CLALLAM COUNTY ROAD DEPARTMENT

INTEGRATED WEED MANAGEMENT PLAN 2023


BIOLOGICAL


PHYSICAL


CHEMICAL


CULTURAL


PREVENTATIVE


POLLINATOR FRIENDLY

Table of Contents

The Cover: photos, from top knapweed weevil (biological control agent) on meadow knapweed flower head photo credit Laura Parsons, University of Idaho; staff manually removing Itlalian thistle; selective herbicide treatment on road right of way; native plantings for Hoko Ozette culvert; weed free quarry to show prevention of weed seeds spreading; pearly everlasting in full bloom, one of the native species in our natural, pollinator-friendly, roadside revegetation projects.

List of Tables

Page

List of Figures

CLALLAM COUNTY INTEGRATED WEED MANAGEMENT PLAN

INTRODUCTION

Clallam County is a major landholder subject to Washington State weed laws RCW 17.10 and WAC 16-750, which mandate the control of specific non-native, invasive "noxious" weeds. An integrated weed management plan is needed to help the County efficiently comply with its noxious weed control obligation on county roadsides and other lands under Road department management.

The primary responsibility of the Clallam County road system is safety in the transport of people, goods, and services. Roadside weed management is a unique element within a general road maintenance program. Effective weed management requires identifying the best mix of all control techniques as well as an understanding of how plant communities are part of a dynamic process. Healthy, self-sustaining plant communities better compete with weed pressure. The explicit goal of this plan is to shift roadside vegetation to natural, site appropriate plant communities. This includes using best management practices that support that shift, minimizing the need for all types of interventions, including the use of herbicide.

The IWM plan must be consistent with Clallam County's long-term goals for its road system including environmental and public safety considerations. The IWM plan will strive for a balance of multiple, but compatible, goals, such as reducing maintenance costs for weed control over time while increasing environmental services. Other considerations will include protection and preservation of the natural environment, preserving and enhancing the scenic and habitat quality of the roadside, and being a good neighbor to adjoining property owners.

This document serves as the strategic plan for managing non-native invasive plants that infest county rights-of-way. It contains information on priority weed locations, and guidelines and procedures for best management practices in weed control. This plan is developed in compliance with Washington State Noxious Weed Law, Chapter 17.10 of the Revised Code of Washington, and modeled on the State of Washington's Integrated Pest Management program as codified in Chapter 17.15 of the Revised Code of Washington. Specific County legislative direction upon which this plan is based is codified in Clallam County Code Ordinance 923 (Appendix A).

Roadside weed management is an evolving process, and it is intended that this plan be annually evaluated and adapted over time based on input and technical updates from federal and state agencies, tribes, universities and local partners and stakeholders. It is essential that the results of control activities are monitored, evaluated and adjusted as necessary to maximize efficiency and effectiveness. Best Management Practices (BMPs) for each weed program element with continued research and education will provide important information for ongoing Integrated Weed Management (IWM) treatments.

This plan encourages public involvement. "Owner Will Control" agreements, Adopt-A-Patch, and revegetation projects represent volunteer opportunities. Annual plans, treatment progress updates and year-end reports will be available to the public online at: https://www.clallamcountywa.gov/821/Noxious-Weed-Control

Please contact the County at the numbers listed below for questions or comments:

Christina St John, 360-417-2442 or Joe Donisi, 360-417-2404

WHY CONTROL NOXIOUS AND INVASIVE WEEDS?

Noxious weeds impact native ecosystems by reducing biodiversity, altering hydrologic conditions, altering soil characteristics, changing fire intensity and frequency, modifying successional pathways, competing for pollinators, displacing rare plant species, serving as reservoirs of plant pathogens, and by replacing complex native communities with simple non-native ones. Noxious weeds cause economic impacts. In general, noxious

and invasive weeds are expensive to control and negatively impact agricultural and forestry production, property values, water flow and availability, and recreation opportunities. It is estimated that invasive plants cause about $123 billion in damages and losses to the U.S. economy annually (Harper-Lore, Johnson, and Skinner, 2007). Non-native weeds cause an estimated $34 billion in losses to crops and pastures alone (Pimentel, McNair et al., 2001).

For these reasons, Washington State law requires the control of certain weed species. The purpose of the law is to limit economic loss and adverse effects to Washington's agricultural, natural, and human resources due to the presence and spread of noxious weeds in all terrestrial and aquatic areas in the state. The processes for regulation and control are defined in the Revised Code of Washington Chapter 17.10 and the Washington Administrative Code Chapter 16-750. All landowners, public and private, are required to control noxious weeds on lands they own.

Transportation rights-of-way are high priority locations for control of noxious weed species because they cross and link so many adjacent properties and land uses and can act as conduits for the spread of weeds. Weeds often appear first along road corridors.

Clallam County must be a responsible steward of County-owned land. It supports commerce and the economic viability of the agricultural community. The County also values environmental preservation. It has taken the lead on projects to restore ecosystem function. The County promotes tourism and recreational opportunities. All can be undermined by the spread of invasive plants. To meet its responsibilities, the County must ensure noxious and invasive weeds are effectively and efficiently controlled on its rights-of-way (Figure 1, A and B).

Figure 1A. The herb Robert monoculture shown here, dies back to bare ground, does not filter pollutants, is susceptible to erosion, and exudes chemicals to inhibit the germination of native species.

Figure 1B. A low growing, naturally sustainable plant community is compatible with right-of-way goals while providing environmental services and quality habitat.

INTEGRATED WEED MANAGEMENT

Integrated Weed Management

Integrated Weed Management (IWM) is a coordinated decision-making process that uses the most appropriate weed management methods and strategies, along with a monitoring and evaluation system, to achieve roadside maintenance goals and objectives in an environmentally and economically sound manner. This includes assessing potential non-target impacts that may occur as a result and minimizing adverse effects through best management practices. The principles of IWM dictate that each weed problem is addressed from the perspective of all control options. The selected mix of control methods is the best treatment for the long-term stability of the plant community. Stable plant communities become established when the desired plants are not disturbed by the control program for the undesired plants. The physical design of the roadside environment coupled with the sporadic occurrence of noxious weeds imposes restrictions on the selection of control methods.

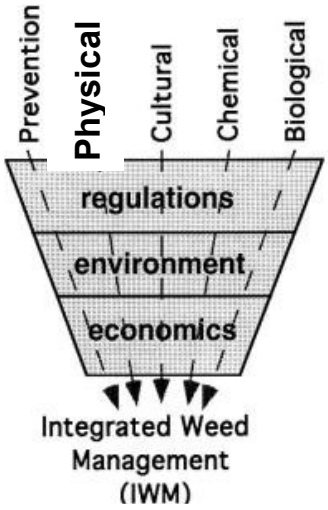


Figure 2. Factors influencing IWM program.

CHOOSING CONTROL METHODS

Weed control methods include biological, chemical, cultural, physical, and preventative. Each has its strengths and weaknesses influenced by regulations, environment and economics (Figure 2). A consideration of potential non-target impacts also plays a role. (See Appendix B for risk assessments)

Biological (such as releasing insect agents) and physical methods (such as mowing) use fewer labor resources. These are best for managing and slowing the spread of, but not controlling or reducing, widely dispersed weed infestations. Mowing is non-selective and can spread weed seeds or other viable propagules. Biological agents can be extremely selective but require specific conditions. Both must be repeated indefinitely to suppress the weed population. Neither will eliminate populations of most weeds without using other techniques in combination.

Physical methods such as hand-pulling or digging are labor intensive but can effectively control or eliminate small weed infestations of limited distribution. While highly selective, such methods are unlikely to control deeply rooted weeds or weeds with spreading root systems.

Herbicides can effectively and selectively control all sizes and types of weed infestations with a small, but knowledgeable workforce. Careful attention must be paid to minimize potential non-target effects and to follow all relevant regulations. See Appendix B for analysis of non-target impacts and risk assessment. Weather or site conditions can limit use.

Cultural and prevention practices are the most cost effective and efficient in the long term. These methods are more indirect and best used in tandem with the others. As current weed populations are eliminated, the goal is to shift control measures toward cultural practices such as use of native seed mixes and less disturbance of native shrub communities, as well as prevention practices such as weed-free material standards and cleaning equipment between job sites.

Use of the most effective method or combination of methods within an IWM decision-making framework will result in the greatest roadside service levels at the lowest life-cycle costs. Figure 3 demonstrates some of the feedback loops involved in an IWM strategy.

THE IWM DECISION-MAKING PROCESS

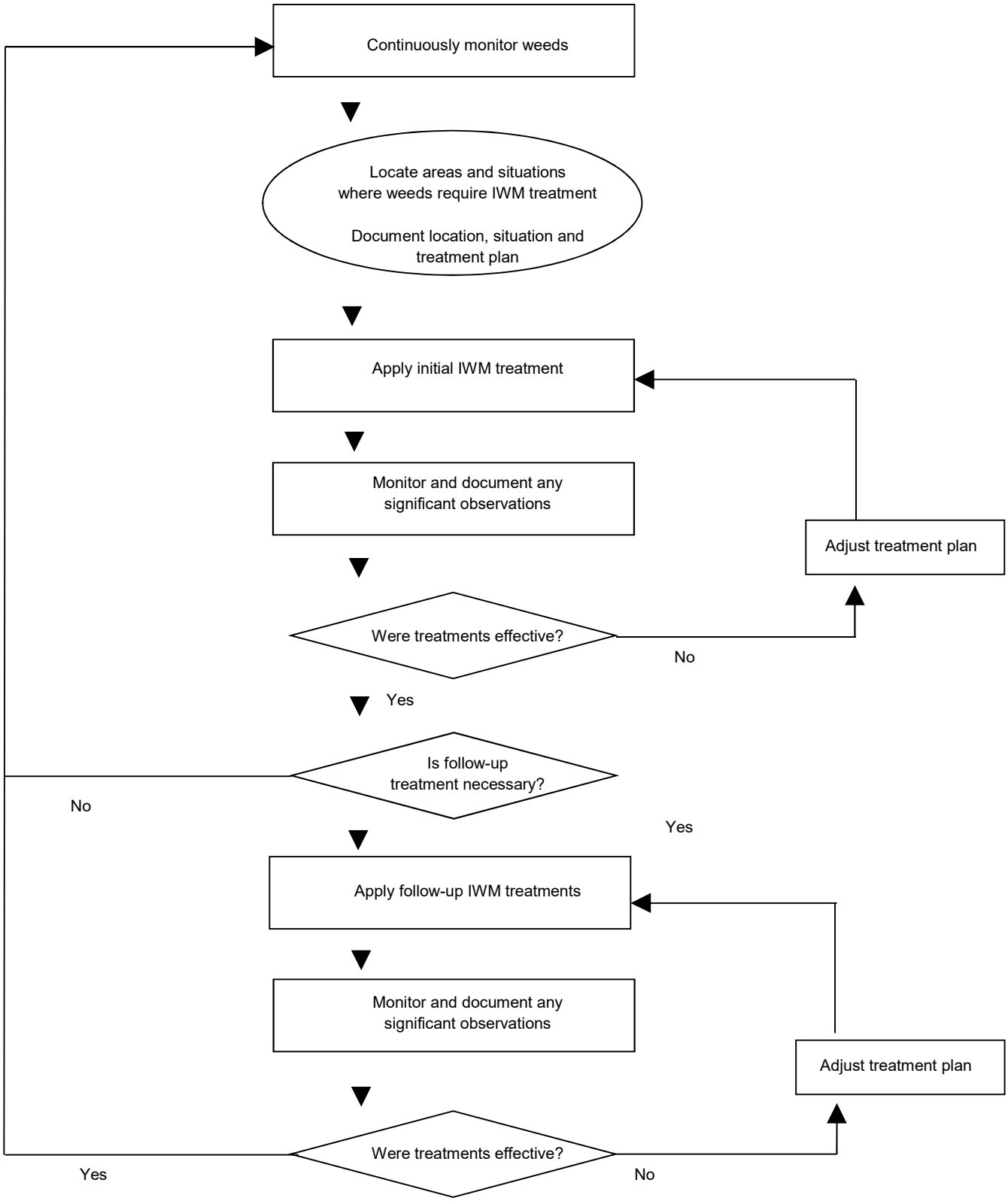


Figure 3. The continuing flow of monitoring, evaluation and adapting treatments occurring in an IWM program (adapted with permission from WSDOT area management plans).

BIOLOGICAL WEED CONTROL

Description

Methods which use living organisms to inhibit a host plant's ability to survive or reproduce are considered biological controls. Insects, diseases, and foraging animals, such as goats and cattle, are examples of biological control organisms. Biological methods are typically applied only when weed infestations are so well established that total eradication is not practical or possible.

General Use Considerations

Insect biocontrol agents are routinely inexpensive to maintain, but their populations lag behind the development of the weed population. Careful testing and screening are done before releasing insect agents to ensure they will not also attack native or other desirable plants. Insect predators are intended to be very weed-specific, though insects are not available for many weeds. They are usually part of regional programs of which the roadside right-of-way is an incidental beneficiary. Livestock grazing has the same effect as mowing; it removes the top growth without disturbing the roots so perennial plants re-grow as soon as grazing pressure is removed. Grazing animals can suppress desirable bee and butterfly forage, create bare ground or otherwise disturb the shoulder making it prone to re-infestation and erosion. Measures must be taken to ensure that animals do not destroy desirable vegetation on adjoining land. Contiguous acres are usually needed for successful biological control. Biological controls can reduce populations but can never result in eradication. The use of disease organisms as a form of biological control is still very limited.

ROADSIDE APPLICATION

There are several limitations and hazards associated with using grazing animals on Clallam roadsides. Most importantly, many of the noxious and invasive weeds targeted for control are sporadically dispersed along the road system and not easy to selectively target by grazing animals. Biological control is applicable where host weeds are present in dense or continuous colonies. All available insect agents have been released or are present for control of noxious weeds within Clallam County (Table 1).

Limitation

Grazing: *not considered for use at this time*

- Grazing animals on narrow right-of-way pose a hazard to motorists
- Insufficient grazing area
- Creates bare ground
- Targeted species are distributed in such a way that makes grazing inefficient and less selective

Insects:

- Insect agent unavailable for many weeds
- Non-contiguous infestation or insufficient host density
- Minimal disturbance is required for insect population to grow to an effective level; often conflicts with routine mowing schedule
- Will not eliminate weed populations, only suppress them

Table 1. Insect biocontrol agents in Clallam County

BIOLOGICAL AGENT	LATIN NAME	TARGET WEED	COMMENTS
Bindweed gall mite	*Aceria malherbae*	bindweed sp	Generally, for field bindweed, but experimental use for hedge bindweed; best for hot, dry sites; these are new releases
Bull thistle seed head gall fly	*Urophora stylata*	bull thistle	Seed feeder; not compatible with other control methods; may be present already
Canada thistle stem gall fly	*Urophora cardui*	Canada thistle	Metabolic sink, reducing vigor; not compatible with other control methods; three additional agents had been previously released (not by us!) for thistle control, but very detrimental to native thistle species.
Banded gall fly and knapweed seed head fly Lesser knapweed flower weevil and blunt nosed flower weevil	*Urophora quadrifasciata and U. affinus* *Larinus minutus and L. obtusus*	knapweed, meadow	Flies often destroyed by seed weevils when both agents occur together Seed feeders
Knapweed root weevil Lesser knapweed flower weevil and blunt nosed flower weevil	*Cyphocleonus achates,* *Larinus minutus, and L. obtusus*	spotted knapweed	Root weevil can be very effective, but limited distribution Seed feeders
Sap-sucking psyllid	*Aphalara itadori*	knotweed sp.	Experimental releases only in WA
Defoliating hemlock moth	*Agonopterix alstroemeriana*	poison hemlock	Not effective, no longer distributed
Black-margined loosestrife beetle	*Galerucella calmariensis*	purple loosestrife	Highly effective even in low density infestations, some non-target effects
Tansy flea beetle Cinnabar moth	*Longitarsus jacobaeae* *Tyria jacobaeae*	tansy ragwort	Best on rosettes and seedlings; poor survival in wet areas; a Swiss ecotype was released in the hopes of increased survival A generalist that feeds on all plants in the *Senecio* genus, **distribution not recommended** - danger to native plants
Seed-feeding bruchid Seed-feeding weevil	*Exapion fuscirostre* *Bruchidius villosus*	Scotch broom	Seed eaters
Klamath weed beetle	*Chrysolina quadrigemina*	St. John's wort	Feeds on ornamental and native species also; present; not well adapted to our climate

Application Guidelines

- Grazing may be possible under specific "Owner Will Control" option
- Release additional viable insect agents should they become available.

Maintenance

None required at this time.

PHYSICAL WEED CONTROL

Description

Physical control includes both mechanized and manual methods. Mechanical methods use equipment to mow, cut, prune, scrape or cultivate in a manner which reduces, removes or prevents undesirable plant growth. A variety of machines are used in a roadside program, such as flail, reel, sickle, and rotary mowers, which come in different sizes, and graders, which are used to pull shoulders and remove sod buildup. Brush cutting is usually done with machines that are larger and heavier versions of rotary mowers. Mechanical methods are for larger scale general vegetation maintenance activities.

Manual methods include hand-held tools such as bladed weed-eaters, string trimmers, chain saws, brush hooks, hoes, and machetes; mechanical methods on a small scale, as well as grubbing and pulling weeds. Hand pulling is generally reserved for small or difficult to access sites or where greater selectivity is required. Repeat treatments are required for many species.

General Use Considerations

Mechanized equipment is typically used to non-selectively suppress undesirable or excessive vegetation growth on a large scale, not specifically to control weeds. Mechanical tools such as mowers do not affect the roots of plants and cut plants often resprout in greater numbers. This is particularly true of weedy biennial and perennial forbs or shrubs. Many weeds respond to mowing by shorter regrowth and producing seeds on stalks below the blade height. Properly timed or frequent mowing can delay or prevent seed development during a growing season, but improperly timed mowing results in spreading propagules over a broad area. Sod scalping causes erosion potential and creates sites for weed invasion.

Weed suppression by mowers is temporary and must be repeated to achieve the desired effect. Without specific guidelines, mowing is non-selective in its effect on the plant community. Many desirable native plants grow more slowly than their weedy, invasive cousins. Desired and undesired plants are continuously reduced to the same height, the same starting point, with each mowing. Some weeds are spread by the mowing operation. Stable plant communities, an expressed objective of the county's roadside program, are not retained under heavy mowing pressure. Unless carefully timed, close mowing may be disastrous for ground nesting birds, animals, and pollinator forage. Mowing also has a large carbon footprint in comparison to other control strategies and machinery can leak hydraulic fluid and shed other hazardous substances into ditches and other sensitive environments.

Special considerations for this management option are necessary due to exposure to hazards such as noise, sharp power equipment and road traffic. Extra alertness is necessary. Protection for eyes, ears, hands, legs, and feet is required when using these tools. Alternative mechanical methods such as steam or flame have been investigated. Both steam and flaming work by destroying top growth and are best used when plants are first germinating, not when well established. Both have little effect on roots. Additionally, steam and flaming pose significant hazards for the operator and the environment and are very costly. These methods are not being considered for inclusion at this time.

Manual methods are commonly used for small infestations. This technique is effective in treating areas where obstructions prohibit mechanical methods. Hand pulling can be very selective and may be reserved for sites where extreme selectivity is critical and the infestation is small. Grubbing and hand pulling rely on moist soils and can be performed during inclement weather. These methods are labor intensive, slow, disturb the soil, and are usually expensive compared to other methods. As with other physical methods using mechanized equipment, manual treatments that do not extract all the roots of perennial plants will result in re-sprouting.

ROADSIDE APPLICATION

Physical control methods, both mechanical and manual, have been the preferred method for roadside vegetation management in Clallam County for many years. Mowing and brushing activities are an indispensable part of maintaining road safety by preventing line-of-sight obstructions, reducing fire hazard, preventing flooding, and ensuring bio-filtration of hazardous runoff. Reach mowing is the practice of clearing vegetation, primarily brush and small trees, from the right-of-way. Work is accomplished with a rotary or flail mowing head attached to an extendable boom mounted to a tractor. This practice includes ditches and intersections. Clearing undesirable brush and trees from ditches encourages the growth of desirable grasses. This helps maintain the bio-filtration function of grass, resulting in cleaner runoff water.

The road department strives to make one complete mowing pass per year: more at intersections or critical locations. Right-of-way mowing and brushing can occur from spring to early fall when shoulder vegetation is actively growing, and ongoing shoulder maintenance is required. Mowing does not normally reduce weed infestations but can provide temporary suppression. It is best used in close coordination with other weed control methods. In general, perennial weeds like Canada thistle must be mowed at least three times per season or the weeds are invigorated.

Under the IWM plan, road shop supervisors will work closely with the environmental coordinator, noxious weed control coordinator, and right-of-way weed crew lead and coordinate with the mowing crew to ensure that all work is performed in accordance with Endangered Species Act and water quality requirements and state weed laws. Critical areas have been identified ensuring that mowers will know which areas and locations require special consideration. Appropriate guidelines have been developed for these locations. Changes and updates are done as necessary.

The road department funds sheriff department-led Clallam Roadside Ecological Workers (C.R.E.W) provide a valuable manual workforce. Manual weed control activities will be incorporated into their assigned duties. C.R.E.W. or volunteer events will be the backbone of weed control activities that require a large labor force. They will be directed to work on large infestations of easily recognized weeds that can be effectively pulled such as flowering tansy ragwort and Scotch broom.

Limitation

- Mowing suppresses weed infestations; but does not control. Where control is desired, mowing is not recommended unless in combination with other control measure.
- Tough perennial weeds, especially those with extensive roots, are difficult to control using only physical means.
- Pulling or digging weeds is most effective when ground is soft.

Application Guidelines

- Avoid close mowing of desirable, native vegetation. Limit back slope mowing as much as possible. Avoid mowing the back slope in critical areas.
- Resurvey mowed roads to locate weed regrowth.
- Do not mow knotweed infestations; mowing encourages re-sprouting, may spread fragments capable of producing viable plants, and makes other treatments less effective. Consult crews responsible for weed control recommendations.
- Manual methods may be applied where practical and conditions favorable.
- Digging should be limited to individual plants or very small infestations.
- Limit digging of perennial weeds or those with deeply spreading roots unless they are newly established
- Pull and bag the heads of flowering plants. Dispose of appropriately.

Personnel

Mowing program staffing is fluid. Each district has a different number of operators who mow, as time allows, between other road maintenance duties.

The road department funds C.R.E.W (as resources allow), which is comprised of up to five low-risk offenders overseen by a corrections officer. C.R.E.W performs various tasks as directed by the road department.

Weed Board staff dig up minor regulated weed infestations as conditions and resources allow to help the County achieve compliance with law.

Training and Licensing

On-the-job training

Safety trainings, briefings

Plant identification and weed control training in conjunction with the Noxious Weed Control Program

Equipment

Various mechanical mowers and tractors with mowing attachments, weed whackers, chainsaws, weed wrenches, shovels, dandy diggers, and *hori-horis* (specialized digging tools).

Maintenance

- Regular maintenance and inspection of mowers and mower heads to minimize leaks or potential spills.
- Operators will be familiar with a spill prevention plan and carry spill kits.
- Ongoing training in critical areas issues for operators.
- Recurrent weed identification training for C.R.E.W.
- Ongoing improvements in equipment.

Performance Maintenance

- Number of weeds pulled
- Number of volunteer events
- Mowing – number of roadside pass miles. Pass miles count each shoulder mile mowed including those that are mowed more than once each year. The goal is to reduce this parameter while satisfying public, safety and regulatory responsibilities.

CHEMICAL WEED CONTROL

Description

Herbicide applications only target specific noxious weeds or non-native and invasive species of special concern in our area that have been identified by the Clallam County Noxious Weed Board, state or federal agencies. Applications are made with herbicides selected for their effectiveness on the weed being targeted and may be applied using backpack sprayers or other handheld equipment as determined appropriate by the site conditions and/or the target weed.

General Use Considerations

Herbicide applications are a less physically labor-intensive means of controlling large weed infestations. Herbicides are the most effective way to control deeply rooted, persistent weeds. Properly applied herbicides can suppress weed germination and allow desirable vegetation to flourish with minimal effort. However, herbicides may not be appropriate under certain site or weather conditions and require more complex decision making and staff training than most other control measures. In Washington all herbicides must undergo a registration process in addition to that required by the Environmental Protection Agency before they can be legally applied. Washington's pesticide laws may require an applicator be licensed.

Choosing an herbicide application requires carefully considering the level of weed infestation, economic impacts, and human and ecologic consequences. When a chemical measure is chosen, optimal effect is achieved through proper herbicide selection, timely application, proper application method, and the use of the effective rate of herbicide.

Herbicide use may differ depending on the setting. Targeted roadside application, as included in this plan, is fundamentally different than that of many other types of applications where herbicides are the mainstay of weed control. Spot applications of herbicides in a noxious weed control program are often used to control individual plants, while in agricultural settings broadcast applications to entire fields are common. A limited number of chemicals are typically used for noxious weed management compared to those used in agriculture. In a successful weed management program, the amount of herbicide used on a particular site will decrease over time as the invasive plant population declines and sustainable, desirable plant replacement is supported. The potential for developing herbicide resistance is also significantly decreased by this approach.

An herbicide's potential risk is assessed by the Environmental Protection Agency before the product is registered for use. A clear understanding of the risk of using a particular herbicide requires knowledge of the toxicity of the herbicide as well as the likelihood of exposure. Toxicity is a measure of how harmful any chemical compound is. It can be measured in many ways and evaluated for many different biological systems. However, a chemical cannot have any effects on an organism without an exposure. Because noxious weed management with herbicides necessarily introduces chemicals into the environment, the challenge is to estimate the amount of exposure (the dose) for humans and different types of animals, as well as non-target plants. The presence of an herbicide in the environment poses less risk if the exposure for non-target organisms is sufficiently low that it is unlikely to have a negative impact.

ROADSIDE APPLICATION

It is the explicit goal of this IWM plan to minimize the use of herbicides whenever practicable, while shifting roadside vegetation to natural, self-sustaining, site-appropriate plant communities. Activities that create bare ground in the course of controlling weeds will be avoided, or be limited in duration, to prevent reinvasion by other weed species. Revegetation of bare ground with desirable plants will be promoted wherever opportunity exists.

Each species will have a Best Management Practice (BMP) specific to that species, developed and provided by the Clallam County Noxious Weed Program. Product label guidelines for timing and rates will be observed for best results. Herbicides may be used in conjunction with other practices, including biological and physical.

Most of the herbicides used in noxious weed control are of fairly low toxicity; however, not all herbicides have equal impacts. For example, some may pose greater risks to aquatic life and are not approved for use in aquatic settings. Others have long-lasting pre-emergent herbicidal activity that may restrict plant emergence or growth for several months after treatment. In areas that are to be re-vegetated soon after treatment, these herbicides may not be the best choice if their residues remain biologically active in the soil after desirable plant species are seeded or transplanted.

Herbicide products chosen for this program are ones that maximize effectiveness, selectivity, and safety. Appendix B provides herbicide toxicity and possible exposure scenarios for wildlife. The analysis presented in the Cal-IPC document from which this information was reproduced, was based on the best available scientific data. Herbicide users are reminded of the need to keep in mind that risk analysis is a dynamic, ongoing process, as new data is generated on exposure potential and toxicity. Future studies or refined analyses may reveal risks that were previously unknown; alternatively, they may provide assurance that risks are lower than previously understood. Invasive weed managers must stay informed about the latest technical developments about the chemical and non-chemical strategies they use.

The way in which herbicides are applied can enhance efficiency and safety goals. Spot, foliar treatments with backpack sprayers or even more selective handheld equipment (such as wick applicators or injectors) will be the most used application method. Spot treatments can release or protect habitat for wildlife such as pollinators, songbirds, and small mammals. Spot treatments reduce potential for offsite chemical drift. No broadcast treatments with mechanized equipment are being considered.

The general treatment period for noxious weeds will be during the growing season when the weeds are in full leaf. Treating before bloom focuses on preventing seed production, treating after bloom focuses on herbicide translocation to the roots as the plant restores food levels in the roots. Late season treatments need to be timed so that green living leaf and stem growth is still present. Fall applications are effective for controlling germinating winter annuals, biennials in the rosette stage, and moving herbicide to the roots of established perennials.

All herbicides used by Clallam County are currently registered by the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Agriculture (WSDA). Application of herbicides is in accordance with WSDA standards and chemical labels. County employees who apply the herbicides are licensed by WSDA or under the direct supervision of licensed personnel. In addition, these employees undergo continuous training to upgrade their expertise in the selection and safe application of herbicides. Herbicide labels, Safety Data Sheets (SDS), WSDA sensitive person list, a safety plan, and this document are kept in the office and in the weed control truck.

Record Keeping

Thorough record keeping is maintained on a WSDA approved form (Appendix C), per State requirement for all herbicide applications. The record includes information about the treatment including location, chemical used, weather conditions, and applicator comments. Citizen inquiries pertaining to herbicide applications are recorded and addressed.

Limitation

Herbicides should not be used:

- When heavy rainfall is imminent, winds exceed 10 mph or during other inclement weather conditions, such as heavy rainfall that is expected soon after an application.
- Where landowners have a current "Landowner Will Control" agreement
- Special management areas may have specific control practices or limitations.

Application Guidelines/Standard Operating Procedures

- Use only EPA and WSDA approved herbicides.
- All applications conducted under direct supervision of licensed applicators.
- Observe strict compliance to product labels and to State and local regulations.
- Use personal protective equipment as directed on the herbicide product label.
- Carefully select products, rates, timing of application, and equipment to be used.
- Include marker dye to aid identification of treated areas.
- Follow all applicable notification protocols.
- Follow product label for use and storage.
- Apply only aquatically approved formulations within 25 feet of water.
- Treat only the noxious weed site.
- Minimize drift injury by not spraying when wind exceeds 10 mph.
- Use drift reduction agents or techniques as appropriate.
- Don't spray when drift cannot be controlled.
- Avoid foliar application when measurable rainfall is imminent.
- Conduct mixing and loading operations in an area where a spill would not contaminate an aquatic site or well head.
- Do not rinse spray equipment near bodies of water or sources of potable water.
- Be aware and protective of people, working equipment, sensitive crops and gardens, apiaries, endangered species, water and wells.
- Avoid direct applications to pollinators.
- Secure containers during transportation.
- Contain and clean up spills and request help as needed.
- Keep copy of product labels and SDSs in truck.
- Promptly respond to any public inquiries or direct them to the supervisor.
- Post treated areas and specify the duration of exclusion, if appropriate.
- Provide public educational information on the need for weed treatments.
- Coordinate weed management activities where joint use of a right-of-way exists.

Herbicide Notification Process

Our intent is to provide notice as far in advance as possible balanced with the ability to predict weather and scheduling. General notice is provided in early spring through a Press Release (Appendix D) provided to the local news media and Public Notice posted on the County website. Both include general vicinity of areas to be treated, reference to the IWM plan and how to obtain a copy, and information for entering into an Owner Will Control Agreement with Clallam County. Additionally, an Herbicide Notice (Appendix E) is posted at intersections within a quarter mile of each other or at the discretion of the applicator. The Herbicide Notice includes the herbicides to be used, target weed species, application date, and phone contact. Notices that are

pre-posted are re-dated with the actual date of application. Staff is trained and available to explain applications and answer onsite questions.

Staff

The IWM program will be staffed with a licensed supervisor and any additional employee will be licensed or operate under the direct supervision of the supervisor or licensed Noxious Weed Control Board staff.

Training and Licensing

Washington State Department of Agriculture Pesticide License “Public Operator”
Washington State University IPM Program Certification (Continuing Education)

Equipment

Equipment used: backpack sprayers, handheld spray bottles and loppers, wicker wipe applicators, EZ-Ject lance and injection guns for selected noxious weeds. A backpack sprayer is a self-contained unit (tank and pump) and is carried on the back of the applicator. The capacity of these sprayers is usually less than 5 gallons. The entire tank may be pressurized or only a small chamber that draws from the main tank. This equipment is useful for selective applications and spot treatments. Backpack sprayers are very adaptable to a wide range of nozzle configurations for treating foliage. The backpack sprayer is the major application device for roadside weed control in Clallam County.

Maintenance

- Regular maintenance and calibration of all spray equipment.
- Early detection of targeted weed infestations and ongoing site evaluations.
- Ongoing training of staff including yearly recertification credits.
- Ongoing improvement and updates of equipment and handling protocols.

Performance Measurements

- Number of projects completed, ratio of spot treatment to whole road treatment.
- Area of weeds controlled.
- Number of weed species controlled/encountered/eradicated
- Public, interdepartmental, and agency weed control requests – number of requests, area of treatment, miles of road
- Public satisfaction -- number of complaints (the lower the number, the better the performance)
- Survey goals: – area, number of miles inspected, number of roads in a four-year rotational cycle.
- Documentation, monitoring, evaluation, and reporting

OWNER WILL CONTROL AGREEMENT AND ADOPT-A-PATCH

Owner Will Control Agreement

Property owners have the option to keep the road right-of-way abutting their property weed free with or without herbicides. To do so, the property owner must enter into an Owner Will Control Agreement with the County and perform weed control as outlined in the Agreement.

When entering into an Owner Will Control agreement, property owners assume the County's responsibility under state laws RCW 17.10 and WAC 16-750 to control noxious weeds, which requires timely and often repeated control efforts during the growing season. The landowner would also assume any additional weed control responsibilities resulting from county policy.

Property owners participating in control agreements may also be interested in assisting with cultural control enhancements consistent with long-term roadside weed control goals. Such opportunities will be pursued as program resources and voluntary participation allow.

A sample Owner Will Control packet is included in Appendix F.

Adopt-A-Patch

The public may "Adopt-A-Patch" consisting of weeds infestations that may be controlled manually. These types of locations will be annually identified, compiled, and posted online before seasonal county treatments commence. Those who wish to adopt a patch must enter into a Control Agreement (obtain a special use permit) with the County, which will outline control responsibilities and the deadline for completion.

An adoption deadline will be posted along with Adopt-A-Patch locations to avoid scheduling conflicts with County control personnel. Permits granting permission to control weeds on County-owned or managed lands, safety training and tips, as well as any other conditions required by county policy will be included in the Control Agreement packet.

A sample Adopt-a-Patch packet is included in Appendix G.

CULTURAL WEED CONTROL

Description

Techniques that benefit the development and health of desirable, competitive plant communities are considered cultural weed control methods. Cultural methods, along with prevention, are the preferred method of weed control wherever possible. Examples include the use of mulch and soil amendments that improve soil fertility to stimulate growth of desired species or to alter soil pH to discourage undesired plants. Cultural weed control includes the planting or seeding of desirable species. Effective use of cultural methods must be conducted in close coordination with efforts to eliminate existing noxious weed sites.

General Use Considerations

Cultural control methods encourage natural, self-sustaining, site-appropriate plant communities to develop in the long term. Native plant materials are preferred because once established on appropriate sites they require few additional inputs to thrive and self-perpetuate. In addition to low maintenance, well established native plantings provide many environmental services, such as erosion control, bio-filtration, pollinator and animal habitat. Native plantings have the potential to prevent undesirable weeds from becoming established by two mechanisms, competition and allelopathy. Competition is the interaction between plants for site resources such as space, nutrients, moisture, and light. Allelopathy occurs when one plant produces chemicals which inhibit the establishment and growth of others. The composition of plant communities on the roadside is likely to be a result of both mechanisms. Native wildflowers provide forage for pollinators and are aesthetically pleasing, while occupying the site to prevent or retard invasion by undesired noxious weeds.

ROADSIDE APPLICATION

The long-term goal of this plan is to programmatically incorporate cultural practices into overall roadside management practices. Possible opportunities include new construction, shoulders and ditches, locations under “Owner Will Control” agreements, post-treatment, and other county land such as pits, trails, and parks.

Activities that enhance or create native or self-sustaining plant communities should be applied as broadly as possible. Cultural practices are best applied to disturbed or bare ground or after weed treatments have occurred. Controlling the noxious weeds may release native roadside plants but more active measures may be required. Clallam County is committed to developing and obtaining locally sourced native seed mixes and plant material as available.

Activities to improve site conditions such as weed control, mulching or soil amendments to increase successful desirable plant establishment will be considered as resources and materials are available. Such activities cannot interfere or conflict with the primary use and safety of county rights-of-way.

Limitation

- Revegetating activities must be postponed until weed infestation is adequately controlled.
- Plant selection must not conflict with roadside safety and maintenance considerations, public or animal health, and adjacent land use or values.
- Roadsides are a harsh environment for establishing many desirable plant species; amending soil and providing supplemental water may not be a viable option in many cases.

Application Guidelines

- Use native species wherever possible.
- Blend with adjacent landscaping.
- Choose low growing plants for foreslope that require less mowing

- Utilize weed-free, chipped materials on site to suppress weeds. Weedy brush may only be chipped and left on site if it is in early growth stages and has no ripe seed.

Staff
WSU Master Gardener Coordinator
Road Department Volunteer Coordinator
Volunteers
Weed Crew

Training and Licensing
No licensing required
Native plant identification, biology, and habitat needs
Planting techniques
Use of GPS equipment

Equipment
Handheld GPS, hand tools

Maintenance
Maintain/evaluate sites for first five years
Monitor periodically thereafter

Performance Measurements
- ♦ Cooperative relationships with outside entities developed and maintained
- ♦ Planning documents developed
- ♦ Volunteer participation
- ♦ Area vegetated with native, self-sustaining plant community
- ♦ Maintenance costs are reduced over time

PREVENTATIVE WEED CONTROL

Description

Preventative weed control refers to any control method that aims to reduce or prevent weeds from being established. Examples of preventative weed control would be using certified weed free materials such as road and shoulder base rock, gravel, straw, soil, or mulch material for construction and maintenance activities, and making sure equipment is cleaned before moving from one location to another.

General Use Consideration

Prevention is, by far, the most environmentally and cost-effective control strategy. In addition to the above-mentioned best management practices, prevention includes actively surveying for and eradicating new invaders or small, newly discovered infestations as they are encountered.

ROADSIDE APPLICATION

Prevention is a top priority for this plan. Using certified weed-free materials whenever possible reduces or prevents introducing new weeds and avoiding soil disturbance helps prevent creating an environment vulnerable to invasion. Road designs that are easier to maintain and incorporate weed prevention features can be very cost effective in the long term. Weed Board staff is available to advise and provide technical assistance to Road Department engineers at all stages in road construction.

Weed Free Materials. Since prevention is the foundation of noxious weed control, prevention should start with certified weed-free seeds, mulches, soil, and gravel. The North American Invasive Species Management Association has certification standards that involve inspection of sources and sites to determine they do not contain seeds or plant parts of invasive weeds. Inspection includes, but is not limited to, surrounding ditches, topsoil piles, gravel/sand piles and pits, fence rows, roads, easements, rights-of-way, working areas, storage areas, and a buffer zone surrounding the area. Washington subscribes to these certification standards and Clallam County will apply these standards as widely as possible.

Clean Equipment. An important part of prevention is to not carry noxious weed seeds or plant parts from site to site. Before moving from or to a construction or maintenance project, clean the equipment. Remove hanging debris; wash off mud. Ensure that associated vehicles and crew are similarly inspected. These actions help stop the movement of weeds along the roadside corridor. Clean hand tools, boots and clothing as well.

Avoid Bare Ground. One of the problems of mechanical tools is scalping the soil. Whether it's by a grader, a mower, a bush hog, or a string trimmer, bare ground creates openings for the establishment of invasive weeds. Historically, when roadsides were disturbed, native plants from the soil seed bank or undisturbed adjacent land provided the seed source for the new native plants. In today's world, with human disturbances and inadvertent plant introductions, aggressive invasive plants are ready to occupy the available site. Covering bare ground with weed-free materials or seeding with desirable seed mix as soon as possible will suppress weed germination.

Design Controls. Adding new engineering standards that require less maintenance, such as favorable slope gradient, extending chip-seal edge, and incorporating native plantings in construction planning all help to prevent weed invasion.

EDRR. Eradication is a very realistic objective in the early stage of noxious weed establishment. Detecting new invaders or small weed patches and eliminating them at an early stage prevents costly

intervention later. This form of prevention, called Early Detection, Rapid Response (EDRR), is a preferred strategy for this program.

Both county employees and the general public can be an important part of the EDRR process. The components of EDRR are: 1) detection reporting, 2) identification confirmation, 3) rapid assessment, 4) program planning, and 5) rapid response. The general public will be encouraged to report suspicious plants, or new weed locations. The Clallam County noxious weed board has the resources to confirm the identity of suspicious weeds.

Limitation

- Roadways are exposed to all manner of weed pressure and completely preventing transportation and introduction of invasive plants is not possible.
- Routine maintenance activities will create some amount of bare ground.
- This control measure does not deal with established weed infestations.

Application Guidelines

- Incorporate prevention strategies programmatically into all aspects of planning and executing weed control activities and road maintenance.
- Develop native plant materials so that native seeds of desired plants are readily available.
- Limit activities that create bare ground.
- Where disturbance is expected, plan to revegetate with site appropriate plants. Identify the most favorable conditions for establishment.
- Inspect, evaluate weed invasion risk, and treat appropriately in response to emergency disturbances such as fire and flooding.
- Adopt a monitoring schedule to detect the presence of new invaders along roadsides or weed invasion of new construction.
- Incorporate EDRR strategy

Personnel

WSU Master Gardener Coordinator
Volunteers
Noxious Weed Control Board Staff

Training and Licensing

Cooperative training with WSDOT
Annual prevention and weed identification programs conducted by the Weed Board

Equipment

None determined at this time

Performance Measurement

- A higher percentage of weed sites are small.
- Program costs are reduced over time.

2023 WORK PLAN

2023 Work Plan

The focus of this work plan is the control of state-listed noxious weeds and invasive, non-native weeds of special concern on Clallam County rights-of-way. The integral precept of this IWM plan is that all control techniques are potentially applicable to the solution of the problem. A project list will be posted online and updated as treatments occur to keep the public informed.

With more than five hundred miles of county roads there are a variety of weed problems as well as control opportunities. Biological controls will continue to operate on roadsides through releases made elsewhere in the county. Additional releases will be made if new insect controls become available and are compatible with routine maintenance activities such as mowing, which is non-specific to and independent of weed control.

Physical controls will continue to be applied across the road system where effective and as resources allow. Volunteers will be recruited for various projects, especially where adjacent infestations threaten county assets.

Chemical control is an important tool that is needed for specific weed problems. Great care has been taken in choosing which herbicides may be applied, and additional safeguards are included by ensuring only targeted, hand applications are allowed. Herbicide use is limited to specific county roads and noxious weed locations which are listed in this plan based on past surveys and on-going treatment locations.

Most importantly, cultural and preventative controls will be applied programmatically to sustain the progress made by all the above-mentioned control methods. Combined, these management practices will move us towards achieving a low maintenance, naturally stable plant community.

High priority weed targets are identified and control options for an array of roadside weeds are summarized in the tables below. These are followed by specific tasks necessary to implement the 2023 work plan. Tasks are itemized under separate category headings. While listed separately, the tasks represent the best mix of control options chosen to address specific weed problems. The complete set of tasks is carefully designed to be implemented in tandem, not independently.

IDENTIFYING HIGH PRIORITY WEED TARGETS

Table 2 contains many of the known roadside noxious weeds for Clallam County. The table is arranged to show which weeds are the highest priority for control based on potential economic or environmental impacts and feasibility for control. The list is not comprehensive and will change as conditions change.

"Plant status" indicates one of several categories: a **noxious weed** (a prioritized legal designation including Class A, Class B and Class C weeds where control may be required under state law), a **non-native, invasive** plant capable of causing economic or environmental impacts, but not listed by the state, and **weedy**, so prevalent that it is generally considered naturalized or an aesthetic nuisance. Infestations of invasive, non-native species are more easily eliminated before they become established.

To be most efficient when deciding treatment priorities, where known, weeds are characterized as widespread or rare. The following abbreviations are used in the "status" column in Table 2:

ISSC = **I**nvasive **S**pecies of **S**pecial **C**oncern
NCR = **N**oxious, **C**ontrol **R**equired
NR = **N**oxious**, R**are
NW = **N**oxious, **W**idespread
WR = **W**eedy**, R**are
WW = **W**eedy**, W**idespread

Weeds are assigned to a "category" based on information in the "status" column. Weeds are categorized as follows:

Category 1 weeds are Class A, B designate, and selected B or C noxious weeds, additional noxious weeds and invasive species of special concern that are very limited in distribution, and newly discovered invaders that were previously unknown in the county (EDRR - early detection, rapid response). Category 1 weeds are the *highest priority* for control.

Category 2 weeds are noxious weeds that are widespread, but of particular concern to the general public or an affected public entity. Category 2 weed infestations will be added to the annual work plan to methodically reduce widespread weeds over time and to accommodate requests.

Category 3 weeds are those that are so widespread they are generally considered naturalized or a nuisance. These weeds are tolerated. Control is not considered feasible.

Table 2. Known roadside weeds in Clallam County

Common Name	Scientific Name	4-Letter Weed Code	Category	Status	Threat
Category 1 Weeds					
alyssum, hoary	*Berteroa incana*	BEIN	1	NCR	Aggressive invader in fields of forage crops; toxic to horses
bindweed, field	*Convolvulus arvensis*	COAR	1	NR	Outcompetes native vegetation and reduces crop yields; climbs and forms dense tangled mats
brome, false	*Brachypodium slyvaticum*	BRSL	1	NCR	Aggressive bunch grass that is highly invasive in shaded woodlands, open prairies, and grasslands
brome, ripgut	*Bromus diandrus*	BRDI	1	ISSC	Long seed awns cause injury to nose and eyes of grazing animals; known to occur in Clallam County, but not on roadsides; will be treated under EDRR protocol if observed
butterfly bush	*Buddleia davidii*	BUDA	1	NR	Invades natural areas; crowds out native vegetation in riparian areas and interferes with natural succession
cheatgrass or downy brome	*Bromus tectorum*	BRTE	1	ISSC	Depletes soil moisture in early spring; fire hazard in summer; known to occur in Clallam County, but not on roadsides; will be treated under EDRR protocol if observed
chicory, common	*Cichorium intybus*	CIIN	1	ISSC	Only found in East Clallam county, where it is starting to spread rapidly
cinquefoil, sulfur	*Potentilla recta*	PORE	1	NCR	Not readily grazed by livestock and wildlife; dense stands exclude other species
comfrey, common	*Symphytum officinale*	SYOF	1	ISSC	Used medicinally for poultices; liver damage when ingested; can form dense stands; difficult to control once established
fennel, common	*Foeniculum vulgare*	FOVU	1	NCR	Dense stands exclude native vegetation; outcompetes desirable forbs and grasses in pastures and grasslands
hawkweed, European	*Hieracium sabaudum*	HISA	1	NCR	Dense stands exclude other species; bitter and unpalatable, little forage for livestock and wildlife
hawkweed, orange	*Hieracium aurantiacum*	HIAU	1	NCR	Dense stands exclude other species; bitter and unpalatable, little forage for livestock and wildlife
hawkweed, yellow	*Hieracium caespitosum*	HICA	1	NCR	Dense stands exclude other species; bitter and unpalatable, little forage for livestock and wildlife

Common Name	Scientific Name	4-Letter Weed Code	Category	Status	Threat
herb Robert	*Geranium robertianum*	GERO	1	N	Rapid spreading; displaces native herbaceous plants; allelopathic, inhibits the germination of small-seeded forbs in forest understory
hogweed, giant*	*Heracleum mantegazzianum*	HEMA	1	NCR	Skin contact with sap causes severe dermatitis and blistering on people and animals
Italian arum	*Arum italica*	ARIT	1	NR	Toxic; forms dense monocultures; difficult to control once established; rare in Clallam County
knapweed, diffuse	*Centaurea diffusa*	CEDI	1	NCR	Spreads seed by tumbling; prickly flower heads; unpalatable after early spring
knapweed, meadow	*Centaurea x gerstlaueri*	CEMO	1	NCR	Outcompetes pasture species; degrades wildlife habitat; interferes with agriculture
knapweed, mountain	*Centaurea montana*	CEMO2	1	NR	Dense stands exclude native vegetation; out-competes natural forage species
knapweed, spotted	*Centaurea stoebe*	CEST	1	NCR	Allelopathic plant that can inhibit the germination of grasses; forms dense stands that exclude desired plants and wildlife
knotweed, Bohemian	*Fallopia X Bohemian* *(Polygonum bohemicum)*	FABO	1	NCR	Easily spreads by disturbance; dense colonies eliminate other plant species and can degrade fish habitat; causes structural damage
knotweed, giant	*Fallopia sachalinensis* *(Polygonum sachalinense)*	FOSA	1	NCR	Easily spreads by disturbance; dense colonies eliminate other plant species degrades fish habitat; structural damage to human structures
knotweed, Japanese	*Fallopia japonica Polygonum cuspidatum*	FAJA	1	NCR	Easily spreads by disturbance; dense colonies eliminate other plant species and can degrade fish habitat; causes structural damage to human structures
laurel, spurge	*Daphne laureola*	DALA	1	NR	Toxic to humans and animals; contact with plants can cause dermatitis
loosestrife, purple*	*Lythrum salicaria*	LYSA	1	NCR	Dense stands eliminate other plant species; poor palatability; degrades wildlife habitat and hunting and fishing areas.
lupine, tree	*Lupinus arboreus*	LUAR	1	WR	Can hybridize with native lupine; forms dense monocultures; drought tolerant, likes disturbed areas

Common Name	Scientific Name	4-Letter Weed Code	Category	Status	Threat
nightshade, bittersweet	*Solanum dulcamara*	SODU	1	NR	Aggressive and vine like, grows in disturbed lands and pastures; toxic to livestock
old man's beard	*Clematis vitalba*	CLVI	1	NR	Climbing growth smothers other plants, even trees
poison hemlock	*Conium maculatum*	COMA	1	NCR	Highly toxic to humans and animals; all parts of the plant are toxic; severe birth defects
rush skeleton weed	*Chondrilla juncea*	CHJU	1	NR	Aggressive invader; displaces native plant communities
ribbon grass	*Phalaris arundinacea*	PHAR	1	NR	Aggressive invader displaces other plants in wet sites; an ornamental form of reed canary grass; may also be used as a source for psychedelic drugs
sowthistle, perennial	*Sonchus arvensis*	SOAR	1	NR	Aggressive invader; outcompetes desirable forbs and grasses in pastures; limited distribution in Clallam County
tansy ragwort	*Jacobaea vulgaris (Senecio jacobaea)*	JAVU	1	NCR	Poisonous to horses, cattle, and pigs; animals grazing tansy can produce tainted milk, may result in toxic residue in honey
tansy, common	*Tanacetum vulgare*	TAVU	1	NCR	Dense stands degrade forage value; toxicity issues for humans and livestock
teasel, common	*Dipsacus fullonum*	DIFU	1	NCR	Forms dense stands of prickly, unpalatable plants; degrades habitat and reduces accessibility
thistle, Italian	*Carduus pycnocephalus*	CAPY	1	NCR	Forms dense stands of prickly, unpalatable plants; potential roadside fire hazard
whitetop, hairy	*Lepidium appelianu*	LEAP	1	NR	Monocultures displace desirable plants; unpalatable; can be toxic to cattle
wild basil savory	*Clinopidium vulgare*	CLVU	1	NCR	Aggressive invader, outcompetes native understory
willow herb, hairy	*Epilobium hirsutum*	EPHI	1	NCR	Semi aquatic in wetlands, ditches, streambank; dense growth can outcompete native vegetation
wormwood, absinth	*Artemisia absinthi*	ARAB	1	NR	Aggressive invader, will outcompete desirable forbs and grasses in pastures, fields and native grasslands
yellow archangel	*Lamiastrum galeobdolon*	LAGA	1	NCR	Aggressive invader, competes understory species, degrades wildlife habitat

Common Name	Scientific Name	4-Letter Weed Code	Category	Status	Threat
Category 2 Weeds					
barberry, common	*Berberis vulgaris*	BEVU	2	NR	Can form undesirable thorny thickets that can crowd out native species.
birdsrape mustard	*Brassica rapa*	BRRA	2	WW	Can be toxic to livestock, can degrade agricultural seed production
bamboo, spp	*Phyllostachys aurea*	PHAU	2	NR	Bamboo species form dense thickets and roots; jeopardize line of site and asphalt on county roads; causes structural damage to human structures
blackberry, cutleaf	*Rubus laciniatus*	RULA	2	NW	Dense canopies crowd out native species; impenetrable barrier
blackberry, Himalayan	*Rubus armeniacus*	RUAR	2	NW	Dense canopies crowd out native species; impenetrable barrier
broom, Scotch	*Cytisus scoparius*	CYSC	2	NW	Forms dense stands; unpalatable; interferes with forest regeneration; fire hazard; scent can exacerbate human grass allergies; seeds are toxic to horses and livestock
burdock, common	*Arctium minus*	ARMI	2	WR	Forms large rosettes; hooked spines on seeds become entangled in fur of animals
canarygrass, reed	*Phalaris arundinacea*	PHAR	2	NW	Unpalatable unless young, forms dense stands that crowd out native plants; especially difficult to control; serious wetland invader; stops process of succession in riparian sites, impedes tree seedling
carrot, wild	*Daucus carota*	DACA	2	NW	Damages agricultural commodity as it may cross pollinates with domestic carrot, seriously degrading the quality of commercial carrot seed production
chervil, bur	*Anthriscus caucalis*	ANCA	2	WW	Aggressive and can form monocultures; displaces native vegetation in pastures and along ROW's.
common mullein	*Verbascum thapsus*	VETH	2	WR	Formerly on State Weed list; unpalatable, not widespread
hawthorn, English	*Crataegus monogyna*	CRMO	2	NR	Carried by birds into forests and open fields where it can form dense, thorny thickets that outcompete native species

Common Name	Scientific Name	4-Letter Weed Code	Category	Status	Threat
iris, yellow flag	*Iris pseudacorus*	IRPS	2	NR	Toxic to humans and animals; displaces vegetation at wet margins of ditches, ponds, and lakes; plant resins can cause skin irritation in humans
nightshade, hairy	*Solanum physalifolium*	SOPHY	2	NR	Thrives in degraded pastures and disturbed areas, poisonous to humans and livestock
peavine, everlasting	*Lathyrus latifolius*	LALA	2	ISSC	Forms dense thickets; seeds can be toxic to livestock; seriously interferes with forest regeneration where it invades from edges of timber units
periwinkle, large	*Vinca major*	VIMA	2	WW	Dominates in forest understories and displaces native vegetation
St John's wort, common	*Hypericum perforatum*	HYPE	2	NW	Causes photosensitization when grazed; toxic at all stages of growth
thistle, bull	*Cirsium vulgare*	CIVU	2	NW	Aggressive competitor; unpalatable for cattle; decreases forage
thistle, Canada	*Cirsium arvense*	CIAR	2	NW	Aggressive competitor, unpalatable; decreases forage; host species for several agricultural pests
yellow toadflax	*Linaria vulgaris*	LIVU	2	NR	Invades rangelands and cultivated fields; reduces yields

Common Name	Scientific Name	4-Letter Weed Code	Category	Status	Threat
Category 3 Weeds					
bindweed, hedge	*Calystegia sepium*	CASE	3	WW	Overwhelms crops, reduces yields by 60%; impossible to fully eradicate once established
buttercup, creeping	*Ranunculus repens*	RARE	3	WW	Depletes wet soil potassium; grows 40 sq ft/year; toxic to animals
catsear, common	*Hypochaeris radicata*	HYRA	3	NW	Crowds out palatable forage species; thrives in highly disturbed areas
clover, various clover, yellow sweet	*Melilotus albus, Melilotus officinalis*	MEAL	3	WW	Germinates by fire; invades abandoned fields, dunes and prairies
daisy, oxeye	*Leucanthemum vulgare*	LEVU	3	NW	Livestock avoid grazing; milk from dairy cows has unpleasant flavor
dandelion, common	*Taraxacum officinale*	TAOF	3	WW	Dense circular mats that crowd out desirable species
English holly	*Ilex aquifolium*	ILAQ	3	WW	Dense thickets can dominate shrub layer and suppress desirable vegetation
fox glove	*Digitalis purpurea*	DIPU	3	WW	Can be toxic to livestock; spreads aggressively in disturbed areas
orchard grass and other pasture grasses	*Dactylis glomerata*	DAGL	3	WW	Outcompetes and suppresses native vegetation including pasture grasses

*No active sites, but previously documented; **Insufficient distribution information

Table 3 shows general guidelines for year-round treatments of the listed noxious weeds and invasive weed species of special concern. It is intended as a basic reference framework from which decisions are made for weed treatments from available options. Seasonal variables are considered and addressed as they become evident. Changes to the Clallam County Noxious Weed List or species that appear on county right-of-way may make adjustments necessary.

Table 3: Recommended control treatments for Clallam County roadside noxious weeds

Noxious Weed	Fall	Winter	Spring	Summer
Category 1 Weeds				
alyssum, hoary	Foliar herbicide treatment	Manual removal/ digging	Manual removal/ digging; foliar herbicide treatment	Foliar herbicide treatment; clip flower heads
bindweed, field	Foliar herbicide treatment	Plants die back - no action	Foliar herbicide treatment	Foliar herbicide treatment
brome, false	Manual removal; foliar herbicide treatment	Manual removal/ digging,	Foliar herbicide treatment	Foliar herbicide treatment; mow before seed sets
brome, ripgut	Foliar herbicide treatment	Plants die back - no action	Foliar herbicide treatment	Foliar herbicide treatment
butterfly bush	Herbicide treatment - cut stump or foliar	Manual removal/ digging; mowing; cut stump treatment	Manual removal/ digging; herbicide treatment - cut stump or foliar	Manual removal/ digging; herbicide treatment - cut stump or foliar
chicory, common	Manual removal/ digging;	Plants die back - no action	Foliar herbicide (rosette stage)	Foliar herbicide treatment
cinquefoil, sulfur	Foliar herbicide treatment	Plants die back - no action	Manual removal / digging, foliar herbicide treatment	Foliar herbicide treatment
comfrey, common	Foliar herbicide treatment	Plants die back - no action	Foliar herbicide treatment	Foliar herbicide treatment
fennel, common	Manual removal/ digging; foliar herbicide treatment for fall regrowth	Manual removal/ digging;	Manual removal/ digging; foliar herbicide treatment	Manual removal/ digging; foliar herbicide treatment
hairy white top	Foliar herbicide treatments	Plants die back - no action	Foliar herbicide treatments	Foliar herbicide treatments
hawkweed, European	Foliar herbicide treatments	Plants die back- no action	Foliar herbicide treatments	Foliar herbicide treatments
hawkweed, orange	Foliar herbicide treatment	Plants die back - no action	Foliar herbicide treatment	Foliar herbicide treatment
hawkweed, yellow	Foliar herbicide treatment	Plants die back - no action	Foliar herbicide treatment	Foliar herbicide treatment

Noxious Weed	Fall	Winter	Spring	Summer
herb Robert	Foliar herbicide treatment	Plants die back - no action	Manual removal; foliar herbicide treatment	Manual removal; foliar herbicide treatment
hogweed, giant	Manual removal/ digging;	Plants die back - no action	Manual removal/ digging; foliar herbicide treatment; clip flower heads	Manual removal/ digging; foliar herbicide treatment
jewelweed, spotted	Manual removal/ digging, foliar herbicide treatment; clip flower heads	Plants die back-no action	Manual removal/ digging;	Manual removal/digging, foliar herbicide treatment; clip flower heads
knapweed species	Manual removal/ digging;	Manual removal/ digging;	Foliar herbicide treatment (rosette)	Foliar herbicide treatment; biological
knotweed species	Foliar herbicide treatment or injection	Plants die back - no action	Avoid disturbance; No action; mow for site distance ONLY	Foliar spray or injection (late summer)
laurel, spurge	Foliar herbicide treatment; cut stump	Manual removal/ digging; cut stump	Foliar herbicide treatments; cut stump	Foliar herbicide treatments; cut stump
loosestrife, purple	Manual removal/ digging	Plants die back - no action	Manual removal/ digging	Manual removal/ digging; foliar herbicide treatment; clip flower heads; biological control
lupine, tree	Foliar herbicide treatment, cut stump, manual removal	Manual removal/ digging;	Manual removal/ digging; cut stump and foliar herbicide treatment, clip flower heads	Manual removal/ digging; cut stump and foliar herbicide treatment;
nightshade, spp.	Manual removal/ digging;	Plants die back - no action	Manual removal/ digging; foliar herbicide treatment	Manual removal/digging;
old man’s beard	Foliar herbicide treatment if prostrate; basal stem treatment	Basal stem treatment	Foliar herbicide treatment if prostrate; basal stem treatment	Foliar herbicide treatment if prostrate; basal stem treatment
poison hemlock	Manual removal/ digging; foliar herbicide treatment for fall regrowth	Manual removal/ digging	Foliar herbicide treatment (rosette stage)	Manual removal/ digging; foliar herbicide treatment; clip flower heads; biological control

Noxious Weed	Fall	Winter	Spring	Summer
ribbon grass	Foliar herbicide treatment	Plants die back - no actions	Foliar herbicide treatment	Foliar herbicide treatment
skeletonweed, rush	Foliar herbicide treatment	Manual removal/ digging	Foliar herbicide treatment	Manual removal/ digging, cut and dispose of flower heads; foliar herbicide treatment
sowthistle, perennial	Foliar herbicide treatment	Plants die back - no actions	Foliar herbicide treatment	Foliar herbicide treatment
tansy, common	Foliar herbicide treatment	Plants die back - no action	Manual removal/ digging; foliar herbicide treatment	Foliar herbicide treatment
tansy ragwort	Manual removal/ digging; foliar herbicide treatment for fall regrowth	Manual removal/ digging	Manual removal/ digging; foliar herbicide treatment (rosette stage)	Manual removal/ digging; foliar herbicide treatment, clip flower heads; biological control
teasel, common	Foliar herbicide treatments	Plants die back - no action	Manual removal/ digging; foliar herbicide treatment	Foliar herbicide treatment
thistle, Italian	Plants die back, no action	Manual removal/ digging; foliar herbicide treatment	Manual removal; foliar herbicide treatment	Manual removal; foliar herbicide treatment
whitetop, hairy	Foliar herbicide treatment	Manual removal possible but take care to remove all root fragments	Manual removal; foliar herbicide treatment	Manual removal; foliar herbicide treatment
wild basil savory	Foliar herbicide treatment, manual removal is infestation is small	Foliar herbicide treatment, manual removal is infestation is small	Foliar herbicide treatment, manual removal is infestation is small	Foliar herbicide treatment and manual removal if infestation is small
willow herb, hairy	Foliar herbicide treatment	Foliar herbicide treatment	Foliar herbicide treatment	Foliar herbicide treatment
wormwood, absinth	Mowing for sight distance and seed prevention; herbicide treatment - cut stump, basal bark	Mowing for sight distance; herbicide treatment - cut stump, basal bark	Manual removal/ digging; mowing for sight distance; herbicide treatment - foliar, cut stump, basal bark	Mowing for sight distance; herbicide treatment - foliar, cut stump, basal bark
yellow archangel	Foliar herbicide treatments	Plants die back - no action	Foliar herbicide treatments	Foliar herbicide treatments

Noxious Weed	Fall	Winter	Spring	Summer
Category 2 Weeds				
bamboo, spp.	Foliar herbicide treatment	Manual removal/ digging; pruning to ground	Manual removal/digging; herbicide treatment	Foliar herbicide treatment
blackberry species	Foliar herbicide treatment; cut stump treatment; mowing for sight distance issue	Mowing for sight distance issues	Foliar herbicide treatment; cut stump treatment; mowing for sight distance issue	Foliar herbicide treatment; mowing for sight distance issue
burdock, common	Foliar herbicide treatments	Plants die back - no action	Manual removal/ digging; Foliar herbicide treatments	Foliar herbicide treatments
broom, Scotch	Manual removal /digging; mowing for sight distance issues; cut stump treatment	Manual removal/ digging; cut stump treatment	Manual removal/ digging; cut stump and foliar herbicide treatment	Manual removal/ digging; cut stump and foliar herbicide treatment; clip flower heads; biological control
carrot, wild	Foliar herbicide treatment	Plants die back - no action	Manual removal/digging; foliar herbicide treatment	foliar herbicide treatment
hawthorn, English	Manual removal/ digging; mowing for sight distance issues; cut stump treatment	Manual removal/ digging; mowing; cut stump treatment	Manual removal/ digging; cut stump and foliar herbicide treatment	Manual removal/ digging; cut stump and foliar herbicide treatment
iris, yellow flag	Foliar herbicide treatment	Plants die back - no action	Foliar herbicide treatment	Foliar herbicide treatment
lupine, tree	Manual removal/ digging, cut stump; foliar herbicide treatment	Manual removal/digging, cut stump treatment	Manual removal/ digging, cut stump; foliar herbicide treatment	Manual removal/ digging, cut stump; foliar herbicide treatment
mustard, birdsrape	Manual removal/ digging; foliar herbicide treatment	Plants die back - no action	Manual removal/ digging; foliar herbicide treatment	foliar herbicide treatment
peavine, everlasting	Foliar herbicide treatments	Plants die back - no action	Foliar herbicide treatments	Foliar herbicide treatments
periwinkle, large	Foliar herbicide treatments	Plants die back – no action	Foliar herbicide treatments	Foliar herbicide treatments
canarygrass, reed	Foliar herbicide treatment	Plants die back - no actions	Foliar herbicide treatment	Foliar herbicide treatment

Noxious Weed	Fall	Winter	Spring	Summer
thistle, bull	Foliar herbicide treatment to rosettes	Plants die back - no action	Manual removal/ digging; foliar herbicide treatment	Manual removal; herbicide treatment; clip flower heads
thistle, Canada	Foliar herbicide treatment	Plants die back - no action	Foliar herbicide treatment	Foliar herbicide treatment; clip flower heads
toadflax, yellow	Foliar herbicide treatment; manual removal	Manual removal/ digging	manual removal/digging	Manual removal; mowing; foliar herbicide treatment
wild basil savory	Foliar herbicide treatment	Plants die back - no action	Foliar herbicide treatment	Foliar herbicide treatment

2023 IWM TASKS

Biological
Identify appropriate release sites adjacent to County right-of-way
Coordinate with WSU Extension and Washington State Noxious Weed Control Board for releases as they become available
Physical
Update contact list to be shared between departments
Update mulch requirements for all county projects
Promote desirable native vegetation wherever possible
Clearly mark treatment areas
Collaborate with Roads department and Clallam PUD to identify landscape goals and harmonize maintenance techniques
Create Adopt-A-Patch opportunities
Review public involvement opportunities to ensure the available material meets program goals and is readily accessible online
Cultural
Identify opportunities to use native plantings in the early stages of projects in the county's transport plan
Further develop pollinator friendly plantings and coordinate with Road Department and WSU Extension to incorporate existing volunteer programs
Seek grant opportunities to implement plot projects
Assist with research projects where possible
Continue building partnerships with local native plant sources and update material list to incorporate these projects
Partner with experts from local, state and federal agencies and entities including but not limited to: Clallam County Parks, Washington State University Extension, WSU Master Gardeners, local chapter of bee keepers, the native plant and Audubon societies, the Nature Conservancy, conservation districts, Olympic National Park, Olympic National Forest, USFW Marine Refuge System, Makah, Quileute, Lower Elwha Klallam, and Jamestown S'Klallam tribes, and others who have an interest in developing local native seed and plant resources for use in government projects
Manage "Owner Will Control" agreements. Maintain current list and map of "Owner Will Control" locations for both office and field use. Review "Owner Will Control" application process and forms to ensure all public involvement opportunities are readily accessible online. Encourage landowners with "Owner Will Control" agreements to undertake adjacent roadside enhancement consistent with developing a low maintenance, self-sustaining plant community to prevent weed invasion
Identify and compile a list of sites for revegetation opportunities

Develop native seed mix for Road Department projects where bare ground is necessary
Preventative
Update rock and gravel source weed management protocols
Continue our partnership with mowing personnel to facilitate practices that encourage growth of natural site appropriate vegetation
Inventory, develop and implement weed management plans for all county quarries, storage areas, and spoil disposal sites (pits); update as needed as County use requirements change
Survey roads that do not have up to date information on weeds located in right of way
Implement weed free material requirements for all county projects
Facilitate annual department native and invasive plants identification training in cooperation with weed board staff. Supply field crew with identification booklets
Identify equipment needs, investigate available resources, procure as resources allow
Create county pit reference maps to include in management plans
Treat all sand piles and sand extraction zones in county pits
Provide inspection services for all privately sourced material for county projects
Monitor and evaluate treatments in county pits
Catalog weed infestations and update road priorities in treatment structure
Compile list of sources that meet weed-free standards
Chemical
Implement project list based on tables 4-8
Post annual project list. Update during season as resources allow
Compile locations and instructions for special management areas. Include and update field maps as frequently as possible
Assess equipment and supplies, identify needs, and procure as needed
Ready all necessary forms, regulatory compliance paperwork and safety equipment before commencing treatment season
Coordinate with Road Department staff to identify "special management areas" or non-native, invasive weed locations that interfere with road safety or function; outline additional management needs and strategy for weed control in these areas
Develop and utilize regional partners to assist in weed control across the county
Complete treatment records daily. Enter data into Clallam County Noxious Weed Control Program database. Monitor at least 10% of all treatments, retreat as needed and as resources allow
Identify any additional equipment needs and take steps to incorporate any available resources, including vehicles, application equipment, water tanks, or technical equipment

Provide WSU Master Gardeners Roadside Vegetation Monitoring Team (RVMT) with safety equipment, additional training opportunities, and technical support for monitoring projects
Conduct a weed inventory on at least 25% of all county roads annually
Identify, document and map additional species, location, size and density
Update survey data of county roadsides and catalog infestations over time
Identify and compile a list of high priority infestations for following year. Create map
Support, volunteer-based projects either on or adjoining county property that protects county property from weed infestations. This may include monitoring and re-vegetation projects
Promptly respond to all public inquiries. Address any public concerns regarding applications
Review and update on-line weed control request application process and forms as necessary
Review process and forms for interdepartmental communication
Compile annual report summarizing accomplishments, effectiveness, and recommendations for subsequent year. Brief the Road Department and County Commissioners by December 31st
Draft IWM plan and submit to the Clallam County Noxious Weed Control Board and Road Department Supervisor for approval prior to the Weed Board's first meeting of the year. Submission of the IWM plan should occur 20 days before the meeting and should be posted online. Provide public notice that plan will be discussed, with weed board meeting announcements. The finalized plan and a map of proposed treatment locations should be posted online and made available upon public request

APPLICATION LOCATIONS

The 2023 Work Plan identifies treatment locations that may include the use of herbicides. The IWM Program priorities for roadside weed control in 2023 include:

1) Control of Category 1 regulated weeds on County roadsides in accordance with state law.
2) Control of Category 1 regulated weeds and select weeds at all County rock sources/District shops.
3) Control of Category 1 and 2 weeds at locations with most impact to local agriculture.
4) Control of Category 1 and 2 weeds at locations with most impact to local forestry.
5) Control of non-native weeds that interfere with the safety or function of County roadsides or additional non-roadside "special sites".
6) Control of Category 1 and 2 weeds at locations requested by the public and local agencies.

In general, sites included in the 2023 Work Plan were chosen to complement previous work, to account for observed field conditions, or to further specific public benefit and need. Roadside treatments will include the most effective mix of methods as site or species appropriate. Tables 4-8 only include locations where herbicides may be used, even if in combination with other treatment methods. The tables include county roads to their full extent; however, treatments may be limited to specific weed locations and in many cases only at isolated patches of Category 1 weeds.

Roads controlled in prior years for infestations of Category 1 weeds are included in this Work Plan for retreatment; adjacent roads may have also been included as needed. This Work Plan also includes county roads with isolated patches of Category 1 weed species as identified by past survey data. Isolated infestations can be controlled efficiently and require limited time and effort.

To prevent the spread of weeds, all county rock sources (pits/quarries), and district shops are included in the 2023 Plan as a priority for control.

This Work Plan includes control of roadside Category 2 weed targets in agriculture and forestry areas as identified in Tables 4-6; selections reflect input from farmers and foresters. Additional Category 2 weeds may be controlled as time and resources allow. Non-native, invasive weeds that interfere with the safety or function of the selected roads or weeds at additional County-owned "special sites" may be controlled as needed.

Early Detection Rapid Response (EDRR) sites are small roadside infestations, defined here as those that are patches that are less than 100 square feet per 1/10 of a mile, previously unknown, and/or requested by an affected owner or entity during the treatment season. An EDRR strategy is efficient, reduces costs, and increases efficacy of control. EDRR is a preferred strategy for this program, but by nature cannot be determined in advance. All sites that are treated under EDRR will be individually posted on site (with *Herbicide Notice*) and published online as soon as possible. Unknown county infestations found *outside* of the road right-of-way may be treated as EDRR sites up to 500 square feet.

The public may request control of Category 1 or Category 2 species at locations not listed in this plan. Control measures may include the use of herbicide, but more likely, will be controlled using the most effective mix of measures as site or species appropriate. Public requests will be accommodated with the highest priority given to Category 1 weeds, followed by Category 2 weeds in the order they are received. Requests received prior to March 1st are most likely to be accommodated in the same year as requested. Requests received after March 1st are likely to be verified and included in a subsequent year's work plan.

SELECTED ROADS: TABLES 4-6

The Clallam County roadsides included in the 2023 Integrated Weed Management Plan are listed below in Tables 4 - 6. The tables are separated geographically into “East Clallam County”, “Central Clallam County” and “West Clallam County” and are intended to mirror the road maintenance district boundaries. Roads are grouped by similar weed management goals; a description of each “Group” is available at the beginning of the table.

Roads are assigned a relative “Treatment Priority” (**1** - highest priority, **4** - lowest priority) based on infestation conditions and overall IWM program goals.

Priority 1 roads are intended to be completely treated in 2023

Priority 2 roads are intended to be treated in conjunction with adjacent roads or activities

Priority 3 roads will be treated as time and resources allowed

Priority 4 roads have been put on a low maintenance cycle of 2-4 years for monitoring

East Clallam County Selected Roads

East Clallam County includes areas around Carlsborg, Sequim, Bly and the Miller Peninsula (reference Focus Area Maps 2-4). The Dungeness Valley, situated between Sequim and Carlsborg, is the primary agricultural region in Clallam County. Roadside infestations of Canada thistle impose significant impacts on adjacent agricultural producers and have been elevated in priority in East Clallam County to reflect the input and requests of local land managers.

Road Groups:

Agricultural: roadsides with weed infestations most likely to have an impact to adjacent agricultural producers; infestations of Canada thistle are intended to be completely treated.
Source Cat. 1 Weeds: roadsides with the most extensive infestations of category 1 weeds; treatment is intended to contain and reduce infestations.
Isolated Cat. 1 Weeds: roadsides with isolated infestations of category 1 weeds either treated or surveyed in the past; treatment is intended to eradicate individual infestations or plants.
Pit Entrance: roadsides leading to County pits; treatment is intended to contain and protect county resources.
Public Request: roadsides with infestations requested by individuals or public agencies; treatment is intended to meet requests as time and resources allow.
N/A: roadsides that still need to be surveyed and categorized into “Group” or roadsides surveyed in the past that require a current survey to determine “Target Weed Species for Control”; these will be surveyed and categorized as time and resources allow.

Table 4. East Clallam County roads selected for herbicide treatment in 2023

Target Weed Species For Control – additional non-native, invasive species may be controlled as time and resources allow. Species listed in italics are unconfirmed infestations.

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Blue Mountain Rd	Source Cat. 1 Weeds	7.0	meadow knapweed, tansy ragwort	1
Business Park Loop	Source Cat. 1 Weeds	0.5	chicory, meadow Knapweed	1
Carlsborg Rd	Agricultural	0.5	Canada thistle, Scotch broom, spotted knapweed	1
Cays Rd	Source Cat. 1 Weeds	2.8	Bohemian knotweed , Canada thistle, Italian thistle, meadow knapweed, Scotch broom, spotted knapweed	1
Cline Spit Rd	Isolated Cat. 1 Weeds	0.3	poison hemlock	1
Coulter Rd	Isolated Cat. 1 Weeds	0.4	poison hemlock	1
Dawley Rd	Isolated Cat. 1 Weeds	0.7	poison hemlock, spurge laurel, tansy ragwort	1
Diamond Point Rd	Isolated Cat. 1 Weeds	4.0	poison hemlock, Scotch broom, tansy ragwort	1
E Anderson Rd	Agricultural	2.1	Canada thistle, poison hemlock	1
East Sequim Bay Rd	Isolated Cat. 1 Weeds	4.5	Scotch broom, tansy ragwort	1
Evans Rd	Agricultural	1.7	Canada thistle, common teasel, poison hemlock, Scotch broom	1
Fasola Rd	Isolated Cat. 1 Weeds	1.0	common teasel, poison hemlock	1
Gilbert Rd	Isolated Cat. 1 Weeds	0.2	poison hemlock, Scotch broom, spurge laurel	1
Happy Valley Rd	Source Cat. 1 Weeds	5.7	Canada thistle, chicory, common teasel, meadow knapweed, poison hemlock, tansy ragwort	1
Johnson Creek Rd	Source Cat. 1 Weeds	1.1	Canada thistle, meadow knapweed, Scotch broom	1
Kitchen-Dick Rd	Agricultural	3.2	absinth wormwood, Canada thistle, common tansy, common teasel, diffuse knapweed, field bindweed, hairy whitetop, hoary alyssum, meadow knapweed, poison hemlock , Scotch broom, spotted knapweed, tansy ragwort	1
Lamar Ln	Source Cat. 1 Weeds	0.7	Italian thistle, poison hemlock	1
Lost Mountain Rd	Isolated Cat. 1 Weeds	5.2	meadow knapweed, tansy ragwort	1
Lotzgesell Rd	Agricultural	3.4	Canada thistle, common tansy, common teasel, meadow knapweed, Scotch broom, spotted knapweed,	1
Marine Dr	Isolated Cat. 1 Weeds	1.6	poison hemlock, spurge laurel	1
N Brown Rd	Isolated Cat. 1 Weeds	0.5	common teasel, meadow knapweed, tansy ragwort	1
Old Blyn Hwy	Isolated Cat. 1 Weeds	2.1	poison hemlock, tansy ragwort	1
Palo Alto Rd	Source Cat. 1 Weeds	8.7	Canada thistle, meadow knapweed, Scotch broom, sulfur cinquefoil, tansy ragwort	1
Port Williams Rd	Agricultural	2.3	Canada thistle, common teasel, Scotch broom	1

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
River Rd	Source Cat. 1 Weeds	2.5	Canada thistle, common fennel, common tansy, meadow knapweed, Scotch broom, spotted knapweed, sulfur cinquefoil	1
S 3rd Ave	Isolated Cat. 1 Weeds	0.5	meadow knapweed	1
Sawmill Rd	Intersects with ODT	0.3	N/A	1
Sequim-Dungeness Way	Agricultural	4.1	common fennel, common teasel, field bindweed, Himalayan blackberry, meadow knapweed, poison hemlock, spotted knapweed, tansy ragwort	1
Sieberts Creek Rd	Agricultural	0.8	sulfur cinquefoil	1
Towne Rd	Agricultural	3.0	Canada thistle, common fennel, common tease, hairy white-top, meadow knapweed, spotted knapweed, poison hemlock	1
Turnstone Ln	Source Cat. 1 Weeds	0.7	butterfly bush, scotch broom, spotted knapweed	1
Vistas Dr	Pit Entrance	0.2	poison hemlock, Scotch broom	1
W Hendrickson Rd	Agricultural	1.2	common teasel, poison hemlock	1
W Washington St	Source Cat. 1 Weeds	0.3	Canada thistle, poison hemlock, spotted knapweed, spurge laurel	1
Ward Rd	Agricultural	1.7	Bohemian knotweed, poison hemlock, yellow archangel,	1
Washington Harbor Rd	Isolated Cat. 1 Weeds	1.4	N/A	1
Woods Rd	Isolated Cat. 1 Weeds	4.2	tansy ragwort, wild basil savory	1
3 Crabs Rd	Isolated Cat. 1 Weeds	1.4	poison hemlock, tree lupine, white sweet clover	2
Abbott Rd	Agricultural	0.2	Canada thistle	2
Alderwood Dr	N/A	0.2	N/A	2
Annabelle Ln	N/A	0.4	N/A	2
Applegate Ln	N/A	0.3	N/A	2
Aster Rd	Isolated Cat. 1 Weeds	0.1	tansy ragwort	2
Atterberry Rd	Public Request	2.8	Scotch broom	2
Balmoral Ct	N/A	0.1	N/A	2
Barbara St	N/A	0.3	N/A	2
Barker Rd	Isolated Cat. 1 Weeds	0.1	poison hemlock	2
Bellway Rd	N/A	0.2	N/A	2
Brigadoon Blvd	N/A	0.9	N/A	2
Brittany Ln	N/A	0.3	N/A	2
Buckhorn Rd	N/A	0.4	hairy whitetop	2
Cameron Rd	Agricultural	0.8	Canada thistle, poison hemlock	2
Cat Lake Rd	Public Request	1.2	poison hemlock, Scotch broom, tansy ragwort	2
Charles Way	N/A	0.1	N/A	2
Chestnut Ln	N/A	0.4	N/A	2

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Chicken Coop Rd	Isolated Cat. 1 Weeds	3.5	common teasel, tansy ragwort	2
Christian Ln	N/A	0.2	N/A	2
Conner Rd	N/A	0.6	N/A	2
Cook Rd	Agricultural	0.3	Canada thistle	2
Cormorant Dr	N/A	0.1	N/A	2
Corriea Rd	Isolated Cat. 1 Weeds	0.8	common teasel, poison hemlock	2
Crestline Dr	N/A	0.1	N/A	2
Dickinson St	N/A	0.2	N/A	2
Discovery View Dr	Isolated Cat. 1 Weeds	0.5	tansy ragwort	2
Don Schmith Rd	N/A	0.5	N/A	2
Dryke Rd	N/A	0.7	N/A	2
E Bluff Dr	Isolated Cat. 1 Weeds	0.6	tansy ragwort	2
E Nelson Rd	N/A	0.3	N/A	2
E Runnion Rd	Isolated Cat. 1 Weeds	0.8	Scotch broom, spotted knapweed	2
E Silberhorn Rd	N/A	0.8	Himalayan blackberry, Scotch broom	2
Eagle Creek Rd	Isolated Cat. 1 Weeds	0.2	tansy ragwort	2
Easterly Rd	Isolated Cat. 1 Weeds	0.3	meadow knapweed, tansy ragwort	2
Eberle Ln	N/A	0.3	N/A	2
Edgington Rd	N/A	0.3	N/A	2
Eggloff Rd	Isolated Cat. 1 Weeds	0.4	meadow knapweed, tansy ragwort	2
Emery Rd	N/A	0.6	N/A	2
Finn Hall Rd	Isolated Cat. 1 Weeds	2.5	common teasel, poison hemlock	2
Fish Hatchery Rd	N/A	3.0	chicory, Himalayan blackberry, herb Robert	2
Fleming Dr	Isolated Cat. 1 Weeds	0.5	poison hemlock	2
Forest Ridge Dr	N/A	0.2	N/A	2
Frick St	N/A	0.1	N/A	2
Gasman Rd	Isolated Cat. 1 Weeds	1.7	tansy ragwort	2
Gehrke Rd	Agricultural	0.9	Canada thistle, Scotch broom	2
Gellor Rd	Isolated Cat. 1 Weeds	1.0	meadow knapweed	2
Grandview Dr	N/A	0.8	N/A	2
Greywolf Rd	N/A	0.5	N/A	2
Gunn Rd	Agricultural	0.9	Canada thistle, Scotch broom	2

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Gupster Rd	Isolated Cat. 1 Weeds	0.5	giant hogweed, poison hemlock, spotted knapweed	2
Heath Rd	N/A	1.5	N/A	2
Heuhslein Rd	Agricultural	1.1	Canada thistle	2
Hogback Rd	Agricultural	0.8	Canada thistle, Scotch broom	2
Holgerson Rd	N/A	0.7	N/A	2
Holland Rd	Agricultural	1.7	Canada thistle, Scotch broom, yellow archangel	2
Hooker Rd	Isolated Cat. 1 Weeds	2.7	poison hemlock	2
Industrial Pkwy	Isolated Cat. 1 Weeds	0.5	tansy ragwort	2
Jamestown Rd	N/A	1.6	N/A	2
Jimmy Come Lately Rd	Isolated Cat. 1 Weeds	4.0	herb Robert, meadow knapweed	2
Joslin Rd	N/A	0.4	N/A	2
Kirk Rd	N/A	0.3	N/A	2
Kirner Rd	Pit Entrance	1.2	Himalayan blackberry, meadow knapweed, Scotch broom	2
Koeppe Dr	N/A	0.2	N/A	2
Lester Way	N/A	0.2	N/A	2
Lewis Rd	Agricultural	0.6	Canada thistle, Scotch broom	2
Libby St	N/A	0.4	N/A	2
Lighthouse View Dr	N/A	0.1	N/A	2
Lilly Rd	N/A	0.2	N/A	2
Lorraine Dr	N/A	0.2	N/A	2
Louella Rd	N/A	0.9	Himalayan blackberry, *meadow knapweed, tansy ragwort*	2
Lupine Dr	Isolated Cat. 1 Weeds	0.5	tansy ragwort	2
Madrona Ter	N/A	0.3	N/A	2
Madrona Way	Isolated Cat. 1 Weeds	1.1	tansy ragwort	2
Manzanita Dr	Isolated Cat. 1 Weeds	0.7	N/A	2
Marmot Loop	N/A	0.5	N/A	2
Marshall Rd	N/A	0.8	N/A	2
Matson Rd	Agricultural	0.5	Canada thistle	2
McAlmond St	N/A	0.1	N/A	2
McComb Rd	Agricultural	0.8	Canada thistle, Himalayan blackberry	2
McFarland Dr	N/A	1.2	N/A	2
Medsker Rd	N/A	1.3	N/A	2
Mill Rd	N/A	0.6	N/A	2
Miller Rd	Isolated Cat. 1 Weeds	0.8	*meadow knapweed, poison hemlock*	2
Montrose Pl	N/A	0.1	N/A	2

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Moonlight Dr	N/A	0.4	N/A	2
Mountain View Dr	N/A	0.4	N/A	2
N Beverage St	N/A	0.4	N/A	2
N Boyce Rd	N/A	0.2	N/A	2
N Kendall Rd	N/A	0.4	N/A	2
N McCrorie Rd	N/A	0.3	N/A	2
N Scott Dr	N/A	0.1	N/A	2
North St	Isolated Cat. 1 Weeds	0.7	tansy ragwort	2
Old Olympic Hwy	Source Cat. 1 Weeds	9.6	absinth wormwood, butterfly bush, Canada thistle, common tansy, field bindweed, hairy nightshade, meadow knapweed, poison hemlock, spotted knapweed, spurge laurel, Scotch broom, tansy ragwort	2
Olson Rd	Weedy Widespreads	2.8	Himalayan blackberry, Scotch broom	2
Olstead Rd	N/A	0.5	N/A	2
Olympic Vis	N/A	0.1	N/A	2
Panorama Blvd	Source Cat. 1 Weeds	0.8	tansy ragwort	2
Parrish Rd	N/A	1.0	N/A	2
Peaceful Pl	N/A	0.1	N/A	2
Peninsula St	N/A	0.1	N/A	2
Phinn Rd	N/A	0.2	N/A	2
Pierce Rd	Isolated Cat. 1 Weeds	0.3	tansy ragwort	2
Pinnell Rd	Isolated Cat. 1 Weeds	0.7	Canada thistle, meadow knapweed	2
Poplar Ct	Isolated Cat. 1 Weeds	0.1	tansy ragwort	2
Rhododendron Dr	Isolated Cat. 1 Weeds	0.8	poison hemlock, tansy ragwort	2
Riverside Rd	Isolated Cat. 1 Weeds	0.5	*poison hemlock*	2
S Boyce Rd	N/A	0.2	N/A	2
Salal Way	Isolated Cat. 1 Weeds	0.4	tansy ragwort	2
Schmuck Rd	Agricultural	1.3	Canada thistle, Scotch broom	2
Secor Rd	N/A	0.5	N/A	2
Serpentine Ave	Isolated Cat. 1 Weeds	0.8	poison hemlock	2
Sherwood Rd	Isolated Cat. 1 Weeds	0.3	poison hemlock, tansy ragwort	2
Simpson Rd	N/A	0.4	N/A	2
Smithfield Dr	Isolated Cat. 1 Weeds	0.3	spotted knapweed	2

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Sophus Rd	N/A	0.2	N/A	2
South St	Public Request	0.1	Scotch broom	2
Spencer Rd	N/A	0.5	N/A	2
Sporseen Rd	N/A	0.9	N/A	2
Spring Rd	Agricultural	0.6	Canada thistle	2
Streit Rd	N/A	0.2	N/A	2
Sturdevant Rd	N/A	0.7	N/A	2
Sunshine Ave	Isolated Cat. 1 Weeds	0.6	tansy ragwort	2
Sunshine Plz	Isolated Cat. 1 Weeds	0.2	tansy ragwort	2
Taylor Cut-off Rd	Public Request	2.7	butterfly bush, meadow knapweed, spotted knapweed	2
Taylor Ranch Rd	Isolated Cat. 1 Weeds	0.8	Italian arum, tansy ragwort	2
Thompson Rd	Isolated Cat. 1 Weeds	1.8	*poison hemlock, Scotch broom, tansy ragwort*	2
Thornton Dr	Isolated Cat. 1 Weeds	1.5	poison hemlock, tansy ragwort	2
Timber Rd	Isolated Cat. 1 Weeds	0.1	tansy ragwort	2
Tripp Rd	Isolated Cat. 1 Weeds	0.3	Canada Thistle, Orange Hawkweed	2
Twin View Dr	N/A	0.6	N/A	2
Vautier Rd	Agricultural	0.6	Canada Thistle	2
Vista View Dr	Isolated Cat. 1 Weeds	0.3	poison hemlock, yellow archangel	2
W Anderson Rd	Isolated Cat. 1 Weeds	0.8	field bindweed	2
W Bedinger Rd	N/A	0.1	N/A	2
W Deytona St	N/A	0.3	N/A	2
W Johnson Dr	N/A	0.1	N/A	2
W Nelson Rd	N/A	0.6	N/A	2
W Runnion Rd	Isolated Cat. 1 Weeds	0.5	poison hemlock, spotted knapweed	2
West Sequim Bay Rd	Isolated Cat. 1 Weeds	2.2	spotted knapweed, tansy ragwort	2
Wilcox Ln	N/A	0.7	N/A	2
Woodcock Rd	Agricultural	6.3	N/A	2
Woodland Dr	N/A	0.4	N/A	2
Youngquist Rd	Isolated Cat. 1 Weeds	0.9	tansy ragwort	2
Arbor Ln	N/A	0.2	N/A	3
Autumn Rd	Isolated Cat. 1 Weeds	0.6	spotted knapweed	3
Barnes Rd	N/A	0.7	N/A	3

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Bay View St	N/A	0.4	N/A	3
Buck Loop Rd	N/A	0.5	tansy ragwort	3
Cassidy Creek Rd	N/A	0.9	N/A	3
Cassidy Rd	Isolated Cat. 1 Weeds	0.8	poison hemlock, spotted knapweed	3
Clark Rd	Agricultural	0.9	poison hemlock, tansy ragwort	3
Cline Rd	N/A	0.6	N/A	3
Cottonwood Ln	N/A	0.2	N/A	3
Dent Pl	N/A	0.1	N/A	3
E Diane Dr	N/A	0.1	N/A	3
Eagle Pl	N/A	0.1	N/A	3
Elizabeth Ln	N/A	0.4	N/A	3
Elliott Ct	N/A	0.1	N/A	3
Falcon Rd	N/A	0.1	N/A	3
Farm Pl	N/A	0.1	N/A	3
Fitzgerald Rd	N/A	0.2	N/A	3
Frost Rd	N/A	0.5	N/A	3
Garden Ln	N/A	0.1	N/A	3
Guiles Rd	N/A	0.5	N/A	3
Hardwick Rd	N/A	0.5	N/A	3
House Rd	N/A	0.4	N/A	3
Hudon Rd	N/A	0.2	N/A	3
James St	N/A	0.1	N/A	3
Jay Robinson Rd	N/A	0.2	N/A	3
John Scott Rd	Isolated Cat. 1 Weeds	0.7	poison hemlock, herb-Robert	3
Karen Ct	N/A	0.1	N/A	3
Kellie Ct	N/A	0.1	N/A	3
Knapp Rd	N/A	0.2	Canada thistle	3
Lange Ln	N/A	0.3	N/A	3
Macleay Rd	N/A	0.6	N/A	3
Mains Rd	N/A	0.3	N/A	3
Mantle Rd	N/A	0.4	N/A	3
Marchbanks Rd	N/A	0.1	N/A	3
Meadow Lark Ln	N/A	0.3	N/A	3
N Barr Rd	Isolated Cat. 1 Weeds	1.3	tansy ragwort, poison hemlock	3
N Eldridge Rd	N/A	0.2	N/A	3
N Mariott Ave	N/A	0.3	N/A	3
N Olympic View Ave	N/A	0.2	N/A	3

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Park Ln	N/A	0.1	N/A	3
Pebble Way	N/A	0.1	N/A	3
Robbins Rd	N/A	0.3	N/A	3
S Barr Rd	Isolated Cat. 1 Weeds	0.7	poison hemlock	3
S Eldridge Rd	N/A	0.4	N/A	3
S McCrorie Rd	N/A	1.8	N/A	3
S Olympic View Ave	N/A	0.4	N/A	3
S Scott Dr	N/A	0.4	N/A	3
Schindler Rd	N/A	0.3	N/A	3
Schmith Rd	N/A	0.6	N/A	3
Schoolhouse Point Ln	N/A	0.4	N/A	3
Senz Rd	N/A	0.7	N/A	3
Sherburne Rd	Isolated Cat. 1 Weeds	1.0	spotted knapweed, sulfur cinquefoil	3
Shore Rd	Agricultural	0.9	Canada thistle, Scotch broom	3
Sofie Rd	N/A	0.5	N/A	3
Sofie Ridge Ln	N/A	0.3	N/A	3
Spath Rd	Agricultural	1.3	Canada thistle	3
Starry Rd	N/A	0.2	N/A	3
Stone Rd	N/A	0.6	N/A	3
Summerset Ct	N/A	0.1	N/A	3
Tyee Rd	N/A	0.2	N/A	3
Van Dyken Dr	N/A	0.3	N/A	3
Voice Of America Rd	Isolated Cat. 1 Weeds	1.3	poison hemlock	3
W Alder Ct	N/A	0.1	N/A	3
W Diane Dr	N/A	0.1	N/A	3
W Palo Verde Loop	N/A	0.3	N/A	3
W Silberhorn Rd	N/A	0.5	giant hogweed, poison hemlock	3
W Spruce Ct	N/A	0.3	N/A	3
Wheeler Rd	N/A	0.5	N/A	3
Wild Currant Way	Agricultural	0.3	Canada thistle, Scotch broom	3
Willard Dr	N/A	0.1	N/A	3
Williamson Rd	N/A	0.6	N/A	3
Wright Rd	N/A	0.5	N/A	3
E Robert Pl	N/A	0.1	N/A	4
Jake Hall Rd	N/A	0.4	N/A	4
Josephine Pl	N/A	0.1	N/A	4
June Pl	N/A	0.1	N/A	4

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Nello Pl	N/A	0.1	N/A	4
Nicole Pl	N/A	0.2	N/A	4
Percy Ln	N/A	0.1	N/A	4
Ridge Pl	N/A	0.1	N/A	4
Ridge View Dr	N/A	0.8	N/A	4
Steve Pl	N/A	0.1	N/A	4
Sundial Loop	N/A	0.3	N/A	4
W Robert Pl	N/A	0.1	N/A	4
Total: **266 roads**		Total: **228.2 mi**		

[1]Target Weed Species for Control – additional non-native, invasive species may be controlled as time and resources allow.

CENTRAL CLALLAM COUNTY SELECTED ROADS

Central Clallam County includes the approximate areas of Port Angeles, Joyce and the Elwha Valley (reference Focus Area Maps 4-6). The roads selected for treatment in 2023 primarily include infestations of Category 1 weed species and adjacent roads. Significant roadside infestations of meadow knapweed, knotweed and tansy ragwort have been previously treated and require retreatment and monitoring in 2023.

Road Groups:

Clallam Co Restoration Project: roadsides adjacent to Clallam County environmental restoration or mitigation projects and may include native revegetation efforts; treatment is intended to contain infestations of non-native, invasive species to protect native plantings and function.
Source Cat. 1 Weeds: roadsides with the most extensive infestations of category 1 weeds; treatment is intended to contain and reduce infestations.
Isolated Cat. 1 Weeds: roadsides with isolated infestations of category 1 weeds either treated or surveyed in the past; treatment is intended to eradicate individual infestations or plants.
Pit Entrance: roadsides leading to County pits; treatment is intended to contain and protect county resources.
Public Request: roadsides with infestations requested by individuals or public agencies; treatment is intended to meet requests as time and resources allow.
N/A: : roadsides that still need to be surveyed and categorized into “Group” or roadsides surveyed in the past that require a current survey to determine “Target Weed Species for Control”; these will be surveyed and categorized as time and resources allow.

Table 5. Central Clallam County roads selected for herbicide treatment in 2023

Target Weed Species For Control – additional non-native, invasive species may be controlled as time and resources allow. Species listed in italics are unconfirmed infestations.

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Benson Rd	Isolated Cat. 1 Weeds	1.1	orange hawkweed	1
Black Diamond Rd	Isolated Cat. 1 Weeds	4.4	common teasel, herb Robert, meadow knapweed	1
Camp Hayden Rd	Source Cat. 1 Weeds	3.5	tansy ragwort, meadow knapweed	1
Crescent Beach Rd	Isolated Cat. 1 Weeds	3.5	tansy ragwort, herb Robert	1
Deer Park Loop	Clallam Co Restoration Project	0.6	common teasel, meadow knapweed, Scotch broom	1
East Beach Rd	Source Cat. 1 Weeds	0.2	meadow knapweed, tansy ragwort	1
East Lyre River Rd	Isolated Cat. 1 Weeds	0.6	meadow knapweed, tansy ragwort	1
Eden Valley Rd	Isolated Cat. 1 Weeds	1.8	Bohemian knotweed, common teasel, meadow knapweed, tansy ragwort	1
Elwha River Rd	Isolated Cat. 1 Weeds	1.9	Canada thistle, herb Robert, meadow knapweed, tansy ragwort	1
Farrington Rd	Source Cat. 1 Weeds	0.9	Canada thistle, meadow knapweed, Scotch broom, tansy ragwort	1
Fisher Cove Rd	Isolated Cat. 1 Weeds	0.8	Bohemian knotweed, Canada thistle, common tansy, meadow knapweed, wild basil savory	1
Freshwater Bay Rd	Isolated Cat. 1 Weeds	2.5	tansy ragwort	1
Freshwater Park	Isolated Cat. 1 Weeds	1.3	tansy ragwort	1
Gagnon Rd	Isolated Cat. 1 Weeds	0.5	Bohemian knotweed	1
Granite Rd	Isolated Cat. 1 Weeds	0.3	meadow knapweed, Scotch broom	1
Gravel Pit Rd	Pit Entrance	0.1	Scotch broom	1
Joyce-Piedmont Rd	Isolated Cat. 1 Weeds	1.4	Bohemian knotweed, meadow knapweed, tansy ragwort, yellow archangel	1
Laird Rd	Isolated Cat. 1 Weeds	0.9	meadow knapweed, tansy ragwort	1
Lake Dawn Rd	Source Cat. 1 Weeds	0.5	orange hawkweed	1
Little Loop Dr	Isolated Cat. 1 Weeds	0.8	tansy ragwort	1
Little River Rd	Source Cat. 1 Weeds	7.2	common teasel, herb Robert, meadow knapweed, tansy ragwort, yellow archangel	1
Lower Elwha Rd	Clallam Co Restoration Project	2.8	bull thistle, Canada thistle, meadow knapweed, Scotch broom, tansy ragwort	1
McGarvie Rd	Isolated Cat. 1 Weeds	0.3	tansy ragwort	1

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Okerman Rd	Isolated Cat. 1 Weeds	0.4	meadow knapweed, old man's beard	1
Olympic Hot Springs Rd	Source Cat. 1 Weeds	1.0	Bohemian knotweed, herb Robert, meadow knapweed, tansy ragwort	1
Park and Ride Rd	Clallam Co Restoration Project	0.1	Himalayan blackberry, Scotch broom, tree lupine	1
Place Rd	Light Mow Pilot Program	2.5	Scotch broom, tansy ragwort	1
Power Plant Rd	Isolated Cat. 1 Weeds	0.8	Bohemian knotweed, meadow knapweed, tansy ragwort	1
Schmitt Rd	Isolated Cat. 1 Weeds	0.6	tansy ragwort	1
Township Line Rd	Isolated Cat. 1 Weeds	1.7	tansy ragwort	1
W Edgewood Dr	Isolated Cat. 1 Weeds	2.3	common tansy, meadow knapweed, tansy ragwort	1
West Lyre River Rd	Source Cat. 1 Weeds	0.6	meadow knapweed, tansy ragwort, wild basil savory	1
Whiskey Creek Beach Rd	Isolated Cat. 1 Weeds	1.6	tansy ragwort	1
Alice Rd	N/A	0.5	N/A	2
Baker Farm Rd	N/A	0.4	N/A	2
Baskins Rd	N/A	0.4	N/A	2
Billy Smith Rd	N/A	0.7	N/A	2
Bishop Rd	N/A	0.4	tansy ragwort	2
Champion Rd	N/A	0.4	No target weed species found	2
Dan Kelly Rd	Isolated Cat. 1 Weeds	3.2	Bohemian knotweed, tansy ragwort	2
Deer Park Rd	Source Cat. 1 Weeds	4.8	herb Robert, Himalayan blackberry, Scotch broom, tansy ragwort, yellow hawkweed	2
Dempsey Rd	Isolated Cat. 1 Weeds	0.7	tansy ragwort	2
Dietz Rd	N/A	0.5	N/A	2
Dry Creek Rd	Isolated Cat. 1 Weeds	0.7	meadow knapweed	2
Durrwachter Rd	N/A	1.5	N/A	2
E Arnette Rd	N/A	0.4	N/A	2
E Scrivner Rd	N/A	1.1	N/A	2
Elwha Rd	N/A	0.2	N/A	2
Evergreen View Pkwy	N/A	0.5	N/A	2
Fey Rd	N/A	0.3	N/A	2

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Fors Rd	Isolated Cat. 1 Weeds	0.3	tansy ragwort	2
Frederickson Rd	N/A	0.3	N/A	2
Garling Rd	N/A	0.7	N/A	2
Gerber Rd	N/A	0.6	N/A	2
Gossett Rd	Isolated Cat. 1 Weeds	0.9	meadow knapweed, tansy ragwort	2
Harrington Rd	N/A	0.4	N/A	2
Hauk Rd	N/A	0.4	N/A	2
Henry Boyd Rd	Isolated Cat. 1 Weeds	1.6	Bohemian knotweed, tansy ragwort	2
Hidden Valley Rd	N/A	0.5	No target weed species found	2
Hoare Rd	N/A	0.7	N/A	2
Huckleberry Hill Dr	N/A	0.4	N/A	2
Hudson Rd	N/A	0.4	N/A	2
Hulse Rd	N/A	0.7	N/A	2
Hunt Rd	N/A	0.2	Scotch broom	2
Karpen Rd	N/A	0.7	N/A	2
Kemp St	N/A	0.8	N/A	2
Kreaman Rd	N/A	0.4	N/A	2
Lake Aldwell Rd	Isolated Cat. 1 Weeds	0.6	meadow knapweed	2
Lake Farm Rd	N/A	0.9	N/A	2
Leighland Ave	N/A	0.5	N/A	2
Liljedahl Rd	Isolated Cat. 1 Weeds	1.0	Scotch broom, tansy ragwort	2
Lookout Rd	N/A	0.4	N/A	2
Lower Dam Rd	N/A	0.5	N/A	2
Mapleton Way	N/A	0.3	N/A	2
Markuson Rd	N/A	0.2	N/A	2
McCarver St	N/A	0.5	N/A	2
Miles Rd	N/A	0.4	No target weed species found	2
Monroe Rd	Isolated Cat. 1 Weeds	3.8	tansy ragwort	2
Mount Pleasant Rd	Isolated Cat. 1 Weeds	5.7	, meadow knapweed, poison hemlock, tansy ragwort	2
N Bagley Creek Rd	N/A	0.8	N/A	2

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
O'Brien Rd	Isolated Cat. 1 Weeds	4.1	meadow knapweed, tansy ragwort	2
Old Rd	N/A	0.2	N/A	2
Orvis St	N/A	0.1	N/A	2
Oxenford Rd	N/A	1.0	Scotch broom, herb Robert	2
Patterson Rd	N/A	1.0	N/A	2
Ranger Rd	N/A	1.0	Scotch broom, Canada thistle, bull thistle	2
Rife Rd	Isolated Cat. 1 Weeds	0.6	Bohemian knotweed	2
Robinson Rd	N/A	0.4	No target weed species found	2
S Airport Rd	N/A	0.6	N/A	2
S Bagley Creek Rd	Isolated Cat. 1 Weeds	2.0	Bohemian knotweed, poison hemlock	2
S Bay View Ave	N/A	0.3	N/A	2
S Bean Rd	Isolated Cat. 1 Weeds	0.5	Bohemian knotweed meadow knapweed	2
S Brook Ave	N/A	0.2	N/A	2
S Doss Rd	Isolated Cat. 1 Weeds	0.8	tansy ragwort	2
S Mount Angeles Rd	Isolated Cat. 1 Weeds	3.2	tansy ragwort meadow knapweed,	2
S Old Mill Rd	Isolated Cat. 1 Weeds	0.9	Bohemian knotweed	2
S Reddick Rd	N/A	0.6	Canada thistle	2
S Shore Rd	N/A	2.1	herb-Robert, orange hawkweed	2
Sandhagen Rd	N/A	0.5	N/A	2
Sandstone Pl	N/A	0.1	N/A	2
Striped Peak Rd	N/A	3.9	N/A	2
Stuart Dr	N/A	0.4	N/A	2
Sutter Rd	N/A	0.7	N/A	2
Sylvan Way	N/A	0.2	N/A	2
Thors Rd	N/A	0.3	N/A	2
Tongue Point Park Rd	N/A	0.6	N/A	2
W Arnette Rd	N/A	0.1	N/A	2
W Edwards Rd	Isolated Cat. 1 Weeds	0.1	meadow knapweed	2
W Bluff Dr	N/A	0.3	N/A	2
Wasankari Rd	N/A	1.0	N/A	2
Wye Rd	Isolated Cat. 1 Weeds	0.6	tansy ragwort	2

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Brown Rd	N/A	0.6	N/A	3
Crown Z Water Rd	N/A	0.6	Scotch broom	3
Draper Rd	Isolated Cat. 1 Weeds	1.0	poison hemlock	3
Dunmire Rd	N/A	0.3	N/A	3
E Bay St	N/A	0.6	N/A	3
E Key Rd	N/A	0.6	N/A	3
E Myrtle St	N/A	0.3	N/A	3
E Simmons Rd	N/A	1.0	N/A	3
E Tamarack Ln	N/A	0.6	N/A	3
Elwha Bluffs Rd	N/A	0.8	N/A	3
Erving Jacobs Rd	Isolated Cat. 1 Weeds	0.7	No target weed species found	3
Glass Rd	Isolated Cat. 1 Weeds	2.2	Bohemian knotweed	3
Grauel-Ramapo Rd	Isolated Cat. 1 Weeds	1.9	tansy ragwort	3
Harry Brown Rd	Isolated Cat. 1 Weeds	0.2	tansy ragwort	3
Herrick Rd	Pit Entrance	1.5	meadow knapweed, Scotch broom	3
Howard Rd	Isolated Cat. 1 Weeds	0.6	tansy ragwort	3
Island Vista Way	N/A	0.2	N/A	3
John Jacobs Rd	Isolated Cat. 1 Weeds	0.3	*poison hemlock*	3
Juan De Fuca Way	N/A	0.2	N/A	3
Kacee Way	Public Request	0.4	Herb Robert	3
King St	Isolated Cat. 1 Weeds	1.4	N/A	3
Lawrence Rd	Isolated Cat. 1 Weeds	0.8	N/A	3
Melton Rd	Isolated Cat. 1 Weeds	0.3	N/A	3
N Brook Ave	N/A	0.6	N/A	3
N Larch Ave	N/A	0.5	N/A	3
N Lee's Creek Rd	N/A	0.6	N/A	3
Nordstrom Rd	N/A	0.3	N/A	3
Pearce Rd	Clallam Co Restoration Project	1.0	tansy ragwort	3

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Peters Rd	Isolated Cat. 1 Weeds	1.0	tansy ragwort	3
Reynolds Rd	Isolated Cat. 1 Weeds	0.4	meadow knapweed, tansy ragwort	3
Shadow Ln	Isolated Cat. 1 Weeds	0.4	Bohemian knotweed, tansy ragwort	3
Total: **141 roads**		Total: **141.7 mi.**		

[1]Target Weed Species for Control – additional non-native, invasive species may be controlled as time and resources allow.

WEST CLALLAM COUNTY SELECTED ROADS

West Clallam County includes areas approximately west of Lake Crescent; the area includes Clallam Bay, Sekiu, Hoko-Ozette, Beaver, and Forks (reference Focus Area Maps 7-8). West Clallam County has a limited number of county roads and known infestations include knotweed, tansy ragwort, and Scotch broom. Roadside Scotch broom infestations impose significant negative impacts on adjacent forestry lands and have been elevated in priority at select locations in West Clallam County to reflect input and requests from local land managers.

Road Groups:

Forestry: roadsides with weed infestations most likely to have an impact to adjacent timberlands; infestations of Scotch broom are intended to be completely treated.

Clallam Co Restoration Project: roadsides adjacent to Clallam County environmental restoration or mitigation projects and may include native revegetation efforts; treatment is intended to contain infestations of non-native, invasive species to protect native plantings and function.

Source Cat. 1 Weeds: roadsides with the most extensive infestations of category 1 weeds; treatment is intended to contain and reduce infestations.

Isolated Cat. 1 Weeds: roadsides with isolated infestations of category 1 weeds either treated or surveyed in the past; treatment is intended to eradicate individual infestations or plants.

Pit Entrance: roadsides leading to County pits; treatment is intended to contain and protect county resources.

Public Request: roadsides with infestations requested by individuals or public agencies; treatment is intended to meet requests as time and resources allow.

N/A: roadsides that still need to be surveyed and categorized into "Group" or roadsides surveyed in the past that require a current survey to determine "Target Weed Species for Control"; these will be surveyed and categorized as time and resources allow.

Table 6. West Clallam County roads selected for herbicide treatment in 2023

Target Weed Species For Control – additional non-native, invasive species may be controlled as time and resources allow. Species listed in italics are unconfirmed infestations.

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Ballard Rd	Pit Entrance	0.2	Himalayan blackberry, Scotch broom	1
Bear Creek Rd	Public Request	2.1	Scotch broom, tansy ragwort	1
Charley Creek Rd	Isolated Cat. 1 Weeds	0.6	yellow archangel	1
Coho Dr	Isolated Cat. 1 Weeds	0.3	tansy ragwort	1
Dolly Varden Dr	Isolated Cat. 1 Weeds	0.2	tansy ragwort	1
Hermison Rd	Isolated Cat. 1 Weeds	0.5	Bohemian knotweed, Canada thistle, Himalayan blackberry	1
Hoko-Ozette Rd	Source Cat. 1 Weeds	17.9	Bohemian knotweed, herb Robert, tansy ragwort	1
Mary Clark Rd	Forestry	7.7	Scotch broom, tansy ragwort	1

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Mina Smith Rd	Forestry	3.3	herb Robert, Himalayan blackberry, Scotch broom, tansy ragwort,	1
Pillar Point Rd	Clallam Co Restoration Project	0.3	perennial sowthistle, Scotch broom	1
Quillayute Airport Rd	Isolated Cat. 1 Weeds	0.4	Himalayan blackberry, tansy ragwort	1
Quillayute Rd	Isolated Cat. 1 Weeds	6.9	Scotch broom, tansy ragwort	1
Rainbow Ave	Isolated Cat. 1 Weeds	0.4	tansy ragwort	1
Richwine Rd	Isolated Cat. 1 Weeds	0.6	tansy ragwort	1
River Park Rd	Isolated Cat. 1 Weeds	0.3	tansy ragwort, Himalayan blackberry, Canada thistle	1
Swan Bay Rd	Isolated Cat. 1 Weeds	0.8	tansy ragwort	1
Wentworth Rd	Isolated Cat. 1 Weeds	1.2	tansy ragwort	1
Whitcomb-Diimmel Rd	Pit Entrance	1.5	Scotch broom, tansy ragwort	1
Wilson Rd	Isolated Cat. 1 Weeds	0.8	tansy ragwort	1
6th St	N/A	0.2	N/A	2
7th St	N/A	0.3	N/A	2
8th St	N/A	0.2	N/A	2
Bloedel Blvd	Road infrastructure	0.2	bamboo	2
Bogachiel St	N/A	0.3	N/A	2
Commercial St	N/A	0.1	N/A	2
Community Hall Rd	N/A	0.1	N/A	2
Conley Rd	N/A	0.6	N/A	2
Cooper Ranch Rd	Forestry	5.6	herb-Robert, Scotch broom, tansy ragwort	2
Division St	N/A	0.1	N/A	2
Duncan Rd	N/A	0.3	Himalayan and cutleaf blackberry	2
Eagle Point Rd	Isolated Cat. 1 Weeds	1.3	bohemian knotweed, Himalayan blackberry	2
East Lake Pleasant Rd	N/A	1.4	N/A	2
Erickson Rd	N/A	0.3	N/A	2
Funk & Ballards Aly	N/A	0.3	No target weed species found	2
Gaydeski Rd	N/A	0.8	No target weed species found	2
Grant Rd	N/A	0.5	N/A	2
Green Rd	N/A	0.5	No target weed species found	2
Iverson Rd	N/A	0.3	N/A	2
Kalawah St	N/A	0.1	N/A	2
Kilmer Rd	N/A	0.8	No target weed species found	2
Lake Pleasant Park Rd	N/A	0.3	N/A	2
Leyendecker Rd	N/A	0.1	cutleaf blackberry	2

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Maxfield Rd	N/A	0.8	N/A	2
Moriarty Rd	N/A	1.3	N/A	2
Nichols Rd	N/A	0.6	N/A	2
Old La Push Rd	N/A	0.4	Himalayan blackberry	2
Post Arbeiter Rd	N/A	0.1	N/A	2
Rice St	N/A	0.1	N/A	2
Salmon Dr	N/A	0.3	N/A	2
Sekiu Airport Rd	N/A	0.3	No target weed species found	2
Sekiu Heights Rd	N/A	0.2	No target weed species found	2
Sekiu River Rd	N/A	0.7	No target weed species found	2
Shuwah Rd	Isolated Cat. 1 Weeds	0.5	Bohemian knotweed	2
Sol Duc St	N/A	0.1	N/A	2
Steelhead Ave	N/A	0.7	N/A	2
Treichel Ln	N/A	1.0	N/A	2
Trout Ave	N/A	0.5	N/A	2
W Kellogg St	N/A	0.2	N/A	2
Walgren Rd	N/A	0.7	N/A	2
Walter Way	N/A	0.2	N/A	2
Washington St	N/A	0.4	N/A	2
West Lake Pleasant Rd	Isolated Cat. 1 Weeds	4.7	Bohemian knotweed, Scotch broom, yellow flag iris	2
Wisen Creek Rd	N/A	0.4	N/A	2
Calawah Way	N/A	1.4	N/A	3
E Division St	N/A	0.8	N/A	3
Elk Creek Ridge Rd	N/A	0.2	N/A	3
Elk Loop Dr	N/A	0.2	N/A	3
Elk Valley Rd	N/A	0.5	N/A	3
Front St	N/A	0.6	N/A	3
Frontier St	N/A	0.7	No target weed species foundS	3
Hilstrom Rd	Isolated Cat. 1 Weeds	0.6	Bohemian knotweed	3
Hoko Ln	N/A	0.1	No target weed species found	3
Kallman Rd	N/A	0.6	N/A	3
Palmer Rd	N/A	0.5	N/A	3
Pavel Rd	N/A	1.3	N/A	3
Pit Ln	N/A	0.9	N/A	3
Smith Rd	N/A	0.5	N/A	3
Undi Rd	Isolated Cat. 1 Weeds	2.0	Bohemian knotweed	3
Vista Dr	N/A	0.3	No target weed species found	3

Road Name	Group	Est. Road Miles	Target Weed Species For Control[1]	Treatment Priority
Vista Ln	N/A	0.1	No target weed species found	3
Weel Rd	N/A	0.3	No target weed species found	3
Total**: 81 roads**		Total: **86.5 mi.**		

[1]Target Weed Species for Control – additional non-native, invasive species may be controlled as time and resources allow.

COUNTY PITS

An important component of the IWM Program is prevention, such as maintaining weed free rock sources. County-owned rock sources and storage pits sites are routinely surveyed for weeds and specific management strategies are tailored to match each pit's county use and needs. Most are gated, with no public access.

The 2023 Work Plan includes all County-owned pits as potential locations for weed control. The County Pits vary in size, activity, and weed pressures. Table 7 lists the county pits in alphabetical order and includes the target weed species for control and approximate pit location. Control methods may include physical or chemical methods, but more likely a combination of both, depending on weed species, area, and available resources. Cultural practices, such as reseeding with locally sourced plant material will be pursued as materials become available and suitable pit locations identified.

Table 7. County Pit Sites for treatment in 2023

Pit Name	Location	Target Weed Species For Control[1]
Blue Mountain Transfer Station	Blue Mountain Rd, Port Angeles	bull thistle, Canada thistle, meadow knapweed, poison hemlock, reed canarygrass, Scotch broom
Blyn Pit	Woods Rd, Blyn	Bohemian knotweed, butterfly bush, common teasel, everlasting peavine, field bindweed, hairy nightshade, herb Robert, Himalayan blackberry, poison hemlock, Scotch broom, tansy ragwort, wild carrot
Clallam Bay Storage Yard	Frontier St, Clallam Bay	Himalayan blackberry, reed canarygrass
District 1 Shop	W Washington St, Sequim	bull thistle, Canada thistle, Himalayan blackberry, meadow knapweed, spotted knapweed, St. John's wort
District 2 Shop	W Lauridsen Blvd, Port Angeles	herb Robert, meadow knapweed, poison hemlock, Scotch broom
Herrick Gravel	Herrick Rd, Port Angele	bull thistle, Canada thistle, everlasting peavine, herb Robert, Himalayan blackberry, meadow knapweed, Scotch broom, St. John's wort
Hogback Pit	Cays Rd, Sequim	common tansy, tree lupine
Hoko-Ozette Rd MP 4.5	MP 4.5 Hoko-Ozette Rd, Clallam Bay	herb Robert, orange hawkweed, tansy ragwort, Scotch broom
Hoko-Ozette Rd MP 10	MP 10 Hoko-Ozette Rd, Clallam Bay	herb Robert, tansy ragwort
Hoko-Ozette Rd MP 13	MP 13, Hoko-Ozette Rd, Clallam Bay	herb Robert, tansy ragwort
Hwy 101 Storage Yard	Hwy 101/Old Olympic Hwy, Port Angeles	herb Robert, poison hemlock
Kirner Pit	Kirner Rd, Sequim	bull thistle, common chicory, common periwinkle, common teasel, Himalayan blackberry, lesser burdock, meadow knapweed, spotted knapweed, poison hemlock, Scotch broom, tansy ragwort, tree lupine, yellow archangel
La Push "Ballard" Pit	Ballard Rd, Forks	Canada thistle, cutleaf blackberry, everlasting peavine, Himalayan blackberry, Bohemian knotweed, Scotch broom, tansy ragwort, yellow archangel

Pit Name	Location	Target Weed Species For Control[1]
Lake Creek Pit	Bedrock Rd, Beaver	bull thistle, Canada thistle, cutleaf blackberry, Himalayan blackberry, Bohemian knotweed, Scotch broom, tansy ragwort
Little River Pit	Little River Rd, Port Angeles	bull thistle, Canada thistle, herb Robert, meadow knapweed, Scotch broom, everlasting peavine, tansy ragwort
Lower Elwha Pit	Lower Elwha Rd, Port Angeles	bull thistle, Canada thistle, poison hemlock, reed canarygrass, Scotch broom
McInnes Pit	Vistas Drive, Sequim	Bohemian knotweed, birdsrape mustard, bull thistle, bur chervil, Canada thistle, common teasel, herb Robert, field bindweed, Himalayan blackberry, Italian thistle, meadow knapweed, poison hemlock, reed canarygrass, Scotch broom, spotted knapweed
Morse Creek Pit	Gravel Pit Rd, Port Angeles	Bohemian knotweed, bull thistle, Canada thistle, common tansy, common teasel, herb Robert, Himalayan blackberry, poison hemlock, reed canarygrass, Scotch broom, St. John's wort
Piedmont Pit	Joyce-Piedmont Rd, Joyce	bull thistle, Canada thistle, common teasel, herb Robert, meadow knapweed, Scotch broom, tansy ragwort
Place Pit	Place Rd, Port Angeles	Bohemian knotweed, bull thistle, butterfly bush, Canada thistle, common teasel, cutleaf blackberry, everlasting peavine, herb Robert, Himalayan blackberry, meadow knapweed, oxeye daisy, reed canarygrass, Scotch broom, tree lupine
Quillayute Pit	Quillayute Rd, Forks, WA	Bohemian knotweed, Himalayan blackberry, Scotch broom, St. John's wort, tansy ragwort
Ranger Pit	Place Rd, Port Angeles	Bigleaf periwinkle, Bohemian knotweed, bull thistle, butterfly bush, Canada thistle, common, teasel, cutleaf blackberry, everlasting peavine, field bindweed, herb Robert, Himalayan blackberry, meadow knapweed, reed canarygrass, Scotch broom, tansy ragwort, tree lupine
Sequim Storage Yard	W Washington St, Sequim	birdsrape mustard, common chicory, common teasel, cutleaf blackberry, Himalayan blackberry, meadow knapweed, oxeye daisy, poison hemlock, reed canarygrass, spotted knapweed, spurge laurel
Umbrella Creek Pit	Hoko-Ozette Rd, Clallam Bay	Bohemian knotweed, cutleaf blackberry, herb Robert, Himalayan blackberry, Scotch broom, tansy ragwort
Whitcomb-Diimmel Pit	Whitcomb-Diimmel Rd, Forks	Bohemian knotweed, bull thistle, Canada thistle, common teasel, Himalayan blackberry, Scotch broom, tansy ragwort, St. John's wort

[1]Target Weed Species for Control – additional non-native, invasive species may be controlled as time and resources allow.

COUNTY SPECIAL SITES

The Road Department has land management responsibilities for several non-roadside properties called "Special Sites". Locations listed in Table 8 are listed in alphabetical order and include the location of the site, a description and target weed species for control. The list includes a variety of sites, including designed features with specific functions and/or management requirements. The sites have been prioritized for weed management and control may include the use of herbicides. Other Road Department-managed lands that are encountered during other weed control projects that are not listed in Table 8 may be included as EDDR site.

Table 8. County Special Sites selected for treatment in 2023

Site Name	Location	Description	Target Weed Species For Control[1]
61 Marjory Ln	61 Marjory Ln, Carlsborg	County-owned property adjacent to Hwy 101	hoary alyssum
Blake Sand & Gravel Ridge	Cays Rd, Sequim	Ridge and slope northwest of Hogback Pit	Italian thistle, poison hemlock
Black Diamond Native Planting	Adjacent to 223 Black Diamond Rd, Port Angeles	Native planting maintenance	Canadian thistle, Scotch broom
Carlsborg Road Fire District	Carlsborg Rd, Carlsborg	Large county parcel adjacent to fire maintenance facility, school, and housing development.	poison hemlock
Cays & Lamar Intersection	Cays Rd & Lamar Rd, Sequim	County-owned parcel between Cays Rd and Lamar Rd	bull thistle, Italian thistle
Deer Park Overpass and Rest Area	Deer Park Loop, Port Angeles	Construction and slope stabilization project; control of non-native, invasive weeds to protect constructed slopes and adjacent areas to prepare for revegetation. Control of vegetative invasive blackberries ONLY.	common teasel, cutleaf blackberry, Himalayan blackberry, meadow knapweed, Scotch broom
Dry Creek Road	Dry Creek Rd, Port Angeles	Construction and slope stabilization project; control of non-native, invasive weeds to protect constructed slopes and adjacent areas to prepare for revegetation. Control of vegetative invasive blackberries ONLY.	Himalayan blackberry, Scotch broom
Dungeness Dike	Towne Rd, Sequim	Multi-use trail; Category 1 species and Canada thistle adjacent to agricultural area; control of vegetative invasive blackberries ONLY.	Bohemian knotweed, Canada thistle, common teasel, herb Robert, poison hemlock, Scotch broom, wild carrot
Dungeness Dike Trail Parking Lot	Towne Rd, Sequim	School House parking lot with access to multi-use trail	poison hemlock

Site Name	Location	Description	Target Weed Species For Control[1]
Dungeness River Bridge	Old Olympic Highway, Sequim	County-owned parcel with small foot trail down to the Dungeness River under the bridge	Bohemian knotweed, butterfly bush, Canada thistle, Himalayan blackberry, Scotch broom
E Ennis Creek	E Ennis Creek Rd, Port Angeles	County owned property off E Ennis Creek Rd	Yellow archangel
E Greentree Ln	E Greentree Ln, Port Angeles	County owned property along E Greentree Ln	Yellow archangel
Hoko-Ozette Culvert Installation MP 8.8	Hoko-Ozette Rd, Sekiu	Culvert installation and revegetation project; control of non-native, invasive weeds and support the establishment of native plantings at constructed culvert locations.	Scotch broom
Jamestown Beach Bank Stabilization	Jamestown Rd, Sequim	Revegetation and bank stabilization project; control of non-native, invasive weeds to support the establishment of native plantings.	Survey data not available
Kugel Creek Culvert Installation	Cooper Ranch Rd, Sappho	Culvert installation and revegetation project; control of non-native, invasive weeds and support the establishment of native plantings at constructed culvert locations.	herb Robert
Lower Dam Interpretive Center	Lower Dam Rd, Port Angeles	Trail head, parking lot, and interpretive center;	bull thistle, catsear, dandelion, mint
Lower Elwha Rd Culvert Installation	Lower Elwha Rd, Port Angeles	Culvert installation and revegetation project; control of non-native, invasive weeds and support the establishment of native plantings at constructed culvert locations.	Canada thistle, evergreen blackberry, Himalayan blackberry, Scotch broom
Marsden Rd Culvert Installation	Marsden Rd, Port Angeles	Culvert installation and revegetation project; control of non-native, invasive weeds and support the establishment of native plantings at constructed culvert locations.	Survey data not available
McDonald Creek Bridge	4100 - 4132 Old Olympic Highway, Agnew	Bridge construction and revegetation project; control of non-native, invasive weeds and support the establishment of native plantings at constructed slopes.	Canada thistle, cutleaf blackberry, everlasting peavine, herb Robert, Himalayan blackberry
Mt. Pleasant Storm water Raingarden	Mount Pleasant Rd, Port Angeles	Constructed storm water raingarden; control of non-native, invasive weeds to support the establishment of native plantings.	Survey data not available
O'Brien ROW parcel	O'Brien Rd, Port Angeles	Large ROW parcel, adjacent to Erving Jacobs intersection. Public request.	Canada thistle

Site Name	Location	Description	Target Weed Species For Control[1]
Olympic Discovery Trail	County wide	Multi-user transportation/recreational trail; control of Category 1 species and Category 2 species as time and resources allow; control of vegetative invasive blackberries ONLY.	Canada thistle, common teasel, European hawkweed, herb Robert, meadow knapweed, poison hemlock, spotted knapweed, Scotch broom
	Berm on Old Olympic Hwy east of Lewis Rd, Agnew	Multi-user transportation/recreational trail; revegetation project; control of non-native, invasive weeds and support the establishment of native plantings at constructed slopes.	birdsrape mustard, bull thistle, bur chervil, Canada thistle, reed canarygrass
	Hwy 101 crossing near Sol Duc	Multi-user transportation/recreational trail	European hawkweed
	Gossett Rd to Gossett Bridge, Joyce	Multi-user transportation/recreational trail; revegetation project; control of non-native, invasive weeds and support the establishment of native plantings at constructed slopes.	Canada thistle, herb Robert, meadow knapweed, reed canary grass, tansy ragwort
	Priest Rd, Sequim	Multi-user transportation/recreational trail; access to Dungeness River Nature Center	poison hemlock
Olympic Wetland Mitigation Site	91 E Hwy 101, Port Angeles	Wetland mitigation project; control of non-native invasive weeds and support the establishment of native plantings.	Canada thistle, Scotch broom, sulfur cinquefoil, reed canary grass
Pearce Rd Culvert Installation	Pearce Rd, Port Angeles	Culvert installation and revegetation project; control of non-native, invasive weeds to support the establishment of native plantings at constructed culvert locations.	Canada thistle, mint, Scotch broom
Pillar Point Bank Stabilization	Pillar Point Recreation Area, Pysht	Revegetation and bank stabilization project; control of non-native, invasive weeds to support native plantings.	perennial sowthistle, Scotch broom, tansy ragwort
Ward Bridge Restoration	Woodcock Rd, Sequim	Bridge construction and revegetation project; control of non-native, invasive weeds and support native plantings.	herb Robert, poison hemlock
Weel Road Bank Stabilization	Weel Road, Clallam Bay	Revegetation and bank stabilization project; control of non-native, invasive weeds to support native plantings.	Survey data not available

[1]Target Weed Species for Control – additional non-native, invasive species may be controlled as time and resources allow.

Focus Area Maps of Selected Roads

The following maps display the County roads, pits, and Special Sites selected for control in 2023. All selected roads are color coded to the full extent of County management, but treatments may be limited to weed locations and, in many cases, only at isolated patches of Category 1 weeds. Selected roads are highlighted by color to represent their treatment priority.

Priority 1 selected roads are color coded in **green** and are intended to be completely treated for target species

Priority 2 selected roads are color coded in **yellow** and are intended to be treated for target species in conjunction with adjacent roads or activities

Priority 3 selected roads are color coded in **orange** and are intended to be treated or surveyed only as time and resources allow

Priority 4 selected roads are color coded in **blue** and are intended to be put onto a 4-year maintenance regime where no treatment is necessary

County-owned Special Sites and pits are included in the focus area maps. 2022 roadside treatment points, when taken, have been included for reference.

Overview of Clallam County

Map 1. District Boundaries Area

East Clallam County

Map 2. Happy Valley – Blyn Treatment Area

Map 3. Sequim – Dungeness Valley Treatment Area

Central Clallam County

Map 4. Mount Pleasant – Deer Park Treatment Area

Map 5. Port Angeles East – Agnew Treatment Area

Map 6. Port Angeles Treatment Area

West Clallam County

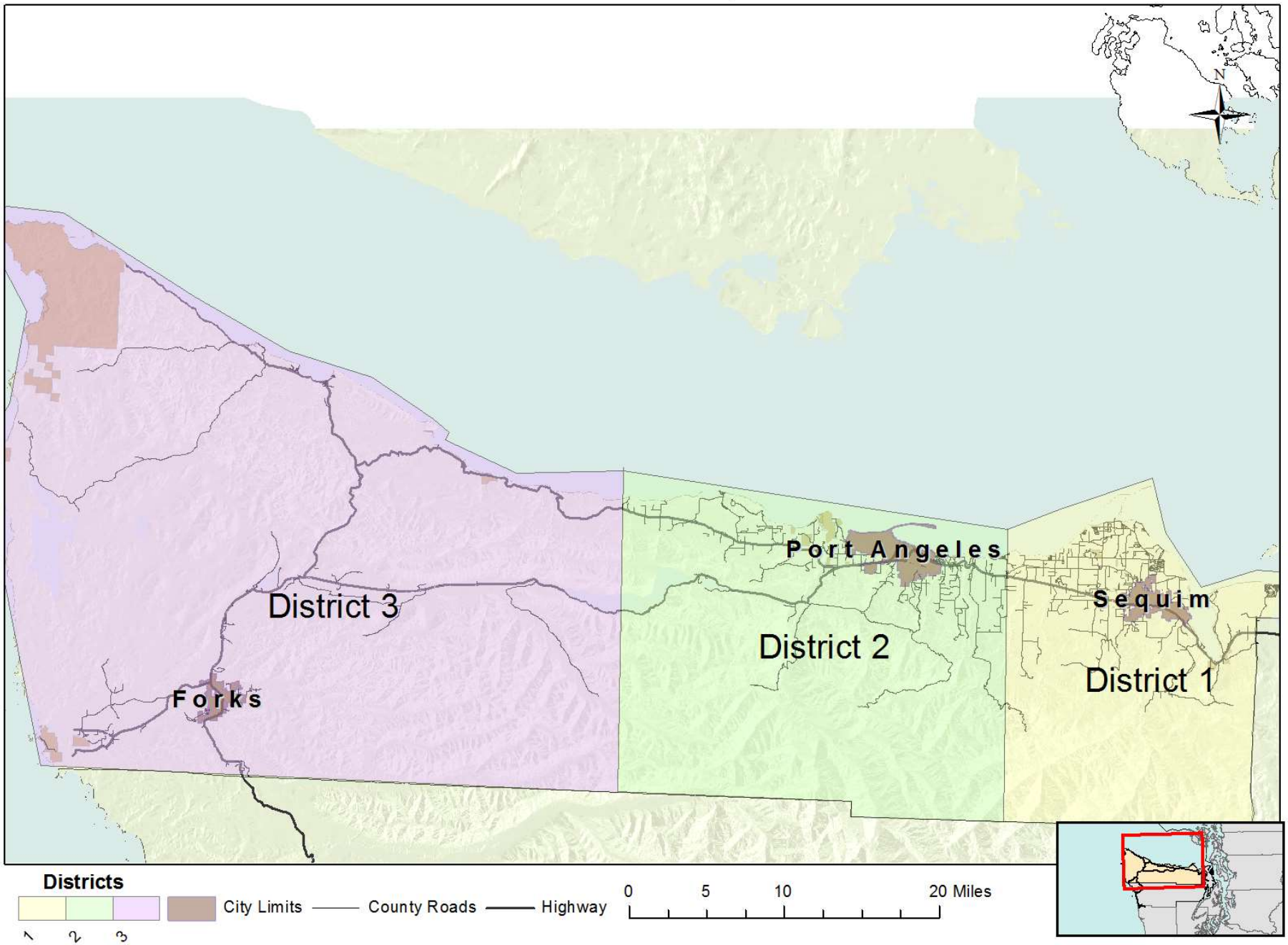
Map 7. Joyce Treatment Area

Map 8. Lake Pleasant Treatment Area

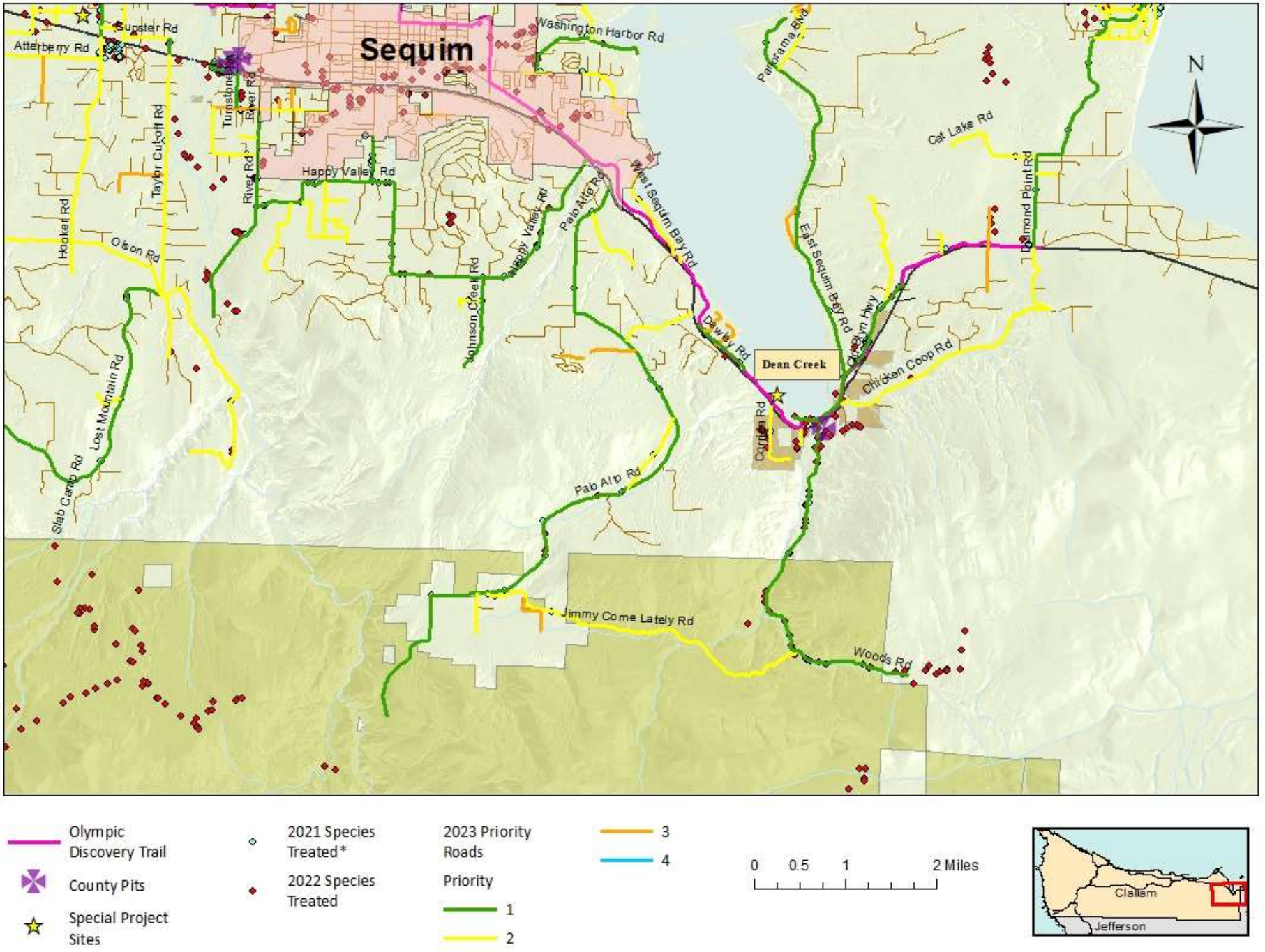
Map 9. Hoko – Clallam Bay Treatment Area

Map 10. Forks Treatment Area

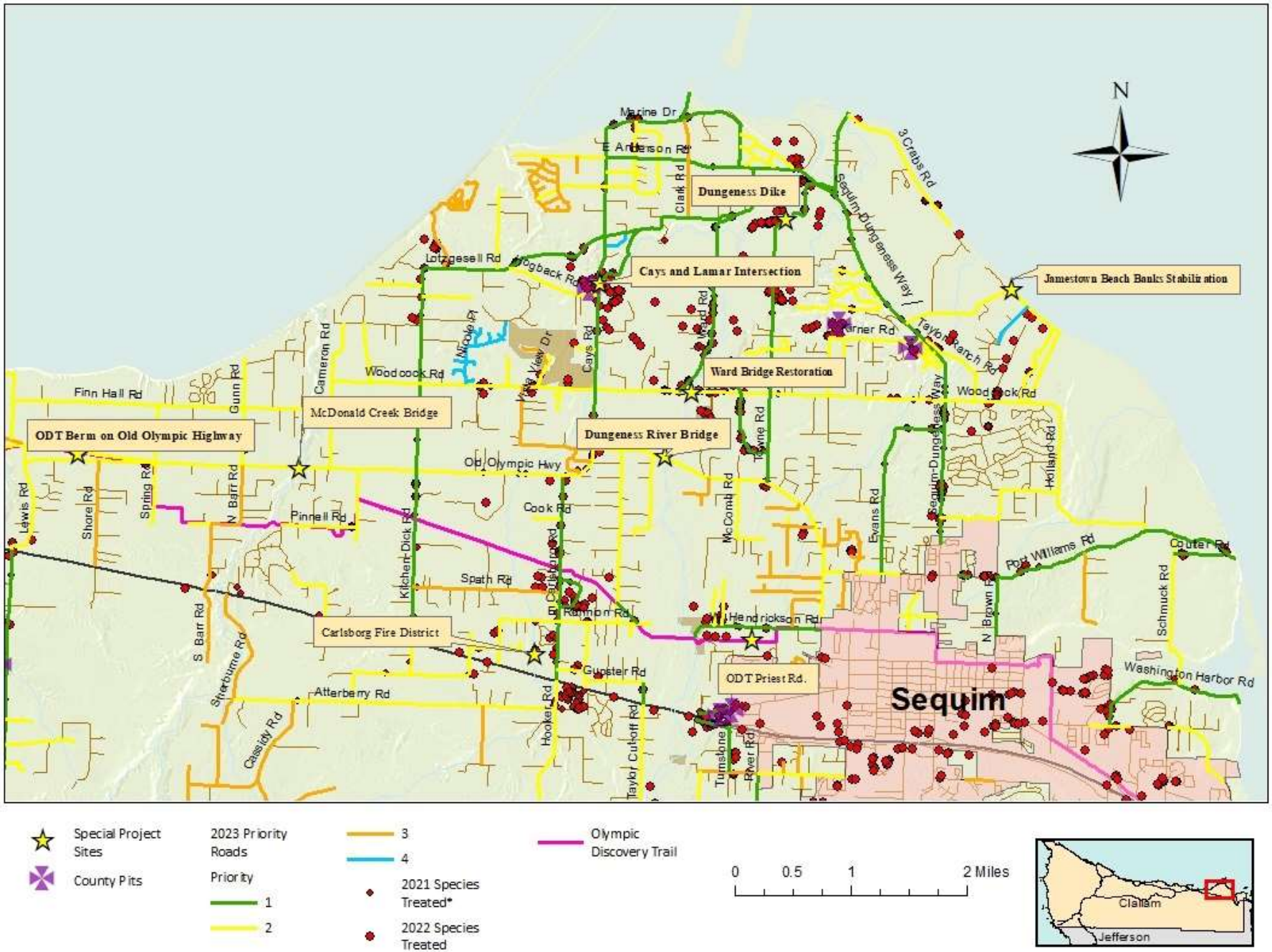
MAP 1. DISTRICT OVERVIEW



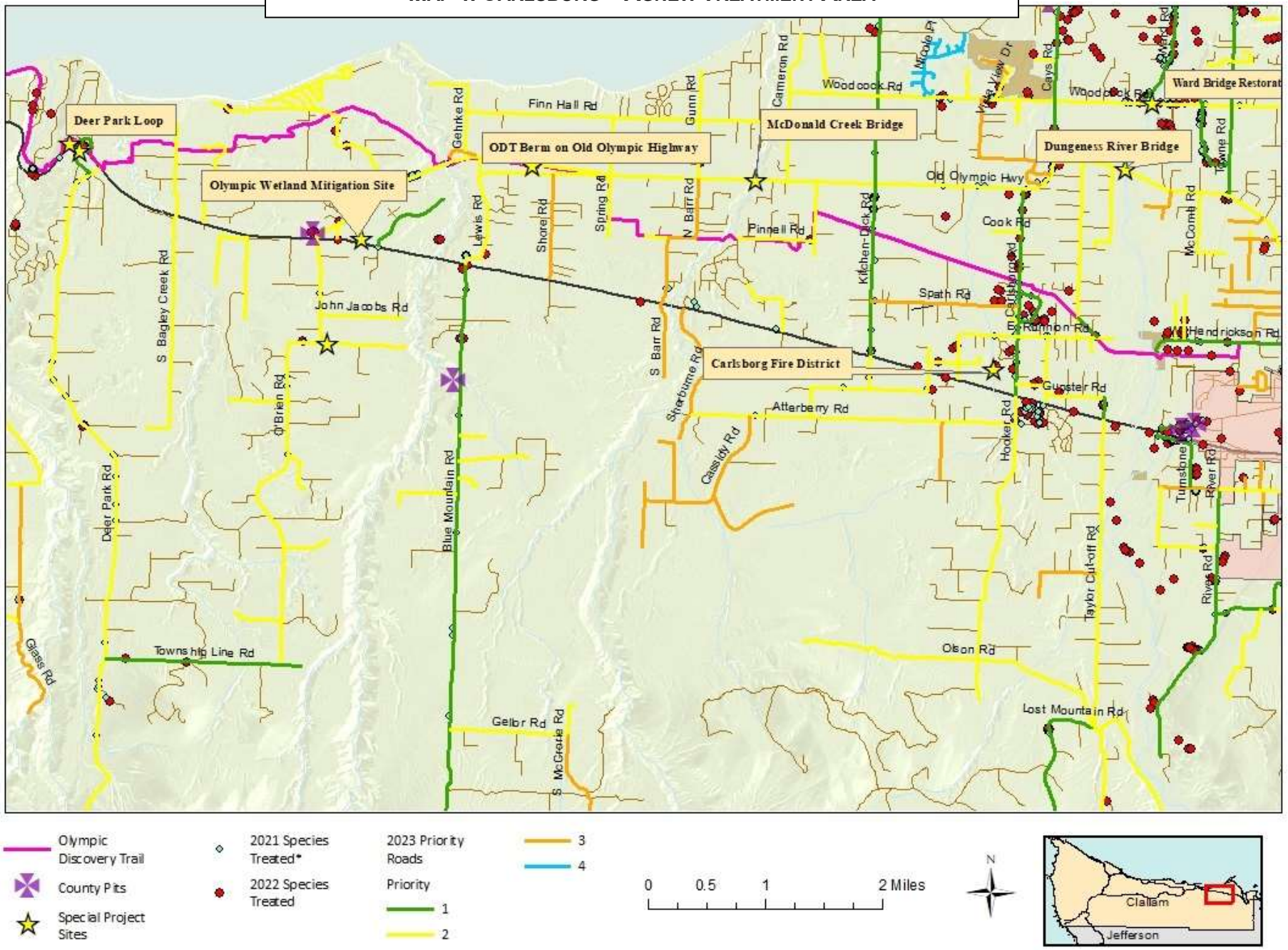
MAP 2. BLYN – MILLER PENINSULA TREATMENT AREA



MAP 3. SEQUIM – DUNGENESS VALLEY TREATMENT AREA

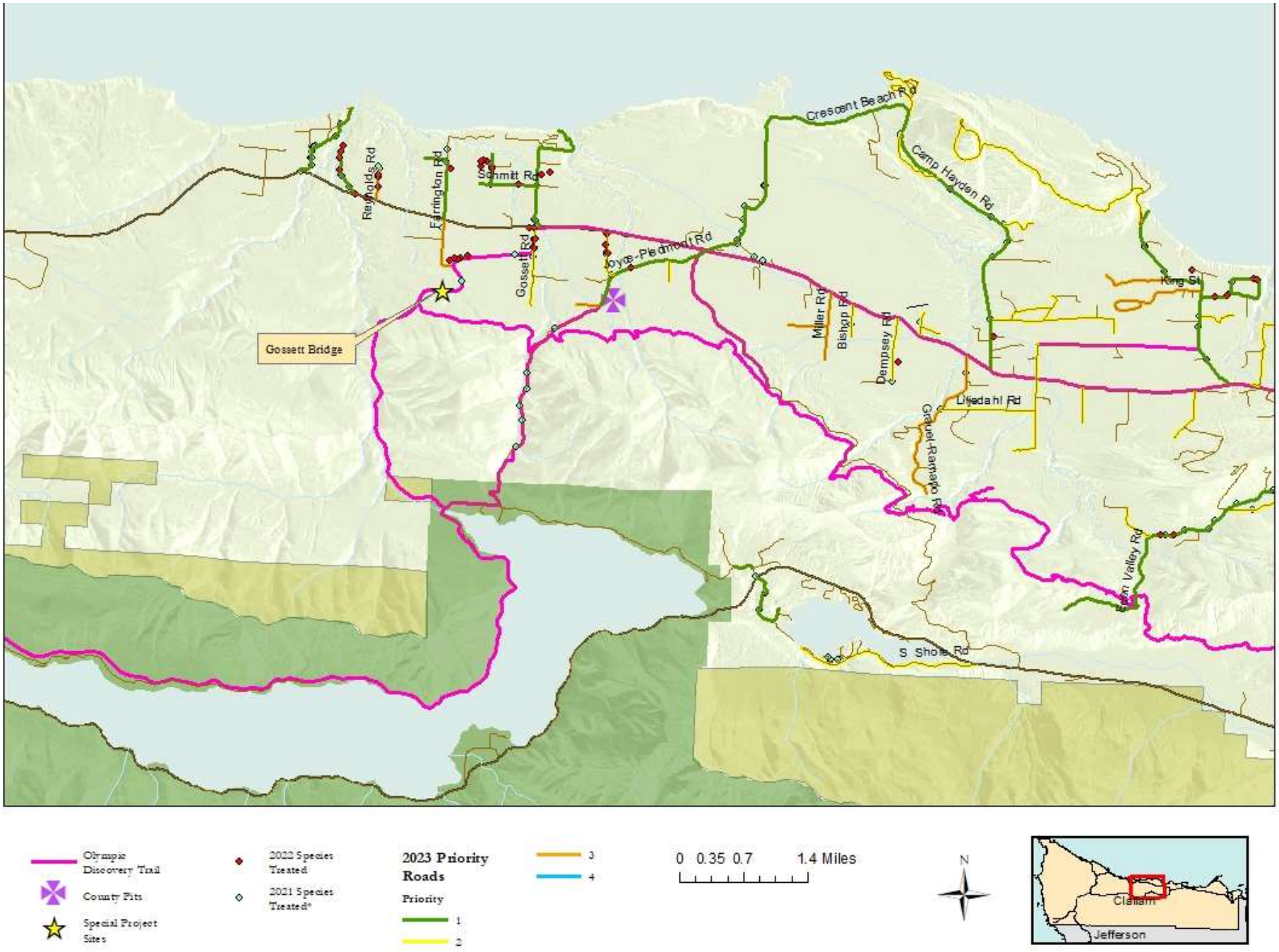


MAP 4. CARLSBORG – AGNEW TREATMENT AREA



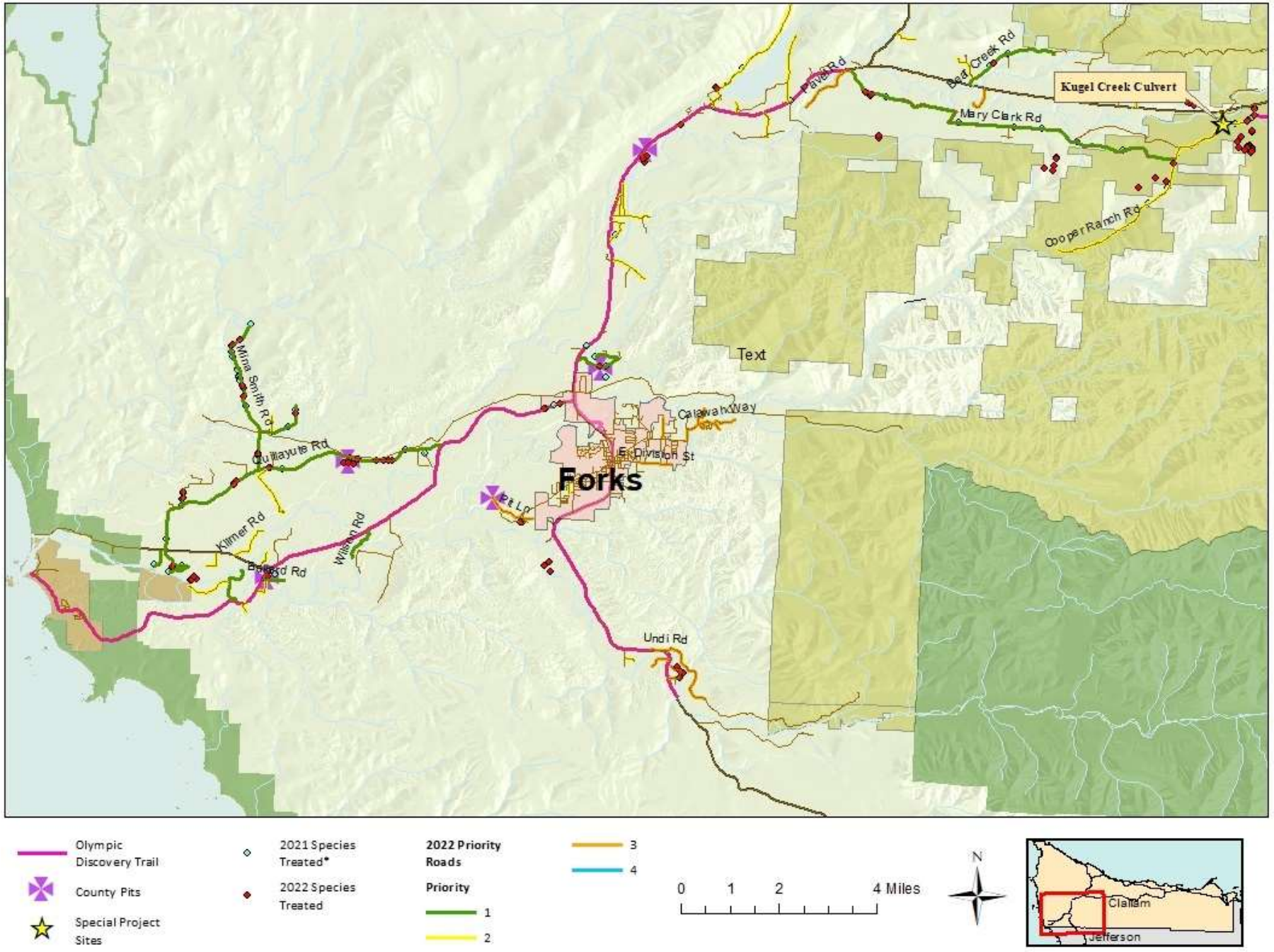
MAP 5. PORT ANGELES TREATMENT AREA

MAP 6. JOYCE TREATMENT AREA



MAP 7. CLALLAM BAY – HOKO TREATMENT AREA

MAP 8. FORKS


Kugel Creek Culvert
Mary Clark Rd
Beaver Creek Rd
Parker Rd
Cooper Ranch Rd
Text
Forks
Calawah Way
E Division St
Mina Smith Rd
Quillayute Rd
Kilmer Rd
Undi Rd
Olympic Discovery Trail
County Pits
Special Project Sites
2021 Species Treated*
2022 Species Treated
2022 Priority Roads
Priority
1
2
3
4
0 1 2 4 Miles
N
Clallam
Jefferson

HERBICIDE PRODUCT LIST

Products chosen for this program are effective on known roadside and pit weeds, offer the greatest weed selectivity, maximize worker and public safety (no wait, access when the spray has dried), and pose the lowest risk for wildlife and the environment. See Appendix B for greater detail of risk analysis, product selection process and description of application methods. Because the preferred provider may vary from year to year; different brand names than listed in the following tables with the same active ingredient may be substituted. New products or different formulations with the same active ingredient that are more user or environmentally friendly and cost beneficial will be substituted as they become available.

Clallam County identifies the following products for targeted herbicide applications:

AquaNeat® (aquatic formulation glyphosate)
Element 3A® (aquatic formulation triclopyr)
Fusilade II® (fluazifop-P)
Garlon 3A® (triclopyr)
Milestone® (aquatic formulation aminopyralid)
Oust XP® (sulfometuron-methyl)
Plateau® (imazapic)
Polaris® (aquatic formulation imazapyr)
Ranger Pro® (glyphosate)
RoundUp Pro® (glyphosate)
Transline® (clopyralid)
Vastlan® (aquatic formulation triclopyr)

APPENDICES

Appendix A: Ordinance 923 – Integrated Weed Management

Appendix B: Non-target Impacts and Risk Assessment, Herbicide Selection Process, Product List, and Application Methods

Appendix C: Sample Record Keeping Forms

Appendix D: Sample Press Release and Public Notice

Appendix E: Sample Herbicide Notice

Appendix F: Owner Will Control Packet

Appendix G: Adopt-a-Patch Permit

Appendix H: Historical Data for Known Roadside Weed Locations

Appendix I: References

APPENDIX A: ORDINANCE 923 - INTEGRATED WEED MANAGEMENT

Ordinance 923

AN ORDINANCE creating a chapter titled *"Integrated Weed Management"*

BE IT ORDAINED BY THE BOARD OF CLALLAM COUNTY COMMISSIONERS:

Section 1. Section .010, Purpose, is created to read as follows:

The purpose of this chapter is to establish an integrated weed management approach that aids Clallam County in keeping county owned or managed lands, including its improved and unimproved right-of-ways, quarries, parks and other county lands safe and operating at an efficient level of service while meeting its legal obligations and stewardship responsibilities to control noxious weeds.

Furthermore, it is the legislative body's intent that Clallam County's departments, employees, and designees have the ability and flexibility to address and combat the spread of noxious weeds in our community.

Integrated weed management should promote desirable vegetation and remove noxious and invasive plant species of special concern, through comprehensive, strategic, environmentally responsible, and cost effective methods, including mechanical, biological, cultural, chemical, and prevention control methods as needed.

This chapter is subject to applicable federal and state laws as adopted and hereafter amended; and supersedes the Clallam County Roadside Vegetation Management Policy and any subsequent resolutions relating thereto.

Section 2. Section .020, Applicability, is created to read as follow:

The provision of this chapter applies to any Clallam County department, employee, or designee that may perform work within county right-of-ways, parks or other county owned or managed lands with regard to weed control as defined in this chapter.

Inclusion of this chapter in this specific title is not intended to limit its scope and application to all county owned or managed lands.

Section 3. Section .030, Definitions is created to read as follows:

For purposes of this section, the following definitions apply:

(1) "Biological control" means using living organisms that suppress the host plant. Insects, diseases, and foraging animals are examples of biological controls.

(2) "Chemical control" means using conventional or natural herbicides to eliminate noxious weeds or additional invasive, non-native plant species that present a special concern within a specified area. It does not mean treatments for general vegetation management.

(3) "Cultural control" means enhancing the vigor of desirable plants which may crowd-out or prevent weed infestations. Hydroseeding or planting low-growing, self-maintaining shrubs are examples of cultural practices.

(4) "Feasible" means a control method or combination thereof that is capable of being carried out or achieving a goal. This includes consideration of such factors as plant biology, site characteristics, scope of the problem, and available resources.

(5) "Integrated Weed Management (IWM) " means a coordinated decision making process that uses the most appropriate weed management methods and strategies, along with a monitoring and evaluation system, to achieve weed management goals and objectives in an environmentally and

economically sound manner. It allows for the use of mechanical, biological, cultural, chemical, and prevention control methods.

(6) "Invasive plant" means an introduced, non-native plant that is aggressive and causes economic loss and adverse effects to agricultural, natural and human resources.

(7) Invasive plant of special concern means an invasive plant identified as a threat by the US Department of Agriculture, the Washington Departments of Agriculture and Ecology, or the Washington Invasive Species Council.

(8) "Mechanical, manual control" means cutting or cultivating in a manner to reduce or slow undesirable plant growth (*i.e.*, using hand labor, mowers, graders, and ditching equipment).

(9) "Planning and prevention" means creating design standards that enhance or complement other control methods (such as slope grade within mower reach) and policies or standard operating procedures such as equipment cleaning or weed free material standards that prevent contamination or spread of noxious or non-native invasive species.

(10) "Weeds" means both noxious weeds which are so designated under State law, and additional non-native invasive plants of special concern that have been added to a County specific list of plants targeted for control and elimination.

(11) "Work Plan" means a plan prepared annually by the Clallam County Road Department or any other county department with land management responsibilities, and approved by Clallam County Noxious Weed Control Board prior to the commencement of seasonal weed management.

Section 4. Section .040, Integrated Weed Management Plan, is created to read as follows:

Each department with land management responsibilities, such as the Road Department, shall develop and implement an Integrated Weed Management Plan (hereinafter "IWM Plan" or "work plan"), that is specific to land under their management. Each work plan will be reviewed annually, and amended as needed, in concert with and approved by the Noxious Weed Control Board.

Each IWM Plan shall contain a list of priority species and must include the Clallam County Noxious Weed List. Other invasive species may be added as resources allow and according to the level of threat posed. Work plans shall also contain provisions for early detection/rapid response (EDRR) that allows additional weeds, locations, and techniques to be added to a work plan as necessary should new infestations of high priority weeds be discovered during the course of the treatment season.

IWM Plans shall contain detailed information about departmental practices and standards, including but not limited to:

(1) Location of high-priority weed infestations, sensitive areas, and other areas with special management considerations.

(2) Guidelines and prescriptions for best management practices in dealing with weed problems and opportunities, including planning and prevention measures.

(3) Monitoring protocols used to evaluate infestation status and treatment effectiveness, the results of which are publically available and used to inform subsequent work plans.

(4) Creation of an outreach and education component including coordinated volunteer opportunities as time and resources allow.

A copy of each IWM Plan will be maintained by the Department for which it is developed and the Noxious Weed Control Board.

Section 5. Section .050, Citizen Option, is created to read as follows:

(1) Property owners that do not wish herbicides to be applied to eliminate noxious weeds or other invasive weeds of special concern to road right-of-ways or county managed lands directly bordering their property may enter into an annual "owner will control" agreement with Clallam County. Those with current agreements are allowed to post the county adjacent boundary as no spray areas.

(2) Under an "owner will control" agreement, the property owner must undertake specific measures, prescribed within the agreement that will ensure the timely and effective control and reduction of target weed species within the right-of-way or within a proscribed area specifically identified in the agreement

(3) If the property owner fails to effectively control or reduce targeted weed species as agreed, then Clallam County will issue a single written warning. If the problem persists after 10 days from when the written warning was sent, then Clallam County reserves the right to void the agreement upon written notice to the property owner.

(4) If any agreement is subsequently voided, Clallam County may immediately proceed with any planned weed control deemed necessary.

(5) A property owner may re-apply for a new agreement in a subsequent season; however, the County reserves the right to deny said application if there is a documented history of failure to adhere to the terms of such agreements or history of voided agreements.

ADOPTED this tenth day of January 2017

BOARD OF CLALLAM COUNTY COMMISSIONERS

Mark Ozias, Chair

Randy Johnson

ATTEST:

Loni Gores, Clerk of the Board

Bill Peach

APPENDIX B: NON-TARGET IMPACTS AND RISK ASSESSMENT, HERBICIDE SELECTION PROCESS, PRODUCT LIST, AND APPLICATION METHODS

Non-Target Impacts and Risk Assessment

Not only must a weed control strategy be effective and efficient, but it must consider potential adverse impacts to non-target plant and animal species and include measures to mitigate those impacts to the greatest extent possible.

Any potential impacts to humans, pets, livestock, wildlife, desirable plants and the environment from noxious weed and invasive plant removal are of concern to the project managers. Every control method has benefits and costs. For example, the disturbance caused by workers and mowing or excavation equipment which allows weeds to proliferate can be more significant than impacts from herbicides. Hand removal may result in trampling and soil disturbance. Although all control methods pose some level of risk, potential risks associated with herbicide use will receive the greatest scrutiny. Best management practices that reduce or mitigate potential herbicide impacts to non-target organisms will be incorporated into all aspects of the work plan.

An assessment of risk involves understanding the toxicity and likely exposure paths for various organisms that may be exposed to an herbicide. Risk assessments are used by project managers to identify those exposures that might be problematic. The project manager then uses this information to decide whether herbicides can be used without undue risk and to develop mitigation actions to reduce risks. A critical component of properly applying this risk assessment process is creating the institutional conditions for obtaining and retaining project managers who either receive or have had significant training and depth of experience to make and apply these decisions.

Several concepts are important in minimizing adverse effects. At a minimum, herbicide users should be familiar with:

1. The relative risk posed by the herbicide to the applicator and general public, and the anticipated exposure scenarios.
2. The types of wildlife and vegetation present, including endangered species. The invasive weed manager should learn enough about each species (life cycle, breeding habitat, food supply, shelter needs, etc.) to avoid impacts.
3. The relative risk posed by the herbicide to different wildlife and plant taxa that may be present and the anticipated exposure scenarios. Consideration should be given not only to the active ingredient, but also other compounds added to an herbicide formulation or added to the “tank mix” to be applied, such as surfactants.
4. The relative persistence of the herbicide in the environment, primarily in soil. Herbicide persistence is measured in terms of “half-life.” One half-life is the amount of time it takes for the herbicide to break down to 50% of its original concentration in soil or water. Generally, it takes five half-lives for more than 97% of the herbicide to be fully degraded. Herbicide persistence is discussed in more detail in Appendix B.
5. The mobility of the herbicide in runoff water. Off-site movement in surface water and leaching to groundwater are both primarily influenced by the amount applied, the herbicide’s water solubility and its tendency to adsorb to soils. Factors affecting herbicide mobility are discussed in more detail in Appendix B.

Important background information regarding the types of animals that may be impacted by noxious weed and invasive plant control in a roadside setting has been synthesized from the California Invasives Species Council (Cal-IPC) 2015 manual titled, *Best Management Practices for Wildland Stewardship: Protecting Wildlife When Using Herbicides for Invasive Plant Management* and presented below. The full document is available at www.cal-ipc.org. Such information is vital to making informed decisions on ways to mitigate or avert potential

effects where possible; especially when making control choices about herbicide selection, application methods and timing. Although the Cal-IPC manual's focus is on wildlands, many of the same types of animals may be found living near if not on, county roadsides and should therefore be considered.

Organisms that are endangered or under threat of becoming endangered receive special protection under The Endangered Species Act. An Information for Planning and Conservation (IPaC) Trust Resource report of threatened and endangered plant and animal species found in Clallam County was provided by the US Fish and Wildlife Service. These species are included in Table 10.

Insects

Insects are a diverse class of animals that are part of the food web on which many vertebrate species depend. Butterflies, bees, wasps and even mosquitoes pollinate plants that then provide fruits and seeds for other animals. Flies and beetles eat rotting debris, which helps recycle nutrients in the ecosystem. Aphids and many other soft-bodied insects suck the juices of plants and are themselves a high-protein food for other insects, reptiles, amphibians, birds and mammals.

Most insects are so small and so intimately connected to vegetation that it is difficult to avoid spraying them directly, along with the invasive plants being treated. Honeybees are routinely tested for sensitivity to herbicides and are broadly representative of other insects. While most herbicide active ingredients used in wildland weed management pose very low toxicological risks to invertebrate species, some of the inert ingredients in formulated herbicide products may pose a greater risk. For example, some oil-based emulsifiable concentrate formulations may be harmful to soft-bodied adult or larval insects like aphids or caterpillars. The Taylor's checkerspot butterfly is the only endangered insect listed in Clallam County. No roadside habitat for the Taylor's checkerspot butterfly has been identified.

Reptiles and Amphibians

Lizards, snakes, turtles, frogs, newts and salamanders are frequently residents of areas where invasive plant management is planned. These species can be exposed to herbicides through direct sprays and spray drift, and through consuming herbicide-contaminated water, prey, or plants. Amphibians may be especially vulnerable, since they spend a portion of their life cycle as aquatic organisms and often only need small puddles or seasonal streams for growth. The inert ingredients in a formulated herbicide product may be as important to evaluate as the active ingredient in terms of the risk they pose to amphibians. No endangered or threatened reptiles or amphibians have been identified in Clallam County.

Fish and Aquatic Invertebrates

Fish and aquatic invertebrates are often more sensitive to herbicides than terrestrial animals because of their physiology or the increased exposure potential that may result from herbicide movement into aquatic sites. Aquatic species can be exposed to herbicides through direct spray, spray drift, spills or surface runoff. Though few commonly used herbicide active ingredients are highly acutely toxic to aquatic organisms, toxic effects can result from the exposure to other ingredients in formulated products, such as surfactants. With the current suite of herbicides typically used in invasive plant management, bioaccumulation of herbicides in fish tissue is not a problem, since these herbicides are typically metabolized and/or excreted fairly quickly. A number of fish species (salmonids and trout) found in Clallam County are listed as threatened or endangered and many creeks and rivers are the subject of habitat restoration projects intended to help restore these stocks to healthy population levels.

Mammals

Deer, coyotes, mountain lions, wood rats, gophers, and mice are just a few of the mammals that may populate or feed on animals that populate typical roadsides. Pets, such as dogs and cats, with their owners or

wandering freely, might be exposed in a more limited manner. Animals may be exposed to herbicides through contaminated food or water, as well as direct sprays, spray drift, and contact with treated vegetation. The toxicity of herbicides to mammals has been better studied than for most other species because they are used as surrogates for human toxicity assessments. Studies on mammals allow for evaluation of a wide variety of parameters, including reproductive, developmental, and neurological effects in exposed populations, as well as effects on blood chemistry, organ weights, and body weight gain or loss.

The most abundant mammals on a typical roadside area are rodents. They are small enough and abundant enough that they may be directly sprayed or exposed to drift during an herbicide application, particularly with ground spray equipment.

Deer and other herbivores may browse on treated vegetation. Once the vegetation is dead, it becomes less attractive to eat; however, in situations where a selective herbicide is used that kills only broadleaf plants or only grass plants, the treated, but unaffected plant species may pose a dietary exposure risk.

Fishers, while not currently listed as an endangered species, have received special management consideration and have been reintroduced into Clallam County in Olympic National Park. No county roadside habitat has been identified.

Birds

Potentially impacted birds include large carnivorous birds like hawks or ospreys, herbivorous species like geese and ducks, small insectivorous birds, and small fruit and seed-eating birds. All of these species can be exposed to herbicides through their food and drinking water. The highest risks are typically for birds eating sprayed vegetation since that is often the target of the application, and the likelihood of being exposed is higher than for those species eating contaminated prey. In general, the herbicides used to control invasive plants do not pose significant acute toxicity risks to birds when used under typical use scenarios; however, less is known about chronic and reproductive effects. To minimize risk, applications during nesting season should be avoided if possible. Several federally listed bird species are found in Clallam County, but there are no habitat listings for county right-of-way.

Plants

All types of plants may be affected by weed control activities. Because herbicides are designed to kill plants, an applicator’s ability to distinguish desirable plants from weeds is critical. Certain native plant species are protected under state or federal laws. The most current data set (as a GIS shapefile) was obtained from the Natural Heritage Program which is managed by the Washington State Department of Natural Resources. It contained general locational information of rare, threatened and endangered plant species. It was reviewed for species and sites that warrant special management consideration on Clallam County roadsides. Pink fawn lily, which is noted as sensitive (a non-regulatory status) was found in the vicinity of six county roadsides. No noxious weed infestations have yet been documented in close proximity to these pink fawn lily sites, but all shall be noted and continue to be under special consideration. Whitebark pine which is a candidate for federal listing is known to exist in Clallam County, but no sites have been identified on county right of way. No rare, endangered or threatened species were identified on county roadsides in the DNR Natural Heritage Program dataset.

Table 9. Species in Clallam County with potential for special management consideration

Common Name	Populations Present /Habitat	Population Identified on County Roadside	Listing Status
PLANT			
Pink fawn lily	Yes	In vicinity of Walgren Rd, Grant Rd, Pavel Rd, River Breeze Wy, West Lake Pleasant Rd, Hoko-Ozette Rd	State-Sensitive, (non-regulatory)
Whitebark pine	Yes	none	Fed Candidate
BIRD			
Streaked Horned Lark	Yes	none	Fed-Threatened
Marbled murrelet	Yes/plus habitat overlap	none	Fed-Threatened
Northern spotted owl	Yes/plus habitat overlap	none	Fed-Threatened
Short-tailed Albatross	Yes	none	Fed-Endangered
Yellow-billed Cuckoo	Yes	none	Fed-Threatened
FISH			
Bull Trout	Yes/plus habitat overlap	Indirect	Fed-Threatened
Dolly Vardon	Yes	Indirect	Fed-Threatened
INSECT			
Taylor's checkerspot butterfly	Yes-FS, private, ONP, DNR/ plus habitat overlap	None - possible potential habitat?	Fed-Endangered
MAMMAL			
Fisher	Yes, reintroduced in ONP	None	Fed-Threatened
HABITAT OVERLAP ONLY			
Chinook	Habitat designation	Indirect	Threatened
Chum	Habitat designation	Indirect	
Sockeye	Habitat designation	Indirect	
Killer whale	Habitat designation	Indirect	

Risk Charts

The herbicide risk charts, tables, and text that follow have been reproduced with permission from the publication: Cal-IPC. 2015 *Best Management Practices for Wildland Stewardship: Protecting Wildlife When Using Herbicides for Invasive Plant Management.* Cal-IPC Publication 2015-1. California Invasive Plant Council, Berkeley, CA. The charts include the most common herbicides used by wildland managers for invasive plant management and include those chosen for use on Clallam County roadsides (see Table 13 in Appendix B). Fluazifop, which would be allowed for use under this plan, was not included in the Cal-IPC risk charts because the data needed to conduct the analysis was not available at the time the risk charts were completed.

Wildlife

The risk charts provide information on the comparative risk of each herbicide to each type of wildlife from selected exposure scenarios. A summary of the methods used to generate these charts follows and refers the reader to the primary sources for more detail. Each chart summarizes potential risk for a specific exposure scenario and is based on a risk assessment model developed by the USFS. See the spreadsheet of calculations on the PRI website for detailed information on risk charts. Using the spreadsheet, you can modify application rates to assess changes in risk profiles. It is important to note that many of the scenarios are "worst case" and do not represent typical real-world situations. The assumptions for each scenario, with a description

about how they relate to typical real-world situations are listed on the risk charts.

Risks that fall outside an acceptable zone should prompt the land manager to consider steps to mitigate the risk.

Risk to Wildlife Depends on Both Toxicity and Exposure

Risks to wildlife are dependent on the herbicide's toxicity to that particular taxonomic group and the animal's exposure to the herbicide. Toxicity is described using Toxicity Reference Values (TRVs), which represent the dose of herbicide generally assumed to be without adverse effects. Lower TRVs indicate a more toxic herbicide for the particular taxonomic group. The TRVs used to develop the risk charts for the different wildlife taxa are summarized in below.

An important determinant of exposure is the herbicide application rate. For the risk charts, the application rates were set to half of the maximum application rate as indicated on the herbicide's product label. This "half- max" application rate was used to better approximate typical wildland herbicide applications. For example, invasive plant management typically involves portions of acres to be spot treated, but not entire acres. Alternatively, entire acres might be treated via broadcast spray, but at rates below maximum allowable rates. Since application rate is directly proportional to risk, the risk values at maximum application rates would simply be twice the values shown in the charts (likewise, lower rates would have proportionally less risk)—with the exception of spills, where application rate is not relevant. Table 11 provides the application rates used to estimate exposure for each herbicide in terms of pounds of the active ingredient (or the acid equivalent of the active ingredient) and the equivalent rate per acre for the formulated product.

While hazard assessment for most chemicals typically involves investigating the relationship between increasing exposure and increasing observed adverse effects in laboratory studies, some chemicals may have the potential to cause impacts at very low doses.

Examples of this are the endocrine disrupting chemicals (EDCs), which can interfere with an animal's endocrine (hormone) system, potentially at very low exposure levels. Certain chemicals such as the plasticizers found in plastic bottles are suspected to be EDCs. At the present time, there is no evidence that any of the herbicide active ingredients used in invasive weed control are EDCs. The US EPA studied glyphosate and 2,4-D through their Endocrine Disruptor Screening Program and determined that no convincing evidence exists that either substance disrupts estrogen, androgen, or thyroid pathways. Studies have not been conducted for the other herbicides discussed in this manual, but none are on the European Union list of suspected endocrine disruptors.

Hazard Quotients Defined

The Hazard Quotient (HQ) is a measure of risk and is defined as the ratio of the predicted exposure to a Toxicity Reference Value (TRV) for the particular type of wildlife being assessed. HQ values >1 indicate that exposure exceeds the "No Effect" level, and wildlife may be at risk of adverse effects. For these exposure scenarios, action should be taken by the land manager to reduce exposure.

Table 10. Half-Maximum Application Rates Used in Risk Charts

Herbicide Active Ingredient	Half-Max Application Rate (lbs AE or AI per acre)	Half-Max Application Rate (rate per acre)
Aminopyralid	0.055	3.5 oz of Milestone®/acre
Chlorsulfuron	0.061	1.5 oz of Telar®/acre
Clopyralid	0.125	0.335 pints Transline®/acre
Glyphosate	4.0	3.5 quarts RoundupProMax®/acre (with surfactant) 4 quarts Aquamaster®/acre (no surfactant)
Imazapyr	0.75	3 pts Habitat®/acre
Triclopyr BEE	4.0	4 quarts Garlon 4®/acre
Triclopyr TEA	4.5	1.5 gals Garlon 3®/acre
2,4-D	2.0	4 pts Weedar®/acre

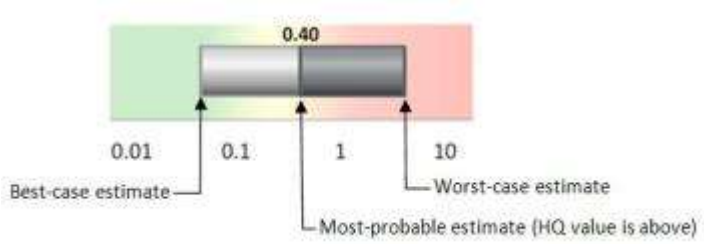
AE = Acid Equivalent; AI = Active Ingredient.

**Fluazifop (Fusilade®) is the one widely-used active ingredient not included in the risk charts because USFS risk analysis was completed after the risk charts were developed*

How to Read the Risk Charts

In the risk charts that follow, risk is expressed as a Hazard Quotient (HQ), which is the ratio of the predicted exposure to a Toxicity Reference Value (TRV), a level of exposure that is anticipated to be without adverse effects.

Each bar on the chart shows a range of estimated risk for a specific exposure scenario based on three estimates of exposure—best-case (low exposure), most-probable (the most likely exposure), and worst-case (high exposure). Each estimate is based on a set of assumptions, such as the amount of herbicide residue on food (such as foliage, fruits, and insects) and the amount of food eaten or the amount of runoff into a water body. Factors used to estimate exposure specific to each scenario are listed in the caption for each chart.



The **best-case risk estimate** is at the left end of each bar and assumes the lowest exposure. The **most- probable risk estimate** (HQ=0.40 in the example above) is located at the point at which the bar changes color from light gray to dark gray and assumes the most likely exposure. The **worst-case risk estimate** is at the right end of the bar and assumes worst-case exposures.

The background of each risk chart is color-coded, with a HQ in the green zone indicating low risk, an HQ in the yellow zone indicating that anticipated exposures are approaching a level of concern, and an HQ in the red zone indicating that the predicted exposure will exceed the TRV, and adverse effects may result. Because wildlife TRVs are derived from No Observable Adverse Effect Levels (NOAELs), a bar in the red zone does not necessarily mean that harm will occur, but risks that fall in this zone should prompt the land manager to consider steps to mitigate the risk. The further the bar is into the red zone, the more likely it is that adverse effects will occur. The BMPs in Section 3 describe steps that can be taken to reduce risks when HQ values risk calculations exceed a level of concern.

The scale of the charts is logarithmic, which allows for the display of values that differ by many factors of ten. The logarithmic scale also visually compresses the bars and skews plots slightly to the right—for example, a HQ value of 0.5 is not exactly in the middle between 0.1 and 1, but slightly to the right of the halfway point.

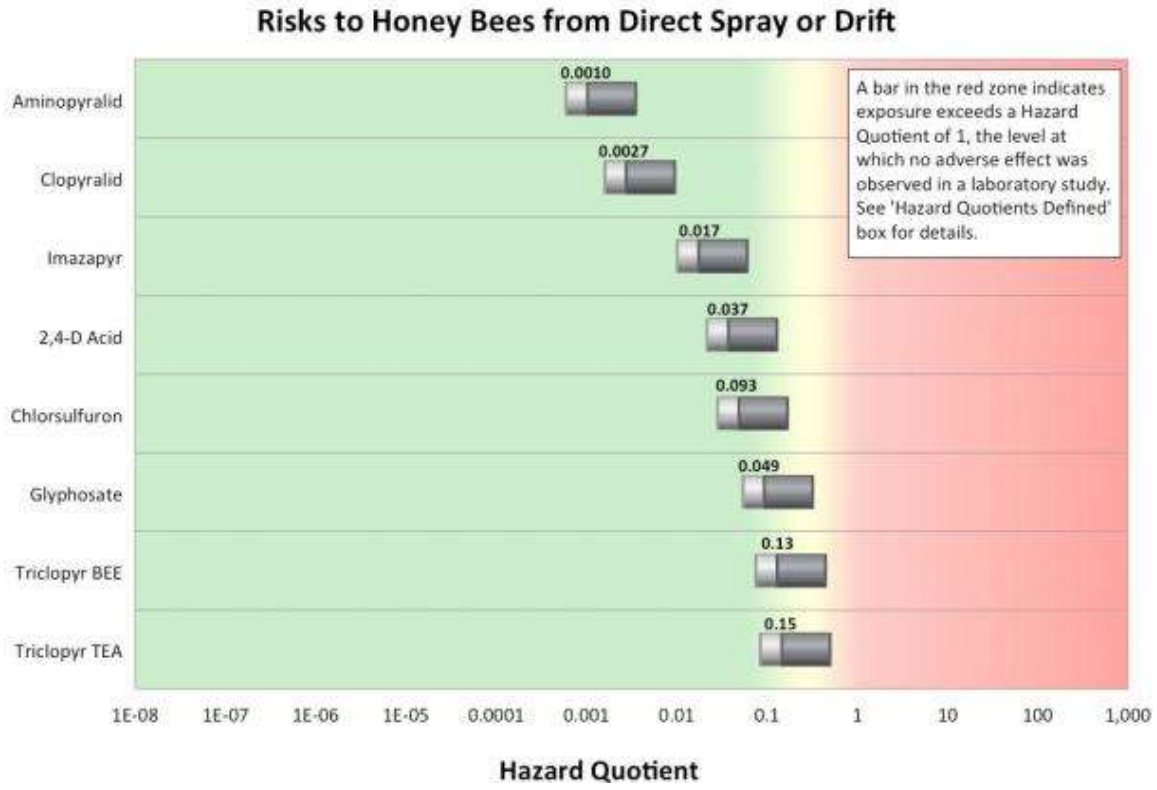
Overview of Risks to Wildlife from Use of Common Herbicides

Overall, the risk estimates shown in the charts demonstrate that for the majority of the most-probable acute exposure scenarios, the herbicides pose low risks to wildlife. An exception to this involves fish and aquatic invertebrates exposed to glyphosate formulations that contain certain higher-toxicity surfactants such as polyethyleneamine (POEA). These products cannot be legally applied directly to water, and applicators should also use caution when making applications near aquatic sites, such as ephemeral pools that may be used as breeding areas for amphibians and insects. Using glyphosate products that do not contain POEA in these settings can reduce the potential for impacts.

A second example of risks that may exceed the level of concern under the most-probable exposure scenarios involves products that contain either triclopyr BEE or triclopyr TEA. In these cases, the HQ values can exceed the level of concern for chronic exposure scenarios when large, herbivorous mammals consume vegetation that contains residues of these herbicides.

With regard to the worst-case (highest) exposure level scenarios, 2,4-D acid, glyphosate/surfactant combinations and triclopyr BEE and TEA can all pose risks that exceed the level of concern. These scenarios include both acute and chronic exposures for aquatic invertebrates, fish, mammals and birds.

Figure 4:



Taxa: Adult stage honey bees are used as a surrogate for all terrestrial insects.

Assumptions: Terrestrial application of herbicide at half of the maximum rate on a representative product's label (see Table 11); 50% of the bee's body surface is covered with herbicide; 100% of herbicide is absorbed; the distance between the bee and the sprayer is 0-10 feet.

Likelihood: Most likely with spray-to-wet applications on blooming plants or those with extrafloral nectaries.

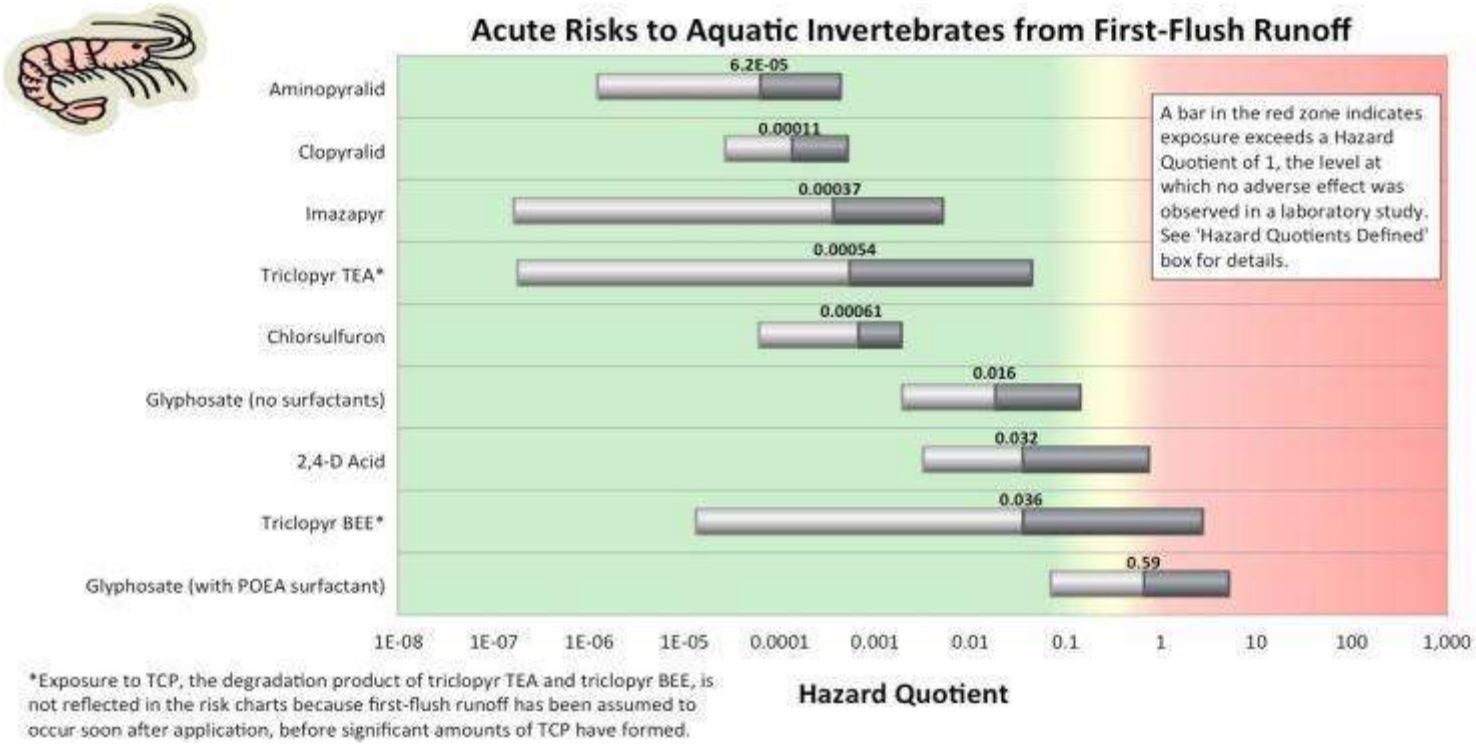
Mitigation: Do not apply to blooming plants. Apply early in the morning or close to sunset when insects are less active. Use low-volume applications and reduce the amount applied per acre.

Risk calculated as a function of: The inherent toxicity of the herbicide to honey bees; the amount of active ingredient sprayed; and the distance between bee and applicator. Risks in this chart do not account for potential toxicity of any surfactants that are part of the product formulation or added to spray mixtures.

Methodology and sources: See description following risk charts and PRI website, where you can access a spreadsheet for adjusting application rates and other variables.

Reading the chart: For each bar, the labeled central value is the most likely estimate. The right end of the bar assumes worst-case conditions for all underlying variables; the left end of the bar assumes best-case conditions. Mitigation is advised if risk enters the red zone.

Figure 5:



Taxa: Aquatic invertebrates.

Assumptions: Terrestrial application of herbicide at half of the maximum rate on a representative product's label (see Table 11); 10-acre treatment with no buffer zone between treatment area and water body.

Likelihood: Buffer zones may be required on some water ways and are common practice when using herbicides not approved for aquatic use. Dry season applications can result in long intervals before a rain event, resulting in lower residues for runoff.

Mitigation: Use low-volume applications and reduce the amount applied per acre. Use buffer zones (see Bakke (2001) to help gauge effective buffer distances). Make applications during the dry season to avoid runoff. For applications near waterways, consider using herbicide formulations intended for use in aquatic systems.

Risk calculated as a function of: The inherent acute toxicity of the herbicide to aquatic invertebrates; herbicide characteristics that affect transport through soil to water (water solubility, ability to adsorb to soil); soil type; and the application rate. Herbicide degradation is not considered, as the estimate is for runoff occurring soon after the application. Except for glyphosate with the POEA surfactant, risks in this chart do not account for potential toxicity of any surfactants that are part of the product formulation or added to spray mixtures.

Methodology and sources: See description following risk charts and PRI website where you can access a spreadsheet for adjusting application rates and other variables.

Reading the chart: For each bar, the labeled central value is the most likely estimate. The right end of the bar assumes worst-case conditions for all underlying variables; the left end of the bar assumes best-case conditions. Mitigation is advised if risk enters the red zone.

Figure 6:

*Exposure to TCP, the degradation product of triclopyr TEA and triclopyr BEE, is not reflected in the risk charts because first-flush runoff has been assumed to occur soon after application, before significant amounts of TCP have formed.

Taxa: Fish are also used as a surrogate for amphibians.

Assumptions: Terrestrial application of herbicide at half of the maximum rate on a representative product's label (see Table 11); 10-acre treatment with no buffer zone between treatment area and water body; rain within 24 hours of application.

Likelihood: Buffer zones may be required on many water ways and are common practice when using herbicides not approved for aquatic use. Dry season applications in California will result in a long interval before a rain event, resulting in lower residues for runoff.

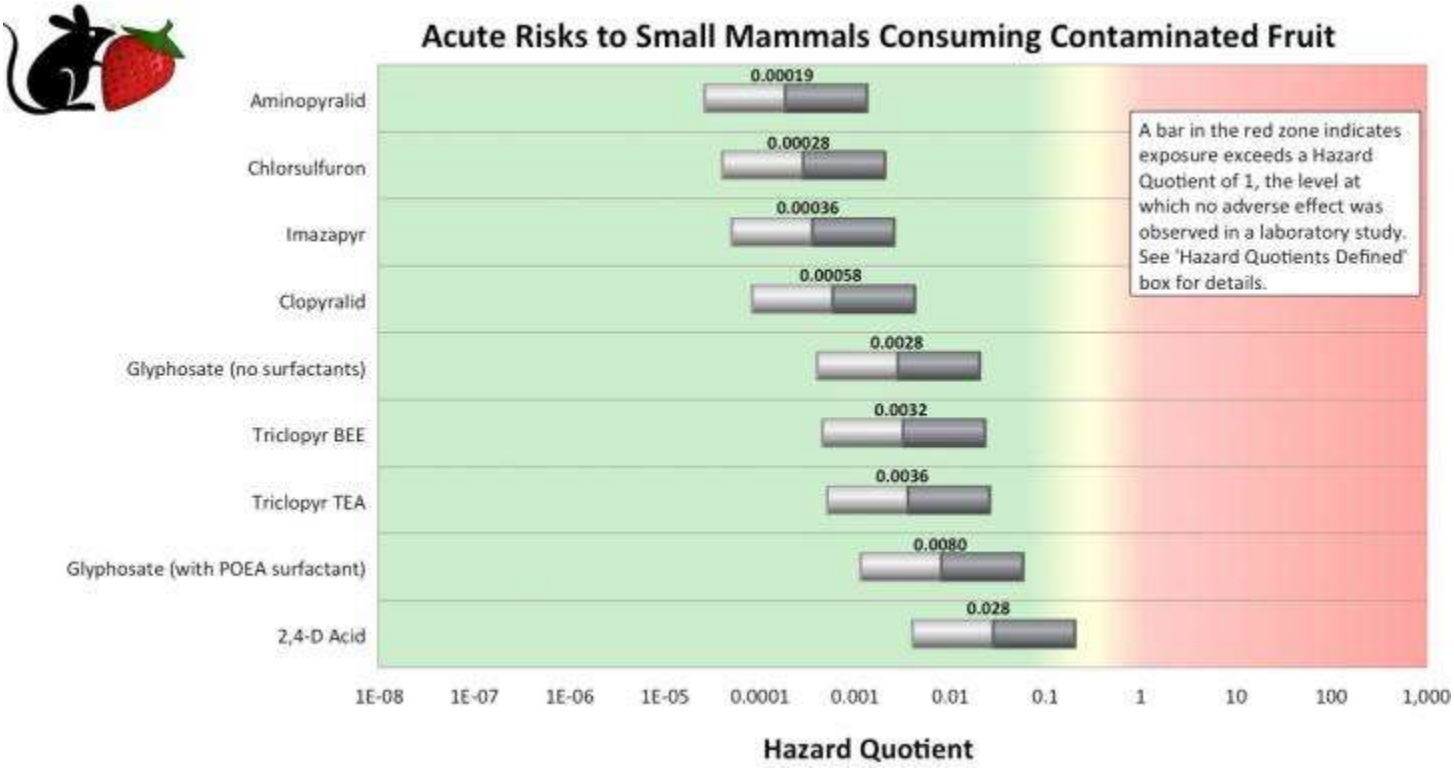
Mitigation: Use low-volume applications and reduce the amount applied per acre. Use buffer zones (see Bakke (2001) to help gauge effective buffer distances). Make applications during the dry season to avoid runoff. For applications near waterways, consider using herbicide formulations intended for use in aquatic systems.

Risk calculated as a function of: The inherent acute toxicity of the herbicide to fish; herbicide characteristics that affect transport through soil to water (water solubility, ability to adsorb to soil); soil type; and the application rate. Herbicide degradation is not considered, as the estimate is for runoff occurring soon after the application. Except for glyphosate with the POEA surfactant, risks in this chart do not account for potential toxicity of any surfactants that are part of the product formulation or added to spray mixtures.

Methodology and sources: See description following risk charts and go to PRI website where you can access a spreadsheet for adjusting application rates and other variables.

Reading the chart: For each bar, the labeled central value is the most likely estimate. The right end of the bar assumes worst-case conditions for all underlying variables; the left end of the bar assumes best-case conditions. Mitigation is advised if risk enters the red zone.

Figure 7:



Taxa: Small mammals.

Assumptions: Terrestrial application of herbicide at half of the maximum rate on a representative product's label (see Table 11); 10-100% of diet is contaminated.

Likelihood: Under spot applications it is possible that a significant portion of a small mammal's diet could be contaminated. With broadcast applications over any sizable area (unusual for wildland management) contamination is likely for some small mammals.

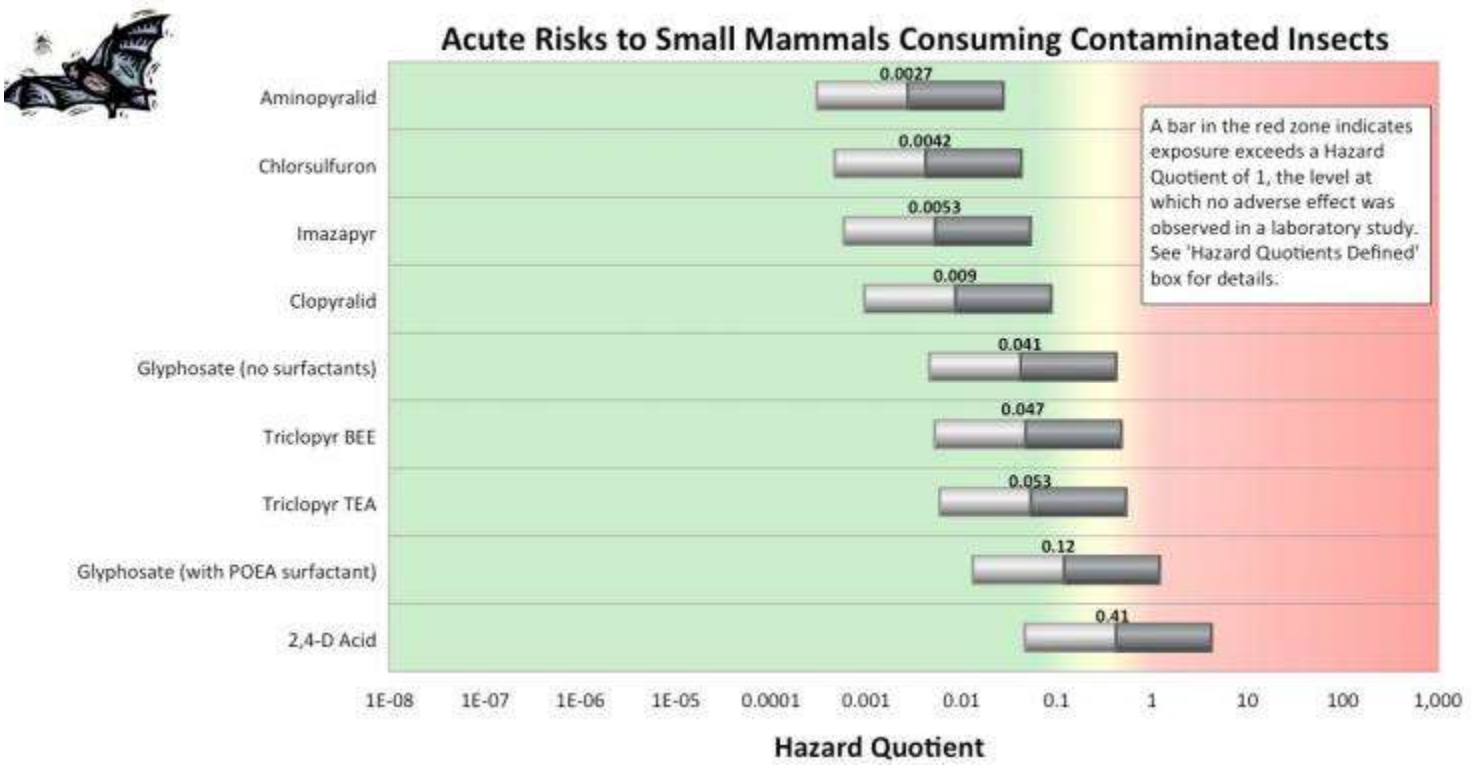
Mitigation: Use low-volume application and reduce the amount applied per acre. If possible, don't treat large contiguous areas all at once. Avoid contamination of plants used as food sources by small mammals.

Risk calculated as a function of: The inherent acute toxicity of the herbicide to mammals; the residue rate of herbicide on fruit (which is proportional to the application rate). Except for glyphosate with the POEA surfactant, risks in this chart do not account for potential toxicity of any surfactants that are part of the product formulation or added to spray mixtures.

Methodology and sources: See description following risk charts and go to PRI website, where you can access a spreadsheet for adjusting application rates and other variables.

Reading the chart: For each bar, the labeled central value is the most likely estimate. The right end of the bar assumes worst-case conditions for all underlying variables; the left end of the bar assumes best-case conditions. Mitigation is advised if risk enters the red zone.

Figure 8:



Taxa: Small mammals.

Assumptions: Terrestrial application of herbicide at half of the maximum rate on a representative product's label (see Table 11); 10-100% of diet is contaminated.

Likelihood: Under spot applications it is unlikely that a significant portion of a small mammal's insect-based diet could be contaminated. With broadcast applications over any sizable area (unusual for wildland management) contamination is possible for some small mammals.

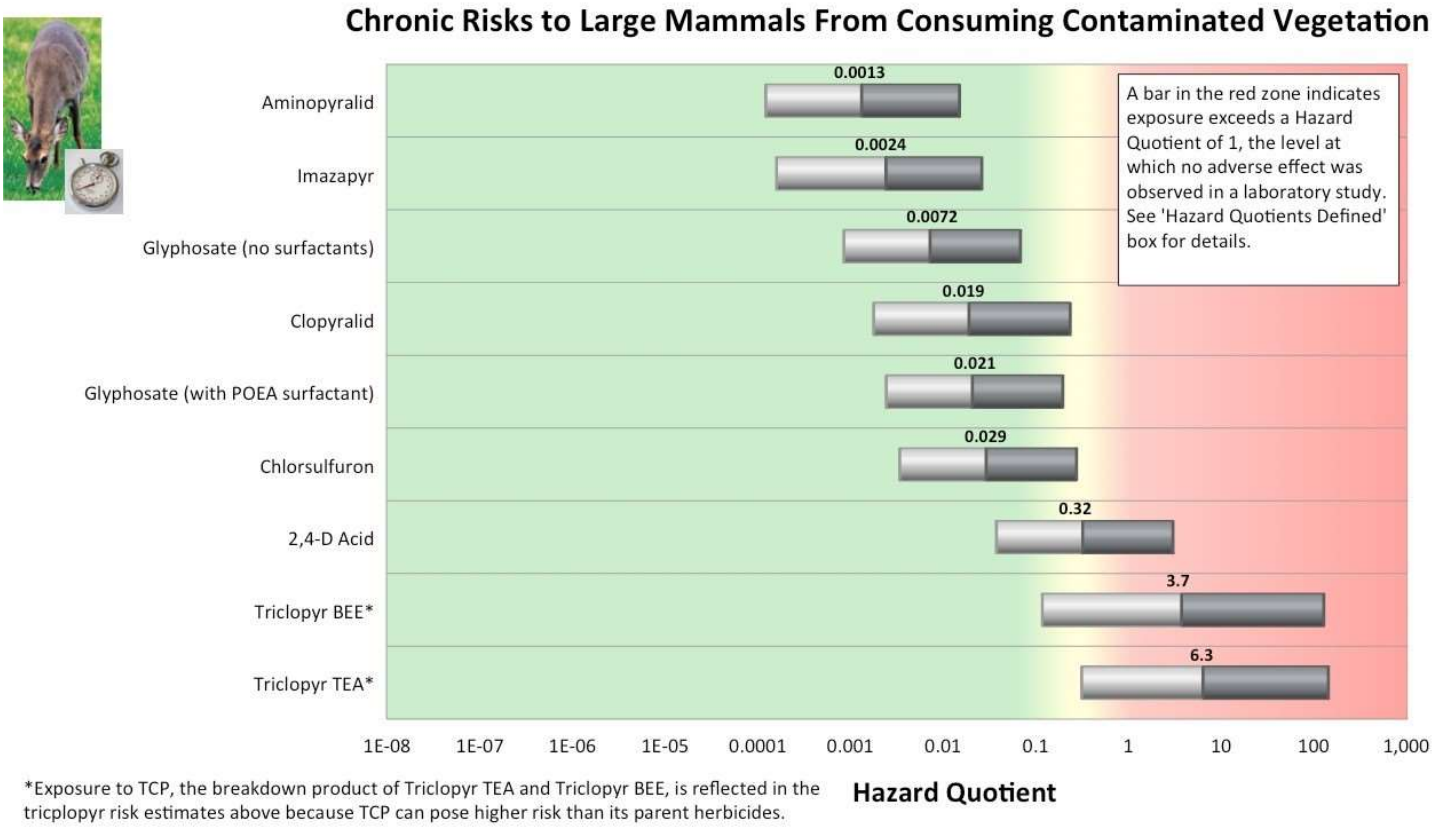
Mitigation: Use low-volume applications and reduce the amount applied per acre. If possible, don't treat large contiguous areas all at once. Avoid treating plants when feeding by insects is likely, if known.

Risk calculated as a function of: The inherent acute toxicity of the herbicide to mammals; the residue rate of herbicide on insects (which is proportional to the application rate). Except for glyphosate with the POEA surfactant, risks in this chart do not account for potential toxicity of any surfactants that are part of the product formulation or added to spray mixtures.

Methodology and sources: See description following risk charts and go to PRI website, where you can access a spreadsheet for adjusting application rates and other variables.

Reading the chart: For each bar, the labeled central value is the most likely estimate. The right end of the bar assumes worst-case conditions for all underlying variables; the left end of the bar assumes best-case conditions. Mitigation is advised if risk enters the red zone.

Figure 9:



Taxa: Large mammals.

Assumptions: Terrestrial application of herbicide at half of the maximum rate on a representative product's label (see Table 11); 10-100% of diet is contaminated for several months.

Likelihood: Under spot applications it is unlikely that a significant portion of any large mammal's diet would be contaminated. With broadcast applications over any sizable area (unusual for wildland management) consider the feeding range of the wildlife relative to the treatment area.

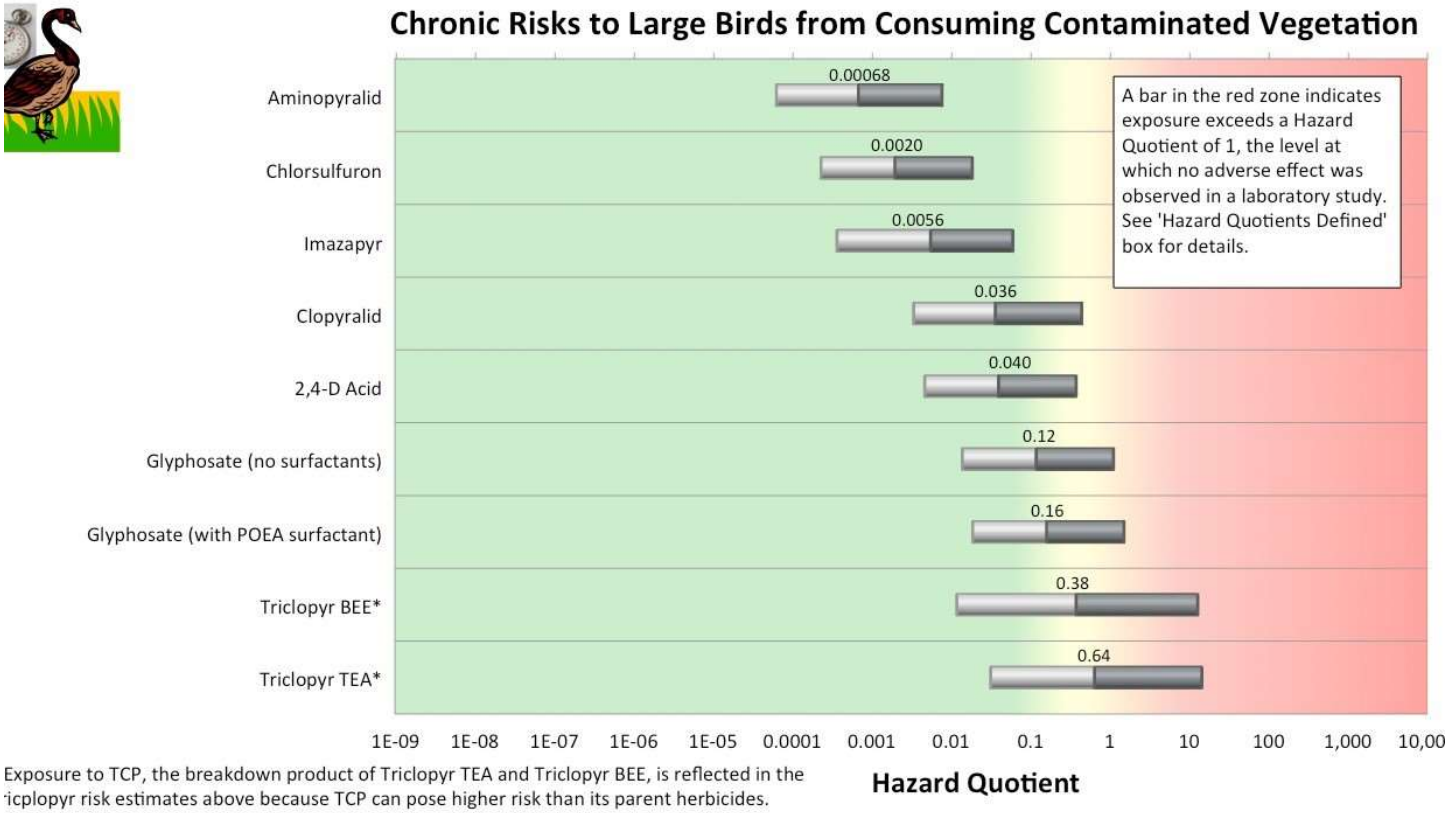
Mitigation: Use low-volume applications and reduce the amount applied per acre. If possible, don't treat large contiguous areas all at once. Avoid contamination of plants known to be used as food sources by large mammals.

Risk calculated as a function of: The inherent chronic toxicity of the herbicide to mammals; the residue rate of herbicide on vegetation (proportional to the application rate). Except for glyphosate with the POEA surfactant, risks in this chart do not account for potential toxicity of any surfactants that are part of the product formulation or added to spray mixtures.

Methodology and sources: See description following risk charts and go to PRI website, where you can access a spreadsheet for adjusting application rates and other variables.

Reading the chart: For each bar, the labeled central value is the most likely estimate. The right end of the bar assumes worst-case conditions for all underlying variables; the left end of the bar assumes best-case conditions. Mitigation is advised if risk enters the red zone.

Figure 10:



Exposure to TCP, the breakdown product of Triclopyr TEA and Triclopyr BEE, is reflected in the ·icplopyr risk estimates above because TCP can pose higher risk than its parent herbicides.

Taxa: Large birds.

Assumptions: Terrestrial application of herbicide at half of the maximum rate on a representative product's label (see Table 11); 10-100% of diet is contaminated for several months.

Likelihood: Under spot applications it is unlikely that a high portion of any bird's diet would be contaminated. With broadcast applications over any sizable area (unusual for wildland management) consider the feeding range of the wildlife relative to the treatment area.

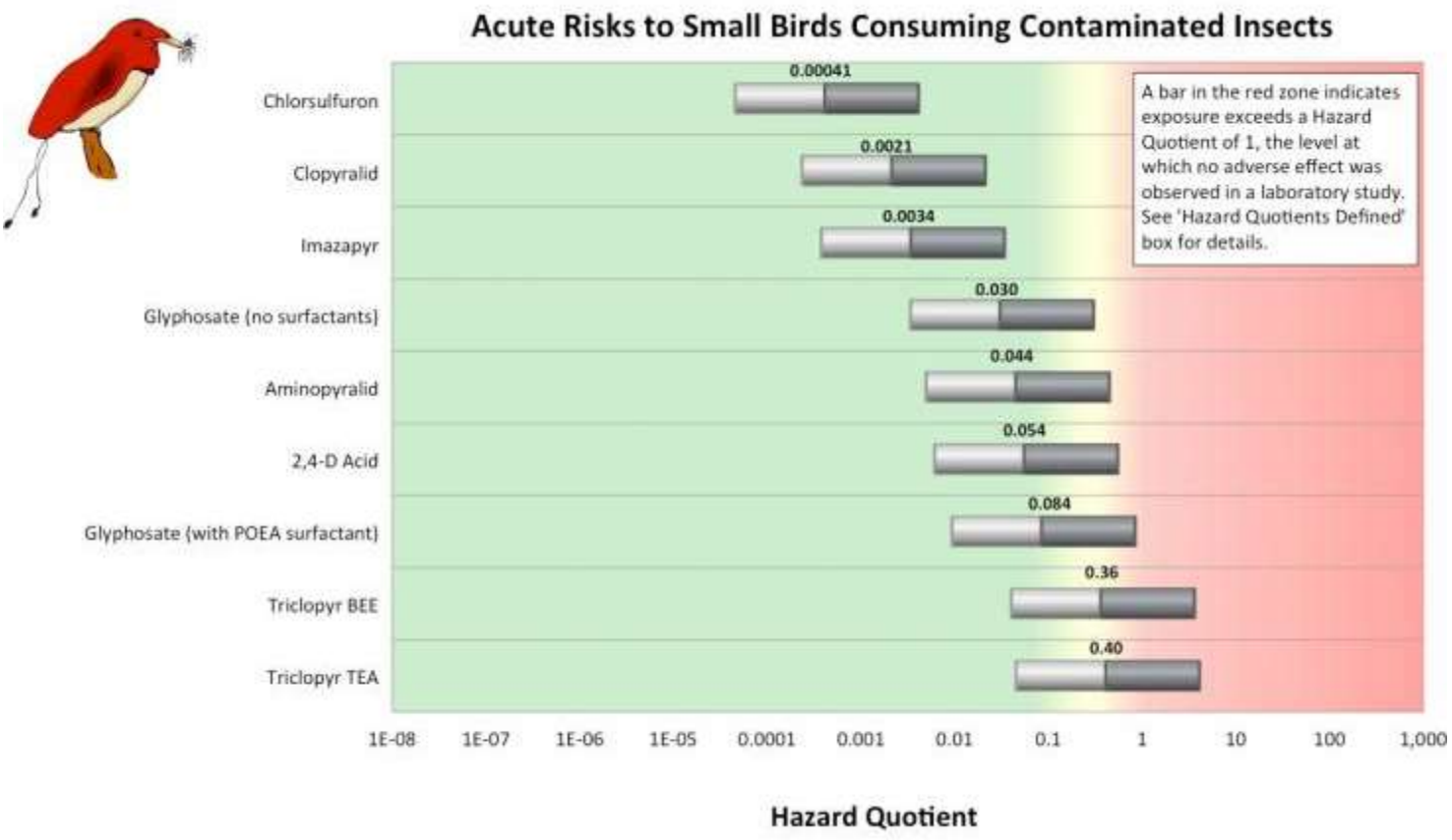
Mitigation: Use low-volume applications and reduce the amount applied per acre. If possible, don't treat large contiguous areas all at once. Avoid contamination of plants known to be used as food sources by birds. Avoid treatments during nesting season.

Risk calculated as a function of: The inherent chronic toxicity of the herbicide to birds; the residue rate of herbicide on vegetation (which is proportional to the application rate). Except for glyphosate with the POEA surfactant, risks in this chart do not account for potential toxicity of any surfactants that are part of the product formulation or added to spray mixtures.

Methodology and sources: See description following risk charts and go to PRI website, where you can access a spreadsheet for adjusting application rates and other variables.

Reading the chart: For each bar, the labeled central value is the most likely estimate. The right end of the bar assumes worst-case conditions for all underlying variables; the left end of the bar assumes best-case conditions. Mitigation is advised if risk enters the red zone.

Figure 11:



Taxa: Small birds.

Assumptions: Terrestrial application of herbicide at half of the maximum rate on a representative product's label (see Table 11); 10-100% of diet is contaminated.

Likelihood: Under spot applications it is unlikely that a high portion of any bird's insect-based diet would be contaminated. With broadcast applications over any sizable area (unusual for wildland management) consider the feeding range of the wildlife relative to the treatment area.

Mitigation: Use low-volume applications and reduce the amount applied per acre. If possible, don't treat large contiguous areas all at once. Avoid treating plants when insects are feeding. Avoid treatments during nesting season.

Risk calculated as a function of: The inherent acute toxicity of the herbicide to birds; the residue rate of herbicide on insects (which is proportional to the application rate). Except for glyphosate with the POEA surfactant, risks in this chart do not account for potential toxicity of any surfactants that are part of the product formulation or added to spray mixtures.

Methodology and sources: See description following risk charts and go to PRI website, where you can access a spreadsheet for adjusting application rates and other variables.

Reading the chart: For each bar, the labeled central value is the most likely estimate. The right end of the bar assumes worst-case conditions for all underlying variables; the left end of the bar assumes best-case conditions. Mitigation is advised if risk enters the red zone.

Risk Assessment Methodology

The methods used for estimating risk are based closely on USFS risk assessment methodology (link), in which three estimates are calculated for the exposure (dose) received as a result of various herbicide use scenarios. Each dose estimate is based on a set of best-case, most-probable, or worst-case assumptions based on exposure parameters appropriate to that scenario. The dose estimates are then compared to Toxicity Reference Values to assess risk if the scenario were to occur.

Exposure estimates were calculated using the risk assessment spreadsheets developed by Syracuse Environmental Research Associates (SERA) for the USFS and the Bureau of Land Management (BLM), published between 2007 and 2014. A full description is available in the report "Preparation of Environmental Documentation and Risk Assessments." Risk assessments for each of the herbicides discussed here are also downloadable from the USFS site. A detailed explanation of the methods used to estimate risk in this report is also available in Chapter 2 of the "2010 Marin Municipal Wastewater District (MMWD) Herbicide Risk Assessment." However, some parameter values and methods used for the risk estimates above differ from the *2010 MMWD Herbicide Risk Assessment*. Each of these changes is discussed below. Finally, the PRI website provides detailed information on how the risk charts were developed and allows users to modify application rates to assess changes in risk profiles.

Modifications to USFS Risk Estimation Methods

Several modifications to USFS/SERA default values were made for this evaluation:

TRVs: Toxicity Reference Values (TRVs) based on LD_{50} or LC_{50} transformed to "No Effect" levels by incorporating an additional uncertainty factor of 20, the methodology used by US EPA to adjust TRVs for assessment effects to endangered species. This transformation ensures that all TRVs are based on "No Effect" levels and allows direct comparison of herbicides. This change has been incorporated into the more recent USFS herbicide risk assessments, and PRI updated the older risk assessments to include this change.

Percent of diet contaminated: In more recent versions of the USFS/SERA herbicide risk assessments, the percentage of an animal's diet assumed to be contaminated was modified to 10% (best-case), 30% (most-probable) or 100% (worst-case). PRI applied the same change to herbicides not yet adopted by USFS, to ensure an "apples to apples" comparison between herbicides. Residue rates assumed for herbicides on food (fruit, vegetation and prey) were based on the most up-to-date values from USFS/SERA (WorksheetMaker 6.0). The caloric error factor, which was introduced in recent versions of USFS/SERA worksheets, was not utilized here.

Herbicide Residue Rates: USFS changed the residue rates used in the latest version of their risk calculation spreadsheets for estimating exposures from consumption of contaminated fruit, insects and vegetation. This change lowers the best-case predicted dose for wildlife from consumption of contaminated food. In the new versions of the spreadsheets, a new lower residue rate was introduced that is equivalent to the following:

Best-case residue rate = Most-probable rate x (Most-probable rate ÷ Worst-case rate)

These values were incorporated into the calculations for all of the herbicides to ensure comparison of equivalent value.

Insect Contamination Rate: The USFS changed the mass of a honey bee from 93 mg to 116 mg and the surface area from 2.66 cm^2 to 1.42 cm^2 in the more recent herbicide reviews. The net effect is to reduce the estimated dose received by the honey bee. These values were incorporated into the calculations for all of the herbicides to ensure comparison of equivalent values.

Toxicity Reference Values Used to Estimate Risk

Toxicity Reference Values (TRVs) are given in terms of mg of acid equivalent (AE) or active ingredient (AI). NOAEL is the No-Observed-Adverse-Effect Level.

Table 11. Toxicity reference values used to estimate risk

Receptor (units)	Herbicide	TRV Used	USFS TRV	Endpoint
Honeybees (mg/bee)	2,4-D Acid	1075	1075	NOAEL
	Aminopyralid	1075	1075	NOAEL
	Chlorsulfuron	25	25	NOAEL
	Clopyralid	909	909	NOAEL
	Glyphosate	860	860	NOEC
	Imazapyr	860	860	NOAEL
	Triclopyr BEE	620	620	NOAEL[b]
	Triclopyr TEA	620	620	NOAEL[b]
Birds, acute (mg/kg body weight)	2,4-D Acid	415	415	NOAEL
	Aminopyralid	14	14	NOAEL
	Chlorsulfuron	1686	1686	NOAEL
	Clopyralid	670	670	NOAEL
	Glyphosate	1500	1500	NOAEL
	Imazapyr	2510	2510	NOAEL
	Triclopyr BEE	126	126	NOAEL[b]
	Triclopyr TEA	126	126	NOAEL[b]
Birds, chronic (mg/kg body weight)	2,4-D Acid	76	76	NOAEL
	Aminopyralid	184	184	NOAEL
	Chlorsulfuron	140	140	NOAEL
	Clopyralid	15	15	NOAEL
	Glyphosate (no surfactants)	58	58	NOAEL
	Glyphosate (with POEA)	43	43	NOAEL
	Imazapyr	610	610	NOAEL
	TCP[c]	116	116	NOAEL[b]
	Triclopyr BEE	7.5	7.5	NOAEL[b]
	Triclopyr TEA	7.5	7.5	NOAEL[b]
Mammals, small (mg/kg body weight)	2,4-D Acid	25	25	NOAEL
	Aminopyralid	104	104	NOAEL
	Chlorsulfuron	75	75	NOAEL
	Clopyralid	75	75	NOAEL
	Glyphosate	500	500	NOAEL
	Imazapyr	738	738	NOAEL
	Triclopyr BEE	440	440	NOAEL[b]
	Triclopyr TEA	440	440	NOAEL[b]

Receptor (units)	Herbicide	TRV Used	USFS	Endpoint
Mammals, large (mg/kg body weight)	2,4-D Acid	5	5	NOAEL
	Aminopyralid	50	50	NOAEL
	Chlorsulfuron	5	5	NOAEL
	Clopyralid	15	15	NOAEL
	Glyphosate	500	500	NOAEL
	Imazapyr	738	738	NOAEL
	TCP[c]	12	12	NOAEL[b]
	Triclopyr BEE	0.4	0.4	NOAEL[b]
	Triclopyr TEA	0.4	0.4	NOAEL[b]
Fish (mg/liter of water)	2,4-D Acid	4.8	95.6	$LC_{50} \div 20$
	Aminopyralid	50	50	NOEC
	Chlorsulfuron	30	30	NOEC
	Clopyralid	5[a]	103	$LC_{50} \div 20$
	Glyphosate (no surfactants)	0.5	0.5	NOAEC
	Glyphosate (with POEA)	0.048	0.048	NOAEC
	Imazapyr	10.4	10.4	NOAEC
	TCP[c]	0.18	0.18	NOAEC[b]
	Triclopyr BEE	0.091	0.091	NOAEC[b]
	Triclopyr TEA	20	20	NOAEC[b]
Aquatic Invertebrates (mg/liter of water)	2,4-D Acid	1.25[a]	25	$LC_{50} \div 20$
	Aminopyralid	89	89	NOEC
	Chlorsulfuron	10	10	NOEC
	Clopyralid	23.1	23.1	NOEC
	Glyphosate (no surfactants)	2.7	2.7	NOAEC
	Glyphosate (with POEA)	0.075	0.075	NOAEC
	Imazapyr	41	41	NOAEC
	TCP[c]	0.55	0.55	NOAEC[b]
	Triclopyr BEE	0.045	0.045	NOAEC[b]
	Triclopyr TEA	25	25	NOAEC[b]

[A] To ensure comparison of equivalent endpoints between herbicides, all TRVs *values expressed as LC_{50} or LD_{50} values were translated by either USFS or PRI to "No Effect" levels by incorporation of an uncertainty factor of 20, similar to that used by US EPA to protect endangered species. This practice was only recently incorporated into the USFS methodology, so PRI implemented these changes for the herbicides reviewed by USFS prior to the change.*

[b] For triclopyr and TCP toxicity to mammals, USFS used allometric parameters that correct the NOAEL for the amount of food and water consumed, based on body weight and size, to adjust for differences between the test species and the taxa to which the TRV is applied.

[c] TCP is the primary degradation product of triclopyr. Because triclopyr must degrade before any TCP is produced, only the chronic scenarios of large mammals and birds eating vegetation involve potential exposure to TCP. The other scenarios are acute events, where triclopyr has not yet degraded to form TCP. Chronic exposure to treated vegetation will result in exposure to a combination of the parent compound and TCP, which degrade at similar rates. The risk bars are based on the TRV for the more toxic (lower value) of the two to produce a more protective risk estimate. For both mammals and birds, the risk charts are based on the TRV for triclopyr acid, since it has the lower value.

Herbicide Half-Life

Herbicide half-life is a measure of persistence in the environment. Herbicides that are persistent in the soil environment continue to have herbicidal activity and cause adverse effects on the ecosystem until the concentration drops below a level that is toxic to plants. The range of half-lives for the herbicides in soil under aerobic conditions—in the presence of oxygen and microbes—can vary by a factor of ten or more for each herbicide. Exposure to sunlight can accelerate decomposition of some herbicides. The longest half- lives are typically relevant under arid conditions where microbial degradation rates are low. Anaerobic degradation is usually slower than aerobic degradation. In general, glyphosate is expected to be less persistent than other herbicides considered in this assessment, while imazapyr and aminopyralid are among the most persistent. Triclopyr BEE and TEA rapidly degrade or dissociate to triclopyr acid, so the persistence of triclopyr degradates—triclopyr acid and TCP— is most relevant to triclopyr applications. Organic herbicides such as clove oil, pelargonic acid, and limonene have very short half- lives (a few days to a week), which limits their potential for exposure.

Figure 4 shows the range of half-lives for the herbicides in soil under aerobic conditions. In the plot, herbicides are arranged in order of the Central value of their measured half-life. The Upper, Lower and Central values on Figure D-1 are based on a review of the academic literature and the values used by government agencies, including US EPA, USFS, California Department of Pesticide Regulation (DPR), and the Oregon Department of Environmental Quality (ODEQ) (see PRI website for more information).

The Central values for the herbicides used in the plots (except for 2,4-D and aminopyralid) in Figure D-1 are the half-life values used by USFS in its risk assessments as the Central half-life estimate in soil, with the values for 2,4-D from DPR's environmental fate review and for aminopyralid from US EPA's risk assessment. Lower and Upper values used in the figure are taken from US EPA's risk assessments or from DPR's or ODEQ's environmental fate documents summarizing the available literature studies. Half-lives vary depending on test conditions, and comparable studies conducted under the same test conditions were not always available for every herbicide. When soil values were unavailable, the half-life on fruit was used.

Figure 4 is intended to provide as much as possible an "apples-to-apples" comparison of aerobic soil half- lives. However, imazapyr does not degrade in soil under aerobic conditions, so a field dissipation half-life (5.9 years) is used, in order to provide a numerical point of comparison to other herbicides. Note that half-lives of herbicides in water or in anaerobic sediments (such as wetlands) may be different than the aerobic soil half- lives presented in Figure 4 For most pesticides, the anaerobic half-life (in the absence of oxygen) is longer than the aerobic half-life. Sunlight and processes that dissipate herbicides in the environment like rainfall runoff, absorption by plants, or irreversible binding to soils can also alter the persistence of a chemical in the treated area.

Figure 4 shows the total range of half-lives observed for the different chemicals. Half-life values used by the USFS in their worksheets are those used to produce the charts and are more narrowly constrained to reflect half- lives under the most common conditions.

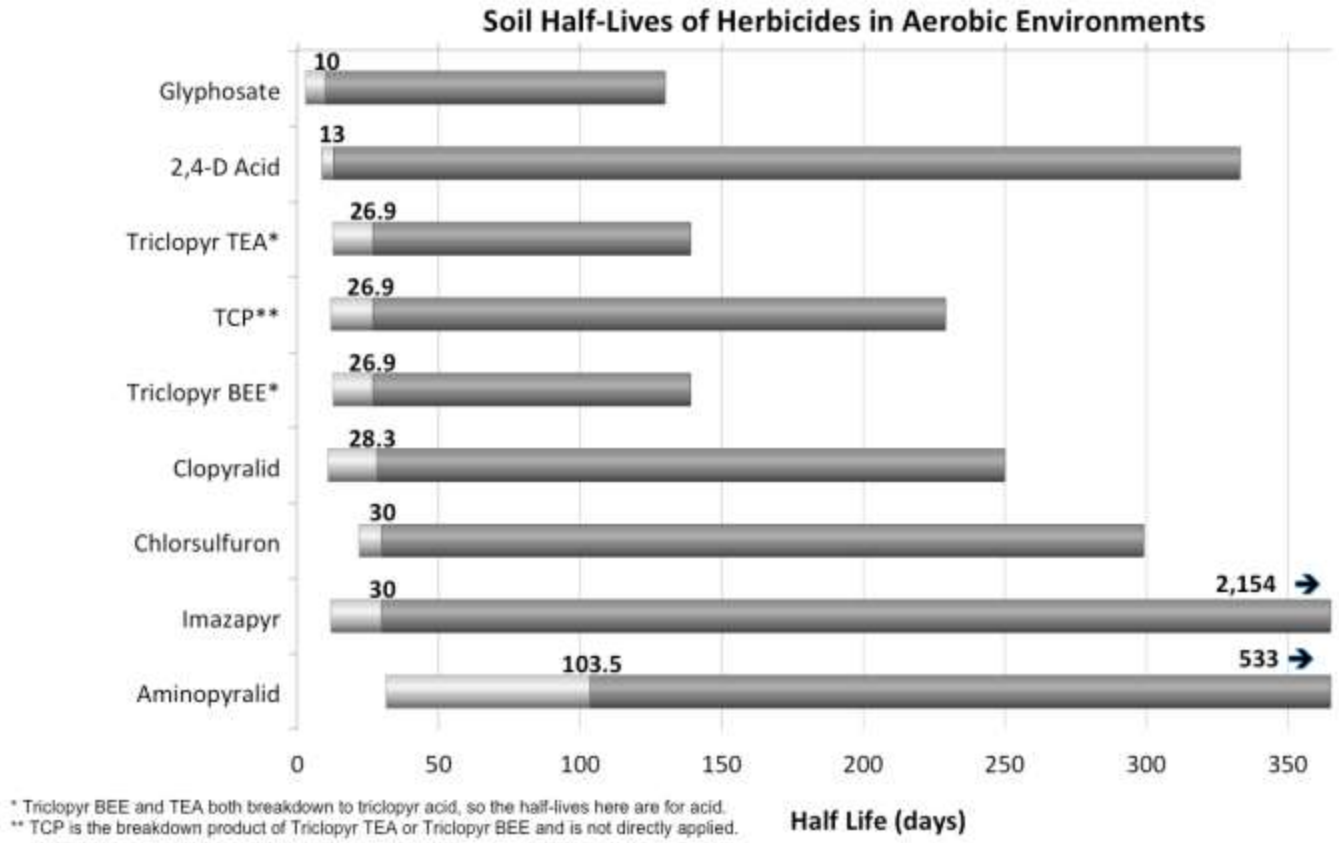


Figure 12: Comparison of the range of herbicide half-lives under aerobic conditions in soil. The high end of the range is typically under arid conditions where microbial degradation rates are low. Exposure to sunlight can accelerate decomposition and shorten the half-life of some herbicides. Sources are described after Table 12. For aminopyralid, see EPA Fact Sheet 2005. For imazapyr, see EPA 2007 Appendix A Imazapyr Effects Determination for the CA Red-legged frog.

Water Contamination Rates

Water contamination rates are a measure of how much of an applied herbicide will run off of the treated area into nearby water bodies. Maximum or peak concentrations of herbicides in water bodies receiving runoff are typically observed when rainfall or irrigation occurs soon after treatment, before the herbicide has degraded substantially. The concentration of herbicide in this "first-flush" runoff may potentially impact aquatic organisms and terrestrial animals that make contact with or drink contaminated water. The potential of herbicides to move off-site in runoff water depends on water solubility, half-life, and the ability of the herbicide to bind to soil. The site characteristics are relevant too, as different soil types bind to herbicides differently. Bare or impermeable soils are much more prone to runoff than vegetated areas; sandy soils are susceptible to leaching that may result in groundwater contamination.

The risk charts use the USFS method (based on the Groundwater Loading Effects of Agricultural Management Systems (GLEAMS) model) to estimate the concentration of each herbicide in water for an application to 10 acres, no buffers along the edge of the treated area, and rainfall after the application based on averages for a variety of sites. The range of water contamination rates is based on the range of site variables such as soil type and chemical properties. Use of buffer zones around water bodies will reduce water contamination.

Water contamination rates are measured in units of milligrams of herbicide per liter per pound of herbicide applied per acre (mg/L per lb/acre). Actual herbicide concentrations in the receiving water body will

depend on how many pounds of active ingredient are applied to land that drains to the water body. Use of herbicides with application rates of fractions of a pound per acre (see Table 11) will generally result in lower concentrations than herbicides with higher application rates. Predicted concentrations in the receiving water bodies for the half-maximum application rates for each active ingredient are shown in Figure 5. These concentrations were used to estimate the risks displayed in the charts for aquatic species and for animals drinking the water.

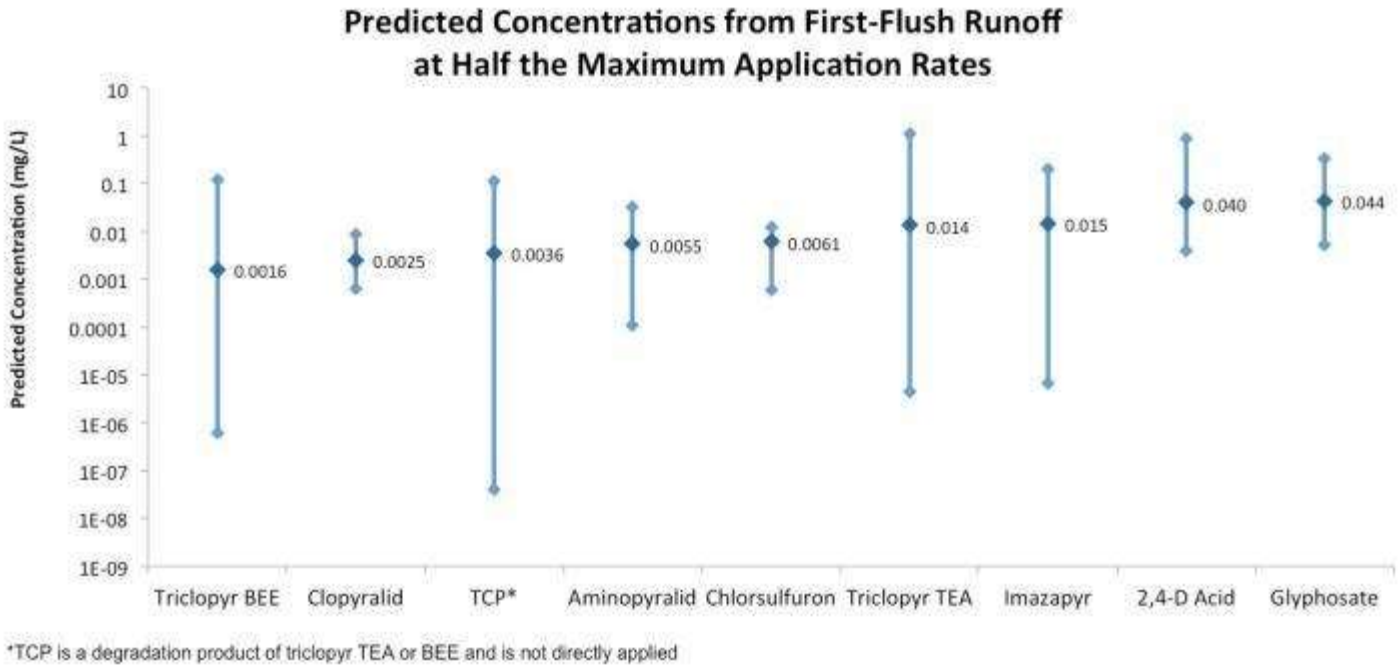


Figure 13: Comparison of the range of predicted concentrations in peak runoff after terrestrial application at half-maximum application rate. Factors affecting predicted concentrations include application rate, water solubility, half-life, and the ability of the herbicide to bind to soil (Koc). Use of buffer zones near surface waters will help to reduce water contamination. Source: "Estimated Water Contamination Rates" in USFS risk assessment worksheets at www.fs.fed.us/foresthealth/pesticide/worksheets.shtml.

Herbicide Selection Process

Several factors contributed to selecting herbicides to control noxious weeds on Clallam County roadsides.

- **EPA Approved for Roadside Use --** All the selected herbicides are fully labeled for use on roadsides and are registered for use in the state of Washington. The herbicide label does not have to list all the weeds, but the label does have to list roadsides or rights-of-way as a use site.
- **Effectiveness on Target Species –** AquaNeat and Polaris are very broad spectrum and will control most of the county's noxious weeds. Milestone, Transline, Vastlan, and 2,4-D are selective and very effective only on broadleaf plants. Fusillade II is effective only on grass species. Many of the targeted weeds have a perennial life cycle with persistent root systems. Effective control requires translocated herbicides that kill the roots. All fthe selected herbicides translocate to the roots.
- **Selectivity –** Several of the herbicides were chosen because they selectively target broadleaf weeds, not grasses. This allows grass to be unaffected and to colonize space previously occupied by broadleaf weeds. The grass herbicide gives the program a selective chemical for controlling weedy grasses, such as reed canarygrass, in a mixed plant community.
- **Human and Environmental Safety –** A carefully selected, limited palette of herbicides rated with low toxicity to humans and wildlife has been chosen for this program. Some of the products are labeled for aquatic use so inadvertent occurrence in water is anticipated to have minimal effects on aquatic organisms. Most are labeled for use on grazed areas such as range and pasture. Most are labeled for use in maintaining wildlife habitat, fence rows, as well as rights-of-way.

Herbicide Product List

Clallam County proposes to use the following products for targeted herbicide applications:

AquaNeat® (aquatic formulation glyphosate)
Element 3A® (aquatic formulation triclopyr)
Fusilade II® (fluazifop-P)
Garlon 4® (triclopyr)
Milestone® (aquatic formulation aminopyralid)
Oust XP® (sulfometuron-methyl)
Plateau® (imazapic)
Polaris® (aquatic formulation imazapyr)
Ranger Pro® (glyphosate)
Transline® (clopyralid)
Vastlan® (aquatic formulation triclopyr)
WeeDestroy AM-40® (aquatic formulation 2,4-D)

The chosen products are effective on known roadside and pit weeds, offer the greatest weed selectivity, maximize worker and public safety (no wait, access when the spray has dried), and used as proposed, pose low risk for wildlife and the environment. See Appendix B for risk analysis.

The standard, minimum personal protection equipment (PPE) when using herbicides includes:

Long sleeved shirt, long pants
Shoes plus socks
Chemical resistant gloves made of any waterproof materials

The required PPE for each herbicide, listed on the label, will be strictly adhered to during treatment.

Table 12. Selected herbicide characteristics.

Chemical Name Product Name	Selective	Aquatic Sites	Target Weeds	Personal Protection Equipment	Comments
2,4-D WeeDestroy AM-40	✓	✓	Broadleaf	Standard; eye protection + apron for mixing	Inexpensive, often used in mix; short residual
Aminopyralid[1] Milestone	✓	✓	Broadleaf	Standard	Moderate residual may help suppress seed germination; very low rates
Clopyralid Transline, Sanora	✓		Broadleaf	Standard	Very selective; will not affect many native and desirable plants; moderate residual; low rates
Fluazifop-P Fusilade II	✓		Grasses	Standard + eye protection	For dry sites; reed canary-grass and annual grasses
Glyphosate AquaNeat		✓	All weeds	Standard	Minimal to no residual; protect desirable vegetation
Glyphosate Ranger Pro			All weeds	Standard	For pits and some special sites only
Imazapic Plateau	✓		Annual weeds	Standard	For dry sites, annual weeds, and for prairie restoration, wildflower establishment
Imazapyr Polaris		✓	All weeds	Standard	Long residual; protect desirable vegetation

Chemical Name Product Name	Selective	Aquatic Sites	Target Weeds	Personal Protection Equipment	Comments
Sulfometuron-methyl Oust XP			Broadleaf, grasses	Standard	Long residual; early season pre and post-emergent; for use in county pits only
Triclopyr amine Element 3A, Tahoe 3A, Garlon 3A	✓	✓	Broadleaf, shrubs	Standard; Eye protection for mixing, access to eye wash station	Moderate residual
Triclopyr choline Vastlan	✓	✓	Broadleaf, shrubs	Standard	Moderate residual
Triclopyr ester Garlon 4	✓		Broadleaf, shrubs	Standard	Moderate residual

[1]Registered as a reduced risk pesticide under the EPA reduced risk pesticide program

Adjuvants are compounds added into an herbicide mix to improve efficacy. They perform various functions, including enhanced plant uptake of the herbicide; better mixing of otherwise incompatible herbicides; increased adhesion of the spray to plant surfaces; and reduced spray drift. In many herbicide products, adjuvants are included as part of the pre-mixed formulation as purchased. Applicators can also add adjuvants to spray mixtures prior to application. Adjuvants include marker dyes, which are visible indicators of freshly treated weeds, include Blazon and Highlite (aquatic formulation).

Surfactants, or “surface active agents", are a type of adjuvant added to a mix to increase the dispersing, spreading, wetting, or other properties of the liquids. Surfactants disperse water droplets and help penetrate a plant’s waxy surface. (Table 13).

Some states require registration of adjuvants as pesticide products, but the US EPA does not, so relatively less is known about adjuvants compared to pesticide active ingredients. Acute toxicity information is often available, with some of these compounds being labeled as strong eye or skin irritants, but information regarding chronic toxicity is sparse. Washington State and European countries require environmental toxicology data on adjuvants.

For many pesticide products containing adjuvants as part of the formulation, the compounds are not explicitly identified on the label or the Safety Data Sheet. Unless they are on one of US EPA’s lists of more toxic chemicals, they do not have to be identified. The identity of these ingredients in a pesticide or adjuvant product is legally protected from full disclosure as “Confidential Business Information.”

Without more detailed information, it is not possible to conduct a comprehensive risk assessment on adjuvants, so they are not included in the risk charts shown as part of Appendix B, which focus on herbicidal active ingredients. However, at least one adjuvant is known to pose hazards to wildlife—the surfactant used in the original formulation of RoundUp®, polyoxyethyleneamine (POEA). This surfactant is more toxic to aquatic life than the active ingredient glyphosate—it has been included as a separate entry in the risk charts. Nonylphenol ethoxylates (NPEs), which are used in some adjuvants (and many consumer products), may be linked to endocrine disrupting effects. No products containing polyethoxylated tallowamine (POEA) or nonylphenol ethoxylates (NPEs) will be allowed for use in this program. Adjuvants with low toxicity to wildlife include modified seed oils, alkyl ethoxylates, and silicones. Liberate®, Competitor®, DyneAmic®, and Agri-Dex® (all aquatic formulations) are brand names of some adjuvants from these low toxicity categories and have been selected for use in this program. Research is developing on this subject and will be regularly added to updates for this program

Government agencies negotiate for favorable pricing and award a contract to a preferred provider for many goods and services. Herbicides will be purchased under state contract whenever possible to conserve tax dollars. Because the preferred provider may vary from year to year; different brand names than listed in the previous tables, with the same active ingredient may be substituted. New products or different formulations with the same active ingredient that are more user or environmental friendly and cost beneficial will be substituted as they become available.

Table 13. Adjuvants used to enhance herbicide effectiveness.

Adjuvants	Aquatic use	Treatment effects	PPE	Comments
Competitor - vegetable oil Agri-Dex, - crop oil concentrate Dyne-Amic - nonionic surfactant Liberate - fatty acids Hasten- vegetable oil	✓	Increases herbicide uptake	Standard	Used at low rates
Blazon - marker dye Highlite - marker dye	✓	No active effect	Standard	Highlights recently sprayed weeds; washable

Several studies have shown non-synthetic products (or “natural”) are considerably less effective for controlling weeds, especially biennials or perennials, than synthetic ones. However, three of these products, acetic acid, clove oil, and limonene are the subject of an on-going study for control of the annual weed, herb Robert. Pending study results, one or more of these herbicides may be added to the herbicide product list for control of this or other annual weeds.

Application Methods

Foliar. Applications to the plants' leaves are an easy way to control weeds with maximum amount of herbicide directed to the target plants and optimum up take by the plants for both herbaceous forbs and grasses.

Wiping Applicators. Wiping applicators (also called rope wicks) rub the concentrated herbicide solution on the plant's leaf and stem surfaces. Because only the weeds tall enough to contact the rubbing surface are affected, nonselective herbicides can be used selectively to release low-growing plants or plants below the treatment height. Drift does not occur with wiping applicators so there is no potential exposure for adjacent crops and gardens.

Stem Injection. Some species, such as knotweeds, have stems of sufficient size that herbicide can be injected directly into the stem. While this is an effective treatment, it is a very labor-intensive treatment for treating dense stands. Only some herbicides are labeled for this application method.

Stem Injection/Spaced Cuts/Cut Surface/Cut Stump/Basal Bark. Stem injection, spaced cuts, cut surface, cut stump, and basal bark are treatments often used for controlling tall growing woody plants. As the name implies, herbicide is applied to just the cut surface or the woody stem. The herbicide rate and carrier are adjusted according to the part of the woody plant being treated. Unlike foliar treatments done during the growing season, these treatments can be applied year-round. These treatments are particularly effective for large butterfly bush and Scotch broom in excess of 1-2 inches in diameter.

APPENDIX C: SAMPLE RECORD KEEPING FORMS

Treatment Form

2023 CLALLAM COUNTY - ROADS
Herbicide/Manual Treatment Data Form

Project ID #:

Project Complete? Y or N (add notes)

Name of Entity/Person for whom Treatment was applied: Clallam County

Street Address: 223 E 4th St City: Port Angeles State: WA Zip: 98362

Address or Exact Location of Site: _____

PIN#: _____

General Activity Fields

County (circle one)	WRIA (circle one)	Project Name (from project list)	Department (circle one)	Workforce**
Clallam	16 17 18 19 20 21		Roads Parks DCD Other	

**Workforce: County Name, WCC Crew Name, County Weed Board

Crew Members Present:

Site/Inventory Fields

Start Date	Stop Date	acres examined for weeds	Treatment Site (circle one)	Treatment Range (circle one)	Total Manual Infested Area Treated: (DO NOT lump plants together)
			Road edge/ROW Pit Special Site Other	Complete Retreatment Spot	acres

Weeds Treated (Just the PLANT code is OK)	Infested Area Treated (DO NOT lump plants together)	% of area examined for weeds infested with this species (lump plants together – use cover classes 1 - 9 listed below)	Manual/Herbicide or Survey
	sq ft		
	sq ft		
	sq ft		
	sq ft		
	sq ft		

* Cover Classes: 1 = Trace, 2 = 1 – 3%, 3 = 3 – 5%, 4 = 5 – 10%, 5 = 10 – 25%, 6 = 25 – 50%, 7 = 50 – 75%, 8 = 75 –95%, 9 = 95 – 100%
Note: Cover classes are meant to be *approximations only*.

Herbicide Application

All Licensed Applicators: Name and License # _____

_____

Firm Name: Clallam County Noxious Weed Control Board Phone # 360-417-2442
Firm Address: 223 E 4th St, Suite 15 City: Port Angeles State: WA Zip: 98362

Application Date	Time Start	Time Stop	Temp (F)	Wind Speed (MPH)	Wind Direction	Cloud Cover	Remarks – Weather forecast

Application Area (acre)	Total Volume of Mix Applied (gal)	Diluent	Special comment
		Water	

Product Name	EPA Registration #	Amount of herbicide used (oz)	Herbicide Applied/Acre or other measure	Concentration Applied
☐ Element 3A	62719-37			
☐ Milestone	62719-519			
☐ Vastlan	62719-687			
☐ Transline	62719-259			
☐ Polaris	228-534			
☐ Oust XP	432-1552			
☐ Ranger Pro	524-517			
☐ Competitor	WA-2935-04001			
☐ Blue Dye				
☐				

Was this application made as a result of a permit? Yes No
If yes, Permit # _____

WA State NPDES Acres:

Notes: # Interactions:

Roadside Vegetation Monitoring Form

Clallam County
Weed Treatment Monitoring

Examiner Name:_____

Evaluation Date:_____

Ref #	
Project # and Name	
From "Comments": **Road name with BMP & EMP** **–OR-** **Min and Max Address**	
Date(s) of treatment	
Herbicide or Manual treatment (circle one)	

Weeds Treated (Scientific name or code)	**Infested Area Treated (acres)**	**Cover class from "% area examined for weeds infested with this species"**	**Percent efficacy of treatment (use codes on next page)**

Do you think this treatment area is a high priority for retreatment next year? Yes / No
Please provide comments on the next page, if you have any.

Instructions: All information on page 1 of this datasheet comes from the "Herbicide/Manual Treatment Data Form", except for:

- **Examiner name**
- **Evaluation Date**
- **Percent efficacy of treatment**

For Percent efficacy of treatment, enter the code that best approximates the percent of the population that was eradicated:

Code	% Efficacy	Rating	Description
0	0	No effect	No effect can be detected on the target species population
03	1 – 5	Failure	Little to no effect can be detected on the target species population.
15	6 – 25	Poor	Treatment killed less than a quarter of the target species population.
35	26 – 50	Marginal	Less than half of the target species population was controlled.
65	51 – 75	Fair	Over half of the target species population was controlled.
85	76 – 90	Good	Treatment was successful in killing most of the target species population
95	91 – 99	Excellent	Over 95% of the target species population has been killed with the treatment.
100	100	Complete	Not a single individual of the target species population was found after a complete survey of the site. The infestation was eradicated.
UN	UNK	Unknown	Treatment efficacy/success cannot be determined.

Comments:

APPENDIX D: SAMPLE PRESS RELEASE AND PUBLIC NOTICE

March 1, 20__

PUBLIC NOTICE

Clallam County is beginning the year 20__ Integrated Weed Control program which may include spot treatments of herbicide to control specific noxious weeds and invasive species of special concern along selected portions of county right-of-way. Approximately _____ miles of road are scheduled for treatment this year. Notices indicating which herbicide has been applied, the application date, and the target weed species will be posted onsite. The Integrated Weed Management Plan, which contains information about target weeds, locations, and treatment methods can be viewed online at _____ or contact the county for further information at 360-417-2442.

Property owners who do not wish to have their adjoining right-of-way treated with herbicide have the option of keeping the right-of-way abutting their property weed free by applying for an Owner Will Control Agreement with Clallam County. Forms can be obtained online at _____ or by contacting the county at (360) 417-2442.

NOTICE

The herbicides aminopyralid, imazapyr, triclopyr, clopyralid or _____ will be applied to this site to control noxious weeds, which threaten native vegetation and habitat in this area.

Planned / Actual Application Date*: _____

*Actual date of application contingent upon weather conditions.

Targeted Noxious Species: _____**

**Other weed species in this area may also be treated at this time.

NO USE RESTRICTIONS ARE IN PLACE

Avoid contact with treated vegetation until after it has dried.

Clallam County Noxious Weed Control Board
223 East Fourth Street, Suite 15
Port Angeles, WA 98362
(360) 417-2442
(360) 460-1842

APPENDIX F: OWNER WILL CONTROL PACKET

Available online at: **https://www.clallamcountywa.gov/821/Noxious-Weed-Control**

OWNER WILL CONTROL APPLICATION

Introduction:

The Noxious Weed Control Board thanks you for your interest regarding the Clallam County Integrated Weed Management Plan and the Owner Will Control opportunity. This packet contains an Owner Will Control Agreement application to be filled out completely and returned to the Noxious Weed board by mail or email. The Agreement releases all noxious weed control responsibility to the agreement holder dependent on Owner's compliance with the County control guidelines.

Owner Will Control Agreement:

The Agreement application must be completely filled out and returned to the Noxious Weed Board at:

Clallam County Noxious Weed Control Board (Or) **OwnerROW@clallamcountywa.gov**
Attn: Weed Specialist
223 E 4th St. Suite 15
Port Angeles, WA 98362

Incomplete applications cannot be accepted. The County will return the agreement holder a copy of the completed application at the email or mailing address provided within ten (10) business days of receipt.

It is important to return the application as soon as possible to ensure the county work plan can be modified to honor the application request. The County will email a reminder notice regarding applications for the following year to all current agreement holders.

Control Guidelines:

Appendix F.1 of this document includes best management practices for Owner control methods. The Owner must adhere to the county guidelines for effective control for each designated species found on county right-of-way. Failure to completely remove weeds as stipulated by this agreement will prompt a ten (10) day notice to comply with control guidelines or the Agreement may be terminated.

Native Plant Enhancement Program:

The goal of this program is to create natural, site appropriate plant communities along county road sides. Once weeds are controlled Owners may be eligible for native material and pollinator friendly plants from the County. Please indicate your interest in this program on your application.

OWNER WILL CONTROL AGREEMENT

By entering into this agreement an adjacent property owner (hereinafter referred to as “Owner”) will agree to control noxious weeds and other weeds of concern as described in Appendix A of this agreement on county right-of-way adjacent to property located at:

_____

(Street) (City) (Zip)

The County will send a confirmation email upon receiving a completed application and return a copy of the finalized Owner Will Control Agreement (hereinafter referred to as “Agreement”).

For the purpose of this Agreement, ‘control’ will consist of complete removal of all above ground biomass and as much of the root system as is feasible of weeds listed in your packet, as well as any additional weeds of concern as determined by the County.

If noxious or other weeds of concern are observed on right-of-way adjacent to above named address, County will notify property owner of their presence. Owner will then have ten (10) days to completely remove weeds as required by this Agreement. If Owner fails to control weeds in that timeframe, this Agreement will be terminated and weeds will be controlled as determined by the County, including the use of herbicides.

This Agreement is valid from the date signed by both parties until December 31 of the same year.

If the Owner Will Control Agreement is terminated as described above the Owner may apply to re-enter into a new Owner Will Control Agreement the following calendar year.

*_____ *_____ *_____

Owner Name (Print) (Signature) Date

*_____ *_____

(Owner Email) (Owner Phone #)

Interested in Native Plant Enhancement Program? (circle one) **YES** **NO**

*_____ *_____ *_____

County Representative (Signature) Date

*Required Field

Appendix F.1:

Owner will be responsible for the complete control of species listed below in the accordance to the county guidelines.

Species List for Control:

Vegetative Propagation*		***Non-Vegetative Propagation***	
bindweed, field	laurel, spurge	alyssum, hoary	hogweed, giant
blackberry, evergreen	peavine, everlasting	birdsrape mustard	iris, yellow flag
blackberry, Himalayan	ribbon grass	brome, ripgut	knapweed, diffuse
canarygrass, reed	sowthistle, perennial	broom, Scotch	knapweed, meadow
hawkweed, orange	tansy, common	burdock, common	knapweed, spotted
Hawkweed, yellow	thistle, Canada	butterfly bush	loosestrife, purple
knotweed, Bohemian	whitetop, hairy	carrot, wild	nightshade, hairy
knotweed, giant	yellow archangel	cheatgrass or downy brome	old man's beard
knotweed, Japanese	-	chicory	poison hemlock
		cinquefoil, sulfur	tansy, ragwort
		comfrey	teasel, common
		English hawthorn	thistle, bull
		fennel, common	wormwood, absinth
		herb Robert	-

*Vegetative Propagation is the ability to reproduce from root and stem fragments. Indicated species must be thoroughly excavated from the ground, collected, and disposed into trash for control.

Control:

Do NOT mow any plants listed for control in table above

Completely remove all above ground biomass and as much of the root system as feasible (care must be taken to ensure proper collection and disposal of waste)

Ensure all flowers and seed heads are cut, bagged and disposed of into trash

Be aware of species listed as *Vegetative Propagation* and dispose of all plant material into trash and NOT compost

Additional control and identification resources can be found online at Clallam County's Noxious Weed page (https://www.clallamcountywa.gov/821/Noxious-Weed-Control) and the State Weed Board's website (http://www.nwcb.wa.gov/).

Sample Failure to Control Warning

Clallam County
223 E Fourth St, Suite 15
Port Angeles, WA 98362

Date

RE: Failure to fulfill 'Owner will Control' agreement

Dear Property Owner,

You entered into an Owner will Control agreement with Clallam County Road Department regarding noxious and invasive weeds on the county roadside adjacent to your property.

Crews were recently in your area and found the roadside adjacent to your property has not been maintained as required by the terms and conditions of the agreement (see enclosed).

You have ten (10) days from date of this letter to control weeds as outlined in the Owner Will Control agreement. If the right-of-way is not adequately maintained as described in the agreement the agreement will be immediately terminated and weeds of concern will be controlled as determined by the County, including by the use of herbicides.

If the Owner will Control agreement is terminated as described above, you may still apply to reenter into an Owner will Control agreement for next calendar year.

If you have any questions, please call _____ at _____

Or email us at:_____

This is the only notice you will receive regarding this matter.

Sincerely,

County Representative
Clallam County Roads Department

Enclosed: Owner Will Control agreement

APPENDIX G: ADOPT-A-PATCH PERMIT

The list of potential 2023 "Adopt-a-Patch" locations to be published online once 2023 Work Plan has been adopted. Permits online at: https://www.clallamcountywa.gov/821/Noxious-Weed-Control

Clallam County Public Works Department
223 East Fourth Street, Suite 15 Port Angeles, WA 98362
360-417-2703 Phone 360-417-2414 Fax

$160 plus all costs beyond public use**
** See C.C.C. 5.100.245 – Fee Schedule 245-A

PROJECT NO._____
ROAD NAME _____
PERMIT NO. _____
COUNTY USE ONLY

APPLICATION FOR SPECIAL USE OR EVENT ALONG CLALLAM COUNTY RIGHT OF WAY

In Clallam County, a "Right-of-Way" permit is required to work along a county-owned road within the county right of way.

PLEASE PRINT

Name of Applicant:	County Road:
Mailing Address:_____ _____ _____ Phone:_____ Cell Phone:_____ Fax:_____	Address/ Milepost of Project Site: _____ **When the project is approved:** (check one item below) ☐ Mail permit when approved ☐ Call when approved ☐ Fax when approved

USE PROPOSED & PURPOSE

Special Use: _____**NOXIOUS WEED CONTROL**_____
_____

Name of Event Coordinator:
_____
Start Date _____
End. Date _____

IMPORTANT:

Project Location(s) Description:_____
(Reference "IWM Partner List" for available locations)

THE EXACT LOCATION OF THE ENTIRE EVENT/USE AREA MUST BE CLEARLY MARKED SO AS TO BE EVIDENT TO COUNTY PERSONNEL. FAILURE TO COMPLY WILL RESULT IN A DELAY OF THE PROCESSING OF THIS PERMIT.
It is the responsibility of the applicant to notify all utilities and private property owners when such property is liable to injury or damage through the performance of the permitted work. The applicant shall make all necessary arrangements relative to the protection of such property and/or utilities.

By signing this permit, the applicant agrees to comply with all conditions as stated on the PERMIT, Form RWPCOND041604, Permit Conditions Addendum and C.C.C. 5.100.245 – Fee Schedule 245-A. Applicant has 10 days from permit approval date to request clarification or modification to permit conditions attached.

Signed _____ Date _____

**********COUNTY USE ONLY**********

PERMISSION IS HEREBY ☐ GRANTED ☐ DENIED
Call 360-417-2703 for the following:
☑ Start Date ☐_____ ☐_____ ☑ Final
The Approved Permit Must be Posted on Site Until Final Inspection.

COMMENTS:_____
_____
_____
_____

FEE CALCULATION
_____
_____
_____
AMT WAIVED:_____
NET FEE:_____
DATE:_____
RECEIPT#_____
CHECK#_____
REC'D BY:_____

This permit shall be void unless the work herein contemplated is completed before the following date:_____

_____
Area Supervisor/Design Review Engineer Date

Final Inspection By: _____
Date:_____

APPENDIX H: HISTORICAL SURVEY DATA FOR KNOWN ROADSIDE WEED LOCATIONS

This table includes all county roadsides managed for noxious weeds since 2017 under the Clallam County Road Department IWM Plan. The table is sorted alphabetically by road name. The table contains the **Species Treated**, **Examined Acres**, **Treated Acres**, **Solid Treated Acres**, and **Solid Manual Acres** for each day work occurred on a road; definitions of these headings can be found at the end of the table. Species treated are listed alphabetically by the assigned 4-letter code (see Table 2); 4-letter codes shown in bold are regulated noxious weeds and required for control in Clallam County.

We completed **128 treatments** on **88 county roads** over **67 days** and controlled **26 species**. In total, we treated **186 miles** (including retreatments/spot treatments) and examined **278 acres** of county roadside. For retreatments, Miles Examined, Acres Examined, and Acres Treated were counted in full in order to correctly calculate application rates and Solid Acres.

Table 14. Roadside Weed Locations from 2017-2022

ROAD NAME	TREATMENT METHOD[1]	TREATMENT DATE	MILES TREATED	ACRES EXAMINED[2]	ACRES TREATED[3]	SOLID CHEMICAL ACRES TREATED[4]	SOLID MANUAL ACRES TREATED[5]	TREATED SPECIES LIST[6]	YEARS TREATED
3 Crabs Rd	M	10/10/22	1.40	1.70	0.001	0.000	0.0001	**COMA**	2018-2022
Atterberry Rd	H	05/04/22	0.20	0.40	0.20	0.003	0.0000	CYSC	2019, 2022
Bear Creek Rd	M	10/20/22	2.10	2.50	0.001	0.000	0.0001	**JAVU**	2020-2022
Benson Rd	H	06/29/22	1.10	2.13	2.13	0.075	0.0000	CIAR, CYSC, GERO, **HIAU**	2020, 2022
Black Diamond Rd	M/H	08/15/22	4.40	5.30	5.30	0.069	0.0001	**CEMO**, CIAR, CYSC, **JAVU**	2017-2022
Blue Mountain Rd	H	07/25/22	1.00	1.50	1.50	0.046	0.0000	**CEMO**, CYSC*, **DIFU**, **JAVU**	2017-2022
Camp Hayden Rd	M	08/16/22	3.50	6.80	6.80	0.000	0.0006	**CEMO**, **JAVU**	2018-2022
Carlsborg Rd	M	04/25/22	0.10	0.05	0.05	0.000	0.0009	**COMA**	2018-2022
	M	06/28/22	0.001	0.001	0.001	0.000	0.0001	**COMA**	
	M	07/05/22	0.001	0.001	0.001	0.000	0.0001	**COMA**	

Road Name	Treatment Method[1]	Treatment Date	Miles Treated	Acres Examined[2]	Acres Treated[3]	Solid Chemical Acres Treated[4]	Solid Manual Acres Treated[5]	Treated Species List[6]	Years Treated
Cays Rd	M	04/11/22	0.01	0.1	0.1	0.000	0.0001	**COMA**	2019-2022
	M	06/28/22	0.001	0.001	0.001	0.000	0.0001	**COMA**	
Cooper Ranch Rd	H	05/31/22	0.80	1.9	1.9	0.063	0.0000	DIPU, GERO, **JAVU**, RUAR	2019-2022
Coulter Rd	M	02/25/22	0.04	0.05	0.005	0.000	0.0008	**COMA***	2020-2022
	M	09/28/22	0.40	0.50	0.001	0.000	0.0001	**JAVU**	
Crescent Beach Rd	M	08/16/22	3.50	6.80	2.40	0.000	0.0013	**JAVU**	2020-2022
Dawley Rd Dawley Rd (cont.)	M	03/02/22	0.01	0.60	0.01	0.000	0.0006	**COMA**	2020-2022
	M	04/20/22	0.70	0.85	0.85	0.000	0.0001	**COMA**	
Deer Park Rd	M	10/17/22	1.70	2.00	0.01	0.000	0.0003	**JAVU**	2018-2022
Diamond Point Rd	M	08/03/22	4.00	7.76	7.76	0.000	0.0019	**JAVU**	2018-2022
Dietz Rd	M	10/17/22	0.50	0.60	0.01	0.000	0.0003	**JAVU**	2021-2022
East Beach Rd	M/H	08/09/22	0.20	0.40	0.40	0.080	0.0001	**CEMO**, CIVU, CYSC, **JAVU**	2017-2022
East Lyre River Rd	M/H	08/30/22	0.60	1.20	1.20	0.005	0.0001	**CEMO**, **CLVU**, **JAVU**	2017-2022
	M/H	09/08/22	0.60	1.20	0.60	0.002	0.0001	**CEMO**, **JAVU**	
East Sequim Bay Rd	H	07/20/22	4.10	8.0	8.0	0.264	0.0000	CIAR, CYSC, GERO, **JAVU**, RUAR*	2019-2022
Eden Valley Rd	M	08/30/22	1.80	3.50	3.50	0.000	0.0001	**CEMO**, **JAVU**	2017-2022
Elwha River Rd	H	07/06/22	1.90	3.70	3.70	0.379	0.0000	DIPU, GERO, HYPE, **JAVU**, RUAR	2019-2022
Farrington Rd	M/H	07/27/22	0.90	0.70	0.23	0.011	0.0003	**JAVU**	2017-2022
Fasola Rd	M	04/05/22	0.10	0.01	0.01	0.000	0.0007	**COMA**	

Road Name	Treatment Method[1]	Treatment Date	Miles Treated	Acres Examined[2]	Acres Treated[3]	Solid Chemical Acres Treated[4]	Solid Manual Acres Treated[5]	Treated Species List[6]	Years Treated
Fasola Rd (cont.)	M	04/18/22	0.002	0.01	0.001	0.000	0.0002	**COMA**	2019-2022
	M	06/28/22	0.09	0.06	0.06	0.000	0.0019	**DIFU**	
	M	09/28/22	1.00	1.50	0.60	0.000	0.0009	**DIFU**	
Freshwater Park	M/H	08/30/22	1.30	2.50	2.50	0.023	0.0020	CYSC, **JAVU**	2022
Gellor Rd	H	05/04/22	0.30	0.60	0.60	0.115	0.0000	CYSC	2022
Gilbert Rd	M	04/11/22	0.10	0.20	0.20	0.000	0.0016	**COMA**	2020-2022
	H	05/17/22	0.03	0.10	0.10	0.003	0.0000	**COMA**, RUAR	
Glass Rd	M	10/17/22	1.20	1.40	0.001	0.000	0.0003	**JAVU**	2021-2022
Gossett Rd	M	06/15/22	0.90	1.93	1.93	0.000	0.0006	**CEMO**, DIPU, **JAVU**	2017-2022
	M	08/30/22	0.90	1.70	0.001	0.000	0.0001	**CEMO**	
Granite Rd	M	02/03/22	0.09	0.18	0.01	0.000	0.0003	**CEMO**, CYSC	2021-2022
	H	06/29/22	0.30	0.90	0.90	0.115	0.0000	**CEMO**, CYSC, HYPE	
	H	08/03/22	0.30	1.15	1.15	0.207	0.0000	**CEMO**, CIAR*, CIVU*, CYSC*, GERO	
Grant Rd	H	06/01/22	0.30	0.10	0.10	0.003	0.0000	**CEST**	2018, 2022
Happy Valley Rd	M	07/05/22	0.001	0.001	0.001	0.000	0.0001	**COMA**	2017-2022
	H	07/18/22	5.70	11.00	11.00	0.057	0.0000	**CEMO**, **DIFU**, **JAVU**, **COMA**	
	M/H	08/31/22	1.20	2.50	2.50	0.057	0.0003	**CEMO**, **DIFU**, **JAVU**	
	M/H	09/27/22	3.00	5.00	3.00	0.069	0.0001	**CEMO**, CIAR, CIVU, **JAVU**, **DIFU**	
Harrison Rd	M	02/22/22	0.21	0.41	0.41	0.000	0.0009	**BEIN**	2021-2022
Henry Boyd Rd	M	10/17/22	0.70	0.85	0.01	0.000	0.0001	**JAVU**	2021-2022

Road Name	Treatment Method[1]	Treatment Date	Miles Treated	Acres Examined[2]	Acres Treated[3]	Solid Chemical Acres Treated[4]	Solid Manual Acres Treated[5]	Treated Species List[6]	Years Treated
Herrick Rd	M	02/03/21	0.04	0.08	0.08	0.000	0.0006	CYSC	2021-2022
Hoko-Ozette Rd	M	08/02/22	17.90	21.70	21.70	0.000	0.0125	CYSC*, **JAVU**	2017-2022
	M	10/20/22	8.80	10.50	0.01	0.000	0.0047	**JAVU**	
Hooker Rd	M	05/02/22	0.003	0.003	0.003	0.000	0.0001	**COMA**	2020-2022
Johnson Creek Rd	M	07/18/22	1.10	2.10	2.10	0.000	0.0001	**CEMO**	2017-2022
Kitchen-Dick Rd	M	04/11/22	0.01	0.10	0.10	0.000	0.0001	LEAP	2017-2022
	M	08/23/22	3.20	4.00	0.01	0.000	0.0005	**COMA**	
	M	10/12/22	3.20	4.00	0.001	0.000	0.0001	**CEMO**	
Laird Rd	H	07/06/22	0.90	1.74	1.74	0.086	0.0000	CIAR, CIVU, CYSC, **JAVU**	2017-2022
Little Loop Dr	M	10/17/22	0.80	1.00	0.01	0.000	0.0005	**JAVU**	2020-2022
Little River Rd	M/H	08/16/22	5.00	7.00	7.00	0.080	0.0001	**CEMO**, **JAVU**	2017-2022
Lost Mountain Rd	M	10/24/22	5.20	7.50	2.90	0.000	0.0018	**CEMO**, **JAVU**	2019-2022
Lotzgesell Rd	M	04/11/22	1.90	1.90	1.90	0.000	0.0021	**COMA**	2018-2022
	H	05/17/22	0.01	0.10	0.10	0.0003	0.0000	**COMA**	
Lower Elwha Rd	M	10/26/22	2.00	2.40	0.01	0.000	0.0002	**JAVU**	2019-2022
Madrona Way	M/H	03/31/22	0.10	0.01	0.01	0.000	0.0011	**JAVU**	2017, 2019-2020, 2022
Marine Dr	M	03/02/22	0.010	0.1	0.01	0.000	0.0014	**COMA**	2019-2022

Road Name	Treatment Method[1]	Treatment Date	Miles Treated	Acres Examined[2]	Acres Treated[3]	Solid Chemical Acres Treated[4]	Solid Manual Acres Treated[5]	Treated Species List[6]	Years Treated
Mary Clark Rd	H	07/12/22	2.90	4.20	4.20	0.115	0.0000	CYSC, DIPU*, **JAVU**	2019-2022
Mary Clark Rd	H	07/13/22	5.60	3.90	3.90	0.275	0.0000	CIAR, CIVU, CYSC, DIPU*, GERO*, **JAVU**	
Mina Smith Rd	M	10/18/22	3.30	4.00	3.00	0.000	0.0008	**JAVU**	2018-2022
Mount Pleasant Rd	M	10/17/22	4.00	5.00	0.001	0.000	0.0002	**JAVU**	2020-2022
N Brown Rd	H	08/23/22	0.40	1.20	0.002	0.0002	0.0000	**CEMO**	2020, 2022
Old Blyn Hwy	M	01/31/22	0.04	0.09	0.09	0.000	0.0029	**COMA**, **JAVU**	2018-2022
	H	07/20/22	2.10	4.07	4.07	0.321	0.0000	**COMA**, CIAR, CYSC, GERO, HYPE	
	M	09/27/22	2.10	3.00	0.001	0.000	0.0001	**COMA**, **JAVU**	
Old Olympic Hwy	M	09/28/22	9.60	14.00	0.03	0.000	0.0008	**DIFU**, **JAVU**	2017-2022
	M	10/19/22	0.10	0.1	0.001	0.000	0.0001	**JAVU**	
Oxenford Rd	M	02/03/22	0.09	0.18	0.17	0.000	0.0005	CYSC	2022
Palo Alto Rd	H	07/19/22	7.80	11.30	11.30	0.333	0.0000	**CEMO**, CIAR, CIVU, GERO, HYPE, **JAVU**	2017-2022
Pinnell Rd	M	02/08/22	0.01	0.01	0.01	0.000	0.0005	**COMA**	2017, 2020, 2022
	M	02/24/22	0.70	0.85	0.001	0.000	0.0005	**COMA**	
Place Rd	H	06/29/22	2.50	4.80	4.80	0.333	0.0000	**CEMO**, CIAR, CYSC, GERO, **JAVU**	2021-2022
Port Williams Rd	M	06/14/22	2.30	4.46	0.20	0.000	0.0001	**JAVU**	2020-2022
	M	09/28/22	2.30	4.00	1.13	0.000	0.0020	**DIFU***, **JAVU**	
	M	10/10/22	0.25	0.40	0.40	0.000	0.0029	**DIFU**, **CEMO**, **JAVU**	
Power Plant Rd	M	02/03/22	0.80	1.00	1.00	0.000	0.0006	CYSC	2019-2022
	H	07/11/22	0.80	0.60	0.60	0.138	0.0000	**CEMO**, CIVU, CYSC, GERO, **JAVU**, **CEMO**2	

Road Name	Treatment Method[1]	Treatment Date	Miles Treated	Acres Examined[2]	Acres Treated[3]	Solid Chemical Acres Treated[4]	Solid Manual Acres Treated[5]	Treated Species List[6]	Years Treated
Quillayute Airport Rd	M	10/18/22	0.30	0.40	0.23	0.000	0.0023	**JAVU**	2021-2022
Quillayute Rd	M	10/14/22	1.30	1.75	0.50	0.000	0.0008	**JAVU**	2020-2022
	M	10/18/22	5.60	7.00	3.00	0.000	0.0027	**JAVU**	
Reynolds Rd	M	09/08/22	0.40	0.78	0.35	0.000	0.0014	**CEMO**, **JAVU**	2022
Rhododendron Dr	M	10/31/22	0.86	1.00	0.001	0.000	0.0001	**JAVU**	2017, 2019-2020, 2022
Richwine Rd	M	10/18/22	0.40	0.50	0.01	0.000	0.0011	**JAVU**	2021-2022
S Airport Rd	M	08/30/22	0.50	0.80	0.40	0.000	0.0001	**DIFU**, **JAVU**	2022
S Bean Rd	M	10/26/22	0.40	0.50	0.03	0.000	0.0013	**CEMO**	2022
Salal Way	M	03/31/22	0.20	0.82	0.01	0.000	0.0011	**JAVU**	2017, 2022
Sherwood Rd	H	03/31/22	0.10	0.10	0.10	0.001	0.0000	**JAVU**	2017-2020, 2022
Sunshine Plz	M	03/31/22	0.23	0.45	0.003	0.000	0.0028	**JAVU**	2017, 2020, 2022
Thornton Dr	M	10/10/22	1.50	1.80	0.02	0.000	0.0010	**JAVU**	2020-2022
Towne Rd	M	04/06/22	0.10	0.01	0.01	0.000	0.0009	**COMA**	2018-2022
	M	07/05/22	0.001	0.001	0.001	0.000	0.0001	**COMA**	
Township Line Rd	M	10/17/22	1.70	2.00	0.02	0.000	0.0005	**JAVU**	2018-2022
Turnstone Ln	H	06/01/22	0.70	1.20	1.20	0.017	0.0000	BUDA, **CEST**, CRMO, CYSC, DACA*, RUAR	2017-2022

Road Name	Treatment Method[1]	Treatment Date	Miles Treated	Acres Examined[2]	Acres Treated[3]	Solid Chemical Acres Treated[4]	Solid Manual Acres Treated[5]	Treated Species List[6]	Years Treated
Voice Of America Rd	M	04/11/22	0.25	1.00	1.00	0.000	0.0015	**COMA**	2019-2020, 2022
W Edgewood Dr	M	10/12/22	2.30	3.00	0.001	0.000	0.0001	**CEMO**	2017-2022
W Hendrickson Rd	H	04/28/22	0.8	1.20	1.20	0.023	0.0000	**COMA**, CIVU, **DIFU**, GERO, RUAR	2018, 2020, 2022
W Washington St	M/H	06/01/22	0.30	3.40	3.40	0.207	0.0002	ANCA*, **CEST**, **COMA**, DALA, RUAR*	2017-2022
	H	08/03/22	0.40	1.80	1.80	0.046	0.0000	**CEST**	
	M/H	09/22/22	0.15	1.15	1.15	0.002	0.0001	**CEST**	
W Edwards Rd	M	02/03/21	0.02	0.04	0.04	0.000	0.0001	**CEMO**	2022
Ward Rd	H	03/07/22	0.10	0.07	0.07	0.001	0.0000	**LAGA**	2018-2022
	H	04/19/22	1.60	3.20	3.20	0.184	0.0000	CIAR*, CIVU*, **COMA**, GERO*, RUAR*	
	H	05/17/22	1.70	0.54	0.54	0.011	0.0000	**COMA**, **POBO**, SYOF	
Washington Harbor Rd	H	03/29/22	1.00	0.94	0.94	0.089	0.0000	**COMA**	2019, 2022
	H	05/05/22	0.08	0.02	0.02	0.023	0.0000	**COMA**	
Washington St	M	10/20/22	0.40	0.5	0.004	0.000	0.0022	**JAVU**	2022
Wentworth Rd	M	10/18/22	1.20	1.50	0.001	0.000	0.0001	**JAVU**	2018-2022
West Lyre River Rd	M/H	08/30/22	0.60	1.20	1.20	0.017	0.0000	**CEMO**, **JAVU**	2017-2022
West Sequim Bay Rd	M	03/30/22	0.10	0.12	0.05	0.000	0.0031	**COMA**	2019-2022
Whiskey Creek Beach Rd	M/H	07/27/22	1.60	0.70	0.64	0.017	0.0003	CIAR*, CYSC, GERO*, **JAVU**	2017-2022

Road Name	Treatment Method[1]	Treatment Date	Miles Treated	Acres Examined[2]	Acres Treated[3]	Solid Chemical Acres Treated[4]	Solid Manual Acres Treated[5]	Treated Species List[6]	Years Treated
Whitcomb-Diimmel Rd	M	10/18/22	0.50	0.75	0.01	0.000	0.0029	**JAVU**	2020-2022
Woodcock Rd	M	03/14/22	0.01	0.006	0.006	0.000	0.0006	**COMA**	2017-2022
Woodcock Rd (cont.)	M	04/18/22	0.47	0.57	0.46	0.000	0.0011	**COMA**	
	M	09/28/22	1.75	2.50	0.005	0.000	0.0002	**DIFU**	
Woods Rd	H	06/16/22	0.30	1.09	1.09	0.092	0.0000	CYSC, GERO, HYPE*, **JAVU**, RUAR*	2018-2022
	M/H	06/21/22	1.30	3.15	3.15	0.953	0.0001	DIPU, GERO, **JAVU**, RUAR*	
	H	06/22/22	1.20	2.32	2.32	0.207	0.0000	DIPU, GERO, **JAVU**	
	H	08/01/22	1.70	3.30	3.30	0.184	0.0000	**CLVU**, CYSC, DIPU*, GERO, **JAVU**, LALA*	
Wye Rd	M	08/30/22	0.30	1.20	0.60	0.000	0.0003	**JAVU**	2019-2022
TOTAL: 88 unique roads	**128 treatments**	**67 days**	**185.97**	**278.05**	**176.35**	**5.401**	**0.0839**	**26 unique species; 10 regulated species**	

*Non-priority species treated intermittently, meaning the entire population was not controlled during treatment
[1]**M** – Manual control; **H** – Chemical control; **M/H** – Combination of manual and chemical control
[2]**Examined Acres** – The total area searched for noxious weeds while crew was involved in treatment activities
[3]**Treated Acres –** The gross area encompassing all treatments per road per day
[4]**Solid Chemical Treated Acres** – The estimated net area if the plants were "clumped" together; calculated using the tank mix volume applied and calibrated sprayer output
[5]**Solid Manual Acres –** The estimated net area controlled by any manual means (pulling, digging, cutting, etc.) if the plants were "clumped" together; calculated by number of plants removed
[6]**Species Treated** – The 4-Letter Weed codes correspond to the species' scientific name and can be found in Table 2. Bolded species are regulated noxious weeds required for control in Clallam County

APPENDIX I: REFERENCES

Noxious weed list

2018 Washington State Noxious Weed List. Washington State Noxious Weed Control Board. https://www.nwcb.wa.gov/pdfs/2018-State-Weed-List_Common_Name-8.5x11.pdf

2018 Washington State Noxious Weed List. Washington State Noxious Weed Control Board. https://www.nwcb.wa.gov/pdfs/2018-State-Weed-List_Scientific_Name-8.5x11.pdf

2017 Clallam County Noxious Weed List Supplement. http://www.clallam.net/weed/doc/ClallamWeedList2017_000.pdf

Pictures of Class A Noxious Weeds. Washington State Noxious Weed Control Board https://www.nwcb.wa.gov/class-a-noxious-weeds

Pictures of Class B Noxious Weeds. Washington State Noxious Weed Control Board https://www.nwcb.wa.gov/class-b-noxious-weeds

Pictures of Class C Noxious Weeds. Washington State Noxious Weed Control Board. https://www.nwcb.wa.gov/class-c-noxious-weeds

Pictures of noxious weeds of Washington. Washington State Noxious Weed Control Board. Monitor list https://www.nwcb.wa.gov/noxious-weed-monitor-list

Pictures of noxious weeds of Washington. Washington State Noxious Weed Control Board. Quarantine list. https://www.nwcb.wa.gov/noxious-weed-quarantine-list

Noxious Weeds and Other Common Plants found in Clallam County. http://www.clallam.net/weed/weedinfo2.asp

Publications of the Washington State Noxious Weed Control Board. http://www.nwcb.wa.gov/nwcb_publications.htm

Literature

Bramble, W.C., W.R. Byrnes, and R.J. Hutnik. 1987. Development of plant cover diversity on an electric transmission right-of-way. pg. 89-93. In: Byrnes, W.R. and H.A. Holt (eds). Proceeding, Fourth Symposium on Environmental Concerns in Right-of-Way Management. Indianapolis, IN. Dept. Forestry & Nat. Res., Purdue University, W. Lafayette, IN. 595 pp.

Bramble, W.C., R.H. Yahner, and W.R. Byrnes. 1999. Effect of herbicide maintenance of an electric transmission line right-of-way on butterfly populations. Jour. Arboriculture 25(6):302-310.

Cal-IPC. 2015. Best Management Practices for Wildland Stewardship: Protecting Wildlife When Using Herbicides for Invasive Plant Management. Cal-IPC Publication 2015-1. California Invasive Plant Council, Berkeley, CA. Available: www.cal-ipc.org

Colquhoun, J. 2003. Pacific Northwest's least wanted list: Invasive weed identification and management. EC 1563, Oregon State University, Corvallis. 44 pp.

Durkin, P. R. 2014. Scoping/Screening Level Risk Assessment on Fluazifop-P-butyl FINAL REPORT. Syracuse Environmental Research Associates, Inc., 293.

Durkin, P, Follansbee, M. 2004. Imazapic- Human Health and Ecological Risk Assessment- Final Report. Syracuse Environmental Research Associates, Inc, Fayetteville, New York 13066. 110 pp.

DiTomaso, J.M., G.B. Kyser et al. 2013. Weed control in natural areas in the western United States. Weed Research and Information Center, University of California, Davis. 544 pp.

Harper-Lore, B.L., M. Johnson, and W.F. Ostrum. 2013 Vegetation Management: An Ecoregional Approach. US DOT, Fed. Highway Admin. 239 pg.

Harper-Lore, B.L., M. Johnson, and M.W. Skinner (editors). 2007. Roadside weed management.FHWA-HEP-07-017, Fed. Highway Admin., US Dept. Transportation. 369 pp.

Hill, K. and R. Horner. 2005. Assessment of alternatives in roadside vegetation management. Final Research Report, Washington State Transportation Center, University of Washington, Seattle. Agreement T2695, Task 67. http://www.wsdot.wa.gov/NR/rdonlyres/0CB59701-542E-4DF2-B8C8-1ACA3CB72172/0/FinalUWReport.pdf

Holt, H.A., R.L. McKenzie, F. Whitford, H.L. Hipkins, J. DiTomaso, R. Dickens, J. Orr, G. Blase, P. Northcutt, and J. McKenzie. 2002. Model Certification Manual for Right-of-Way Pesticide Applicators. http://www.agriculture.purdue.edu/pesp/rowmanual/

Hopwood, J. et.al. 2015. Literature review: Pollinator habitat enhancement and best management practice in highway rights-of-way. Fed. Highway Admin. https://www.environment.fhwa.dot.gov/ecosystems/documents/pollinators_BMPs_in_highway_ROW.pdf

Hutchings, J., J.P. Rutan, J. Gollen, K. Mankle, and L. Baldwin. 2015. Whatcom County Integrated Vegetation Management Plan. http://www.co.whatcom.wa.us/DocumentCenter/Home/View/11074

Kitsap County Noxious Control Weed Board. 2015. City of Bremerton Integrated Vegetation Management Plan. 75 pg. http://www.ci.bremerton.wa.us/DocumentCenter/View/2277

Miller, T. W., C. Lucero. 2014. Meadow knapweed *(Centauria debeauxii)* Response to Herbicide and Mechanical Control. Invasive Plant Science and Management 2014 7:503-510.Monaco, T.J., S.C. Weller and F.M. Ashton. 2002. Weed Science Principles and Practices, 4th Edition. John Wiley & Sons, Inc., New York. 671 pg.

National Archive and Records Administration: Federal Register Volume 78, No 192, Thursday October 3, 2013/ Rules and Regulations. Endangered and Threatened Wildlife and Plants ; Designation of Critical Habitat for Taylor's Checkerspot butterfly and Streaked Horned Lark.

Panter, K.E., M.H. Ralphs et.al. 2011. Plants poisonous to livestock in the western states. USDA, Agri. Bull. No. 415. 107 pp.

Pimentel, P, S. McNair et al. 2001. Economic and environmental threats of alien plant, animal, and microbe invasions. Agriculture, Ecosystems and Environment 84 (2001) 1–20

Prather, T. 2015. Section V. Non-cropland and right-of-way. In: Peachey, Ed (editor). Pacific Northwest Weed Management Handbook. Oregon State University, Corvallis. p. V-1-V-10.

Prather, T., T. Miller, and A. Hulting. 2015. Section W: Control of problem weeds. In: Peachey, Ed (editor). Pacific Northwest Weed Management Handbook. Oregon State University, Corvallis. p. W-1-W-44.

Shaner, D.L., I. Burke et al. (editors). 2014. Herbicide Handbook, 10th Edition. Weed Science Society of America, Lawrence, KS. 513 pg.

Tu, M, C. Hurd and J.M. Randall. 2001. Weed Control Methods Handbook. The Nature Conservancy. (http://www.invasive.org/gist/products/handbook/methods-handbook.pdf)

USDA Forest Service. 2005. Pacific Northwest Region Invasive Plant Program, Final Impact Statement Vol. I 173 pp, Vol. III Appendix B-S.

USDA Forest Service. 2015. Pacific Northwest Research Station, Herbicides an unexpected alley for native plants in the war against invasive species. Science Findings: Issue 176: 1-2.

USDA Pesticide-Use Risk Assessments - http://www.fs.fed.us/foresthealth/pesticide/risk.shtml

USDA Risk Assessment Worksheets - http://www.fs.fed.us/foresthealth/pesticide/worksheets.shtml

USDI BLM. 2007. Final Vegetation Treatments Using Herbicides Programmatic Environmental Impact Statement. BLM PEIS 2007: http://www.blm.gov/wo/st/en/prog/more/veg_eis.html

USDI BLM. 2015. Draft programmatic environmental impact statement for vegetation treatments using aminopyralid, fluroxypyr, and rimsulfuron on Bureau of Land Management lands in 17 western

states.http://www.blm.gov/style/medialib/blm/wo/Planning_and_Renewable_Resources/vegeis.Par.79259.File.dat/Report%20Cover%20Biological%20Assessment%20for%20Vegetation%20using%20Three%20Herbicides.pdf

USDT Federal Highway Administration. 2005. The Nature of Roadsides and the Tools to Work with It. FHWA Pub. No. FHWA-EP-03-005.

USDT Federal Highway Administration. 2016. Pollinators and Roadsides:Best Management Practices for Managers and Decision Makers. Available: https://www.environment.fhwa.dot.gov/ecosystems/Pollinators_Roadsides/BMPs_pollinators_roadsides.asp

Washington Natural Heritage Program. Geographic information system. Rare plants and high quality ecosystems. Wnhp data set July 2015.

Washington State Department of Transportation. Undated. Aminopyralid, Roadside Vegetation Management Herbicide Fact Sheet. 4 pg. http://www.wsdot.wa.gov/NR/rdonlyres/CD6D91AC-D382-4E5D-AF1E-50C52C34484F/0/Aminopyralid.pdf

Washington State Department of Transportation. 2003. 2,4-D, Roadside Vegetation Management Herbicide Fact Sheet. 4 pg. http://www.wsdot.wa.gov/NR/rdonlyres/C6CBCC5B-64F8-4017-A209-9C6116EB36DB/0/2_4D.pdf

Washington State Department of Transportation. 2006. Clopyralid, Roadside Vegetation Management Herbicide Fact Sheet. 4 pg. http://www.wsdot.wa.gov/NR/rdonlyres/C3ECE3F9-BFCF-432D-ACB2-6C716BB8FADC/0/Clopyralid.pdf

Washington State Department of Transportation. 2006. Glyphosate, Roadside Vegetation Management Herbicide Fact Sheet. 4 pg. http://www.wsdot.wa.gov/NR/rdonlyres/A72C98BF-88CD-4BAA-9B0F-5BB709A0C564/0/glyphosate.pdf

Washington State Department of Transportation. 2006. Imazapyr, Roadside Vegetation Management Herbicide Fact Sheet. 4 pg. http://www.wsdot.wa.gov/NR/rdonlyres/C8EB1611-2699-48FB-B5B8-161D1223BC92/0/imazapyr.pdf

Washington State Department of Transportation. 2006. Triclopyr, Roadside Vegetation Management Herbicide Fact Sheet. 4 pg. http://www.wsdot.wa.gov/NR/rdonlyres/DC50D1A8-3711-4B5F-BF12-05912616A486/0/triclopyr.pdf

Washington State Department of Transportation. 2013. Chapter 6, Roadside Management. Washington State Department of Transportation Maintenance Manual M 51-01.05. 34 pg. http://www.wsdot.wa.gov/publications/manuals/fulltext/M51-01/Chapter6.pdf

Washington State Department of Transportation. 2014. Northwest Region, Area 1 Integrated Roadside Vegetation Management Plan. http://www.wsdot.wa.gov/NR/rdonlyres/586B5B84-EB29-45E1-AA6E-EC620BB3CD55/0/NWarea1_2014combined.pdf

Washington State Department of Transportation. 2014. Olympic Region, Area 3 Integrated Roadside Vegetation Management Plan. http://www.wsdot.wa.gov/NR/rdonlyres/315D3EA0-A71F-44D5-92F4-8F494182BD68/0/OLarea3_IVMplan2014combined.pdf

Washington State Department of Transportation. 2014. Southwest Region, Area 3 Integrated Roadside Vegetation Management Plan. http://www.wsdot.wa.gov/NR/rdonlyres/28AD03A3-7994-4A84-8602-1B14AC68264F/0/SWarea3_2014combined.pdf

Westbrook, R.G. 1998. Invasive plants, changing the landscape of America: Fact book. Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW), Washington, DC. 109 pp.

Whitson, T.D., L.C. Burrill et al. 2006. Weeds of the West. 9th ed. Western Society of Weed Science, Las Cruces, NM. 628 pp.

Xerces Society. Pollinator-Conservation-Roadsides http://www.xerces.org/pollinator-conservation-roadsides/

Yahner, R.H. and R.J. Hutnik. 2005. Plant species richness on an electric transmission right-of-way using integrated vegetation management. Jour. Arboriculture 31(3):124-130.