PROGRAM OVERVIEW

STREAMKEEPERS OF CLALLAM COUNTY

PROGRAM OVERVIEW

TABLE OF CONTENTS

WHAT'S A STREAMKEEPER, ANYWAY?

…or… Who Are Those People with the Grubby Equipment Bags?

by William Sarna, Streamkeeper volunteer, inaugural class of 1999

Hello! My name is Bill S., and I'm a Streamkeeper! *(Hello, Bill!)* Relax while I paint some broad brushstrokes to introduce the Streamkeeper program to you newcomers.

You're going to join a great group of people who go out several times a year to bumble around in the stream, have fun, complain if it's raining, and take a bunch of important measurements that inform scientists and the rest of us how our streams are doing.

The core of Streamkeepers is the quarterly stream teams who monitor selected Clallam County streams. Four times a year, your team (usually 3-6 people) spends an hour or two at your designated monitoring sites (usually 3-6 sites on one or two creeks), measuring the health of our streams. Here's a bit about what we do...

Basic Water Quality —Break Out the Toys!

This is the stuff most people think of when they think of monitoring streams—somebody holding an electronic probe in the water. Don't be afraid; you don't need a degree in science to navigate this section. You'll be recording air and water temperature, pH and dissolved oxygen levels, water clarity and conductivity, and flow level. In order to get these readings, you'll break out the probes and meters and other doohickeys, to poke, prod, and tickle the stream to test its make-up. If you like Bill Nye the Science Guy, you'll love this part of monitoring.

If, on the other hand, you're more of the touchy-feely type, you'll love…

Knock Knock — Who's There? The Biological Section

Here you'll look, listen, learn and record what's living in and around your stream reach. Are there any fish? Any birds flying around? Any signs of wildlife? Bad weeds taking over? Then once a year we dig up benthic macroinvertebrates (that's "stream bugs" to you, feller). These little guys may be spineless, but they are critical to assessing the overall ecological health of the stream.

In addition to the regular stream monitoring, there are lots of other projects Streamkeepers get involved in, such as sampling for bacteria, counting fish, entering and checking data, and reaching out to the community. But we'll overwhelm you with all that later! If this seems intimidating, keep in mind that you're joining a program full of former neophytes who are now outstanding in their…streams! You'll have lots of support to learn as you go. Soon, you'll be an old hand spitting out terms like "expected range", "DO saturation", and "Benthic Index of Biological Integrity". Oy.

That's the basics. There's plenty more to absorb, but believe me, stream monitoring is a fascinating and rewarding experience. You'll learn a great deal about our beautiful surroundings and what's happening beneath the surface, and you'll meet some great people in the bargain.

So jump on in, the water's fine! At least…that's what we're here to determine.

Get Wet!

"Uncle" Bill Sarna
May 2000
(Updated by SK staff)

STREAMKEEPERS IN A NUTSHELL

Streamkeepers of Clallam County is Clallam County's watershed public involvement program. Our purpose is to involve residents in caring for watersheds by monitoring local streams, providing useful data that can help guide management decisions, and fostering watershed stewardship.

Program goals are to:

1. Provide credible data useful to stewardship of local watersheds:
    - Describe current watershed conditions
    - Identify trends in watershed conditions
    - Track known problem areas
    - Screen for potential problems
2. Report the information collected to decision-makers, fellow volunteers, other agencies and organizations, and the general public, on a regular and timely basis.
3. Facilitate public involvement in watershed monitoring and stewardship.

Streamkeepers are volunteers who want to be actively involved in caring for their local streams. The most typical job of a Streamkeeper is to perform quarterly monitoring at established sites on the stream whose team they have joined. Besides that, volunteers may choose to join special monitoring projects requested by a citizen or another agency, such as grab-sampling for bacterial pollution or doing fish surveys. Some Streamkeepers also elect to perform cleanups and small-scale restoration projects on their streams, to correct problems identified during monitoring. Others may choose to perform office work in support of our program, perform statistical analysis on our data, serve on a variety of citizen watershed advisory boards, or reach out to the community about watershed health and the work of Streamkeepers.

Data collected during monitoring provides basic information about stream conditions in Clallam County, across space and time. Special project work helps other agencies and entities complete one or more aspects of their mission, which might range from watershed planning to restoration project effectiveness monitoring. For more on this topic, see "The Big Picture: How Does Our Data Fit In?" in the next section, and the more detailed account in the Appendix entitled, "How Is Our Data Used?"

THE BIG PICTURE: HOW DOES OUR DATA FIT IN?

The data we collect informs decisions under multiple regulatory frameworks such as:

- The federal Clean Water Act and Endangered Species Act
- The state Growth, Shoreline, and Watershed Management Acts, and the local planning/regulatory documents which implement those Acts:
  - The Comprehensive Plans and Shoreline Master Programs for Clallam County and the Cities of Forks, Port Angeles, and Sequim
  - Multi-stakeholder Watershed Management Plans which set broad management strategies for state-designated Water Resource Inventory Areas (WRIAs) 18-20 in Clallam County
    - These plans may incorporate or result in other instruments such as the Elwha-Dungeness Water Management Rule, adopted by the State to help implement the WRIA 18 Watershed Plan by securing water supplies in the Sequim area for the benefit of people, agriculture, fish and wildlife.
- Local plans for stormwater, roads, etc.

The data also helps prioritize, fund, plan, and evaluate projects to protect and restore streams through engineering, ecological restoration, or acquisition.

Our data have been used by a variety of entities, including state agencies, tribes, municipalities, water purveyors, restoration project proponents, watershed planning councils, and private citizens; for a detailed list, see http://www.clallam.net/SK/doc/DataRecipients.pdf.

Streamkeepers' data, as well as many other locally-generated data sets, are stored in the Clallam County Water Resources database, designed and managed by Streamkeepers staff and volunteers. Various standardized reports from this database are available on Streamkeepers' website at http://www.clallam.net/SK/studies.html. Customized reports are available on request; fees may apply.

An important recipient of Streamkeepers data is the Washington State Department of Ecology (Ecology). We submit all of our quality-controlled data to their Environmental Information Management (EIM) database for broad access and availability to other entities large and small (http://www.ecy.wa.gov/eim/). For example, Ecology is delegated by the federal government to administer the Clean Water Act in the state. Under this Act, Ecology periodically calls for data and publishes a Water Quality Report listing available data for every water body in the state and rating the water bodies according to how the data compare with state water quality standards. This Report constitutes an important planning tool for the protection and restoration of watersheds.

We also participate in a partnership program with Ecology to test and confirm data accuracy called the Side by Side Sampling Program. Read more about this effort in the next section, "What Kind of Monitoring Do We Do?"

In 2004, Clallam County published a "State of the Waters" report (see "References" appendix for this and other citations), bringing together all available information about

the various waters of the county, much of it from Streamkeepers : http://www.clallam.net/streamkeepers/html/state_of_the_waters.htm. Funding has not been available to update this report since that time.

For a more thorough discussion of the actual and potential uses of our data, see the Appendix entitled, “How Is Our Data Used?”

WHAT KIND OF MONITORING DO WE DO?

Ambient Monitoring

The heart of Streamkeepers is our ambient monitoring program, in which volunteers are organized into teams which monitor streams. Teams go out quarterly to monitor at established sites, and over the course of the year they sample the following parameters of stream health. *[NOTE: Physical parameters in italics have been optional since 2006.]*

Biological Parameters	Chemical Parameters	Physical Parameters
Fish and wildlife	Temperature	Flow: speed, depth, and discharge volume
Noxious weeds	Dissolved oxygen	Reach sketches, maps, and photographs
Benthic macroinvertebrates	pH	Gradient
	Specific conductance	Bank stability
	Salinity	*Canopy closure, Canopy type, Conifer stems Cross-section, Erosion/Revetment, Large woody debris, Pebble count, Pools*
	Turbidity	

Our monitoring activities conform to a Quality Assurance Project Plan (QAPP) (Clallam County, current year in force), approved by the Washington Department of Ecology, describing the technical nuts and bolts of what, when, how, and why we monitor, as well as how we assure and evaluate the quality of the data we collect. In addition to our QAPP, we publish detailed Field Procedures which help volunteers move step by step through the monitoring process and avoid pitfalls.

We are also enrolled and actively participate in Ecology's Side-by-Side Sampling Program ("SxS") to help ensure data quality by monitoring the same parameters at the same location as Ecology's ambient monitoring program. At least four times a year, we sample at one or more of Ecology's preferred sampling stations (generally their Elwha River station at Highway 101), and we compare our data with theirs, for mutual data-quality checking to catch problems and troubleshoot when necessary. More references to SxS sampling are found in the following section "What, When and Why We Monitor".

Streamwalk

In addition to our regular ambient monitoring, volunteers are encouraged to periodically perform a Streamwalk—a rapid, broad-scale assessment of an entire stream. See details in the following section, "What, When and Why We Monitor," as well as the Streamwalk chapter in our Handbook.

Special Monitoring Projects

Streamkeepers also perform special monitoring projects at the request of various clients, generally to help advance watershed protection or stream restoration. In addition to helping clients achieve their goals, these projects provide the added motivation to volunteers of seeing an immediate impact from their efforts. Some of the special projects we've undertaken include:

- Measuring bacterial pollution in streams and stormwater conveyances to identify human-caused sources and remediate them.
- Monitoring extreme conditions during summertime low flows and winter storms.

- Counting salmon redds (i.e., fish egg nests) to assess fish populations.
- Supporting monitoring efforts undertaken by educational institutions.

These special projects are described in our annual Work Plans (see below).

Work Plan for the Current Year

For a list of specific projects Streamkeepers are performing in a given year, see the current year's Work Plan, available on our website: http://www.clallam.net/SK/programplanning.html.

What, When and Why We Monitor

Our regular yearly monitoring calendar is organized by seasonal quarters based on the type of sampling – Stream Teams, Side-by-Side (SxS), or Streamwalk:

	REGULAR STREAM TEAMS				SxS	Stream-walk
Season	**Ambient monitoring: Water chemistry, flow, fish & wildlife, noxious weeds**	**Photos**	**Physical habitat**	**Benthic macroinvertebrate collection (for Benthic Index of Biological Integrity)**	**Water chemistry para-meters**	**Photos, water-shed inventory & narrative**
Winter	January (Report any changes in noxious weeds)	With Ambient sampling			At least 4 times per year with WA Dept. of Ecology during their monthly ambient monitoring	At teams' discretion
Spring	April (Report any changes in noxious weeds)					
Summer	August (Noxious weed reports at all sites, regardless of changes)	With both Ambient & Benthic sampling	Bank stability; Gradient at new sites or where channel has changed; other protocols optional	Aug. 1 – Sept. 30		
Fall	Sept 15 - Oct 15					

More specifically, over the course of each year, Streamkeepers monitor the following parameters by sampling the indicators at the determined frequency:

Type of Parameter	Indicator	When	Why	Desired Level or Range
Chemical	Dissolved Oxygen (DO)	quarterly	Oxygen in water is vital to growth and development of aquatic life.	> 9.5 mg/L for most streams and 8.0 mg/L for the rest*
	pH	quarterly	A healthy stream is neither excessively acid nor alkaline; some aquatic life forms can only live within a narrow pH range, others are more tolerant.	6.5-8.5*
	Salinity	quarterly	In tidally-influenced waters, salinity readings give an idea of the relative degree of freshwater vs. saltwater influence at the sampling point.	Fresh water should generally be 0.1 PSS (Practical Salinity Scale, roughly parts per thousand) or less. Open ocean is about 35 PSS.
	Specific Conductivity (at 25°C)	quarterly	A healthy stream has low conductivity. High electrical conductivity indicates various chemical and biological pollution problems.	No standard established for streams, but readings >300 µS/cm (microSiemens per centimeter) may be cause for concern
	Temperature	quarterly	Consistently cool streams provide better habitat for salmonids. Streams that are unusually warm indicate watershed problems.	< 16° C for most streams and < 18° C for the rest*; consistent, cool temperatures
	Turbidity	quarterly	Turbidity (cloudiness in water) results from suspended solids such as mud. High levels of suspended sediment destroy fish habitat.	No more than 5 NTU above "natural" levels (or 10% above if "natural" level is >50).* (An "NTU" is a measure of turbidity.)

* Source: State water quality standards, Chapter 173-201A WAC. Clallam County streams for which standards are somewhat relaxed are: the Dungeness River and its tributaries downstream of Canyon Creek (RM 10.8), Port Angeles Harbor tributaries from Tumwater to Lees Creeks, and the Dickey River.

Continued on following pages...

What, When and Why We Monitor (cont.)

Type of Parameter	Indicator	When	Why	Desired Level or Range
Biological	Benthic macroinver-tebrates	Aug 1-Sept 30	Diverse populations of macroinvertebrates signal a healthy stream system capable of supporting fish.	Large diversity of creatures, especially those requiring undisturbed conditions.
	Fecal Coliform and other bacterial concentra-tions	quarterly as funding permits or as requested by other sponsors	Fecal bacteria indicate human and animal waste in runoff water. Fecal matter in streams enriches water with nitrogen, contaminates shellfish, and makes people sick.	Geometric mean of 50 colonies per 100 mL and <10% of readings below 100 colonies for most waters, and geometric mean of 100 & <10% below 200 for the rest*
	Fish/wildlife	quarterly plus Streamwalk (July)	Fish and/or wildlife, or signs of their presence, signal a functioning stream system.	Abundant, diverse populations.
	Noxious weeds	Streamwalk (July); quarterly update as needed	Invasive exotic weeds signal an unhealthy stream system and crowd out desired native species.	No noxious weeds.

* Source: State water quality standards, Chapter 173-201A WAC. Clallam County streams for which standards are somewhat relaxed are: the Dungeness River and tributaries downstream of Canyon Creek (RM 10.8), Port Angeles Harbor tributaries from Tumwater to Lees Creeks, and the Dickey River.

Physical	Bank Stability	August	To provide a simple rating scale, based on easily recognizable factors to help evaluate the severity of erosion and revetment.	Stable banks
	Flow	Quarterly, plus during extremes if possible	Track flow regime, calibrate hydrology models, interpret water-quality data	Similar to historical conditions
	Gradient	At reach establish-ment then as needed	Characterize stream geomorphology	Will vary along the length of the stream
	Photographs (fixed vantage point)	January, August, and during macroinvert-tebrate collection	Indicate conditions coincident with sampling; track changes in stream over time	----------
	Sketch map or Reach map	When sites are established or change	Track changes in stream over time	----------

Type of Parameter	Indicator	When	Why	Desired Level or Range
Physical *(optional since 2006)*	*Canopy closure percentage*	January, August	Shade regulates stream temperature and provides cover for fish	Multi-storied canopy, abundant shade year-round
	Canopy type percentages	August	Large conifers are crucial to fish habitat	Near historic number of large conifers present in riparian corridor
	Conifer stems	January - every 5 years	Today's small conifers are tomorrow's large conifers	Density close to natural conditions
	Cross-section	August	Upstream activities can change the channel shape	Relatively stable cross-section
	Erosion / Revetment	August	Both excessive erosion and revetment (artificial bank protection) are harmful to fish and a sign of channel instability	Stable banks, little erosion or armoring
	Large woody debris (LWD)	August	Large downed trees help create pools, store sediment, reduce stream energy, and provide cover and nutrients.	Many large downed logs--conifers if they were historically present
	Pebble Count (Substrate)	August	Channel bed sediment is critical to the physical and biological functioning of stream channels.	Sediment of a size appropriate to the stream size and gradient
	Pools	August	Fish habitat	Abundant, stable pools
	Streamwalk survey & photographs	Occasional, usually summers	Provides an overall picture of stream health and documents potential problems	Naturally-functioning stream system

WHO RUNS THE PROGRAM?

Structure and Governance

Streamkeepers is part of the Clallam County Department of Public Works-Roads. Our ultimate accountability is to the Board of County Commissioners and through them to the citizens of the County.

On a more practical level, the essential direction of the program is guided by the Streamkeepers Steering Committee, itself consisting of two committees: our Volunteer Advisory Committee and our Technical Advisory Committee.

The VOLUNTEER ADVISORY COMMITTEE is composed of any volunteers who care to participate. It recommends changes to any aspect of the program, including program components, activation or inactivation of sites and streams, and other stewardship projects. It meets as needed, convened by program managers or at the request of volunteers. It usually meets in the fall to produce recommendations for program changes for the coming year.

The TECHNICAL ADVISORY COMMITTEE consists of agency biologists and resource managers, plus knowledgeable members of the general public. It connects the Streamkeepers program to other watershed management efforts and local technical expertise, by recommending priorities for sites, streams, parameters monitored, special projects, and reports, as well as providing guidance on technical questions. It meets as needed, convened by program managers or at the request of advisors or volunteers. It usually meets in the fall, sometimes combined with the Volunteer Advisory Committee, to produce recommendations for program changes for the coming year.

THE STREAMKEEPERS STEERING COMMITTEE consists of the combined Volunteer and Technical Advisory Committees. It makes final recommendations on program direction. It finalizes work plan for the coming year and consults on major program changes.

Staff works with these groups to evaluate the prior year's programming and plan the next. With the exception of funding, these committees have guided every major program decision, including where, what, when, how, and why we monitor.

VOLUNTEER JOB DESCRIPTION

Streamkeeper Volunteer

PURPOSE: Implement and shape the Streamkeepers of Clallam County volunteer monitoring and watershed involvement program.

RESPONSIBILITIES:

1. Attend required training sessions.
2. Perform stream monitoring and other activities when scheduled, according to established written protocols.
   - Coordinate with fellow team members to schedule and perform monitoring activities.
   - Follow inventory procedure for borrowing field kits.
   - Use field kits and equipment properly while in the field.
   - Report low supplies and missing or damaged equipment to Streamkeepers staff.
   - Complete monitoring data sheets and check for accuracy.
   - Deliver data sheets to Streamkeepers staff in a timely fashion.

Optional, additional duties include:

- Participate in advisory and other meetings.
- Assist other teams in monitoring or other activities.
- Perform other tasks related to the Streamkeepers program.

TRAINING PROVIDED

- Training in Streamkeepers protocols and procedures, including use of all monitoring equipment and checkout procedures.
- Clallam County Volunteer Orientation.
- Feedback and assistance throughout the year.
- Periodic refresher and supplemental trainings and workshops as needed or requested.

QUALIFICATIONS

- Field volunteers must have physical ability to do field work, which may (but won't necessarily) include carrying equipment storage containers, traversing rough ground and hiking distances of a mile or more to get to a monitoring reach.
- Non-field volunteers need the willingness to do assorted tasks, such as office work, plus possibly handle equipment bags, and contribute according to their special skills.
- All volunteers will need enthusiasm, flexibility, tolerance, and willingness to learn new things.

VOLUNTEER JOB DESCRIPTION

Team Leader (= Team Coordinator + Field Team Leader)

SUMMARY: Streamkeepers' management is built on the team concept, in which staff helps to develop teams and then empowers them to act with a great deal of independence. Team Leadership can either be incorporated into one "job" or broken into two. These two roles, Team Coordinator and Field Team Leader, involve coordinating and leading a team of Streamkeepers (usually 3-6 volunteers) in monitoring one or more of the streams or projects identified in the current year's workscope, as well as helping to shape the Streamkeepers program.

RESPONSIBILITIES:

In addition to regular Streamkeeper responsibilities:

1. TEAM COORDINATOR:

- Keep in touch with all team members, to notify them of upcoming activities and solicit their availability.
- Communicate with team members and Streamkeepers staff to schedule team activities, reserve equipment, and enter activities on the Streamkeepers online Calendar.
- Ensure that field kits and data sheets are returned to the Streamkeepers office in good time and good condition.
- Act as a liaison to the Streamkeepers office for your stream team.
- Welcome and orient new team members to the team.

2. FIELD TEAM LEADER:

- Ensure that team members use field kits and equipment properly while in the field.
- Assist in training and advising your team's volunteers as needed.
- Ensure that monitoring data sheets are completely filled out and computations are accurate.
- Pay special attention to team safety and well-being.

TRAINING PROVIDED: Same as for regular volunteers, plus lots of individual consultation.

QUALIFICATIONS:

- Same as for regular Streamkeepers, plus:
- Willingness and ability to shepherd other volunteers.

History of the Streamkeepers Program

Streamkeepers had its origins as part of the grant-funded "8 Streams Project" of the Washington State University Cooperative Extension Office of Clallam County, which ran from April 1996 to March 1999. This project had a broad-based mission to do community education about water quality; volunteer stream teams were one of several program components. Volunteers particularly embraced the stream-teams program and became increasingly involved in stewardship of their streams.

The 8 Streams Project fielded 50 volunteers on nine streams, between summer 1997 and spring 1999. As the grant was coming to a close, volunteers expressed the desire to not only continue the stream teams, but also to improve the quality of their work. Hence, they proceeded on two fronts:

- Many showed up at a County budget hearing to request County funding to continue the volunteer stream teams. As one volunteer put it, "We're motivated, we're trained, and we're cheap." They were granted a minimal level of funding by County Commissioners.
- Others formed a committee to recommend improvements to the monitoring program. Topics covered included accuracy, replicability, and relevance of data, and efficiency of data collection.

When the County voted to continue funding the volunteer monitoring program, they also decided to move the program into County government. By vote of the volunteers, the program took the name Streamkeepers. Its staff was placed in the Department of Community Development.

Streamkeepers staff completely revamped the monitoring program, using the recommendations of volunteers and local natural resource managers (our "technical advisors") to ensure credible, meaningful data that local resource managers could use to help protect and restore local watersheds. Our Volunteer Handbook and Quality Assurance Project Plan were soon listed as model documents by the Washington Department of Fish and Wildlife (Johnson et al., 2001).

On December 1, 2011, sponsorship of the Streamkeepers program changed from the Department of Community Development to the Department of Public Works-Roads.

Since 1999, County funding has been supplemented by outside funding, some in the form of direct grants to Streamkeepers, some in the form of fee-for-service, and some as part of larger grants that various County departments have received to protect and restore water quality, quantity, and habitat, with Streamkeepers in charge of the monitoring, quality assurance, and data management aspects of the project.

Streamkeepers Staff

Ed Chadd, program coordinator, has a B.S. in Environmental Policy and Assessment from Huxley College of Western Washington University and a Master's in Teaching from The University of Chicago. He has 35 years' experience in traditional and experiential education, public education and outreach, volunteer management, and environmental monitoring, working for nonprofits and various government agencies. He began his streamkeeping career in 1997 as a volunteer team captain in the 8 Streams Project (see "History" section), eventually becoming a Project Assistant in that program and then starting up the Streamkeepers program along with Jessica Baccus in 1999.