Puget Sound Water Quality Action Team
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Sound WAVES

Living on the water's edge:
Sand lance, salmon and people all share the Sound's shores

Building homes and other activities have transformed nearly one third of Puget Sound's shoreline from its natural state. Shoreline modifications or changes—such as bulkheads, riprap and docks—can disrupt the natural processes that sustain healthy habitats for many species of fish and invertebrates.

The Puget Sound Water Quality Action Team is working with other agencies and organizations to educate waterfront property owners, contractors and local governments on ways to avoid damaging valuable shoreline habitat.

Salsbury Point Park in Kitsap County, just north of the Hood Canal Bridge. Careful design makes this erosion control project on the shoreline look and function like a natural beach.

Erosion happens

In a natural, unaltered setting, sediments move from rivers and eroding bluffs along beaches and settle in calm waters to create marshes and spits. Surf smelt and sand lance lay their eggs high up on beaches where overhanging vegetation provides shade. Eelgrass and kelp beds grow in the clear, shallow waters just offshore.

Waterfront property owners concerned about erosion will often use bulkheads or other structures to shore up their beaches and protect their homes. In most cases, however, the energy from waves hitting a bulkhead is directed at the beach in front of the bulkhead, and actually undermines the structure and blocks needed sediment from reaching neighboring properties.

"Fortunately, we are discovering innovative ways to use 'softer' methods to protect homes and other structures, while preventing erosion and further harm to shorelines," said Doug Myers, wetland and habitat specialist with the Puget Sound Water Quality Action Team.

Each beach is unique

Because no two stretches of beach are exactly alike, homeowners, construction contractors and agency regulators must work together to address issues specific to each site. With careful planning, many homeowners may adopt new types of shoreline protection that allow the shoreline to continue its natural process.

Monitoring the results of different soft-protection techniques will determine which are most effective for different site conditions. In some instances waterfront structures may already be too close to the shoreline, or other site conditions may prevent the use of alternative methods.

Nearly 75 percent of Puget Sound's shorelines are privately owned, and that means waterfront property owners have an enormous amount of influence on the health of the shoreline.

"With new construction, the best solution is to site homes and other structures as far away from the shoreline as possible," Myers said.

Soft protection methods may also include a combination of drift logs, native plants and the addition of beach-quality sediments. The possibilities are as varied as the Puget Sound shoreline, and there is no one-size-fits-all solution.

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Inside This Issue

New partner lends expertise to Nearshore Project

In the Winter 2002 issue of ***Sound Waves,*** we reported on a new partnership to help restore and preserve Puget Sound's nearshore habitat. This important project, the **Puget Sound Nearshore Ecosystem Restoration Project,** is off and running with several additional partners adding resources and expertise. Most notably, the U.S. Geological Survey (USGS) is now helping in this effort.

The USGS has provided a significant amount of funding to further the development of the nearshore conceptual model and to begin targeted studies on certain aspects of nearshore processes that are not currently well understood. The USGS brings a wealth of knowledge and expertise to the project as well.

Work continues throughout this summer to develop a conceptual model that will show how the nearshore of Puget Sound works. The habitats that make up Puget Sound's nearshore are the result of physical, chemical and biological processes that occur over time. If one process is changed as a result of restoration, the model should predict a number of different responses in the biological community.

By using this conceptual model, a number of different options to restore or protect the nearshore may be considered. The choices that provide the greatest environmental benefit may be chosen for the feasibility study to determine which are the most practical to construct.

Nearshore Project team learns from other restoration efforts

Puget Sound isn't the only place in the country acknowledging and acting on its significant habitat concerns. A number of other large, regional restoration projects are in various stages of development around the country. Chesapeake Bay, Florida Everglades, San Francisco Bay, Mississippi River and the Grand Canyon regions are involved in studies, education and restoration and preservation projects that involve public, private and non-profit organizations.

The Puget Sound Nearshore Project team is working with key staff from these projects in other parts of the country.

"We hope to learn from others about good, relevant scientific methods and organizational structures that can benefit our work in Puget Sound," said Duane Fagergren, Deputy Director at the Action Team. Fagergren also represents state agencies on the Nearshore Steering Committee.

Fagergren said the Florida Everglades Project is of particular interest because of its scope and organizational structure.

The Corps of Engineers and state and local partners met with staff from the Everglades Project in June. The staff presented the findings of their scientific investigations and how the findings have led them to engineer large-scale water management changes that will benefit the entire South Florida ecosystem.

For updates on the Puget Sound Nearshore Project, a list of project co-sponsors and to learn about other regional restoration and ecosystem study projects around the country, visit the University of Washington's website at **http://www.prism.washington.edu/lc/PSNERP/**

Workshops teach landowners, contractors about alternatives to shoreline protection

▶Waterfront landowners and others learn about nearshore habitats

Local governments have teamed up with the Puget Sound Water Quality Action Team during the last several years to educate people about marine nearshore habitats and their importance to eelgrass, forage fish and young salmon.

In April 2001, a shoreline homeowner's workshop in Port Hadlock, Jefferson County, featured Jim Johannessen of Coastal Geologic Services and Anne Shaffer of Washington Department of Fish and Wildlife. Nearly 90 percent of the workshop participants were waterfront property owners.

Johannessen and Shaffer described the natural geologic and biologic processes that occur along marine shorelines such as erosion, deposition, sediment transport, colonization by eelgrass and forage fish spawning. The Action Team is working with local groups to offer similar workshops in other counties. Watch the Action Team's website for details or subscribe to the water quality information listserv at www.wa.gov/puget_sound.

▶Contractors teach peers about alternatives to shoreline modification

In March, approximately 30 waterfront construction contractors, geologists and environmental consultants from throughout Puget Sound met in Federal Way to present alternative methods to shoreline treatment that can be used instead of hard protection structures, such as bulkheads.

Aware of the habitat issues with hard protection structures, these shoreline practitioners taught each other about methods they've used. While some of the methods are experimental and all are site specific, they tended to rely less on rock, concrete and wood, and more on gravel, sand, native vegetation and large woody debris. The contractors participated in a vigorous discussion and pointed to regulatory inconsistencies between local and state permitting programs.

Coming up...

The next step in moving to alternative shoreline protection is to meet with local government regulators and state habitat biologists who regulate waterfront construction. The Department of Ecology and University of Washington Sea Grant will sponsor a preliminary discussion among regulators and planners in October.

We want your comments on the *Puget Sound Water Quality Work Plan*

The Action Team wants to hear from you about its draft ***Puget Sound Water Quality Work Plan*** for the 2003-2005 biennium. We will be taking comments from July 23 through August 30.

The Action Team support staff developed the work plan with direction from the Puget Sound Council and assistance from state agencies and regional experts from local and tribal government, universities, businesses, and citizen groups. The work plan identifies key issues facing Puget Sound and sets long-term and biennial targets to fix problems. State agencies submit actions funded by the legislature for specific purposes defined in the ***Puget Sound Water Quality Management Plan.***

The work plan also recommends actions for federal agencies and local governments in Puget Sound. The final work plan will be submitted to Gov. Gary Locke and the state legislature in December 2002. You may review and the draft work plan in late July at **www.wa.gov/puget_sound.**

News From Around Puget Sound

Thurston County

In 2001, the **City of Lacey** used Public Involvement and Education(PIE) funding to motivate and train homeowners and homeowner associations to maintain privately owned stormwater ponds. This highly successful program combined technical assistance from city staff with workshops and pond work parties. Now the cities of Lacey, Olympia and Tumwater and Thurston County have joined together to expand the program. Following informational workshops, interested homeowner associations will benefit from on-site technical assistance at work parties and follow-up assistance by

Neighbors work together to clean out a community stormwater site in Lacey.

staff from the appropriate jurisdiction. The goal is to train homeowners in pollution prevention and long-term facility maintenance, so that pond failures and discharges of pollutants can be prevented. Contact **Lisa Dennis-Perez** at (360) 438-2687 or LDennisP@ci.lacey.wa.us.

San Juan County

Thanks to a $211,200 grant from the Salmon Recovery Funding Board, **Friends of the San Juans**, in collaboration with the San Juan Marine Resource Committee and the University of Washington, will be able to compile a comprehensive eelgrass inventory for San Juan County. The inventory will be used to identify eelgrass restoration sites, note targets for land acquisition, increase public education for salmon recovery, and support salmon habitat protection strategies. This project represents the second phase of the Forage Fish Spawning Habitat Assessment Project already undertaken by the Friends of the San Juans and San Juan County. Other financial contributors to this project include the National Fish and Wildlife Foundation, Marine Ecosystem Health Program and the Northwest Straits Commission. Volunteers are needed to assist with this project. Contact **Friends of the San Juans** at (360) 378-2319 or visit their website at www.sanjuans.org.

Kitsap County

An unique coalition of partners—the **Kitsap Smart Growth Coalition**—is working tirelessly in Kitsap County to adopt a list of goals designed to help the county grow more smartly in the coming years. These goals, which were recently endorsed by the Kitsap County Board of Commissioners, include statements such as protecting natural systems and developing livable communities. Recognizing the need for public awareness and involvement in these issues, the coalition sponsored a series of successful presentations from regional and national experts on various Smart Growth topics, including transportation, watershed planning, methods for building coalitions, economics and infrastructure, sustainable development, and the importance of public facilities. The coalition includes Citizens for Responsible Planning, Home Builders Association, Realtors Association, Hood Canal Environmental Council, County Board of Commissioners, League of Women Voters, Kitsap Transit, The Bremerton Sun, Regional Economic Development Council, Consolidated Housing Authority, Kitsap cities, and the Puget Sound Water Quality Action Team. Contact **Michael Ash**, Kitsap Smart Growth Coordinator, (360) 337-4667 or mash@co.kitsap.wa.us.

Pierce County

Citizens for a Healthy Bay (CHB) staff and volunteers are restoring some of the estuarine marshes in an industrial area in Commencement Bay and surrounding areas. CHB and others working through the Natural Resource Damage Assessment process have already restored 116 acres of brackish marsh. The long-term habitat restoration goal set by CHB is to restore 10 percent of the 6,100 acres of tidal habitat that existed in Commencement Bay in 1888. A series of projects, either planned or implemented, will result in a continuous corridor of habitat near the mouth of the Puyallup River. On Earth Day 2002, 175 volunteers demonstrated their support for these restoration efforts. In the pouring rain and cold, they cleaned up and maintained one of the sites. Volunteers also participate in monitoring and maintaining restoration sites through CHB's Adopt-a-Wildlife-Area program. More information is available on the web at www.healthybay.org Contact **Leslie Ann Rose**, Citizens for a Healthy Bay, (253) 383-2429 or lrose@healthybay.org

Whatcom County

The **Port of Bellingham** is making plans and pursuing funds to restore 400 feet of shoreline at Marine Park in Bellingham Bay. The project involves removing concrete slabs, pieces of asphalt, rebar and creosote piles from the site and constructing a naturally sloped cobble beach with sand, native grasses and driftwood along the backshore. The port will also install two small groins to accommodate sediment drift. The restored

Graphic courtesy of the Port of Bellingham

Marine Park public access and habitat restoration project.

shoreline will help reestablish forage fish habitat, reconnect nearby eelgrass beds and enhance public access to the water. The project is part of a long-term, comprehensive program to clean up contaminated sediments and restore nearshore habitats in Bellingham Bay. The program is coupled with other efforts to revitalize the city of Bellingham's valuable waterfront. The Marine Park project is scheduled for 2003, and the cost is estimated at $500,000. Contact **Adam Fulton**, Port of Bellingham, (360) 676-2500, or adamf@portofbellingham.com.

Puget Sound Water Quality Action Team Local Liaisons:

Island and **Snohomish counties:**
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Whatcom and **Skagit counties:**
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San Juan County:
Ginny Broadhurst
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Clallam, Kitsap and **Jefferson counties:**
John Cambalik
(360) 582-0575

Pierce and **King counties:**
Kathy Taylor
(253) 333-4920

Case Study: Changes to Shorelines

Beach community rallies to solve erosion problem

Photo courtesy of Jim Johannessen

Samish beach in 1997 showing eroded beach and part of a collapsed bulkhead (temporarily realigned) and the extent of storm damage. Houses could not be moved landward due to an unstable bluff.

Photo courtesy of Jim Johannessen

Year 4. Center of the project looking west. Monitoring shows beach stability to date (just a 1- to 2-percent loss of volume of shoreline per year).

Along the south shoreline of **Samish Bay** in **Skagit County**, 16 private homeowners, a designer and a contractor worked together to solve the problem of a 1,200-foot-long section of eroding beach.

Development in the area began as early as 100 years ago. Since that time, homeowners put in a number of structures—mostly bulkheads—along the shoreline. The goal of these structures was to protect property from erosion. Homeowners also installed another type of beach structure called a groin perpendicular to the shoreline with the goal of trapping the limited supply of sand and gravel.

Under the high wave energy, however, the bulkheads and groins triggered more erosion. Bulkheads cut off the flow of sediments from the bluff to the beach. As fine sediments washed away, the elevation of the beach dropped, undermining several bulkheads. Eventually the bulkheads failed, forcing the residents to seek alternatives to erosion control.

The Department of Natural Resources staff recommended removing the existing bulkheads and nourishing the beach with new sediments. The homeowners decided to keep the existing bulkheads to protect their property, but they also chose the additional beach nourishment option.

In 1998, Coastal Geologic Services, Inc. led the design project, with input from Wolf Bauer and construction by Waterfront Construction. The design included installing a single groin at one end of the beach with 80 tons of rock to capture and hold on to the new sediments. Workers then added 7,000 cubic yards of gravel to create a berm in front of the existing bulkheads. They shaped the berm into a gradual slope and then covered it with an additional 1,500 cubic yards of finer gravel and 260 cubic yards of sand. The addition of this finer material was intended to help surf smelt spawn.

The result is a very natural-looking beach that has begun to establish new native vegetation. Coastal Geologic Services, Inc. will be monitoring for five years to determine how well it performs and whether there is any change to the sediment composition as time progresses. The total cost of the project for the 16 homes was $250,000.

The bluff that naturally maintains this beach sediment is still disconnected from the beach, but the project mimics the shape and composition of a natural beach. In time, the homeowners may need to have nourishment added again. In the meantime, the project may provide years of healthy habitat for the nearshore ecosystem, while protecting private property and providing a pleasant beach for residents to enjoy.

More case studies available

A detailed description of these shoreline modification projects and others is available in PDF format from the Department of Ecology's website. The publication "Alternative Bank Protection Methods for Puget Sound Shoreline" (Publication #00-06-012), is divided into five sections to minimize the file size. Each of the 15 case studies represent unique solutions to site-specific problems. To view the files, go to **http://www.ecy.wa.gov/biblio/sea2000.html**.

Q&A

Taking a softer approach to shoreline protection

Jim Johannessen, who runs Coastal Geologic Services Inc. in Bellingham, is a shoreline geologist who has consulted on and managed shoreline protection projects in Puget Sound for 10 years, including a large number of projects using alternative soft shore protection.

Sound Waves. How well do the soft- shore protection techniques work compared to traditional bulkheads?

Jim Johannessen. Soft-shore protection projects in Puget Sound generally consist of gravel beach nourishment and a variety of composite designs including, for example, anchored logs; salt-tolerant vegetation; limited rock placement; and shore reconfiguration, such as reorientation, fill removal, or moving the beach landward.

Almost all Seattle area waterfront parks with beaches have artificially enhanced gravel beaches due to the severe cumulative impacts caused by the shoreline railroad bed and bulkheads and subsequent beach erosion.

Seattle area beach-nourishment project sites include West Point in Discovery Park, Golden Gardens, Lincoln Beach and Seacrest. The beaches have been very resilient since the projects started in the 1970s.

Anchor Environmental, Wolf Bauer and I will soon complete a conceptual shoreline redesign for Seahurst Park in Burien, which has almost one mile of Puget Sound shore. The failing artificially elevated beaches and a significant portion of the old seawall and bulkhead at Seahurst Park will likely be replaced by the Army Corps of Engineers and others.

Scientists have monitored only a handful of older beach-nourishment projects in detail, but results show very good performance. These modifications, such as an increase in sand in the gravel beachface, are generally favorable changes for beach habitats and recreational activities, as well

Continued on next page...

as for re-creating a beach that had largely disappeared.

Coastal Geologic Services has been collecting detailed monitoring data at five beach-nourishment sites around the North Sound for up to five years. Monitoring results show that projects lost only 1 to 2 percent of gravel volume annually, with increases noted at some sites. These projects protect property and provide a much more natural beach and backshore.

We documented no negative impacts to adjacent lower beachface and subtidal habitats at any of these sites. Additionally, several of these projects have included substantial native plant restoration in the backshore area.

Several of our project sites—such as Samish Island (see **Case Study**, facing page)—included advance mitigation for surf smelt spawning habitat that was present to some extent in years past. After the first or second year following construction, we documented suitable surf smelt spawning habitat at these sites, just as predicted.

Unfortunately, at a time when soft alternatives are now favored or required, quality monitoring data from projects around the Sound are scarce. If our ecologically critical nearshore habitats are to be preserved or restored, proven soft-shore protection methods will need to be a fundamental element of this effort. Most existing projects are very poorly documented, and planned projects are not likely to be carefully monitored without a coordinated regional monitoring program funded by resource agencies.

Sound Waves. Do the soft-shore protection measures cost more than traditional bulkheads?

Johannessen. The cost of most soft-shore protection methods is generally similar to or a little less than the cost of a new bulkhead. Some projects, such as composite designs involving gravel, anchored logs, and vegetation in the backshore, can be considerably cheaper than a new bulkhead. Additionally, getting a permit for an alternative soft-shore project can be easier since there can be fewer restrictions than with a traditional bulkhead.

For more information about the Action Team's involvement with nearshore and shoreline modification issues, contact **Doug Myers**, wetland and habitat specialist, at (360) 407-7322 or dmyers@psat.wa.gov.

Case Study: Changes to Shorelines

Dully residence—a homeowner-designed alternative

Mike and Barbara Dully recently undertook an innovative modification to the shoreline along their home, located on the north shoreline of southern **Hood Canal near Belfair in Mason County**.

While the wave energy on this part of the shoreline is generally low, the Dully's beach had eroded 10 to 15 feet from 1989 to 1994 because of bulkheads located on neighboring properties on either side of the Dully lot. The bulkheads caused waves to deflect their energy onto the Dully's unprotected shoreline.

Initially the Dullys wanted to install a bulkhead similar to their neighbors' structure, but Washington Department of Fish and Wildlife requirements and the anticipated loss of natural beach discouraged the Dullys from pursuing this route.

In cooperation with state and local agencies, Dully designed an alternative shoreline treatment, and Butch's Bulldozing did the construction.

The contractor's work consisted of burying a rock revetment into the beach, anchoring large logs (20-feet long by 18 inches in diameter) onto the revetment, covering the rock with six inches of gravel and then bringing the beach back to its original grade. Finally, they planted the area with native beach grass.

Photo courtesy of Hugh Shipman

The rock revetment, with large logs anchored to it, provides an emergency bottom in the event that the beach drops.

Photo courtesy of Hugh Shipman

Rock revetment is buried under six inches of gravel, adding further protection.

The rock revetment, which is buried by gravel in a trench parallel to the beach, protects the Dullys' residence in the event of severe erosion.

The contractor completed the project in September 1998. During the first winter, a significant amount of gravel accumulated on the beach above the anchored logs, and beach vegetation became established.

This project is a great example of how a little ingenuity can go a long way toward meeting the goals of protecting shoreline property and maintaining natural beach function.

Resources for waterfront property owners:

- **Shoreline Stewardship Guidebook.** Produced by the Puget Sound Water Quality Action Team, this publication lays out simple tips on how to manage waterfront property in environmentally sound ways. King County is currently updating the guidebook and will mail it to waterfront property owners in King County.
  Other jurisdictions have expressed similar desire to tailor the guidebook for their unique shorelines. Information for shoreline landowners is available as an interactive website **http://www.ecy.wa.gov/programs/sea/pugetsound**.
- **Workshops for property owners.** Action Team staff are conducting workshops for property owners and contractors to discuss shoreline stewardship with biological and geological experts. These workshops often include field trips to evaluate specific shoreline sites. For more information, contact **Doug Myers** at (360) 407-7322 or dmyers@psat.wa.gov.
- **Nearshore Processes video.** The Action Team has produced a 20-minute video that explains shoreline processes and the harm that modifications cause to shorelines. The video also shows an alternative protection project at a home on a beach on Oak Bay near Port Hadlock. To view the video, contact your local planning department or the Action Team at (800)-54-SOUND.

Puget Sound's Health

The Puget Sound Ambient Monitoring Program (PSAMP) is a coordinated effort among state, federal and local agencies to measure the health of Puget Sound's waters and resources. The program complements monitoring by local governments and citizen volunteers.

More people = significant changes to the Sound's shorelines

People have changed Washington State's shorelines extensively. These changes, such as bulkheads and seawalls, often result in habitat loss and harm to remaining habitat by changing natural sediment transport and the way wave energy is naturally dissipated on the beach. The amount of modified shoreline in an area can be a useful indicator of how much people have changed the nearshore environment, which has often resulted in harming the fragile, critical habitat.

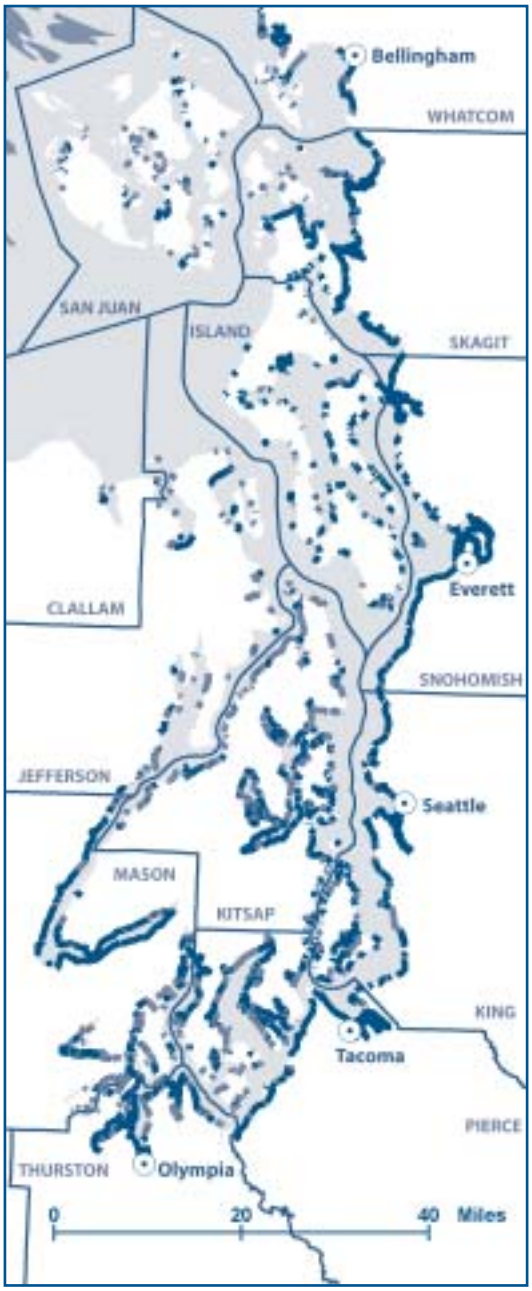
As part of a statewide inventory of saltwater shorelines called the Washington State ShoreZone Inventory, scientists at the Department of Natural Resources (DNR) inventoried the extent of modification or changes to shoreline. Results show that approximately one-third of all saltwater shorelines in Puget Sound have some kind of shoreline modification structure, such as a bulkhead. Given that shoreline modification can harm nearshore habitat, this finding suggests that one in every three feet of saltwater shoreline in the state may be damaged.

Shoreline modifications vary throughout the Sound

Changes to shorelines are not evenly distributed around Puget Sound (see map). The large river deltas are some of the most extensively modified areas, including in the Commencement Bay/Puyallup River areas, and the Elliott Bay/Duwamish River areas. These urban bays were once highly productive estuaries.

At the county level, Snohomish and King counties have the most highly modified shorelines. These areas have relatively high population densities and a high proportion of sandy shorelines subject to erosion. Much of the shoreline has been modified—historically and recently—for agricultural, industrial and residential uses.

Not surprisingly, San Juan County has the lowest modification overall. This county is less heavily developed, and many of the shorelines are rocky, and do not tend to erode as rapidly as those composed of sediment.



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Percentage of shoreline length around Puget Sound with bulkheads or seawalls.

In addition to structures such as bulkheads, the ShoreZone Inventory summarizes other types of shoreline modification. For example, it estimates that the state has approximately 1,200 boat ramps, 3,600 piers and docks, and 30,000 recreational boat slips. These structures also have a potentially negative impact on the nearshore environment.

Single-family residences make up the bulk of shoreline modification

A variety of state and federal statutes regulate shoreline modification projects. State statutes exempt projects associated with single-family residences from extensive review or subject them to less stringent criteria. DNR managers have suggested that existing policies might be altered to address the cumulative impacts of shoreline modification due to single-family residences.

To determine the relative significance of single-family residences in overall shoreline modification, scientists from DNR collected data on the proportion of shoreline modification along state saltwater shorelines associated with single-family residences. They found that approximately half of all shoreline modification in Washington state is associated with single-family residences.

This analysis shows that a major component of shoreline modification is associated with single-family residences. It suggests that any effort to guide shoreline modification toward a particular management objective must address the fact that single-family residences add to eroding shorelines.

Orcas on the decline, but no listing in sight

On June 25 the National Marine Fisheries Service (NMFS) announced that it will not propose listing the Southern Resident killer whale population under the Endangered Species Act (ESA). NMFS will start the process to declare the stock as "depleted" under the Marine Mammal Protection Act, improve whale-watching guidelines and solicit public comment about additional protections.

Assuming NMFS declares the stock depleted, it will prepare a conservation plan. NMFS also announced that it will reassess the Southern Resident killer whales under ESA within the next four years.

NMFS said that it decided not to propose a listing under ESA because it determined the Southern Resident orca are not a distinct population segment. Only entire species or distinct population segments can be listed under ESA.

The Center for Biological Diversity, along with 10 co-petitioners (nine organizations and one individual), submitted a petition in May 2001 asking for protection for the Southern Resident killer whales under ESA. NMFS appointed a team to review all the available information about the Southern Resident killer whale. The team's report, "Status Review under the Endangered Species Act: Southern Resident Killer Whales ***(Orcinus orca),***" provides the technical basis for NMFS's decisions and is available from the web site listed below.

Killer whales are all members of a single worldwide species, ***Orcinus orca,*** commonly called "orca." The Southern Resident orca have declined from nearly 100 individuals in 1997 to only 78 individuals in 2001. Several factors have contributed to this decline:

- Captures of whales in the 1960s and 1970s for public display altered the sex and age ratio, reducing rates of reproduction.
- Toxic chemicals in Southern Resident orca at levels that have been harmful to other species.
- The Pacific Ocean and Puget Sound have fewer fish, such as salmon, for the orca to eat.
- Vessel traffic and whale watching can disrupt the orca and hinder their ability to survive.

"The recent decline in Puget Sound's orcas is just one more sign that Puget Sound is in trouble. Sharp declines in the numbers of orcas, marine birds and rockfish all mean that the ecosystem is changing in ways that need our attention," said Scott Redman, acting chair for the Action Team. "Additional protection efforts are necessary if our grandchildren are to be delighted by these magnificent creatures."

The Action Team will continue to work with NMFS and with tribal, state and local efforts to find out specifically what is causing the decline of orcas and other species, and take specific actions where we can to reverse these declines.

For more information, go to **http://www.nwr.noaa.gov/mmammals/whales/srkw.htm**.

Get Puget Sound water quality INFORMATION electronically

Join the Puget Sound Water Quality Information Listserv. The Puget Sound Water Quality Action Team will send you information about current events, updated web pages and other timely information. The Action Team may send you information approximately one to three times a month.

The listserv is an efficient and cost-effective way to get timely information to you quickly.

The listserv will also send you ***Sound Waves*** each quarter. For a more cost-efficient and speedier delivery of ***Sound Waves,*** when you join the listserv, please e-mail Gigi Williams at the Action Team at gwilliams@psat.wa.gov and ask her to remove your name from the paper distribution of ***Sound Waves***.

To subscribe to the information listserv, visit the Action Team's web page at www.wa.gov/puget_sound

Get Puget Sound water quality NEWS electronically

You may also join the Puget Sound Water Quality Action Team's news release listserv and get news releases that are distributed Soundwide sent directly to you.

To subscribe, visit the Action Team's web page at www.wa.gov/puget_sound.

Update on the *Puget Sound Update*

The Action Team will publish the ***2002 Puget Sound Update*** this summer. The Update reports primarily on findings of the Puget Sound Ambient Monitoring Program (PSAMP), and it includes summaries of other monitoring activities in Puget Sound and the Strait of Georgia.

The Action Team works with PSAMP to produce this report every two years. The 2002 ***Update*** will include recent results from water quality monitoring, contaminant monitoring in sediments and marine life, and the monitoring of the plant and animal resources in the Puget Sound region.

The Update will be available online at **http://www.wa.gov/puget_sound.** Call the Action Team at (360) 407-7300 or (800) 54_SOUND to request a hard copy version.

2003
GEORGIA BASIN/PUGET SOUND
RESEARCH
CONFERENCE

March 31 - April 3
Westin Bayshore Hotel
Vancouver, B.C.

The Puget Sound Water Quality Action Team and the Georgia Basin Ecosystem Initiative have teamed up to host an international conference next year in Canada to communicate research findings of importance to help ensure the sustainability of the Georgia Basin/Puget Sound ecosystem.

Attendees will include scientists from government agencies, universities and consulting firms; natural resource managers and decision-makers; students and the public.

Watch for further details about **conference registration** and a **Call for Abstracts** in future issues of *Sound Waves*, the Action Team's website or by joining the Action Team's information listserv **(www.wa.gov/puget_sound).** Contact **Pete Dowty** at (360) 407-7561 or (800) 54-SOUND (in Washington State) and/or e-mail **David Fraser** with Environment Canada at David.Fraser@ec.gc.ca.

We encourage you to join us, contribute information and learn.

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The Puget Sound Water Quality Action Team works with organizations to protect and restore Puget Sound. The Action Team includes representatives from some state agencies and some tribal, federal and local governments. A Council of business, environmental organization, and local and tribal government representatives and the legislature advises the Action Team.

Acting Chair: Scott Redman

Puget Sound Council Members

Agriculture
Jerry Van der Veen, dairy farmer

Business
Kirk Anderson,
Fisher Communications, Inc.

Environmental Community
Tom Putnam,
Puget Soundkeeper Alliance

Shellfish Industry
Bill Dewey, Taylor Shellfish Co. Inc.

Cities
Jackie Aitchison,
Poulsbo City Council

Counties
Rhea Miller, San Juan County Board of Commissioners

Tribes
Fran Wilshusen, Northwest Indian Fisheries Commission

State Senate
Tracey Eide (D-Federal Way)
Pam Roach (R-Auburn)

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Ken Berg, Manager

Department of Community, Trade and Economic Development
Martha Choe, Director

Department of Ecology
Tom Fitzsimmons, Director

U.S. Environmental Protection Agency
John Iani, Regional Administrator

Interagency Committee for Outdoor Recreation
Laura Eckert Johnson, Director

Department of Fish & Wildlife
Jeffrey Koenings, Director

National Marine Fisheries Service
Bob Lohn, Regional Administrator

Department of Agriculture
Valoria Loveland, Director

Department of Transportation
Doug MacDonald, Secretary

Department of Natural Resources
Francea McNair, Aquatics Steward

Conservation Commission
Steve Meyer, Executive Director

State Parks & Recreation Commission
Cleve Pinnix, Director

Department of Health
Mary Selecky, Secretary

Tulalip Tribes
Daryl Williams, Director,
Department of the Environment

City and County
Positions to be filled