

Sound Waves

Working in partnership to protect Puget Sound

Vol. 19, No. 1

Hood Canal is slowly suffocating



Last fall, visitors to Potlatch State Park found a startling sight in the beautiful, serene surroundings. Approximately 50,000 dead juvenile perch lay strewn on the beach. They had suffocated and died because the deep marine waters of Hood Canal are starved of oxygen, which is critical for the survival of fish.

The canal has a history of low dissolved oxygen levels, but in recent years the problem has worsened.

"We cannot let Hood Canal become the 'dead sea' of Puget Sound," said **Brad Ack**, director of the **Puget Sound Action Team** (Action Team). "We need to take action now to address the causes of this horrific problem."

Low dissolved oxygen can happen naturally. Other causes include the rate of water circulation, flushing of the canal, and the degree of stratification or layering of the seawater that forms between fresh river water and ocean water.

People contribute to the problem by adding nitrogen to the canal from fertilizers, human sewage, animal manure and decaying fish carcasses. Nitrogen spurs growth of

microscopic algae and other aquatic plants that ultimately die and rob the deep water of dissolved oxygen.

In May, the Action Team and **Hood Canal Coordinating Council** (HCCC) issued a report* identifying the primary human causes of nutrient pollution, and the most feasible corrective actions or fixes to those problems.

The report determined that the primary sources of nitrogen associated with human activities collectively put between 100 to 300 tons of nitrogen into the canal every year.

The report recommends a number of actions available now to reduce the nutrient pollution. This summer, the Action Team plans to award up to \$600,000 for innovative and effective projects to help improve dissolved oxygen levels in Hood Canal.

In addition to these corrective actions, a number of state agencies, local governments, tribal governments and non-governmental organizations are working on a three-year monitoring and modeling effort—the **Hood Canal Dissolved Oxygen Program**—to improve our understanding of the problem.

* The report—**Hood Canal Low Dissolved Oxygen Preliminary Assessment and Corrective Actions Plan**—and more information about Hood Canal are available at http://www.psat.wa.gov/Programs/hood_canal.htm.

Actions you can take today to help Hood Canal

The Action Team urges residents and visitors to Hood Canal to better care for the canal.

- If you have an onsite sewage system or backyard septic system, get it inspected and maintained now. Make sure that it is in top working order. New systems or major repairs should consider technologies to reduce nitrogen.
- If you have cows, horses or other farm animals, make sure you properly manage the manure from these animals and that they are out of the canal and nearby streams.
- Keep pet waste out of the canal by picking up after your pets and properly disposing of the waste.
- If you use fertilizer in your yard or garden consider using organic time-released fertilizers and follow the application instructions carefully or consider not using fertilizer. Do not throw yard clippings or other vegetation into the canal.

Help keep an eye on Hood Canal. If you see algae blooms, odd behavior from fish, or other marine animals or dead fish, call **(800) OILS-911**, at the Washington State Emergency Management Department.

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Photo by Peter Wiant

Photo above: Citizen volunteers from the Hood Canal Salmon Enhancement Group help monitor for low dissolved oxygen in Hood Canal.

► **LOW IMPACT DEVELOPMENT**

Reining in the rain in Bellingham

The city of Bellingham saved thousands of dollars by installing rain gardens instead of conventional stormwater vaults to manage runoff at two parking lots. This low impact development (LID) approach lowered construction costs by 75 to 80 percent.

Both rain gardens help protect two vulnerable waterways. The lot at city hall is located near Whatcom Creek, and the 80-stall lot at Bloedel Donovan Park is next to Lake Whatcom, which provides drinking water for Bellingham residents. The rain gardens infiltrate runoff that can cause fluctuations in stream flows, erode and damage aquatic habitat, and harm water quality. Rain gardens also replenish groundwater. To top off their list of virtues, rain gardens look good.

The city is monitoring the park's rain garden to gauge its capacity to infiltrate and treat pollutants in runoff. William Reilly, manager of Bellingham's Storm and Surface Water Utility, was pleased to see how well the rain garden worked when it was put through its paces from July 2003 to January 2004.

"I was pleasantly surprised when I saw the amount of water that this system could handle," Reilly said.

The rain garden infiltrated 86 percent of the precipitation that fell on the 3/4-acre parking lot



Action Team photo

Rain garden in parking lot at Bellingham's city hall.

during the six-month period, including the runoff from a moderately intense rainstorm.

For construction and budget details, see the document *Reining in the Rain: A case study of Bellingham's use of rain gardens to manage stormwater* on the Action Team's Web site at http://www.psat.wa.gov/Publications/Rain_Garden_book.pdf

Rain garden video

The city of Bellingham pioneered rain gardens for their parking lots, and trained staff and building professionals in the community about LID techniques. The city also created a video on LID and green building to use in their training activities, show on their local cable channel, and distribute to contractors.

The video has won national and international awards: the prestigious Emmy Communicator Award of Distinction, an Environmental Silver Award from Axiem Awards, finalist in the Telly Awards, and honorable mention in the Videographer Awards.

The Puget Sound Action Team's Public Involvement and Education fund provided partial funding for the video.

To get a copy of the video and for more information about Bellingham's rain garden projects, contact **Joy Monjure** at (360) 676-6971 or jmonjure@cob.org.

Sound Waves

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Sound Waves is run on an alcohol-free press using vegetable-based inks and printed on recycled paper.



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**PUGET SOUND
ACTION TEAM**

Office of the Governor

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Brochure touts Low Impact Development

A brochure from the National Association of Homebuilders Research Center highlights the benefits of using low impact development (LID) techniques in construction projects.

The brochure provides data showing how LID can lower site infrastructure costs, protect the ecology of the site and increase marketability.

For a copy of the "**Builder's Guide to Low Impact Development**" brochure, visit www.toolbase.org. Follow the link to **Green Building**, then **Land Development**, and select the PDF file "Builder's Guide to Low Impact Development."

▶ SHELLFISH NEWS

A winning streak for shellfish beds in Puget Sound

Pollution threats persist in many areas

People living in the Puget Sound region have established a great track record cleaning up polluted shellfish waters. Many successes took place in the past 10 years, with perhaps the most impressive string of upgrades happening during the past 10 months.

Portage Bay, Whatcom County, October 2003

Better management of sewage, stormwater and, most notably, dairy waste on the 100-plus dairies in the lower Nooksack River watershed reopened 650 acres. The upgrade reinforced the value of collaborative monitoring, planning and action. Agencies and citizens effectively integrated successive planning processes—the Nooksack initiative, shellfish closure response strategy, and water cleanup plan—to guide the restoration.

Dyes Inlet, Kitsap County, November 2003

Restoring 1,500 acres allowed shellfish harvesting in the inlet for the first time in 35 years. The restoration work included on-site sewage system repairs, improvements to reduce combined sewer overflows from the city of Bremerton's wastewater/stormwater collection system, and advanced monitoring and modeling led by the U.S. Navy and other project partners. The inlet's conditional classification means harvesting is not allowed for seven days following a sewage overflow.

Lynch Cove, Mason County, February 2004

Intensive monitoring of surface and subsurface flows near Belfair State Park helped reopen 138 acres. The monitoring study identified failing sewage systems at the state park and a nearby recreational vehicle park. The park completed construction of a new sewage system in 2003, and the recreational vehicle park closed down. The shellfish reopening followed previous upgrades in adjacent areas in 1996 and 1998, but the approved area does not yet include the oyster-rich tidelands of the state park.



Drayton Harbor, Whatcom County, June 2004

Bolstered by the region's first community shellfish farm, citizens and agencies controlled numerous pollution sources to restore 575 acres. The upgrade allowed the citizen farmers to harvest their initial oyster crop for distribution to markets in Shanghai, China. The community farming profits will now be reinvested in projects to improve water and to raise another crop of oysters. The harbor's conditional classification means harvesting is not allowed for five days following rain events of one-half inch or more.

Threatened shellfish growing areas continue to grow

The good news is tempered by the reality that only sustained work will preserve and build on these gains. The news also contrasts with other situations where cleanup efforts have not been successful. Puget Sound's list of threatened shellfish growing areas continues to grow, up from nine sites in 1997 to 18 in 2004. Quick and targeted responses in all areas will help further the region's track record to prevent contaminated and closed shellfish beds. For more information about the 2004 threatened list, go to www.psat.wa.gov/News/releases/news04_058.htm.

For more information about the Puget Sound Action Team's shellfish program, contact **Stuart Glasoe** at (360) 725-5449 or sglasoe@psat.wa.gov.



Puget Sound Action Team photos

*This summer, the Drayton Harbor community celebrated its first crop of oysters after the Washington Department of Health shut down harvesting nearly 10 years ago due to high pollution levels. **Top photo:** Geoff Menzies with the Drayton Harbor Community Shellfish Farm takes people on a tour. **Lower photo:** Charlie Hawkins shucks oysters while Christine Woodward helps out. For more information about the Drayton Harbor Community Shellfish Farm, see the Fall 2003 issue of Sound Waves.*

▶ LOCAL HEROES

Every day, thousands of people are making an enormous difference to protect and restore the environment of Puget Sound. This dedication and commitment by all local heroes is essential to help save the Sound for today and future generations.

ROLAND 'SAM' HOLCOMB AND CLEAR CREEK Saving a creek on a shoestring budget

When Roland "Sam" Holcomb moved to Silverdale 20 years ago with his wife Linda, he bought a small hobby farm along Clear Creek. For someone who'd fished all his life, it seemed the perfect setting for Holcomb's retirement years.

Unfortunately, when development started sprouting up all around eastern Kitsap County,

Holcomb saw a bleak future for his beloved creek.

"With all the big development, Clear Creek was going to go belly up," Holcomb said in true fisherman's vernacular.

As a member of the Kiwanis Club of Central Kitsap, Holcomb, 62, had made friends with a lot of other fishermen, many of whom shared

Holcomb's concern for the fate of Clear Creek. They decided to take action.

"We adopted Clear Creek to keep it from being degraded further and to do some enhancements to help the salmon runs," Holcomb said.

Education plays key role

Early on, the Kiwanis decided education would be an essential part of the creek's survival. Holcomb heard about the Salmon-in-the-Classroom program in the Snohomish County School District, and 18 years ago brought the program to Kitsap County schools.

Since then, students have raised millions of chum and hundreds of thousands of coho from eggs in classroom aquariums provided by the Kiwanis, which the students have released into Clear Creek. The Suquamish Tribe became a partner in the endeavor by providing eggs and helping with the proper permits needed to release the young fish into the creek.

Holcomb has also rallied a strong base of support from school districts, parents, county commissioners, land trusts, citizen conservation and sport groups and more. Funds from Kitsap County, Washington Department of Fish and Wildlife and Puget Sound Action Team's Small Environmental Education Dividends (SEED) fund have helped keep the program afloat.

"Sam is really good at tapping the resources of the community," said Mary Knackstedt, education program specialist with the Action Team. "They do an incredible amount on a shoestring budget because of all the people involved."

Students in the program learn about the life cycle of the salmon they're rearing and how important a healthy environment is to their survival. They've planted trees along the banks of the creek, learned about the function of wetlands and gained an understanding and appreciation of the natural history of the area.

Today, 36 classrooms in 20 elementary, middle and high schools in three county school districts participate in the program.

Holcomb doesn't hesitate to credit the many people who have helped keep the Salmon-in-the-Classroom program alive and well in Kitsap schools.

"I always felt there was a large base of support for Clear Creek, otherwise I never would have tried saving it," said Holcomb.

In 2001, the Kitsap County Commission honored Holcomb with an Earth Day award for his efforts in bringing school and community groups together in the Salmon-in-the-Classroom program.

Gone fishing?

Some people retire and go fishing. Holcomb "retired" in Kitsap County following a 20-year career in communications for the Navy, then became an insurance investigator. Another failed attempt at retiring found him driving a school bus part time, which led him to training other bus drivers. Now he is officially retired, but still works with the Kiwanis and schools.

Perhaps Holcomb will be able to get in some fishing time, when he isn't busy trying to save a creek.



Photo by Linda Holcomb
*Sam Holcomb waters a tree planted near his hobby farm on Clear Creek in Kitsap County. Holcomb and the Kiwanis Club of Central Kitsap tapped into a variety of resources to help restore the creek. One resource was the Action Team's **Small Environmental Education Dividends (SEED) Fund**. To find out how you can tap into this resource, see page 10.*

People taking action to make Puget Sound's marine environment healthier.

ANNIE ROBERTS AND RAAB'S LAGOON

A passion for protecting a paradise in progress

Annie Roberts is a single mother of twin 12-year old daughters. They live on beautiful, serene and picturesque Maury Island, a part of Vashon Island. Fifteen years ago, Roberts and her now ex-husband purchased two acres on **Maury Island** and built a home. Then, in 1997, Roberts bought the rights to Raab's Lagoon, an estuary with approximately 10 acres of water, which is adjacent to her property.

"I bought the lagoon hoping to save it and the shorelines around it," said Roberts. "It had been owned by a development company that threatened to develop it."

Roberts wants to protect the buffer zone around the lagoon from further development and return it to its natural state. Some 11 homes, all requiring septic systems, have been built on properties along the lagoon and a few more are in the planning stages.

"Raab's Lagoon is not only my neighbors' and my front yard, it is a part of Puget Sound," said Roberts. "It is home to salmon, beaver and otter families, oysters and a multitude of other extraordinary wildlife. I feel obligated to help protect their home."

Roberts calls protecting the lagoon and its shoreline a work in progress to conserve the area for wildlife. The estuary is critical to the life stages of salmon as they move from freshwater to saltwater and back to freshwater. The estuary is key to providing food and shelter for salmon, where outgoing fry spend time to get acclimated to saltwater.

Local program helps lagoon

In 2002, Roberts attended a workshop to learn more about protecting shorelines, which was presented by the Puget Sound Action Team and Washington State University Extension. With help from people from the WSU Extension and King County, she obtained a Public Benefit Rating System (PBRS) status for Raab's Lagoon and her lower acre that abuts it.

The PBRS program provides incentives, such as reduced property taxes, to encourage private landowners to voluntarily conserve and protect natural resources and open space.

Roberts is committed to returning the area to a better, less disturbed, more natural habitat. Through the years, Roberts has talked with her neighbors

about protecting the wetlands. She hopes to work with them further and offer some classes to help them restore the wetlands.

The good news is that Roberts has observed more salmon coming back to the area in recent years. Last year, salmon littered the beach at the mouth of Raab's Lagoon and she saw many swimming toward the stream that feeds it.

"Roberts is a true example that the choices we make today will determine whether our children and grandchildren will live in a world with salmon," said Jim Kramer, executive director for Shared Strategy for Puget Sound. "We need more people like Roberts who steward and protect habitats in their own backyards or neighborhoods."

The Shared Strategy for Puget Sound is a collaborative effort of public and private interests dedicated to protecting and restoring salmon runs.

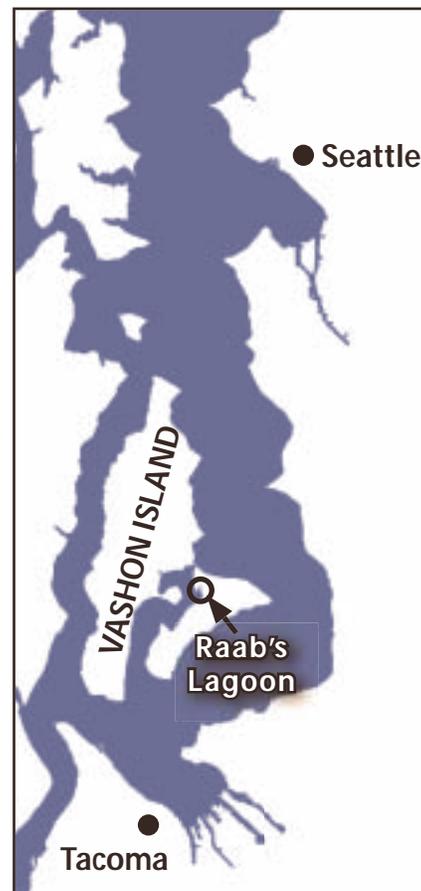


Photo by Logan Harris

Annie Roberts stands on the shore of Raab's Lagoon, which she is working to protect from development.



▶ NEWS FROM AROUND PUGET SOUND

Kitsap County



Photo by Dennis Oost

Above: What hides below the surface of the grass courtyard parking lot—the Rainstore³ underground storm management system.

Right: The Grasspave² parking lot above the finished storm management system.



Kitsap County Ferris wheel enthusiasts and baseball players will now be parking their vehicles on the fairgrounds and hitting home runs on the same grassy surfaces designed to minimize the harm from stormwater runoff into Barker Creek, a salmon bearing stream.

The new grassy surface doubles as a parking lot for the fair and baseball fields at other times.

Using a grass paving system and traditional asphalt, the **Kitsap County Parks Department** created a 500-car parking lot on the fairgrounds designed to handle up to a 200-year storm event, effectively reducing site runoff to zero.

Vegetated swales collect stormwater runoff from the asphalt area, then sand filters treat the runoff or the runoff returns to irrigate the grass paving system. Four baseball fields have an underground-drainage system and a storage system that can hold five days worth of collected irrigation water. The county reapplies the stored water to the ball fields when necessary, reducing water usage by 40 percent.

Any stormwater runoff that is created goes through traditional detention and infiltration pond for treatment. So, if you're in Kitsap munching on cotton candy at the county fair or cheering on your favorite team during a baseball game, take time to think about the stormwater runoff that's being managed right below your feet, silently underground.

Contact: **Dennis Oost**, Kitsap County, (360) 337-5357, doost@co.kitsap.wa.us.

Pierce County

The **Pierce County Council Community Development Committee** is considering a set of ordinances collectively referred to as **Directions for Protecting and Restoring Habitat**. This ordinance package aims to fulfill requirements for protecting critical areas under the Growth Management Act and to help provide for the recovery of endangered salmon.

These ordinances encourage low impact development techniques to retain stormwater on site when appropriate, including keeping or restoring native vegetation, and minimizing the effects of development. Special protections proposed under this package will include marine habitats such as kelp and eelgrass beds; herring, smelt, and sandlance spawning areas; commercial and recreational shellfish areas; and Puget Sound marine shorelines. Other requirements include retaining and protecting some trees within the marine buffers.

Site plans must also maintain natural shoreline processes, and projects must not harm critical fish or wildlife habitat areas or associated wetlands, cause a net loss of intertidal or riparian habitat or function or alter intertidal migration corridors. These ordinances are available online at <http://www.piercecountywa.org/pc/abtus/ourorg/council/habitat%20directions.htm>

Contact **Debby Hyde**, Pierce County, (253) 798-7110.

Action Team photo

Fox Island, Pierce County. Tom Kantz, environmental biologist with Pierce County, observes a feeder bluff, a feature important to marine habitat, that would be protected under proposed ordinances.



Island, Skagit and Snohomish counties

Around the Sound, local salmon recovery efforts are in high gear. With no large rivers, Island County does not host high numbers of spawning salmon, but they do have something of value to migrating salmon: critical nearshore habitats.

Because of the county's proximity to several major rivers, understanding how migrating salmon use shorelines in Island County may prove invaluable to the recovery of salmon from the **Skagit, Snohomish and Stillaguamish rivers**. As well, salmon from most every river system in Puget Sound must swim through Admiralty Inlet, on the west shore of Whidbey Island, as part of their journey to the open ocean.

Scientists from around the region are stepping out of their watersheds to learn how *their* salmon use the waters of Island County. **Skagit River System Cooperative** researchers have been studying how salmon from the Skagit River use Whidbey's nearshore waters. Their ground-breaking work on how juvenile salmon use small pocket estuaries has greatly influenced salmon planning in Island County. The **Tulalip Tribe** is exploring salmon use off south Whidbey Island, and **Washington Trout** plans an assessment on the west side of Whidbey Island in the coming year.

Skagit County

The city of Anacortes will soon be home to a brand new maritime center thanks to the vision and efforts of Lyndon Greene, a local marine electrician. The goal of the **Anacortes Community Maritime Center** is to help people learn and preserve our rich maritime tradition and explore our connection with the waters of Puget Sound.

Greene started the organization based on his love of all things above and below the waters of Puget Sound, and the center's diverse activities and programs reflect his love. In addition to boat building, sailing and rowing programs, the center will host marine ecology workshops, field trips, work parties and volunteer activities. Greene founded the center with the help of Garry Cline of the Anacortes Museum, Erica Pickett of Flounder Bay Lumber and Jean Bailey, a dedicated citizen.

All of this research activity is leading not only to a better understanding of salmon biology, but also to new collaborative efforts and information sharing that, in the end, benefits all efforts to recover salmon.

Contact **Kim Bredensteiner**, Watershed Project Manager, Island County Public Works at (360) 679-7331 or kimB@co.island.wa.us.

Photos courtesy of Skagit River System Cooperative

Top photo: Donald Damien (left) and Lenny Bill, (right) of the Swinomish Tribe catch surf smelt with a beach seine at the tip of Ala Spit in North Skagit Bay. As part of a fish sampling study, researchers identified, counted and then released the smelt back into the bay.

Lower photo: Jason Boome (foreground) of the Upper Skagit Tribe and John Grosglass (background) of the Swinomish Tribe prepare a juvenile chinook salmon caught in Skagit Bay for further study.



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One of the center's first programs will be a marine ecology workshop scheduled for Sept. 11 at Seafarers Memorial Park. A variety of agencies and organizations are working with the Maritime Center to help sponsor the event, including Skagit County, People for Puget Sound, Shannon Point Marine Center, Skagit Marine Resources Committee and the Puget Sound Action Team.

The workshop is geared towards citizens young and old and will include a variety of activities, such as beach walks, presentations about marine conservation projects in Skagit County, and slideshows of marine organisms and animals.

"I want people to leave with tools and knowledge of how they can make a difference in Puget Sound," Greene said.

Contact **Lyndon Greene:** (360) 299-9075 or anacomaritimectr@msn.com.

Everyday home care products don't mix well with aquatic life in Puget Sound

Something in Puget Sound's urban waters may be disrupting English sole's reproductive health. Scientists with the Puget Sound Ambient Monitoring Program (PSAMP) are working to understand why.

Detectable levels of a substance called **vitellogenin** are showing up in the blood of male

English sole. Vitellogenin is the egg yolk protein normally produced by female fish during spawning. Scientists say significant exposure of male fish to natural estrogens or xenoestrogens (see below) may be the cause.

This, and other stresses, could challenge the future reproductive success of English sole and other bottom-feeding fish.

In laboratory studies, male fish have demonstrated reduced sperm production and lower sperm motility and quality. These studies may provide links to what is happening in the Sound.

Females also affected

The exposure to estrogen and estrogen-like compounds is not just affecting the males. Exposure to xenoestrogens also appear to affect

female English sole. Researchers have found that some females begin spawning at a younger age and demonstrate altered reproductive timing. They may even have lower egg production.

Higher levels in urban areas

Through PSAMP, scientists from Washington Department of Fish and Wildlife and NOAA Fisheries have been studying English sole exposure to xenoestrogens in Puget Sound since 1997.

Each year, scientists collect fish from sites throughout Puget Sound—in urban and non-urban waters. They analyze blood samples for vitellogenin levels and examine liver, gonad and bile samples for abnormalities associated with exposure to xenoestrogens as well as other contaminants.

Of all the sites sampled from 1997 to 2002, sites in Elliott Bay along the downtown Seattle's

waterfront had the highest number of males with detectable levels of vitellogenin (36 percent of males sampled). The Thea Foss Waterway in Tacoma had the second highest levels (22 percent of males sampled). In non- or less-urbanized areas, levels were considerably less—as low as 6 percent in Hood Canal, to no detectable levels in Eagle Harbor on Bainbridge Island and in the Nisqually Reach of south Puget Sound.

This indicates that the environment in these large urban and industrial waterways may be more contaminated with xenoestrogen compounds than the non-urban areas that PSAMP scientists tested.

Further studies underway will determine the sensitivity of other marine species to xenoestrogens. In laboratory studies, scientists exposed resident coho salmon to ethinyl estradiol, the synthetic hormone found in birth control pills, at levels found in the environment. The studies showed changes in hormone levels that could disrupt the coho's reproductive cycle.

Getting to the source

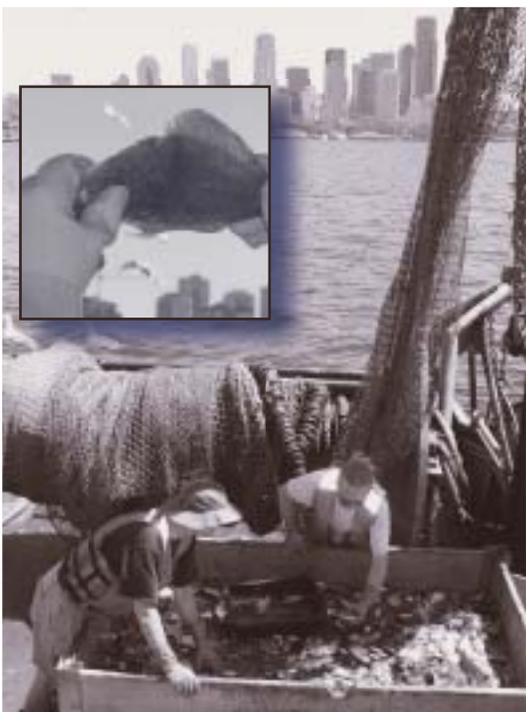
These natural estrogens and xenoestrogens most likely reach our waters through municipal wastewater, runoff from stormwater, on-site septic systems and industrial activities.

Scientists don't yet have a clear picture of how widely dispersed estrogen compounds are in Puget Sound. Most likely they accumulate in sediments and persist in the water near urban sites.

Additional monitoring and focus studies should identify the specific sources of the xenoestrogens found in Puget Sound, and how these compounds affect other marine species.

What are Xenoestrogens?

While estrogen compounds exist naturally in plants and animals, many materials contain synthetic estrogens and estrogen-like compounds (xenoestrogens) that are structurally similar to natural hormones. Xenoestrogens mimic hormones and may block natural hormone function. Some chlorinated pesticides, birth control pills, plastics, soaps and other personal care products can act as xenoestrogens.



Inset: A scientist holds an English sole up to the light to check for gender.

Photo: Researchers haul in samples of sole from Elliott Bay.

Flame retardants raise environmental concerns

Polybrominated diphenyl ethers (PBDEs) are a new pollution concern facing Puget Sound. PBDEs are synthetic flame retardants first introduced in the late 1970s to reduce the flammability of household and commercial products. For more than 25 years, manufacturers have used PBDEs in numerous household and commercial items including fabrics, furniture cushions, mattresses, carpeting and electronics, with some products containing as much as 30 percent PBDEs.

Once regarded as stable chemicals, PBDEs are proving otherwise. Laboratory studies indicate that PBDEs can disrupt thyroid function, impair neurological development, and may harm development in children. PBDEs occur in indoor and outdoor air, home and office dust and in fresh and marine waters. Scientists have detected increased levels of the compounds in fish, seals, birds and human breast milk.

"If concentrations in some marine mammal and human populations continue to rise, PBDEs may be the PCB of the future," said Thomas McDonald, a toxicologist from the U.S. Environmental Protection Agency (EPA).

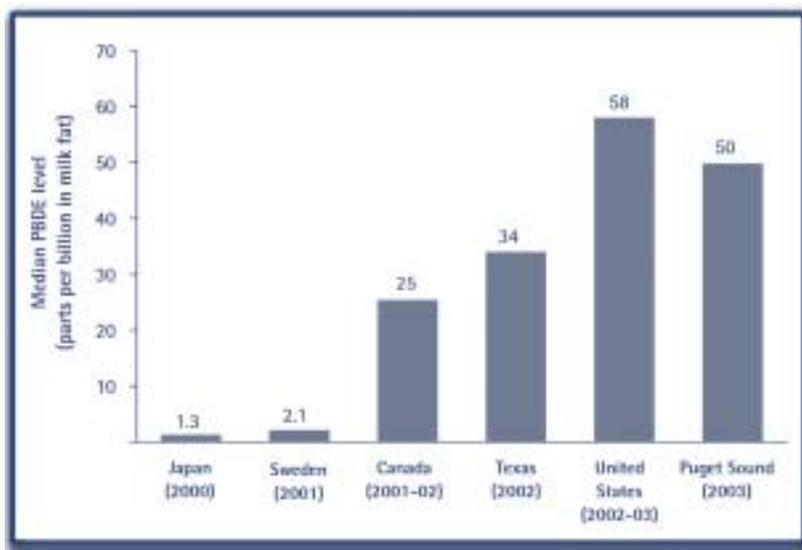
PBDEs are similar to polychlorinated biphenyls (PCBs) in their molecular structure as well as their tendency to bond to lipids (the fat molecules in cells). As with PCBs, flame retardants presumably pass through the food chain, accumulating in tissues of organisms that feed at the top of the chain.

Breast milk from women in the U.S. have 20 to 40 times the PBDEs levels measured in Europe, Japan and Canada. Here in Puget Sound, a study by Northwest Environment Watch indicated elevated levels of PBDEs in human breast milk (see figure). Studies in Columbia River fish indicate that PBDE levels are doubling every 1.6 years.

Putting the brakes on PBDEs

After Sweden banned PBDEs, the contamination in breast milk declined at a steady rate. The European Union will ban the use of PBDEs by 2008. California is the first state in the union to ban the use PBDEs, and the EPA is developing an agreement with manufacturers to withdraw two forms of PBDEs from the marketplace.

Washington state is also engaged in the PBDE issue. In January, Gov. Gary Locke signed an



executive order to develop a PBDE Chemical Action Plan to be completed by the end of 2004. The Chemical Action Plan will describe the state's plan for phasing out the use of PBDEs.

Research underway

Researchers are just beginning to study the extent of PBDE contamination in the Puget Sound marine environment. They want to answer the following questions:

How do PBDEs enter the ecosystem?

Possible modes include atmospheric deposition (when pollution particles are released from the atmosphere), runoff from stormwater, contamination in groundwater and wastewater outflow.

Are PBDEs in our resident fish?

This year, the Puget Sound Action Team and the Washington Department of Fish and Wildlife will analyze tissue from Pacific herring, quillback rockfish, English sole, ling cod and chinook salmon for PBDE contamination.

Are PBDEs in Hood Canal sediments?

This year the Puget Sound Action Team will work with the Washington Department of Ecology to examine sediments in Hood Canal for PBDE contamination. This study will help determine if the contaminant is occurring in non-urban areas, and may provide clues as to whether PBDE contamination is regionally distributed, or is a more local, urban concern.

Source: Northwest Environment Watch

Levels of PBDEs in breast milk in Puget Sound compared with levels elsewhere in the U.S., Canada, Sweden and Japan.

For more information about the Puget Sound Action Team's monitoring and science programs, contact Sarah Brace, science liaison, at (360) 725-5464.

Plant a SEED for Puget Sound

This summer, Washington State residents, businesses, organizations, tribal or local governments, schools or educators may apply to plant a SEED and help Puget Sound's marine environment.

Look for the Puget Sound Action Team's Request for Proposals (RFP) for **Small Environmental Education Dividends (SEED) Fund** later this summer.

SEED funding supports projects that protect and improve Puget Sound's water quality and marine resources through public involvement and education.

Projects may get up to \$4,500 and need to be completed by May 2005. You may download the RFP or find out information about past SEED projects at the Action Team's Web site www.psat.wa.gov or call (800) 54-SOUND for a copy of the RFP.

Panel to Congress: Keep and expand restoration group

By Tom Cowan, Northwest Straits Commission

A national panel of experts has unanimously recommended to extend and expand the **Northwest Straits Marine Conservation Initiative**. The Congressionally mandated panel praised the initiative for implementing projects that are helping restore and protect the marine ecosystem.

"[The initiative] has used local ideas and sound science to come up with useful, effective accomplishments," said Bill Ruckelshaus, a former U.S. Environmental Protection Agency director who chaired the evaluation panel. "The degree of cooperation this process has engendered among tribes, state, county and municipal government bodes extremely well for future progress."

The report from the panel praised the Northwest Straits Initiative for initiating projects that improve the marine habitat and protect salmon, bottom fish, shellfish and other marine resources. Their innovative projects have removed miles of derelict or lost and abandoned fishing nets and hundreds of derelict crab pots that were needlessly harming

marine life; planted hundreds of thousands of oysters to increase harvestable areas and raise awareness of problems with water quality; and helped shoreline landowners manage their property for better marine habitat and wildlife viewing.

"This is exactly the type of grassroots, collaborative effort needed to restore salmon and other declining fisheries while improving Washington's pristine coastline," said U.S. Senator Patty Murray.

The initiative is driven by county-based Marine Resources Committees (MRCs), composed of local representatives from the scientific community, local and tribal governments and economic, recreational and conservation interests. MRCs set priorities and sponsor local projects. They are active in Clallam, Island, Jefferson, San Juan, Skagit, Snohomish and Whatcom counties.

Next year, the panel's recommendation will go to Congress for approval.

For more information about the Northwest Straits Initiative, call (360) 428-1084 or visit www.nwstraits.org.

Action Team Partnership uses public input to set Puget Sound agenda

The Puget Sound Action Team Partnership is setting the state's conservation agenda for Puget Sound's marine and freshwater environment for July 2005 to June 2007. Comments and ideas from people throughout Puget Sound helped the Action Team put together the *2005-2007 Puget Sound Priorities, Strategies and Results*, which is the framework for the two-year plan to protect and restore the Sound.

The Action Team Partnership extends its thanks to all those who sent comments or attended meetings during the winter 2004 public comment period. The Action Team used these valuable suggestions to help determine the priorities and desired results.

This summer, Action Team state agencies are developing actions and budget proposals that will deliver the results under each priority. Action Team staff will compile that information into the *2005-*

2007 Puget Sound Conservation and Recovery Plan, which the Action Team will release in fall 2004. This will be the fifth biennial work plan by the Action Team Partnership to focus and coordinate its work in Puget Sound.

The Action Team will provide the *2005-2007 Puget Sound Conservation and Recovery Plan* to the governor and state legislature for approval during the 2005 legislative session. When the budget for 2005-2007 is adopted, the Action Team Partnership will track the results and use the work plan to achieve coordinated and measurable progress on the conservation and recovery priorities for Puget Sound.

To view the *2005-2007 Priorities, Strategies and Results* visit the Action Team Web site at http://www.psat.wa.gov/Publications/priorities_05/Priorities_05_review.htm

▶ NEWS YOU CAN USE

2004 Olympics' goal: Leave legacy of environmental awareness

ATHENS, GREECE—Security will be the most pressing issue at the 2004 Olympics. Another issue will be the hope that the summer games will leave a legacy of environmental awareness and action.

Earlier this summer, the United Nations Environment Programme (UNEP) and the Organizing Committee for the Athens 2004 Olympic and Paralympic Games (ATHOC) signed an agreement to boost the environmental profile of the summer games.

"Athens 2004 has made environmental commitments in areas such as recycling, public awareness and developing green spaces," said Klaus Toepfer, UNEP's executive director. "We are sure that some of these will leave a lasting and healthy legacy beyond this year's summer games."

UNEP also announced that it was contacting the five cities short-listed for the Summer Olympic Games of 2012 to discuss how the environment can feature high in their proposals.

Source: UN Environment Programme, June 2004

'Flush tax' proposed to help clean up Chesapeake Bay

CHESAPEAKE BAY, MARYLAND—In what environmentalists called Maryland's biggest step toward cleaning the Chesapeake Bay in decades, the state's General Assembly approved new levies on sewer users and septic owners to fund programs to reduce nutrient materials from getting into waterways throughout the state, and specifically in Chesapeake Bay.

Maryland residents will see a \$2.50-a-month flush tax on their sewer bills. Residents with septic systems will pay an equivalent \$30-a-year fee. These fees will finance upgrades to sewage treatment plant, replace septic systems that aren't working and pay farmers to plant cover crops and take other actions to keep nutrients out of waterways.

Source: *The Bay Journal*, May 2004

HOLD THE DATE!

2005 Research Conference

Mark your calendars for the upcoming **Puget Sound-Georgia Basin Research Conference, March 29-31, 2005 at the Sheraton in downtown Seattle.**

This year's theme is "Science for the Salish Sea: A sense of place; a sense of change."

Join scientists, resource managers, decision makers and educators in this international event.

If you are interested in submitting a paper or poster for the conference, look for the **Call for Abstracts** on the Puget Sound Action Team's Web site this summer (www.psat.wa.gov).

Contact **Sarah Brace**, Puget Sound Action Team, at (360) 725-5464 or sbrace@psat.wa.gov.

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Dear subscriber of *Sound Waves*:

Thank you for your interest in receiving *Sound Waves*.

Sound Waves covers issues related to protecting and restoring the environmental health of Puget Sound. It also aims to highlight good ideas in conservation efforts around the country and the globe.

As part of the **Puget Sound Action Team's commitment to sustainability** and to ensure we are communicating with people interested in these issues, we are offering our readership the opportunity to receive this newsletter electronically. The Action Team sends electronic subscribers e-mail announcements when the latest issue of *Sound Waves* is available, along with a direct link to the online version on our Web site.

Getting *Sound Waves* electronically also puts you on our general information listserv, and you will receive periodic updates and announcements about Puget Sound environmental issues. To sign up for the listserv, go to

http://www.psat.wa.gov/Site_index/listserv.htm

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The **Puget Sound Action Team** is the state's partnership for Puget Sound. The Action Team Partnership defines, coordinates, and puts into action the state's environmental and sustainability agenda for the Sound. Representatives from the following groups serve on the Action Team:

Local Government

City of Burien, *representing Puget Sound cities*

Whatcom County, *representing Puget Sound counties*

Washington State Government, directors of the following agencies

Community, Trade, and Economic Development

Conservation Commission

Department of Agriculture

Department of Ecology

Department of Fish and Wildlife

Department of Health

Department of Natural Resources

Department of Transportation

Interagency Committee for Outdoor Recreation

Parks and Recreation Commission

Tribal Government

Tulalip Tribes, *representing Puget Sound Tribes*

Federal Government (*Ex-officio*)

NOAA Fisheries

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

Chair: Director of Puget Sound Action Team

The **Puget Sound Council** includes representatives from business, agriculture, the shellfish industry, environmental organizations, local and tribal governments and the legislature, and it provides advice and guidance to help steer the Action Team.



Graphic courtesy of CommEn Space.



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