important to note that almost all the forest product sequestration estimates are based on gross C accumulation. That is to say, GHG emissions from harvest, transportation of the roundwood or chips to processing plants (i.e., pulp and paper mills, sawmills), mill emissions, and transportation of the forest products to regional distributors and

¹ In the life-cycle analysis context, the wood products stream results in the release of a variety of different greenhouse gases in addition to carbon dioxide (CO₂) and they have varying effects on the climate. Methane, for instance, is produced from the anaerobic decomposition of landfilled wood. According to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Forster et al. 2007), methane (CH₄) is 25 times more potent than CO₂ as a greenhouse gas. (Many applications still use a global warming potential of 21, as suggested in the Second Assessment Report.) Climate policy makers have settled on "carbon dioxide-equivalents" (CO₂e) as a uniform unit for measuring the global warming potential of emissions—so, for example, 1 ton of methane would be measured as 25 tons of CO₂e.

consumers are ignored... Life cycle analysis (LCA)... can be used to quantify total GHG emissions for a forest product from cradle (i.e., forest establishment) to grave (i.e., final fate). Scientists have yet to demonstrate that there is a net C storage in forest products if a complete LCA, from cradle to grave, is completed.

Figure 1 illustrates the flows of materials and energy through the wood products processing chain. Table 1 summarizes the activities at each step that result in GHG emissions from either wood loss or fossil energy use. In addition to the direct effects of wood products production on greenhouse gas emissions, there are less well-defined, indirect effects on both the forest ecosystem and on

economic activity that influence the overall GHG benefits of wood products. These are sketched out under the section on Broader System Effects below. Biomass fuel is a special type of wood product, the climate benefits of which depend upon replacing fossil fuels rather than increasing carbon storage. Because of this fundamental difference, the greenhouse gas implications of increasing biomass fuel use are also treated in a separate section.

Wood Carbon Losses Through the Processing Chain

This section outlines how carbon stored in wood is lost through decomposition or combustion during five stages of processing

FIGURE 1.

The Wood Products Processing Chain

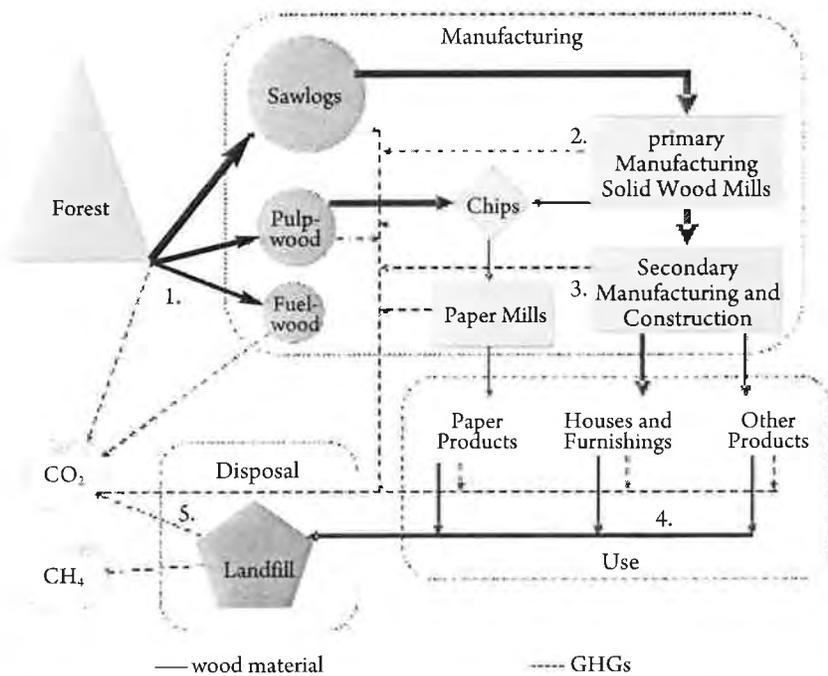


TABLE 1.

Wood Harvesting and Processing Steps

Step	Activities
1. Harvest	Road construction; felling, limbing, cutting trees to length; transport to landing and mill
2. Primary processing	Sorting out material used for fuelwood and paper; sawing into lumber, planing; manufacture of plywood and other panels
3. Secondary processing and construction	Manufacture of primary products into end products (furniture, cabinets, flooring, windows and doors); building construction
4. Use	Maintenance and repairs
5. Disposal	Landfilling, dumping, burning; recovery for re-use

as illustrated by the dotted lines in Figure 1: (1) harvest site losses, (2) primary processing mill residues, (3) secondary processing and construction waste, (4) product use and maintenance, and (5) ultimate disposal.²

Studies present wood losses and GHG emissions in varying units, and percentages use different bases. Since the alternative to harvesting trees would be to leave them standing, in this report we express losses at each step in the processing chain as a percentage of carbon in the standing tree. We assume that carbon density in wood products is similar to that in the live tree, so that losses in wood volume provide rough estimates of carbon losses at each step.

Timber harvests usually produce a mix of roundwood types (logs, pulp, fuelwood, etc.), and a GHG accounting of the effects of harvest decisions should reflect the impacts of the entire bundle of products. However, since carbon storage benefits rest with long-lived wood products, and paper is widely acknowledged to be a net emitter of greenhouse gases,³ we focus here primarily on solid wood products.

Due to the complexity of wood markets, with multiple end products and variable recapture of byproducts and raw materials, generalizations about carbon losses are risky. Nonetheless, broad guidelines for estimating the loss of wood carbon during timber processing are provided by the U.S. Forest Service, in a reference (Smith et al. 2006) used for the U.S. Department of Energy's voluntary GHG registry known as the 1605(b) program. This reference uses available data from mill surveys, forest inventories, forest products research, and data on landfills and housing stock, among other sources, to estimate wood product carbon and predict losses over time as products are disposed of and decomposed. Due to data limitations, these estimates are necessarily based on broad regional averages and extrapolation from knowns to unknowns.

To supplement this general information, some additional research results are summarized below. Our analysis finds losses of similar magnitude to the estimates in Smith et al. (2006). The data that we synthesized from multiple studies indicate that as little as 1% of the carbon present in the standing tree may remain in solid wood products in use after 100 years. Interestingly, landfills make a much larger contribution to long-term carbon storage, sequestering perhaps 13% of the carbon originally present in the standing tree. Table 2 and Figure 2 illustrate the range of wood losses through the processing chain and after 100 years in use, with detailed explanations to follow.

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² This system boundary excludes several less direct effects of wood harvesting activities, including the longer-term impacts of wood harvest on forest carbon, the impacts of wood fuels on fossil fuel consumption, and possible substitution of wood for materials that have different manufacturing emissions. These effects are treated, albeit briefly, in the Broader System Effects and Biomass sections below. Our approach also assumes that impacts will be similar for wood products utilized within the U.S. and those that are exported, so that the location of the impacts is irrelevant to GHG assessments.

³ High-lignin papers may remain in landfills for considerable time, but the methane released from the breakdown of landfilled paper and the energy required for paper production outweigh any carbon storage benefit. The assumption that paper production contributes little on balance to mitigating GHG emissions could change if a greater percentage of paper were recycled or if more of the methane generated by landfilled paper were captured for energy generation.

TABLE 2.

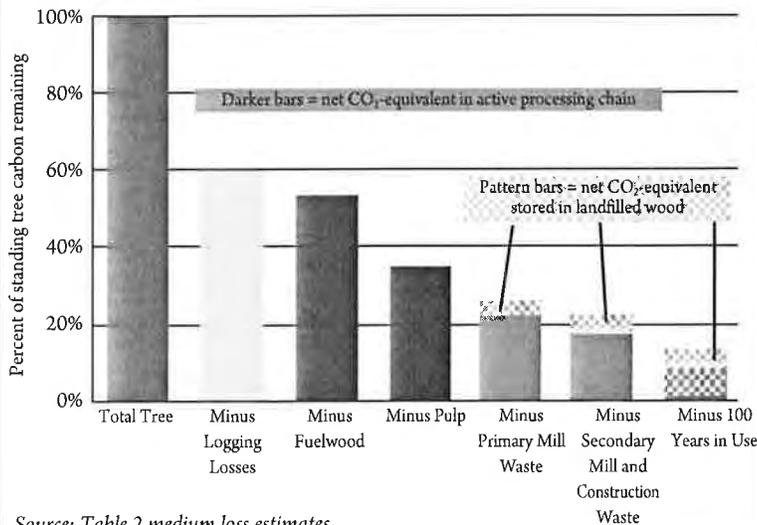
Reductions in Wood Available for Long-Lived Wood Products (% of Live-Tree Volume)

Processing Step	Low	Medium	High
1. Harvest	22%	40%	59%
2. Primary processing – fuelwood portion	2%	5%	33%
2. Primary processing – pulp portion	3%	19%	30%
2. Primary processing – mill	4%	13%	22%
3. Secondary processing	6%	5% ⁴	18%
3. Construction	1%		5%
4. 100 years in use	14%	17%	19%
Cumulative losses		99%	

Sources: See text.⁵

FIGURE 2.

Carbon Storage Through the Wood Products Chain



Source: Table 2 medium loss estimates.

It is important to recognize that the wood from a single tree may experience high losses at one stage and very low losses at another. The variety of processing paths a log may follow, as well as the variation in losses at each processing step, illustrates why direct sampling of wood flows would be important to understand GHG emissions from wood losses. Still, the fact remains that even the most efficient processing chain will result in the loss and emission of a significant portion of the carbon present in the standing tree.

1. Harvest

Significant amounts of carbon are lost during timber harvest when the un-merchantable portion of the tree is piled and burned, left in the woods or at a landing to decompose, or collected and burned as biomass energy. Both the amount and the rate of this loss affect accounting for carbon emissions. Zhang et al. (2008) surveyed data from 110 research sites and found median litter decomposition half-lives between 2 and 3 years.^{6*} Given such rapid decomposition rates, many studies make a simplifying assumption that logging residue is lost immediately, whether burned or left to decompose.

The U.S. Forest Service (2008) estimates logging residue at 30% of roundwood volume for the United States as a whole. State-level percentages range from 3% to 84% (U.S. Forest Service 2007).⁷ These percentages fail to capture the total carbon losses during

⁴ Secondary processing and construction losses are not cumulative—the highest secondary processing losses occur in industries like furniture, where construction losses are zero. The estimate for medium losses from secondary processing and construction combined

assumes 76% of solid wood is used in construction and 24% in finished products, based on data from Smith et al. 2006, Table D2 (see Data Appendix for further details).

⁵ Low and high estimates are from different analyses or regions. Medium estimate is national average (for harvest losses, fuelwood, and pulp), simple average of low and high estimates (for primary processing – mill and in-use), or weighted average (for secondary processing and construction, based on national proportion of wood used for construction and other long-lived uses).

⁶ *Many of the factors reported here required combining multiple sources of data, using different units or a different base for percentages. To avoid cluttering the text with computational details, we have explained all these computations in a Data Appendix. Items explained in the Data Appendix are marked * in text.

logging, as reported logging residue volumes exclude roots, stumps, and small limbs.⁸ Including stumps and small limbs would increase logging residue volumes by an average of 14% for softwoods and 24% for hardwoods (McKeever and Falk 2004), which would increase overall national average residue to about 36%* of roundwood volume. Large roots range from 5% to 51% of total tree biomass, with a mean of 19%, in cold temperate and boreal forests in the United States (Li et al. 2003). Taking all these factors together, approximately 40%* of the original tree volume, with a range from 22%* to 59%* for individual states, might be left behind at harvest, and its stored carbon lost.

Actual losses would vary significantly depending on the type of harvest (whole-tree or bole-only, commercial thinning or diameter-limit or clearcut) and the type and quality of timber (hardwoods generally produce more residue than softwoods, and higher-quality trees produce proportionally less residue). A portion of in-forest decomposition losses due to logging might occur even without harvest activity, due to natural tree mortality. An increase in the commercially used portion of the tree would lower logging residue losses, but might also ultimately reduce site productivity.

2. Primary Processing

As we have seen in the discussion above, logs removed from a harvest site represent approximately 60% of the volume—and hence, stored carbon—of the trees from which they came. Harvested logs may be destined for pulp, fuelwood, sawlogs, or other specialized uses, but long-term carbon storage benefits come mainly from the sawlog portion. The portion of wood going to each use varies widely by region, and will also differ among harvest operations within a region, but the following calculations provide a general indication of processing losses:

- According to figures in a recent Resources Planning Act assessment (U.S. Forest Service 2008), fuelwood removals in 2007 ranged from 3% (in the South Central region) to 51% (Rocky Mountain region) of total roundwood removals by volume, with a national average of 9%.⁹ This national average amounts to about 5%* of the original standing

⁷ Roundwood is the volume of material loaded onto a truck for processing into lumber, pulp, fuelwood, or other uses. Timber Product Output data are from mill surveys and field sampling at logging sites. Data are imputed for years between surveys and could fail to reflect recent changes in technology.

⁸ Logging residue also excludes wood lost during pre-commercial thinning or land clearing, about 8% of total material removed from forests nationwide, but since these losses are not directly related to a harvest decision we consider them outside the boundary of our life-cycle analysis.

⁹ Most of the Forest Service data cited in this report groups U.S. states into nine regions as follows: Northeast (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia); North Central (Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin); Southeast (Florida, Georgia, North Carolina, South Carolina, and Virginia); South Central (Alabama, Arkansas, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee, and Texas); Great Plains (Kansas, Nebraska, North Dakota, and South Dakota); Intermountain (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming); Alaska; Pacific Northwest (Oregon and Washington, further split into Westside and Eastside in some reports); and Pacific Southwest (California and Hawaii).

tree volume burned as fuelwood, leaving 55% (60% minus 5%) available for other uses.¹⁰

- The portion of total roundwood volume used for pulp ranges from 6% for hardwood sawlogs in the North Central region to 50% for softwood pulp in the Pacific Northwest Westside, with a national average of about 31%* (Smith et al. 2006, Table D6).¹¹ These pulp diversions amount to another 3%* to 30%* by region of original standing tree volume lost from the long-lived products stream, with a national average of 19%*. This leaves about 36% (55% minus 19%) of the original tree volume available for processing into long-lived products.
- Bark accounts for about 15% to 18% of roundwood volume (Smith et al. 2006, Table 5). Most is burned for fuel, with small amounts used for mulch, other short-term uses, or discarded. The bark portion of the 36% of original tree volume remaining after fuelwood and pulp are sorted out would amount to another 6%* of original tree volume. However, making a conservative assumption that sawmill waste percentages, as well as fuelwood and pulp diverted, include this bark waste, we will not consider bark as an additional loss in the volume of wood available for processing into long-lived products.

Once wood destined for short-lived uses (fuel and pulp) has been removed from the solid wood stream, further losses during primary processing will vary considerably depending on the product and the equipment used. Standard

circular sawmills may convert only 50% of a log into lumber, while thin-kerf bandsaw mills may approach 70% conversion efficiency. Oriented strandboard (OSB), medium-density fiberboard (MDF), and particleboard may approach 90% conversion of non-bark wood to panels (at the cost of increased use of energy and resins—see the section on fossil energy emissions below).

Northeastern sawmills producing hardwood lumber averaged 56% loss of wood from log to planed lumber (Bergman and Bowe 2008). The Consortium for Research on Renewable Industrial Materials (CORRIM) estimated wood waste losses during primary solid wood



PHOTO COURTESY OF THE MANNING AND AREA ECONOMIC DEVELOPMENT SOCIETY, ALBERTA, CANADA

Either at the harvest site landing or at the mill, logs are sorted by quality and diameter into smaller material used for fuelwood or pulp (relatively short-lived uses) and large material suitable for sawing into lumber.

¹⁰ Wood fuels are often considered “carbon-neutral,” but when evaluating the potential for long-term carbon storage in harvested wood, burning must be treated like any other wood loss because it definitely accelerates the release of carbon. However, see the Biomass section below for a discussion of possible carbon benefits of fuel substitution. Processing byproducts used for fuel are not included in these fuelwood percentages, however, since carbon losses from this source would be included as part of processing waste.

¹¹ Additional waste material from solid wood processing may also be recovered to make paper, but because of paper’s emissions profile this recovery would not make a significant contribution to carbon storage.

processing ranging from 26%* (for Southeast OSB) to 58%* (for Southeast softwood lumber) of the raw log (Kline 2005; Milota et al. 2005; Wilson and Sakimoto 2005). A study from Finland estimated 56% losses for softwood lumber and 62% for plywood (Liski et al. 2001).¹² With about 36% of original standing tree volume available for processing into long-lived products, primary mill losses amount to about 4%* to 22%* (average of 13%) of the standing tree volume, leaving about 23% of the original volume to be incorporated into long-lived wood products such as lumber or panels.

3. Secondary Processing and Construction

Once primary products leave the mill, many undergo further processing into finished products, sometimes in multiple stages. For instance, lumber might be shaped for molding or flooring, then further trimmed at the construction site. Systematic studies of wood waste during secondary processing are hard to come by, but a few examples indicate the general magnitude of waste at this step.

Losses in furniture and cabinetry are particularly high due to trimming of knots and other defects. A North Carolina study (Wood Waste and Furniture Emissions Task Force 1998) assumed wood waste in furniture manufacturing at 55% to 65% of lumber. A Georgia furniture manufacturer scrapped approximately 40% of all hardwood lumber purchased due to cracks and other defects (Crumpler 1996). A British study (BFM, Ltd. 2003) found secondary manufacturing waste at 20% of raw material purchased for "board" products (MDF, OSB, plywood), 27% for softwood lumber, 37% for hardwood lumber, and 50% to 80% for veneer. This range of secondary processing losses (expressed above as percentages of lumber or panel volume) translates to losses of 6%* to 18%* of original standing tree volume lost at the secondary manufacturing stage.

Wood destined for furniture, cabinetry, windows, and doors experiences most losses at the secondary manufacturing plant. By contrast, framing lumber, flooring, paneling, and siding undergo further trimming at the construction site. Using wood waste amounts reported by the National Association of Home Builders (NAHB) Research Center (1995) and total wood materials required for construction of a 2,082-square-foot single-family house (NAHB, cited in Wilson and Boehland 2005) we estimate that construction-site waste in home building ranges from 4% for solid wood to 10% for engineered wood components. The general magnitude of construction wastes according to NAHB data is similar to the 10%-12% range found in several other studies (Cornell University Cooperative Extension 1996; James et al. 2007; McKeever and Falk 2004). Particular construction applications will naturally diverge from these overall national averages. A Cornell University study of the construction of seven homes (Cornell University Cooperative Extension 1996) found wood waste per square foot of home varied from one-half to twice the NAHB estimates cited above. A Texas study found that construction wood waste from large, custom-built homes was approximately three times the NAHB amounts recorded for

¹² Mill residues from primary mills may be burned on-site for energy, used to make pelleted wood fuel, converted to structural panels or paper, or dumped or landfilled. Other than structural panels and discards in an anaerobic landfill, the other possible uses for mill residues would store carbon for very short time periods so they are considered direct losses here.

Even when mills turn out a product like lumber that is capable of storing carbon for long periods, actual long-term carbon storage will depend upon its final use and expected lifetime in that use.

smaller homes (Houston Advanced Research Center 2005). This range of construction site losses (expressed above as percentages of lumber volume) translates to losses of 1%* to 5%* of original standing tree volume.

Generally the same wood material will not be subject to secondary processing losses and construction site losses, as most construction materials undergo primary processing only. Assuming that 76%* of wood volume in long-lived products is construction lumber, with the remaining 24% in furniture, cabinetry, and other products, total secondary processing and construction losses might be about 5%* of original standing tree volume. If 23% of the tree remains after primary processing, this leaves about 18% of original live tree volume actually incorporated into long-lived products.

4. Use

Once products are placed in service, carbon losses begin to occur as products, or portions of them, are disposed of. Even when mills turn out a product like lumber that is capable of storing carbon for long periods, actual long-term carbon storage will depend upon its final use and expected lifetime in that use, as well as whether it is discarded prematurely due to renovations and repairs. Lifetimes in use vary widely among solid wood products. The longest-lived uses are for buildings or furniture, and about 60%* of all primary solid wood products (lumber and paneling) find their way into these uses (Smith et al. 2006). Shorter-lived uses include pallets and other shipping containers and miscellaneous manufacturing (e.g., matches, popsicle sticks, toothpicks).

Half-lives are generally used to indicate the rate at which wood products will be discarded over time.¹³ The latest WoodCarbII model, used for the 2007 Inventory of U.S. Greenhouse Gas Emissions and Sinks, assumes half-lives of 86 years for single-family and 52 years for multi-family homes built recently (these half-lives are shorter for earlier construction years), 26 years for residential repairs, 38 years for "other" solid wood uses, and 2.5 years for paper (Skog 2008). These half-lives were calibrated so that the WoodCarbII model estimates of discards to landfills match EPA solid waste estimates for 1990 to 2001, and estimates of wood carbon in housing in 2001 fit with Census of Housing data.

Beyond half-lives, estimates of wood carbon remaining in use also depend upon the equation used to describe the disposal path. Researchers make various assumptions about whether the disposal path is linear, logarithmic, or follows some other pattern. Miner (2006) provides examples from Europe (European Forest Institute - EFI), Japan (National Institute of Environmental Studies - NIES), Canada (Kurtz), and alternative U.S. approaches, that can be compared to the first-order functions used in tables developed for Smith et al. (2006) and the 1605(b) program. Figure 3 compares different curves describing the percentage of original tree carbon that remains stored in wood products over time (initial stores begin at 18% since that is the approximate amount of the carbon in the standing tree that would be incorporated in solid wood products). This figure shows that, depending on the underlying assumptions about curve

¹³ For 1,000 tons of lumber used to construct homes in the year 2000, a 100-year half-life implies that 500 tons will remain in use in the year 2100.

formulas and use lives, estimates of carbon still in use in year 100 range from 0% to 4.6% of the carbon originally present in the standing tree. Based on this comparison, the assumptions behind U.S. use curves appear to be less conservative (i.e., result in a higher estimate of 100-year carbon) than those of some other countries.

Renovations: Even before long-lived products reach the end of their expected lifetime, users will discard portions as they repair and renovate homes and furniture. Systematic data are lacking on the percentage of wood products that are discarded before the end of their useful lives, but a few statistics indicate that this is likely to be a significant source of wood carbon losses. Residential repairs and renovations utilized 61% as much lumber, 42% as many square feet of structural panels, and 60% as many square feet of nonstructural panels, as new construction in the United States in 1998 (McKeever 2002). Renovations generate about 20% of all wood waste, more than the percentage of wood waste from new construction (McKeever and Falk 2004).

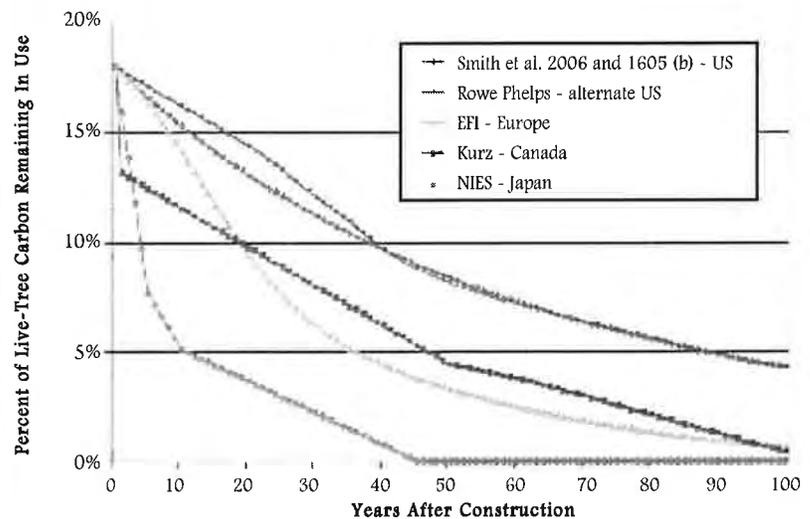
In the WoodCarbII model, half-lives for houses and wood used for repairs are calibrated so that model estimates of wood discarded to landfills match EPA data on discards from 1990 to 2001. Hence, in a general sense the calibrated half-lives for houses incorporate the effects of wood discarded during renovations, but additional analysis would be needed to sort out the separate effects of renovation waste and expected house lifetimes.

5. Disposal

The percentage of harvested wood in use as long-lived products does not tell the whole story of wood products carbon sequestration. In fact, discarded wood in landfills actually stores much more carbon than the wood in long-lived products in use. In addition to discarded products, some of the wood waste from mills and construction sites will also be disposed of in landfills (checked bars in Figure 2). Wood carbon in landfills can persist for some time, as anaerobic conditions inhibit the fungi that specialize in breaking down lignin (the substance that makes wood "woody"), but landfill decomposition rates vary considerably with environmental and management factors. Predicted decomposition rates are often extrapolated from laboratory experiments (Barlaz 1997) that were designed to calculate maximum methane emissions under anaerobic conditions. These studies may overstate total decomposition under

FIGURE 3.

Estimates of Carbon Stored in Wood Products Over Time (% of Total Carbon in Standing Tree)



Sources: McKeever 2002; Miner 2006; Smith et al. 2006; Skog 2008.



PHOTO BY PHILIP ARAMAN, USDA FOREST SERVICE

Wood discarded in landfills continues to store carbon for some time once it is buried and cut off from an oxygen supply. The portion that does decompose releases significant quantities of methane, however, which has a much higher global warming effect than carbon dioxide.

field conditions, but they are also short in duration which makes extrapolation to 100 years quite speculative.

Field tests near Sydney, Australia, confirm that solid wood may last for a significant time in landfills (Ximenes et al. 2008). Researchers estimated carbon losses based on the proportion of lignin in excavated wood that was buried for 19, 29, and 46 years (assuming lignin totally resists decomposition under anaerobic conditions). Wood buried for shorter periods appeared to decompose very little, while an estimated 17%-18% of initial wood carbon had been released from the 46-year sample. Results from these three sample sites raise as many questions as they answer. After year 46, would decomposition continue at an accelerated rate due to removal of some initial deterrent to bacterial activity? Or would decomposition slow as

lignin constitutes a larger proportion of the residual material? Similar to the case discussed above regarding wood products in use, the form of the equation that is chosen to describe landfill decay also has significant implications for stored carbon estimates at any given time (Pingoud and Wagner 2006). Various studies have assumed that anywhere between 20% and 80% of landfilled wood is subject to decay (Borjesson and Gustavsson 2000). Only further research can answer these questions, and variable landfill conditions mean that estimates will always remain uncertain.

The WoodCarbII model assumes that only 56% of paper and 23% of solid wood are subject to decay in landfills, with decay half-lives of 14.5 years for paper and 29 years for wood (Skog 2008). These numbers were calibrated to match solid waste estimates from the EPA and to meet IPCC guidelines. WoodCarbII also makes assumptions about how much of the waste at each stage will be landfilled, burned, dumped, or recycled and how quickly its carbon will be released as a greenhouse gas (Skog 2008). Based on this model, the 1605(b) tables (Smith et al. 2006, Table 6) indicate that about 9% of North Central region softwood pulp volume (or about 5%* of standing tree volume) would remain in use or in landfills at 100 years, with over 91% of that in landfills. At the other end of the scale, the tables estimate that 41% of Pacific Northwest Westside softwood sawlog volume (or about 25%* of standing tree volume) would remain in use or in landfills at 100 years, with two-thirds of that in landfills. Clearly, what happens in landfills is an important part of wood carbon accounting.

Methane: Many carbon accounting schemes address only the *rate* at which carbon is released from decomposing products, without accounting for the *form* in which it is released, but the global warming potential of methane (CH₄) is 25 times that of CO₂. Due to the anaerobic conditions, over half the carbon released from decomposing wood in landfills will be in the form of methane, or about 20% once flaring or burning for energy use (which converts CH₄ to CO₂) is accounted for (U.S. EPA 2006). A Swedish study (Borjesson and Gustavson 2000) found that if all wood from the demolition of a four-story wood-frame

apartment building is landfilled at the end of useful life, rather than being burned or re-used, the consequent methane emissions are large enough to make the overall structure a strong net emitter of greenhouse gases over its complete life cycle.

If 23% of the mass of landfilled solid wood products eventually decomposes, and 20% of the carbon thus emitted is released as methane, the global warming potential of these emissions would be about 60%* of the CO₂e originally stored in the discarded wood. The 1605(b) tables, based on carbon alone, do not reflect this methane effect. Because of methane's climate impacts, landfilled wood waste from mills, construction sites, and house demolition stores only about 13% of the CO₂e present in the standing-tree (checkered bars in Figure 2). Including the carbon remaining in wood products in use (solid bars in Figure 2), total harvested wood CO₂e at 100 years is about 14% of that present in the standing tree.

Fossil Fuel and Other GHG Emissions Associated with Wood Products

In addition to the carbon lost through decomposition or combustion of wood waste, the processing and transport of wood products also requires energy, much of it provided by fossil fuels that emit greenhouse gases when burned. Returning to Figure 1 (page 4), energy emissions are associated with transformations that occur within the solid shapes in the diagram, as well as with the transportation represented by solid lines. Few full life-cycle assessments have been made of energy use and carbon emissions associated with wood products from harvest to disposal. Nonetheless, several sources indicate that energy use and other emissions associated with these stages can be substantial, perhaps even greater than the CO₂-equivalent stored in the finished wood products.

Since paper is known to be an energy-intensive net emitter of greenhouses gases, we concentrate here, as above, on the solid wood products chain. Carbon losses from combustion of wood as fuel (both wood sorted as fuelwood and processing byproducts burned for energy) have already been included as losses to the long-lived products stream in the previous section, so this section considers only fossil fuel energy emissions. Again, we use wood carbon remaining in use or in landfills at 100 years after harvest as the metric to represent the carbon storage benefits of wood products. The emissions associated with producing those benefits are the GHG cost of that activity. Therefore, this section expresses GHG emissions from energy use during processing, transport, use, and disposal of wood products as a ratio to 1 metric ton CO₂e of 100-year wood carbon.¹⁴

1. Harvest

Harvest-related activities at the source forest emit a relatively small amount of greenhouse gases. A CORRIM study (Johnson et al. 2005) found emissions from

¹⁴ This section assumes that 100-year wood carbon (including landfilled wood) would be approximately 14% of standing tree carbon. See Data Appendix for computations marked by * in text.

fossil fuels used in harvest, replanting, and fertilization—plus methane and nitrous oxide (N_2O , a greenhouse gas more than 300 times more potent than CO_2)—of about 0.9%* to 1.3%* of CO_2e in the raw log. In a life-cycle analysis for Chetwynd Forest in British Columbia, Gower et al. (2006) estimated that harvest-related emissions (including road-building, reforestation, and transport to the sawmill) were about 2%* of the CO_2e stored in the roundwood removed. When compared to long-term carbon storage rather than raw logs, the ratio of harvest-related emissions to 100-year carbon ranges from about 0.04* to 0.07*.

2. Primary Processing

CORRIM studies found fossil fuel-related emissions for processing of four primary wood products ranging from 2%* (softwood lumber, including only on-site emissions) to 18%* (oriented strandboard, including off-site emissions) of the CO_2e in the raw log (Kline 2005; Milota et al. 2005; Wilson and Sakimoto 2005). Data from Finland indicate primary processing emissions range from 3% to 7% of log CO_2e content (Liski et al. 2001). Gower et al. (2006) found sawmill emissions from nonrenewable energy to be 2%* of the CO_2e in the raw log for softwood lumber. Bergman and Bowe (2008) found that processing of hardwood logs resulted in fossil fuel-based GHG emissions equivalent to 2%* of the initial log carbon (for on-site emissions only) or 7%* (including off-site). Skog et al. (2008) estimate that GHG emissions associated with resins and other non-wood components of panels are as high as 20%* of the CO_2e stored in the panel (a factor that likely accounts for some of the high off-site emissions for oriented strandboard above).

Beyond on-site process energy and transport of raw materials to the manufacturing facility, transport from mill to retail outlet can contribute significant emissions. The U.S. EPA (2006) provides life-cycle data that combine manufacturing and transport emissions for selected wood-based products. Emissions from burning of biomass to produce process energy are not included. The EPA's transport emissions include only the shipping of raw materials to the place of manufacture (assumed to be 20 miles) and from there to the retailer; they exclude transport to the final consumer and do not account for any CH_4 or N_2O emissions from transport. Raw material acquisition and manufacturing and transport emissions (in metric tons of carbon equivalent per wet ton of material arriving at the landfill) amount to 0.05 for lumber and 0.10 for medium-density fiberboard (U.S. EPA 2006). This translates to emissions of 12%* to 24%* of the CO_2e content of these raw materials.

Gower et al. (2006) tracked transport emissions as wood products moved from sawmill to retail store, and found that this stage by far dominated the overall emissions picture at about 70% of the CO_2e stored in the lumber. The market chain for this lumber included transport to Home Depot wholesale warehouses, with redistribution across the continent; the significance of transport emissions for this processing chain illustrates the importance of sampling emissions flows for each individual offset project. At the other end of the transport spectrum, analysis by CORRIM of two sample wood-framed houses, a 2,062-square-foot house in Minneapolis and a 2,153-square-foot house in Atlanta, found transport

Beyond on-site process energy and transport of raw materials to the manufacturing facility, transport from mill to retail outlet can contribute significant emissions.

from manufacturing facility to construction site to be an insignificant source of emissions (Meil et al. 2004).

Based on the studies above, the ratio of primary processing emissions to 100-year carbon stores varies from about 0.02* to 0.77* for processing and related raw material transport. If transportation of the finished product to outlets is included, the ratio varies from 0.16* (EPA 2006) to 1.19* (Gower et al. 2006; 1.12 for transport and 0.07 for primary processing). Since finished product transport emissions are so variable (from 0 for products that are used very close to the manufacturing site, to the dominant element of the emissions picture for those with continent-wide transport networks), we have reported this emissions source separately in Table 3 and Figure 4 below.

3. Secondary Processing and Construction

Manufacturing of lumber or panels into secondary products (windows, doors, cabinets, furniture) and/or construction into buildings requires additional energy. The studies cited above provide emissions data only through primary processing. With very little comprehensive data available, our accounting for wood products emissions includes a potentially large gap for energy emissions from secondary processing.

CORRIM studies calculated construction emissions for the two sample wood-framed houses described above. These homes stored a total of 22.4 and 17.1 metric tons of CO₂e, respectively, in their wood components (Perez-Garcia et al. 2005) over an expected lifetime of 75 years. These studies included only basic framing, and therefore did not account for secondary processing or construction emissions associated with components such as finished flooring, cabinets, wood paneling, wooden doors, and so on. Thus, total emissions from actual home construction would be much higher than those reported here. In the CORRIM studies, fossil fuel GHG emissions from construction were 1.3 and 1.1 metric tons CO₂e, respectively (Meil et al. 2004), but only a portion of those emissions were directly associated with wood components. With wood at 15% of materials for the Minneapolis house and 10% for the Atlanta house, the ratios of construction emissions to 100-year carbon stores associated with wood products might be about 0.011* and 0.008*.

It is important to recognize that total manufacturing and construction emissions for these sample homes far exceed the CO₂e stored in the wood, even without considering secondary processing of the wood components. For the Minneapolis house, emissions are 1.65 times the CO₂e content of the wood components, and for the Atlanta house 1.25 times. The entire home must be built in order to store the wood long-term, but it is not clear what portion of total emissions should be considered a direct cost of wood carbon storage.

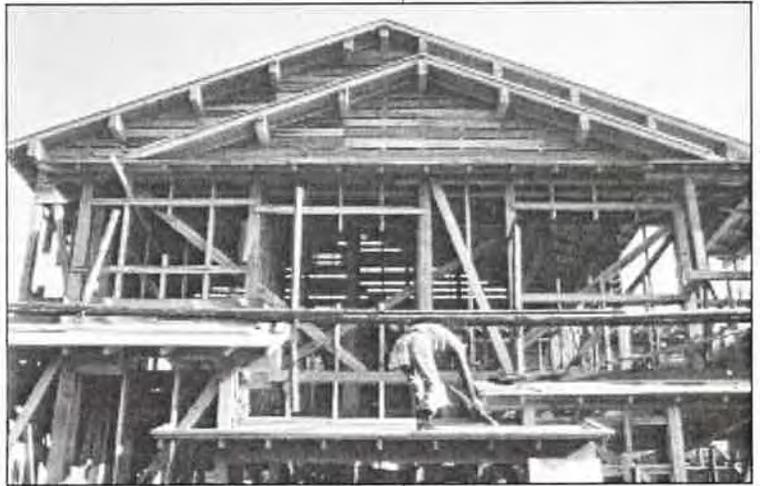


PHOTO BY DAVID BRIGGS, PROVIDED BY RURAL TECHNOLOGY INSTITUTE

Construction emissions are typically calculated for the building frame only, without factoring in the GHG costs of turning raw wood material into paneling, cabinets, finished flooring, and other components.

4. Use (Maintenance)

Since wood products would not be long-lived without maintenance and heating of the homes and furniture that store the wood, some accounting for maintenance energy is appropriate. Heating and cooling for the two CORRIM model houses emitted 5,174 kg of CO₂e (Minneapolis) and 3,032 kg of CO₂e (Atlanta) per year (Winistorfer et al. 2005), but only a small portion of these emissions might be required to slow the decay of wood components so that they remain an effective carbon sink. In addition to heating and cooling, some house

components need to be repaired or replaced periodically, and these activities are more directly attributable to wood carbon storage. The greenhouse gas emissions associated with maintenance of the wooden portions of CORRIM's model houses over a 75-year lifespan were 1,066 and 890 kg CO₂e respectively (Winistorfer et al. 2005)—a ratio to 100-year wood carbon of about 0.06*.

TABLE 3.

Greenhouse Gas Emissions from Solid Wood Products Processing

Processing Step	Ratio of non-wood energy GHG emissions to wood storage in year 100 (CO ₂ e basis)		
	Low	Medium	High
1. Harvest and transport to mill	0.04	0.05	0.07
2. Primary processing	0.02	0.10	0.77
3. Secondary processing			
Construction	0.008	0.009	0.011
Transport to end use	0.00	0.56	1.12
4. Use/maintenance	0.06	0.06	0.06
5. Demolition and disposal	0.003	0.003	0.003
Total	0.13	0.78	2.03

Sources: See text.

5. Disposal

Again in the CORRIM model homes study, demolition and transport to the landfill of the wood materials in the two houses released another 65* kg CO₂e (Minneapolis) and 49* kg CO₂e (Atlanta) (Winistorfer et al. 2005), for a ratio to 100-year wood carbon of less than 0.01. Additional expenditures of fossil fuel energy would occur at the landfill itself to move and bury wastes, but these were not included.

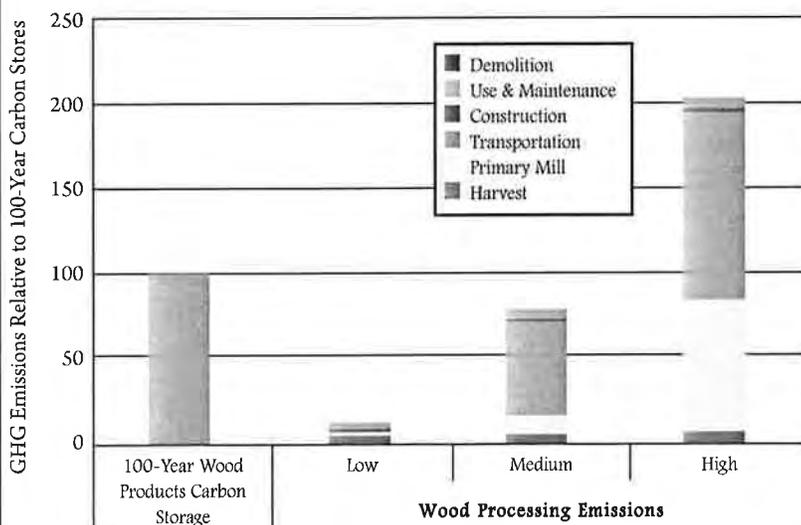
Thus, as indicated in Table 3 and Figure 4, the entire process of transforming wood into a form suitable for carbon storage causes substantial GHG emissions, and in some cases long-distance transport may cause emissions to exceed the CO₂e storage value.

Broader System Effects

The stump-to-dump analyses outlined above track wood carbon losses and fossil fuel energy use throughout the life cycle of a wood product, but timber harvest also has broader system effects, on forest ecosystems as a whole as well as on markets and the larger economy.

FIGURE 4.

Energy and Other Process-Related Greenhouse Gas Emissions Associated with Wood Products



Source: Table 3.

Note – excludes secondary processing emissions.

The effect of timber harvest for wood products on the broader forest ecosystem depends on the assumptions of a particular study. At one extreme, some studies assume that without a wood products market, no forests would exist; hence wood products should be credited for all carbon sequestered by the source forest. At the other extreme are studies assuming that without a wood products market, natural forests would remain undisturbed and would continue to fix carbon at a slowing but still significant rate for centuries; hence any harvest activity reduces carbon stores, at least temporarily. The typical situation lies somewhere in the middle.

A key determinant of the broader ecosystem effect of wood products is the particular management system that is applied to the source forest. Multiple studies have compared the carbon storage implications of different forest management systems, accounting for carbon stored in the forest, in wood products in use, and in landfills. Some sources assume that sustained yield guarantees the carbon-neutrality of wood, but sustainability of harvest volumes is actually a poor indicator of overall GHG benefits of the management regime. For example, a management regime that involves periodic light harvests and maintains high forest stand volumes, and a regime using clearcuts with short rotations and low average stand volumes, will both produce "sustainable" harvest flows, but they have very different carbon implications.

The volume of live and dead wood maintained on the site over time is a better indicator than the sustainability of harvest flow to assess the carbon sequestration contributions of a particular forest management system. Management regimes that reduce the standing stock of timber, even if they produce a sustainable flow of timber over time, will have smaller GHG benefits than regimes that maintain high stand volumes (Liski et al. 2001; Hoover and Stout 2007; Ray et al. 2007; Depro et al. 2008;). Even very old stands continue to build carbon reserves, particularly in the soil (Luysaert et al. 2008). For young secondary managed forests, the carbon balance depends upon multiple factors, including the effect of harvest on stand regeneration, the proportion of wood converted to long-lived versus short-lived products, the rate of decomposition and amount of methane emitted by discarded products and the extent of reuse, and the growth dynamics of the particular forest type. For older forests with a low risk of major disturbances, conversion to young, fast-growing forest will cause large amounts of GHG emissions as the old stand is removed (Harmon et al. 1990), and it may take decades or even centuries for a sustainable harvest regime to work off this initial carbon debt.

In addition to readily observable effects on standing timber and carbon volumes, harvest operations can affect soil and forest floor carbon stores through physical disturbance. Surprisingly little is known about these effects, but in general, logging can be expected to reduce forest floor carbon. Early research by Covington (1981) indicated that forest floor biomass decreased by half during the 15 years following clear-cutting of northern hardwood stands, presumably due to faster decomposition and reduced deposition of litter. Harmon et al. (1990)



PHOTO BY JOHN ZAPPEL, HOLLY MOUNTAIN RESOURCES, LTD., PROVIDED BY RURAL TECHNOLOGY INSTITUTE

The effect of a particular forest management regime on greenhouse gases depends upon the volume of standing trees maintained over time, as well as on soil and forest floor impacts, including road building.

Even the best forest growth models cannot predict future conditions, disturbance events, or forest responses with much certainty. Forest climate strategies will need to adapt to a shifting reality.

estimated that fine woody debris and forest floor carbon would decrease from 26 to 7 metric tons per hectare if an old-growth Douglas fir stand were converted to a 60-year rotation. Removal of whole trees appears to decrease forest floor carbon as compared to removal of sawlogs only (Johnson et al. 2002). A recent review of studies relating forest management practices to soil carbon stores indicated that thinning generally leads to lower forest floor carbon due to faster decomposition and less litterfall, despite the pulse of carbon from harvest residues (Jandl et al. 2007). Effects on mineral soil are less pronounced, and depend on the degree of disturbance, but clearcutting can lead to overall carbon deficits for up to 20 years as immediate losses of carbon from the soil and forest floor outweigh new growth and litterfall. Yanai et al. (2003) paint a more complex picture, citing studies that show *slower* litter decomposition after clearcuts (due to a less favorable environment for decomposer organisms), combined with possible accelerated losses of carbon within the soil organic horizon, and mixing of some litter into mineral soil by logging disturbance. Forestland managed for timber may also lose soil and forest floor carbon due to clearing for logging roads. And finally, loss of cover in wet boreal forests with deep peat soils could trigger release of the vast amounts of carbon stored in those soils.

Beyond the relatively short-term effects on standing trees and the longer-term effects on the forest floor and soils, timber harvest can also affect the resilience of forests to disturbances over time. In fire-prone forests, thinnings that reduce excess fuel loads may reduce the frequency or severity of fire, protecting forest carbon reservoirs into the future (Oneil et al. 2007). However, thinning in moist forests may make forests more vulnerable to ice damage or wind throw. Timber operations that remove invasive exotic species can produce more diverse stands that better resist stresses from droughts to pest outbreaks; by the same token, disturbance from harvest activities can also help spread invasives that inhibit regeneration of tree species with high carbon storage potential. Single-age, single-species plantations may grow rapidly during intermediate stand ages, but can be more vulnerable to future disturbances and consequent carbon losses. Even the best forest growth models cannot predict future conditions, disturbance events, or forest responses with much certainty. Forest climate strategies will need to adapt to a shifting reality, with the state of scientific knowledge continuously scrambling to keep up as forests and management methods change and develop.

In addition to ecosystem effects, changes in wood products volume may also reduce GHG emissions as markets substitute wood for more GHG-intensive materials. However, the actual degree of substitution is extremely difficult to document. Simply producing more wood products will not do the trick. The ultimate impact of expanded lumber production on GHG emissions depends on a) the elasticity of substitution of wood for alternative materials, b) the impact of materials availability on housing supplies, and c) the elasticity of demand for housing (Figure 5). The first factor, the elasticity of substitution for alternative building materials, is likely to be low, because wood is already the "business as usual" technology for home construction and residential furniture in the U.S. (used for 90% to 94% of one- and two-family homes, Gustavson et al. 2006) and it is difficult to build wooden high-rises (usually framed with steel) or foundations (usually concrete). Considering the other two factors, if abundant lumber drives down housing costs (b),¹⁵ and if people respond by building more or larger houses or renovating existing ones (c), expanding the lumber supply

could well result in *more* overall GHG emissions as fossil fuels are burned to construct and maintain those homes. Overall, then, it would seem that the possible GHG benefits of substitution are relatively low for long-lived wood products.

Biomass

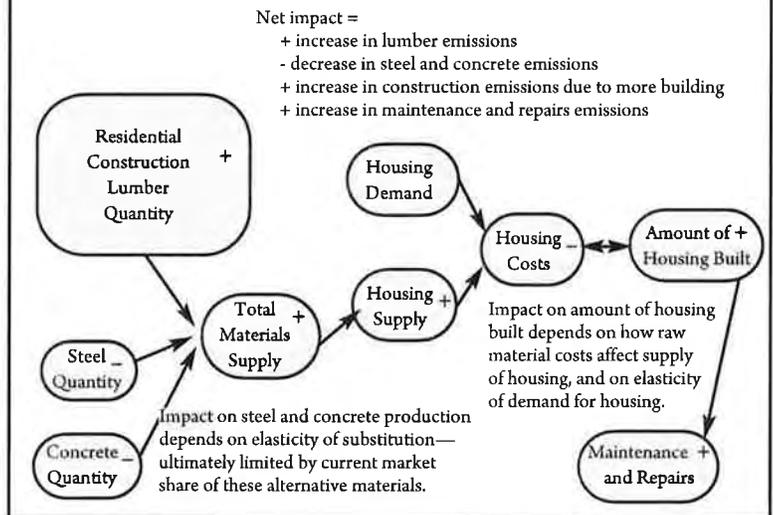
The discussion above traces the greenhouse gas emissions associated with wood products flows. An analysis of the greenhouse gas emissions associated with wood fuels is closely related, because woody biomass that is burned to generate heat or electricity is often a byproduct of both timber cutting operations and the processing of wood products. Unlike wood products, wood fuels lack any carbon storage benefit, so substitution effects comprise the entire climate benefit of these fuels. Fossil fuels are currently the dominant source of energy, so there is much greater substitution opportunity for biomass than there is for wood in construction. As for wood products, however, the benefits depend upon wood fuels actually reducing fossil fuel use, and not simply on expanded woody biomass use.

As a fuel, wood unquestionably has a smaller atmospheric carbon impact than coal, oil, or natural gas. Yet wood fuels are definitely not, literally speaking, "carbon neutral." First, an analysis of the GHG benefits of wood fuels must reflect the fact that they, like wood products, require fossil fuel energy to produce and transport. In the case of wood-chip fuel, the fossil fuels used to harvest, chip, and transport wood release about 5% of the CO₂e contained in the fuelwood portion of the tree (Mann and Spath 1997).¹⁵ This figure may underestimate actual transport energy, as it assumes haul distances of only 17 miles and does not account for truck idling time while loading and unloading, which one source estimated could be as high as 60% of total truck run time (Hakkila and Aarniala 2002). Small-scale biomass projects with a localized "woodshed" can minimize the fossil fuels used to transport bulky solid wood fuels.

Wood pellets require more processing than wood chips. One Wisconsin study found that wood pellets used 6% to 9% as much fossil fuel energy in processing as the energy contained the pellets, compared to wood chips at 2% to 3% (Katers and Kaurich 2006).¹⁷ Fossil energy used to transport and process heating oil, by comparison, was 16% to 25% of the energy contained in the

FIGURE 5.

Greenhouse Gas Emissions Impact of Expanded Lumber Production



¹⁵ This effect of abundant lumber is likely small, since wood is typically only about 10% of overall building costs.

¹⁶ When comparing fossil fuel consumption associated with various energy sources, it is important to consider how each study treats the energy embedded in equipment as well as upstream and downstream energy use—fossil fuels themselves also require energy for extraction, processing, and transport.

¹⁷ Because wood fuels contain more water (and otherwise burn less efficiently) than heating oil (see below), fossil fuel energy as a percentage of useful heat will be slightly higher than these percentages.

fuel (Katers and Kaurich 2006). Wood fuels clearly have much lower GHG emissions from processing and transport than fossil fuels, but their fossil-based emissions are not zero.

Liquid biofuels require even more energy to produce than solid fuels. Pimentel and Patzek (2005) estimate that harvest, transport, and processing of wood for cellulosic ethanol uses 57% *more* energy from fossil fuels than the energy contained in the ethanol itself. Even if cellulosic ethanol is produced using steam heat generated by wood, this study estimated that its production still requires 73% as much fossil fuel energy as the ethanol itself contains. A study by Argonne National Laboratory for the U.S. Department of Energy (Wu et al. 2006), in contrast, estimates that cellulosic ethanol will use only 16% as much fossil fuel energy as the energy contained in the ethanol and could reduce GHG emissions by 85% compared to burning gasoline.¹⁸

In addition to fossil fuels used to process wood fuels, combustion and conversion are generally less efficient for wood than for fossil fuels, so more units of heat (BTUs) must be generated to produce a given amount of useful energy. Solid biomass fuels like wood are used primarily for heat (in traditional wood stoves and furnaces that burn cordwood, wood gasification plants that use chips, and stoves or boilers that burn wood pellets) or to generate electricity (over 80 wood-fueled power plants nationwide have a combined output of nearly 1,700 megawatts). The most efficient wood use is for heat alone (about 65% of the potential BTUs in wood burned in a typical home wood stove are converted to useful heat, and up to 75% in gasification systems according to Biomass Energy Resource Center 2009), or for combined-cycle heat and power, also known as co-generation (60% to 80% efficient at converting wood energy to useful energy). Wood-fueled electric utility plants, on the other hand, may be only 18% to 24% efficient (U.S. Forest Service Forest Products Lab 2004). In comparison, modern oil or gas furnaces may be up to 97% efficient, electricity generated from oil or coal is about 30% to 35% efficient, and coal for space heat has about the same conversion efficiency as wood.¹⁹

When evaluating the potential GHG benefits of substituting wood fuels for fossil fuels, the relative carbon content of alternative fuels must also be considered. Wood has a lower hydrogen content than fossil fuels, which causes it to release more carbon per unit of heat. Wood releases 21% more CO₂ per BTU than fuel oil, and 67% more than natural gas, but 14% less than anthracite coal (U.S. Energy Information Administration 2008a).²⁰ So replacing oil or natural gas with wood actually increases greenhouse gases released per BTU, even if the boiler burns with equal efficiency. Replacing coal with wood, on the other hand, potentially reduces emissions per BTU if the wood is burned efficiently. In sum, because of efficiency and chemistry differences, wood fuel may generate up to twice the CO₂ per unit of useful heat or electricity as fossil fuels, with the substitution most favorable for coal.

¹⁸ Differences are due to contrasting assumptions. Wu et al. use much lower values for energy embodied in equipment, assume no fertilization for woody biomass, incorporate the energy content of byproducts, and assume increasing yields over time as technology improves.

¹⁹ Wood stoves and furnaces may be close to oil and gas in efficiency at peak output, but wood equipment is more difficult to start and stop on demand, and hence often runs with incomplete combustion (producing charcoal and ash and increased emissions rather than heat) for part of the season as it operates at lower temperatures and with limited oxygen supply.

Since wood actually releases more greenhouse gases per unit of useful energy than fossil fuels, the climate benefits of a switch to wood depend heavily on the assumption that the source forest continues to take up carbon as rapidly as it is released by burning, and even then there will inevitably be some delay between emissions and reabsorption. Hence, an assessment of the GHG impacts of biomass use on the source forest must also account for the full ecosystem effects of intensified management needed to increase biomass supplies. It is true that burning fossil fuels releases carbon that had been removed from the atmosphere hundreds of millions of years ago, while growing trees and burning their wood cycles carbon in and out of the atmosphere over a scale of a few decades. But timing still matters. If the source forest regenerated instantly, biomass would earn its "carbon-neutral" label, but the longer it takes to regenerate forest carbon after a biomass harvest, the longer that carbon dioxide remains in the atmosphere exerting its heating effect.

Waste wood burned for energy comes closest to true carbon neutrality, as it has already been removed from the forest and would otherwise decompose without energy benefits. New wood fuel plants are often promoted as running on wood waste, but unfortunately there is very little true waste remaining in the wood processing system. Perlack et al. (2005) calculated the amount of additional biomass fuel that could feasibly be used in the United States each year, and estimated that there are only 8 million tons of unused mill waste and 28 million tons of urban and consumer wood waste that could be captured for this purpose. The remainder of the woody biomass documented in the report, a total of 190 million tons, would come from the forest—41 million tons of logging residues, 60 million tons from forest fuels reduction treatments, and 89 million tons from all sources generated as byproducts of potential *increased* harvest and wood products consumption.

Removing 190 million more tons of woody biomass from U.S. forests annually (plus harvesting sufficient additional roundwood to generate enough new logging residue and wood waste) would reduce forest carbon stores in the short term, and could also affect carbon sequestration capacity in the longer term through its effects on site productivity and soil carbon. Increased use of whole-tree harvest technology and collection of widely scattered and bulky residues could create unintended impacts on soils and the forest floor as well as increasing fossil fuel consumption associated with harvest. In special cases, removal of excess woody material can increase forest carbon stores by reducing losses from catastrophic wildfire. But in general, there is a trade-off between burning wood and storing its carbon on the stump. As economists, the "dismal scientists," like to say, "There is no such thing as a free lunch."

Because of fossil fuel energy required to produce wood fuels, differences in combustion efficiency and fuel chemistry, and possible impacts on source forests, woody biomass cannot be considered a truly carbon-neutral energy source. Harvested judiciously, however, with care for long-term forest health, and with an emphasis on small-scale space heating applications, it can help reduce greenhouse gas emissions and help us through the transition to truly renewable energy sources. Incentives and regulations designed to boost use of wood fuels need to minimize the negative effects and promote uses with the greatest net benefit.

Because of fossil fuels required to produce wood fuels, differences in combustion efficiency and fuel chemistry, and possible impacts on source forests, woody biomass cannot be considered a truly carbon-neutral energy source.

²⁰ These comparisons assume kiln-dried wood with complete energy capture, so typical fuelwood in a typical home stove would burn much less efficiently.

Policy Implications

The analyses above revealed that wood losses along the production chain, release of methane from landfills, and GHG emissions from fossil fuel energy used to produce and transport wood products are significant. As a result, long-lived wood products ultimately store only a small portion of the carbon removed from the forest by logging. Moreover, the most significant of these stores are in landfills, rather than in wood products in use. When process energy emissions are included, the U.S. forest products industry as a whole, including paper, releases nearly twice the greenhouse gases (measured in CO₂e) that it stores in products and landfills, even excluding the effects of harvest on forest carbon (Skog et al. 2008).

Despite these broad patterns, the emissions associated with different wood products streams are extremely variable and complex, making it difficult to recommend any uniform policy to enhance greenhouse gas reduction through increased wood products flow. Only life-cycle analysis of specific products and regions can determine whether a particular wood product stream has GHG benefits. For any region or product mix, however, shifting use toward longer-lived products, reducing wood waste at all stages, recovering used wood for new products or energy, reducing processing and transport energy, and capturing more landfill methane could all lower the carbon footprint of wood products.

The clearest climate benefits of wood use, for either products or fuel, come from substitution effects—that is, consequent reduced use of alternative fossil-fuel-intensive materials. This is obvious in the case of biomass fuel, but it is true of wood products as well. In the case of wood products, the opportunities for substitution may be limited, but when substitution does occur it reduces fossil fuel emissions “forever.”

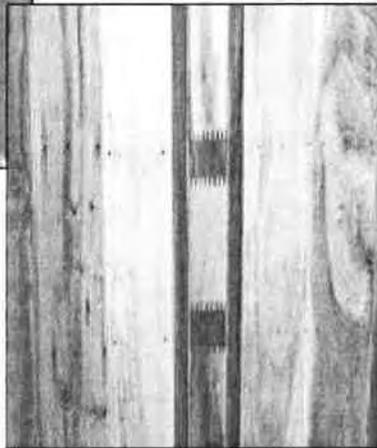
Unfortunately, simply expanding production will not guarantee that substitution actually occurs. Several policy options could tie wood use directly to reduced dependence on fossil fuels: 1) impose full environmental costs on fossil fuel-based and wood-based products alike, hence giving wood a competitive advantage (a carbon tax or cap-and-trade program would do this by increasing the cost of fossil-fuel-intensive alternatives, as long as similar policies applied for trading partners); 2) encourage voluntary choices that favor wood

(provided the advantages are thoroughly documented), through approaches like green building standards or renewable energy certificates; 3) offer temporary subsidies or tax breaks to switch fossil-fuel furnaces to clean-burning wood furnaces where sustainable supplies are available; 4) encourage community-scale wood heat projects that use locally sourced wood and are likely to have fewer environmental and fossil energy impacts than larger-scale projects.

Increased demand for wood products resulting from such policies will ultimately reward wood producers through higher prices, with no need to subsidize wood production directly. Climate policies should not directly reward “second-best”



Processing recovered materials into new long-lived products can extend the storage life of wood carbon already removed from the forest. For instance, discarded pallets may be remanufactured into hardwood paneling.



strategies (like building with or burning wood) without reliable proof that they replace a “third-best” alternative. The “first-best” strategy remains a reduction in the overall use of resources, and direct subsidies for wood use could lead to excess capacity, excessive energy use, and unintended harm to forest health. Since the climate benefits of wood fuels and wood products alike depend upon maintenance of high carbon stores in source forests over time, any temporary subsidies must be accompanied by rigorous forest sustainability standards.

A clear and accurate picture of the climate effects of wood use is critical to the development of effective greenhouse gas reduction strategies. With tightening international and national commitments to reduce GHG emissions, accounting for forest and harvested wood carbon has received increasing attention. The treatment of these carbon pools in national GHG inventories and under cap-and-trade systems will ultimately influence the success of climate change mitigation efforts. The last section of this report provides a brief overview of how wood products have been treated under climate policy to date. A topic of current interest and controversy is whether and how wood products carbon should be credited as part of offset projects, so we also discuss some key issues that must be resolved if this is to be done effectively—that is, if wood products carbon is to help reduce greenhouse gas emissions.

The Role of Harvested Wood Products in Climate Policy: A Short History

Nations that signed the United Nations Framework Convention on Climate Change (Kyoto Agreement) in 1992 agreed to report emissions and sequestration of greenhouse gases. The guidelines developed for these inventories initially omitted wood products carbon, under the assumption that new wood products would simply replace discarded ones with no net change in this carbon pool (IPCC 1996, Chapter 5, Box 5, p. 5.17). Countries could include harvested wood products in their reporting, however, if they could clearly demonstrate that stocks of products in use and in landfills were increasing over time.

As countries gained experience with GHG reporting and as the start of the first 2008-2012 Kyoto commitment period approached, interest grew in crediting carbon stored in wood products and in landfills as part of national inventories to help balance emissions from other sectors. In 2003, the Intergovernmental Panel on Climate Change (IPCC) issued Good Practice Guidance for Land Use, Land Use Change, and Forestry, which included methodologies for measuring carbon in wood products in use and in landfills (IPCC 2003, Appendix 3.a.1), and the most recent Guidelines for National Greenhouse Gas Inventories (IPCC 2006) now incorporate these recommendations.

Beyond simply measuring greenhouse gases, Kyoto Agreement signatories made commitments to meet emissions reduction targets and it took several follow-up meetings to agree on how to treat the forest sector for these targets. The final rules for the 2008-2012 commitment period require countries to report the GHG impacts of land use changes (deforestation and afforestation), and allow countries to choose whether or not to include emissions from and sequestration by managed forestlands that remain forested (with individual-country limits on use of sequestration by managed forests to balance their

industrial emissions).²¹ At this time, increased carbon in wood product pools cannot be credited toward emissions reduction commitments, though negotiations are ongoing about the inclusion of forest products carbon in future commitment periods.

In both international and U.S. contexts, cap-and-trade mechanisms are gaining acceptance as an approach to reducing GHG emissions. Theoretically, market-based trading may be used within a nation or between nations to allocate emissions reduction efforts to least-cost options under a defined emissions cap. Through allowance trading, parties with surplus emissions reductions can market them to those with higher compliance costs. Allowance trading systems have gained acceptance through programs like the U.S. EPA's cap-and-trade program for sulfur dioxide.

Initial cap-and-trade proposals treat forests and agriculture as uncapped sectors. One way to encourage emissions reductions or GHG removals by uncapped sectors is to allow them to sell documented GHG reductions—that is, increased sequestration or emissions reductions beyond “business as usual”—as “offsets” to entities in capped sectors. These offsets can serve as a substitute for direct emissions reductions by those entities. When forestry projects are used to offset emissions from regulated sources, questions about what counts as a GHG reduction can become complex. In general, the U.S. has taken a more favorable attitude toward forest offsets than many other countries. The European Union Emission Trading Scheme, for instance, currently excludes forestry offset projects.

U.S. forests currently capture about 10% of national GHG emissions, thanks to regrowth of forests on abandoned agricultural land and intensively cut timberland. Receiving credit for this sink, at the national accounting level or through individual offset projects, would reduce compliance costs for other sectors. Crediting wood products carbon storage would further expand the range of forest-based offsets. Of course, only changes in practice that supplement “business as usual” sequestration in these sinks will actually contribute to GHG reductions. Emerging regulatory schemes in California, the Northeast (Regional Greenhouse Gas Initiative), and the West (Western Climate Initiative) include forest offset options, and each of these arenas is considering inclusion of wood products pools. Crediting wood products carbon storage would further expand the range of forest-based offsets. Emerging regulatory schemes in California, the Northeast (Regional Greenhouse Gas Initiative), and the West (Western Climate Initiative) include forest offset options, and each of these arenas is considering inclusion of wood products pools. The U.S. Department of Energy's voluntary 1605(b) greenhouse gas registry and the Chicago Climate Exchange also credit wood products carbon for projects registered or offsets traded.

²¹ Canada, for instance, chose to exclude managed forests from its 2008-2012 Kyoto Agreement-mandated reporting, as scientists estimated that there would be a high chance of managed forests acting as a source rather than a sink during this period, due to increasing fire and insect outbreaks.

Accounting for Wood Products in Forest Offsets

Harvesting timber as part of an offset project introduces a complex series of greenhouse gas impacts that spread back to the source forest and outward through the economy. Though many of the issues can be addressed by the life-cycle assessment approach outlined in the first sections of this report, the offsets context introduces new questions about what impacts should be credited or debited to the offset project provider. Incomplete accounting could fail to properly reward significant emissions reductions, whereas crediting activities of questionable climate benefit could inadvertently encourage GHG-emitting activities.

Because the U.S. is somewhat unique in its emphasis on offsets from forest carbon sinks, particularly in proposing to credit wood product pools, it is critical to get the accounting right in order to maintain credibility as our nation begins to play a role in global GHG reduction efforts. A good project accounting system will: 1) define a system boundary that captures major effects; 2) include significant GHG pools and fluxes; 3) set additionality criteria that ensure that "business as usual" activities are not credited (including defining accurate baselines); 4) account for significant leakage (emissions outside the project boundary that are affected by the project); 5) ensure that carbon is stored "permanently;" and 6) address uncertainties and risks by discounting credits and/or pooling risk across multiple projects. The discussion below indicates how each of these criteria applies to wood product pools as part of forest offsets.

1. Project Boundary

One boundary question arises for wood products projects operating in isolation from source forests. It is forests that actually remove carbon from the atmosphere, and production of wood products merely slows the rate of release back into the atmosphere when some of that carbon is removed from the forest site. Because sequestration on the source forest and in harvested wood are so intertwined, stand-alone wood products offset projects would exclude many significant project impacts. Wood products should only be considered as a possible carbon pool within the context of forest management projects, and then only if full accounting of GHG impacts is required.

The second critical boundary question is the treatment of emissions beyond the geographic boundary of the forested property. The following principles for project accounting from the IPCC Good Practice Guidance for Land Use, Land Use Change, and Forestry (2003) provide guidance for defining system boundaries in offset projects:

In a general sense, project boundaries can be thought of in terms of geographical area, temporal limits (project duration), and in terms of the project activities and practices responsible for greenhouse gas emissions and removals that are significant and reasonably attributable to the project activities (Section 4.3.2, p. 4.90).

Project operators need to determine and report the greenhouse gas emissions from direct fossil fuel and electricity use in mobile and stationary equipment (Section 4.3.3.7, p. 4.109).

Because the U.S. is somewhat unique in its emphasis on offsets from forest carbon sinks, particularly in proposing to credit wood product pools, it is critical to get the accounting right.



PHOTO BY DAVID COHEN, UBC

Long-distance shipping is an important source of fossil fuel emissions that should be reflected in harvested wood carbon offset accounting. Exports of logs and lumber to China have grown in recent years, and emissions from this source would fall outside of Kyoto commitments (Zhang Jiagang, China, 2001).

Emissions associated with processing, transport, use, and disposal of wood products are certainly "reasonably attributable" to the wood carbon storage function, as without these steps a tree removed from the forest would decompose much more rapidly. However, projects that claim offset credits for wood stored off-site depend on capped sector entities to perform these services. It is not at all clear how to handle this anomaly since capped sectors themselves are not eligible to sell offsets.

In an offsets context, accounting for energy emissions matters because forest project developers will choose between strategies that accumulate

more carbon in the forest ecosystem and strategies that remove more carbon for storage in products and landfills. Projects that include timber harvest will have a competitive advantage because timber revenues help cover project costs. Crediting these projects for the full amount of carbon stored in wood products, without accounting for associated emissions, would skew the offsets mix toward timber harvest projects, and would increase pressure on limited fossil fuels and raise costs elsewhere in the economy. Considering only the sequestration aspect would be like a cost/benefit analysis that considers only benefits. Some wood products clearly result in more processing emissions than the carbon they store, and these activities should not be subsidized by valuing the carbon stored in final products and landfills without accounting for GHG emissions along the production path.

Some claim that under an economy-wide program offset projects should not be responsible for fossil fuel-related emissions outside the forest, since those emissions are already capped. By this line of argument, allowance costs associated with processing and transport will affect offset providers through a lower value for raw harvested wood. But allowance costs will also raise prices for finished wood products and lower profits for wood businesses, among other effects, so raw wood values will not reflect the entire cost. Lower timber prices will also apply equally to all forest landowners, not just offset providers. Hence the burden is on regulators to ensure equal treatment for forest offset strategies through project accounting that reflects net carbon storage, rather than gross storage. A requirement that offset projects maintain pre-project forest carbon stores throughout the project period would also help guard against unintended intensification of harvest.

2. Carbon Pools

Most carbon accounting protocols call for periodic sampling of all significant carbon pools, with offset providers credited or debited based on stock changes.

This system would adequately reflect forest carbon reductions directly caused by timber harvest, as well as losses occurring from natural processes in the absence of harvest activity. The volume of standing live and dead trees would decrease after harvest; forest floor and down dead wood pools would briefly increase and then decrease as material rots over several years. Carbon losses from the stumps and roots of harvested trees would also be accounted for if below-ground carbon is estimated from above-ground tree biomass, as a missing tree would lower the post-harvest below-ground estimate. Long-term losses of soil and litter carbon due to harvest disturbance are less likely to be captured through periodic inventories due to the difficulty of sampling soils adequately. Because soils commonly hold one-third to one-half of forest carbon, a small percentage change in soil carbon can significantly affect total forest carbon. When soil-carbon impacts are underestimated, this can make short-rotation, intensive-production forestry look more favorable from a carbon perspective than it really is.

Measurement of wood product carbon stocks and flows is a bit trickier. Documentation of carbon storage in wood products for offset projects would probably concentrate on the portion converted to solid lumber, plywood, or panels, and perhaps the portion remaining intact in landfills. Because of the complexities of tracking these pools over time, the U.S. Department of Energy introduced the 100-year method into its voluntary 1605(b) program. This approach allows project developers to report carbon stocks expected to remain in wood products and landfills 100 years after harvest. Projects relinquish claims to shorter-term carbon stores, in exchange for receiving permanent credit for stores present in year 100. Registry participants are provided with a set of tables developed by the USDA Forest Service (based on Smith et al. 2006), which are sufficiently accurate for a voluntary registry.

In an offset context, however, this simple approach is inadequate. Regional data in the 1605(b) tables blend results from very diverse operations—with different management styles and land use histories; harvesting logs of various species, sizes, and qualities; and shipping to mills with different product mixes and equipment—all of which creates extremely variable patterns of carbon storage over time. Without direct sampling of a particular wood products stream, adequate discounting of offset credits to reflect the substantial uncertainty of model estimates would likely eliminate creditable wood products carbon altogether. Tracking the wood processing path of an individual project would encourage efficiency, recycling, and channeling of wood to long-lived products to improve retention of wood carbon over time. Some 1605(b) parameters, such as the carbon density of various finished products, apply across all projects and can be combined with project-specific data to develop estimates of carbon stored in wood products. Changes in wood product technology and consumer behavior also demand periodic adjustments in estimation parameters.

3. Additionality

After establishing appropriate project boundaries and defining carbon pools, an offset project claiming wood product credits would compare the flow of wood products under planned project management to the flow under a “business as usual” scenario. The *difference* in GHG emissions would comprise the wood

products component of project carbon credits. Developers of offset standards are just beginning to consider how to define a wood products baseline, against which an offset must measure its carbon storing activities. Should the baseline be the historical flow from this property, the projected future flow, or the average from similar properties? Additionality questions are an important but unresolved issue that all offset protocol developers are still wrestling with.

4. Leakage

Additionality is further complicated by market leakage and substitution effects, both outside the direct control of the offset developer. At its most extreme, leakage seems to confound any attempt to change “business as usual” practices, as project actions may be undone by non-project reactions. If a project lowers historic levels of timber harvest in order to accumulate forest carbon, but nearby properties respond with increased cutting that depletes their carbon stocks, leakage adjustments would reduce creditable project carbon. If a project increases harvest to store more carbon in wood products, and nearby properties respond with reduced cutting, this would likewise undercut wood carbon gains. Work to estimate and compensate for leakage in forest offset projects is ongoing (see Willey and Chameides 2007 for one suggested method).

Substitution is really a type of leakage with effects extending to substitute products. For the harvest-reducing project example, inclusion of substitution effects might penalize the project if the harvest reduction indirectly causes increased use of concrete, steel, or plastics. Conversely, a project that increases timber harvest might claim greenhouse gas reductions from reduced use of concrete or steel framing. As explained in the Broader System Effects section above, data are lacking to actually demonstrate substitution effects in the economy, and crediting such an uncertain outcome would be out of place in an offset project.

An analogy might help provide context for interpreting substitution claims. The owner of a hybrid vehicle might claim that every mile driven in that vehicle reduces GHG emissions, and is worthy of a climate subsidy, because the owner *could* have chosen to drive a conventional sport utility vehicle instead. For the individual driver faced with a choice of vehicles, the hybrid is undoubtedly a more climate-friendly choice, just as for a builder use of wood might be more climate-friendly than concrete. Yet a superior GHG-reducing strategy would be to stop driving altogether or to reduce building size, extend building life, and reuse waste wood. If this driver never owned a sport utility vehicle nor had plans to purchase one, or if the hybrid was driven more miles due to lower driving costs, then the benefits would be entirely fictional. Moreover, if hybrid vehicles or wood construction are already the “business as usual” technologies, no credit may be claimed for their use. Even where they are not dominant, actual substitution must still be demonstrated.

Because these indirect market effects are beyond the control of an offset provider and are mind-bendingly complex, some protocols exclude them from project carbon accounting. Climate policies that directly support efficiency, conservation, and GHG-reducing technologies (e.g., by subsidizing research or

setting appliance standards) are better suited than offset projects to address these economy-wide factors.

5. Permanence

Wood products do not store carbon permanently, though landfills apparently can store it for decades or even centuries (our experience with landfills is too short to know this for certain). Since offsets enable continued GHG emissions above the cap set by public policy, and since those emissions permanently shift carbon from the lithosphere to the biosphere, it is important to use conservative assumptions about the longevity of carbon storage through terrestrial offset projects, particularly for wood products and landfills that do not sequester additional carbon over time as forests do. IPCC's Good Practice Guidance for Land Use, Land Use Change, and Forestry (2003) uses very conservative default half-lives in use of 30 years for all solid wood products and 2 years for paper. Use lives change over time as new technologies extend product life or introduce more disposable products or as consumer habits change, so parameters would need to be updated frequently.

Since it would be impossible to track wood flows from an offset project to particular landfills, regional or national average decomposition rates would be the only option for tracking the fate of landfilled wood carbon. Ongoing monitoring will be critical to improve data on landfill releases, and to update GHG emissions estimates as waste management practices change over time. If the longevity of products and waste are tracked as part of wood pools in offset projects, practices that increase product life or boost waste recovery would be rewarded.

6. Uncertainty and Risk

The wood products life-cycle summary in the first section of this report illustrated the variability of wood processing pathways in terms of their carbon losses and energy requirements. Due to diverse sources and processing methods, it is impossible to develop a single reliable error estimate for wood products carbon measurements. In the face of substantial uncertainty, wood carbon estimates should use conservative estimation methods and should be discounted for uncertainty if credited to an offset project.

Conclusions

The limited role of forests and wood products in sequestering and storing carbon can be understood through information about basic biology and technology, but choices about how forests and wood products and wastes are treated under climate policy are ultimately a matter of public values. Forest and agricultural operations will likely be excluded from a regulatory cap on greenhouse gases, because their land base often sequesters more carbon than it releases and because their carbon flows are so difficult to measure. Nonetheless, management practices of these operations can reduce as well as increase carbon stores, and the distinction between these entities and regulated ones is a matter of degree rather than kind. The ability to market offsets, should it be incorporated in U.S. cap-and-trade legislation, must be understood as a public policy choice and not a right. Offset standards should be designed to support broad public policy outcomes.

Setting public goals for forests will require weighing the advantages of accumulating more carbon in forests versus the advantages of accumulating it in furniture, homes, and landfills or burning to generate energy. In most cases, boosting forest carbon stores will create stable, self-sustaining carbon reserves at no fossil-fuel emissions cost. Protecting and enhancing forest carbon reserves can also help maintain undisturbed, late-successional forests that are currently rare across the landscape. These forests could provide a refuge for species stressed by a changing climate and provide valuable lessons about how natural systems adapt to new conditions. In contrast, carbon storage in wood products and landfills depends upon continuing fossil fuel use and requires space for housing and landfills that displace carbon-fixing vegetation. At the same time, however, wood products and fuels generate revenue for landowners (an incentive to keep forests as forests), provide material comforts for consumers, and may indirectly reduce GHG emissions by substituting for more fossil-fuel-intensive alternatives.

Wood products and wood fuels have a role to play in a carbon-friendly future. An emphasis on increased wood production, however, can distract from the ultimate goal of reducing use of energy and materials. The U.S. economy currently uses over 2.3 times more energy and 1.5 times more materials per capita than Europe (Rogich et al. 2008; U.S. Energy Information Administration 2008b), yet quality of life indicators are lower in the U.S. than in many European countries. There is clearly room for reducing consumption without harming basic human welfare, and the best climate change strategies will keep that goal clearly in sight.

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Data Appendix – Conversions and Calculations

Item	Original Data and Source	Assumptions	Computed Estimate
Wood Losses			
Rate of decomposition of forest floor litter	Zhang et al. (2008). Decomposition rate (k value) for first-order decay = 0.3.	$k = \ln(2) / HL$, where HL = half-life.	Convert rate of decomposition by first-order decay to half-lives. $0.3 = \ln(2) / HL$; HL = 2.3.
Above-ground logging waste including logging residue plus stumps and small limbs	Logging residue and roundwood volume nationwide (30%) and by region: South Central (28%), Rocky Mountain (22%), North Central (40%), Pacific Northwest (28%), Northeast (47%) (U.S. Forest Service 2008, Table 40). Logging residue and roundwood volume at state level: NV (3%), NH (84%) (Timber Product Output data online at http://ncrs2.fs.fed.us/4801/fiadb/rpa_tpo/wc_rpa_tpo.ASP). Stumps and branches add 14% to softwood logging residue and 24% to hardwood logging residue (McKeever and Falk 2004).	Stumps and branches add ~19% to logging residue on average (mean value between 14% for softwoods and 24% for hardwoods).	Above-ground logging waste as % of roundwood is 19% more than logging residue. National = $0.3 * 1.19 = 36\%$. Nevada $0.03 * 1.19 = 4\%$. New Hampshire = $0.84 * 1.19 = 100\%$. South Central $0.28 * 1.19 = 33\%$. Rocky Mountain $0.22 * 1.19 = 26\%$. North Central $0.40 * 1.19 = 48\%$. Pacific Northwest $0.28 * 1.19 = 33\%$. Northeast $0.47 * 1.19 = 56\%$.
Total logging waste including logging residue plus stumps and small limbs and roots	Large roots are 5% to 51%, mean 19%, of total tree biomass in cold temperate and boreal forests (Li et al. 2003).	Apply mean root value of 19% of total tree biomass across United States (omits small roots). Assume all tree parts have same density so that biomass proportions and volume proportions are similar.	If roots are 19% of total tree volume, then 81% of total tree volume is above-ground. A tree with total tree volume = 1 would have above-ground volume of 0.81. If roundwood volume = x and above-ground logging waste including stumps and branches is $0.36x$ (national), then $x + 0.36x = 0.81$ and $x = 0.81 / 1.36 = 60\%$. Total tree losses including above-ground logging residue and large roots = $1 - 0.60 = 0.40$, or 40% of total tree volume. Computations for states and regions use same stumps/branches/roots percentages but substitute logging residue percentages by state or region. Total logging losses including above-ground logging residue and large roots are 22% for NV, 59% for NH, 39% for South Central, 36% for Rocky Mountain, 45% for North Central, 39% for Pacific Northwest.
Fuelwood as percent of standing tree volume	Fuel as percent of roundwood nationwide (9%) and by region: South Central (3%), Rocky Mountain (51%) (U.S. Forest Service 2008, Table 39).	Multiply fuelwood as percent of roundwood times roundwood as percent of standing tree volume to estimate fuelwood as percent of total standing tree volume.	See above for calculation of roundwood as percent of standing tree volume. Fuelwood as percent of standing tree volume: Nationally, $0.09 * 0.60 = 5\%$. For South Central, $0.03 * 0.61 = 2\%$. For Rocky Mountains, $0.51 * 0.64 = 33\%$.
Pulpwood as percent of standing tree volume	Pulp as percent of roundwood for hardwood sawlogs in the North Central region (6%) and softwood pulp in the Pacific Northwest Westside (50%) (Smith et al. 2006, GTR-NE-343, Table D6). 2002 roundwood volumes from Adams et al. (2006, PNW-GTR-659, Table 13).	This source is used because it includes pulp sourced from sawlogs. Multiply pulpwood as percent of roundwood times roundwood as percent of standing tree volume to estimate pulpwood as percent of total standing tree volume.	Estimate national pulp as percent of roundwood (31%) from weighted average based on regional pulp percent of roundwood for hardwood/softwood and sawlog/pulp, weighted by 2002 roundwood volumes from Adams et al. (2006). See above for calculation of roundwood as percent of standing tree volume. Pulpwood as percent of standing tree volume: Nationally, $0.31 * 0.60 = 19\%$. North Central, $0.06 * 0.55 = 3\%$. Pacific Northwest, $0.50 * 0.61 = 30\%$.

Data Appendix – Conversions and Calculations (continued)

Item	Original Data and Source	Assumptions	Computed Estimate
Bark as percent of standing tree volume	15% to 18% of roundwood volume (Smith et al. 2006, Table 5).	Portion of roundwood volume remaining after fuelwood and pulp sorted out = $1 - 0.40 - 0.05 - 0.19 = 0.36$. Assume that bark is included in primary processing losses as calculated below, so not deducted separately.	Portion of roundwood volume available for long-lived products that is bark is $0.36 * 0.165 = 6\%$.
Primary processing losses	General primary processing conversion efficiencies: http://www.borealforest.org/world/innova/processing.htm for circular vs. bandsaw conversion efficiency; Structural Board Association http://osbguide.tecotested.com/faqs/faq_singlepage.html for OSB efficiency.		
Primary processing losses	Log and product masses: PNW lumber: log 1,538 kg, lumber 774 kg (Milota et al. 2005, Table 5); South lumber: log 2,093 kg, lumber 883 kg (Milota et al. 2005, Table 5); PNW softwood plywood: log 504 kg, plywood 241 kg (Wilson and Sakimoto 2005, Table 13); South softwood plywood: log 625 kg, plywood 290 kg (Wilson and Sakimoto, 2005, Table 13); South oriented strandboard: log 772 kg, OSB 574 kg (Kline 2005, Tables 1 & 2).		PNW lumber: $(1,538 - 774) / 1538 = 50\%$. South lumber: $(2,093 - 883) / 2093 = 58\%$. PNW plywood: $(504 - 241) / 241 = 52\%$. South plywood: $(625 - 290) / 625 = 54\%$. South OSB: $(772 - 574) / 772 = 26\%$. Primary mill losses range from 26% (OSB) to 58% (South lumber) of log mass.
Primary processing losses	Percentage losses from various studies: 10% (theoretical OSB) to 62% (plywood in Finland).	To get percent of standing tree, multiply mill losses by percent of standing tree volume remaining after logging losses, fuelwood and pulp are removed (36%).	Convert to percent of standing tree by multiplying by 0.36. Range from $0.10 * 0.36 = 4\%$ to $0.62 * 0.36 = 22\%$. Average loss = 13%, so remaining portion of standing tree in primary products is $36\% - 13\% = 23\%$.
Secondary processing losses	Secondary processing losses as percent of lumber or panel volume (Crumpler 1996; Wood Waste and Furniture Emissions Task Force 1998; BFM, Ltd. 2003).	Multiply mill losses by percent of standing tree remaining after primary processing (23%—see above).	Secondary losses range from 27% to 80% of lumber/panels. Secondary processing losses as percent of standing tree volume: $0.27 * 0.23 = 6\%$ and $0.80 * 0.23 = 18\%$.
Construction losses	Construction losses as percent of lumber or panel volume, (National Association of Home Builders Research Center 1995; Cornell University Cooperative Extension 1996; Houston Advanced Research Center 2005; NAHB, cited in Wilson and Boehland 2005; James et al. 2007; McKeever and Falk 2004;). Conversion factors for lumber and panels: 33 lbs./cubic foot for softwood lumber and 40 lbs./cubic foot (1.25 lbs./square foot 3/8 inch thick) for sheathing (Smith et al. 2006, GTR NE-343, Table D1).	Calculate weight of wood in standard home from volumes using conversion factors. Then apply construction losses to percent of standing tree remaining after primary processing (23%—see above).	Construction losses range from 4% to 21% of lumber/panels. Construction losses as percent of standing tree volume: $0.04 * 0.23 = 1\%$ and $0.21 * 0.23 = 5\%$.

Data Appendix – Conversions and Calculations (continued)

Item	Original Data and Source	Assumptions	Computed Estimate
Secondary and construction losses combined	Percentages in long-lived uses by primary product; total volume of each primary product produced in United States (Smith et al. 2006, GTR-NE-343, Table D2; and McKeever 2002, PNW-GTR-524, Tables 18, 20, 22).	Secondary processing losses 6% to 18% and construction losses 1% to 5% (see above). Use average losses for construction (3%) and secondary processing (12%). Assume primary products represented in GTR-343 and GTR-524 tables are representative of all primary solid wood products for U.S.	Multiply percent of softwood lumber used in construction and for furniture (Smith et al. 2006, Table D2) times volume of softwood lumber produced in 1998 (McKeever 2002, Table 18) to estimate total volume of softwood lumber used for construction and for furniture. Repeat for hardwood lumber, softwood plywood, OSB, and nonstructural panels. Sum estimated amounts of all primary products used for construction. Repeat for furniture. Estimated proportions as weighted average for all primary products in long-lived uses are 76% used in construction and 24% in furniture. To get weighted average combine secondary processing and construction losses, multiply proportion in use times wood loss as percent of standing tree for construction and for furniture and sum. $0.76 * 0.03 + 0.24 * 0.12 = 5\%$. Volume remaining in end uses $23\% - 5\% = 18\%$.
Long-lived uses	Percentages in long-lived uses by primary product; total volume of each primary product produced in U.S. (McKeever 2002, PNW-GTR-524, Tables 18, 20, 22; Smith et al. 2006, GTR-NE-343, Table D2).	Primary products represented in GTR-343 and GTR-524 tables are representative of all primary solid wood products for United States, and same percentages in long-lived uses apply for exports/imports.	Multiply percent of softwood lumber used in construction or furniture (Smith et al. 2006, Table D2) times volume of softwood lumber produced in 1998 (McKeever 2002, Table 18). Repeat for hardwood lumber, softwood plywood, OSB, and nonstructural panels to derive amount in long-lived uses. Sum and divide by sum of total production to get weighted average percent in long-lived uses, 60%.
Use losses	Amount of U.S. production for each primary product for 1998 (McKeever 2002); percent of each primary product in each end use: single-family, multi-family, residential upkeep, and all other (Skog 2008); alternative in-use formulas (first-order for Smith et al. 2006, GTR-NE-343, and other examples from Miner 2006).		Alternative formulas were applied for a period of 100 years. Amount remaining is weighted average based on solid wood products in each end use in the United States from McKeever 2002, proportions of residential wood use in single-family and multi-family construction by primary product from Skog 2008, and unit conversions from Smith et al. 2006, Table D1. Table 2 reports lowest and highest losses over 100 years from alternative formulas. Medium loss listed in Table 2 is weighted average loss.
Comparison with 1605(b) loss estimates	North Central fraction of softwood pulp roundwood in use 0.008, in landfills 0.084. Pacific Northwest Westside fraction of softwood sawlog roundwood in use 0.130, in landfills 0.279 (Smith et al. 2006, Table 6).	See above for regional roundwood as percent of standing tree volume.	North Central softwood pulp fraction in use or landfills = $0.008 + 0.084 = 0.092$. $0.084 / 0.092 = 91\%$ in landfills. Percent of standing tree volume = $0.092 * 0.55 = 5\%$. Pacific Northwest Westside softwood sawlog fraction in use or landfills = $0.130 + 0.279 = 0.409$. $0.279 / 0.409 = 68\%$ in landfills. Percent of standing tree volume = $0.409 * 0.61 = 25\%$.
Methane emissions	23% of solid wood and 56% of paper decomposes in landfills (Skog et al. 2008). About 80% of carbon released from U.S. landfills is in the form of CO ₂ — about 50% of C is released as methane but about 40% of methane is flared or burned for energy, which converts it to CO ₂ (U.S. EPA 2006). GWP of methane is 25 (Forster et al. 2007).	Assume that portion of wood waste from mills and construction that is subject to decay (23%) completely decomposes by year 100.	Calculate net CO ₂ e emissions per ton of solid wood CO ₂ e deposited in landfills: $0.8 * 0.23 = 0.184$ tons CO ₂ and $0.2 * 0.23 * 12 / 44 * 16 / 12 = 0.0167$ tons CH ₄ . CH ₄ measured as CO ₂ e is $0.0167 * 25$ GWP = 0.418. Total CO ₂ e released per ton solid wood landfilled is 0.184 tons CO ₂ plus 0.418 tons CH ₄ measured as CO ₂ e = 0.60 tons, so net long-term CO ₂ e storage is 40% of CO ₂ e deposited in landfill.

Data Appendix – Conversions and Calculations (continued)

Item	Original Data and Source	Assumptions	Computed Estimate
CO₂e from solid wood wastes remaining in use and in landfills at 100 years	Use medium range of wood losses from previous sections of this report. 67% of solid wood waste is disposed of in landfills and 77% of solid wood waste remains in landfills at 100 years (Skog et al. 2008). Net GHG emissions avoided are 40% of CO ₂ e in wood waste, due to methane effects (see methane calculations above).	Primary and secondary mill and construction waste is landfilled at typical rates (67%) and 23% of it decomposes by 100 years after tree is cut. House demolition waste is landfilled at a similar rate, but only 11.5% decomposes by year 100 since disposal occurs gradually over time.	Primary mill waste is about 13% of standing tree volume. Net CO ₂ e in landfilled mill waste at year 100 would be $0.13 * 0.67 * 0.40 = 3\%$ of CO ₂ e in standing tree. Secondary mill/construction waste is about 4% of standing tree volume. Net CO ₂ e in landfilled secondary mill/construction waste would be $0.04 * 0.67 * 0.40 = 1\%$. House demolition waste is about 17% of standing tree volume. Net CO ₂ e in house demolition waste (assuming 1/2 of decay-prone portion decomposes by year 100) would be $0.17 * 0.67 * 0.70 = 8\%$.
Fossil Energy and Other Process Emissions			
Ratios of logs:100-year C, lumber:100-year C, house wood: 100-year C	Wood remaining as percent of standing tree from previous section of this report using medium range estimates. Logs = 60%, Lumber = 23%, End products = 18%. 100-year wood (in use and landfilled) = 14%.	These ratios are used to convert emissions per mass of raw material to emissions per CO ₂ e of wood remaining in Year 100 (see rows below).	Ratios: logs:100-year wood = $60 / 14 = 4.3$; lumber:100-year wood = $23 / 14 = 1.6$; end products:100-year wood = $18 / 14 = 1.3$. For CORRIM houses with 75-year life, all materials to landfill in year 75, 25 years decomposition in landfill leaves 81.75% of wood material remaining in year 100. So ratio is $18 / (18 * 0.8175) = 1.22$.
Harvest	Fossil fuel emissions for site preparation and harvest operations for Southeast and PNW low- and high-intensity management range from 8.02 to 9.71 kg of CO ₂ plus 0.00171 to 0.0127 kg CH ₄ plus 0.00019 to 0.00554 kg N ₂ O per m ³ of log (Johnson et al. 2005).	1 m ³ of logs weighs about 525 kg. Multiply by 0.5 to estimate carbon content, multiply by 3.6667 to estimate CO ₂ content. Hence logs contain 962 kg CO ₂ e per m ³ .	Convert CH ₄ to CO ₂ e by multiplying by 25, and N ₂ O to CO ₂ e by multiplying by 310 and total all GHGs per m ³ of log. Convert CO ₂ e per m ³ to CO ₂ e per kg by dividing by 962 kg/m ³ . Totals range from 0.0085 to 0.0132 kg CO ₂ e of emissions per kg of CO ₂ e in log. Calculate ratios to 100-year carbon by multiplying by 4.3. Range from 0.04 to 0.06.
Harvest	Harvest emissions 11,411 CO ₂ e for 193,170 metric tons of C in logs (Gower et al. 2006).		Convert log C content to CO ₂ e content by multiplying by 3.6667 = 708,296 metric tons. Divide harvest emissions by log CO ₂ e = 0.02. Calculate ratio to 100-year carbon by multiplying by 4.3. Result is 0.07.
Primary manufacturing	Carbon content in raw logs and CO ₂ and CH ₄ emissions by product (Kline 2005, Tables 2 and 7; Milota et al. 2005, Tables 5 and 8; Wilson and Sakimoto 2005, Tables 12 and 13; Bergman and Bowe 2008, Tables 2 and 5).	Assume logs are 50% carbon.	Convert methane (minor emissions) to CO ₂ equivalent by multiplying by 25. Sum fossil CO ₂ and CH ₄ as CO ₂ e. Estimate C in log by multiplying mass by 0.5, then multiply by 3.6667 to derive CO ₂ e in log. Divide emissions by raw log CO ₂ e to get ratios of 0.02 (softwood lumber South or Northeast hardwood), 0.04 (softwood lumber West), 0.03 (OSB), 0.005 (plywood). Including off-site emissions, 0.07 Northeast lumber, 0.18 OSB, 0.11 plywood. Calculate ratio to 100-year carbon by multiplying by 4.3. Range 0.02 to 0.77.
Primary manufacturing	Source reports fossil C emissions as percent of C in primary product (Liski et al. 2001).		0.032 sawmill, 0.069 plywood mill. Calculate ratio to 100-year carbon by multiplying by 1.6. Results 0.05 and 0.11.
Primary manufacturing	Sawmill nonrenewable emissions (lumber portion only) 4,708 metric tons. C stored in lumber = 31,705 (Home Depot) plus 50,477 (other) total tons (Gower et al. 2006).		Convert lumber C to CO ₂ e by multiplying by 3.6667 = 301,366. Divide sawmill emissions by log CO ₂ e = 0.02. Calculate ratio to 100-year carbon by multiplying by 4.3. Result is 0.07.

Data Appendix – Conversions and Calculations (continued)

Item	Original Data and Source	Assumptions	Computed Estimate
Primary manufacturing	200 kg CO ₂ e emissions per metric ton of panels (Skog 2008, p. 16).	1 metric ton panels contains 0.48 metric tons C (Smith et al. 2006, GTR-NE-343, Table D1 panel average).	$1 * 0.48 * 3.6667 = 0.88$ metric tons CO ₂ e in 1 metric ton of panels. $200\text{kg} = 0.2$ metric tons CO ₂ e of emissions/metric ton panels. $0.2 / 0.88 = 0.23$. Calculate ratio to 100-year carbon by multiplying by 1.6. Result is 0.36.
Primary manufacturing, construction, transportation	4-story wood-framed apartment building—wood content has 1,400 GJ embedded energy and primary manufacturing emissions are 117 tons CO ₂ e. Wood contains 15.8 MJ/kg energy content (Borjesson and Gustavson 2000).	Lumber is 50% carbon. Assume all wood embodied in house remains at 100 years.	$1,400 \text{ GJ} = 1,400,000 \text{ MJ}$. $1,400,000 / 15.8 = 88,608 \text{ kg}$ of wood in building. $88,608 * 0.5 = 44,304 \text{ kg C}$ in wood in building. $44,304 * 3.6667 = 162,449 \text{ kg CO}_2\text{e}$ or 162 metric tons CO ₂ e in building wood. Fossil fuels used to produce and transport building materials emit 117 metric tons CO ₂ e. $117 / 162 = 0.72$.
Primary manufacturing and transport	Average combined process and transportation energy and process non-energy emissions, virgin inputs (U.S. EPA 2006, Exhibit 2-2). Conversion factors by product for wet to dry tons (Exhibit 6-4) and carbon content as percent of dry matter (Exhibit 6-2).	Original units are metric tons carbon equivalent per wet (as delivered) short ton of product.	Convert wet tons of product to dry tons. Convert short dry tons to metric dry tons. Calculate carbon content. Calculate ratio of C in emissions to C in discarded material, 0.12 for lumber, 0.24 for fiberboard. Calculate ratio to 100-year carbon by multiplying by 1.3. Results 0.16 to 0.31.
Construction	Construction emissions for Minneapolis and Atlanta model houses converted to CO ₂ e 1,271 and 1,121 kg (Meil et al. 2004, Table 3-4). Wood as percent of materials 15% and 10% (Miel et al. 2004, Table 10). CO ₂ e content of homes at 22.4 and 17.1 metric tons (Perez-Garcia et al. 2005).	Estimate construction emissions for wood based on wood as portion of total materials. House life is assumed to be 75 years, so CO ₂ e remaining at 100 years reflects 25 years decomposition in landfill (82% remains in year 100).	Convert total construction emissions to GWP. Minneapolis house = 1.27 metric tons, Atlanta house = 1.12 metric tons. Proportionally, construction emissions would be $0.15 * 1.3 = 0.19$ for Minneapolis and $0.1 * 1.1 = 0.11$ for Atlanta. 82% of CO ₂ e remains at 100 years: 18 metric tons CO ₂ e for Minneapolis house and 14 for Atlanta house. Calculate ratio of construction emissions to 100-year CO ₂ e. $0.19 / 18 = 0.011$ for the Minneapolis house and $0.11 / 14 = 0.008$ for the Atlanta house.
Transport to construction site	Construction transport emissions converted to CO ₂ e 37 and 21 kg (Meil et al. 2004, Table 3-4). See above for other data.	Estimate transport emissions for wood based on wood as portion of total materials. House life is assumed to be 75 years, so CO ₂ e remaining at 100 years reflects 25 years decomposition in landfill (82% remains in year 100).	Convert total transport emissions from manufacturing to construction site to GWP. Minneapolis house = 0.037 metric tons CO ₂ e; Atlanta house = 0.021 metric tons CO ₂ e. Estimated wood transport for Minneapolis = $0.15 * 0.037 = 0.006$; Atlanta = $0.10 * 0.021 = 0.002$. Construction wood transport emissions as percent of 100-year wood carbon storage is insignificant.
Transport to end use	128,199 (Home Depot) + 83,396 (other) total tons CO ₂ e transport emissions (Gower et al. 2006).	Logs are 50% carbon.	Total carbon stored in lumber $31,705 + 50,477 = 82,182$. $82,182 * 3.6667 = 301,337$ tons CO ₂ e in lumber. Total transport emissions = $128,199 + 83,396 = 211,595$. Divide transport emissions by lumber CO ₂ e $211,595 / 301,337 = 0.70$. Calculate ratio to 100-year carbon by multiplying by 1.6. Result is 1.12.
House maintenance	Emissions associated with maintenance of wood components 1,066 and 890 kg CO ₂ e (Winistorfer et al. 2005, Tables 8 and 9). For total wood CO ₂ e in house see above.		Divide maintenance CO ₂ e by 100-year CO ₂ e (see above). $1.066 / 18 = 0.06$ and $0.890 / 14 = 0.06$.
Demolition	435 and 491 kg CO ₂ e demolition energy emissions (Winistorfer et al. 2005, Table 11). For total wood CO ₂ e in house see above.		Multiply total demolition CO ₂ e by fraction of landfilled material that is wood. $435 * 0.15 = 65 \text{ kg}$. $491 * 0.10 = 49 \text{ kg}$. Divide estimated wood demolition CO ₂ e by house content CO ₂ e. $65 / 22,400 = 0.003$ and $49 / 17,400 = 0.003$.

COVER PHOTOS:

Top: Photo courtesy of Terry Brown,
Oregon State University

Left: Photo by Ann Ingerson



THE
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