



Padilla Bay Newsletter

A Joint Publication of the Padilla Bay Foundation and Padilla Bay National Estuarine Research Reserve

Winter 2009-2010



Padilla Bay

National Estuarine Research Reserve

Padilla Bay National Estuarine Research Reserve is managed by the Washington State Department of Ecology under the National Estuarine Research Reserve System established by NOAA.

www.padillabay.gov

swood@padillabay.gov

10441 Bay View-Edison Road
Mount Vernon, WA 98273
(360) 428-1558



The Padilla Bay Foundation is a membership-based non-profit organization formed in 1987. Its mission is to help preserve the Padilla Bay estuary in Skagit County, Washington, through support of Padilla Bay National Estuarine Research Reserve.

Padilla Bay Foundation
PO Box 1305
Mount Vernon, WA 98273
(360) 757-3234

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Near Real Time Water Quality Data in Padilla Bay

Near real time data transmission is now up and running at 2 water quality monitoring sites in Padilla Bay. Funding from the National Oceanographic and Atmospheric Administration provided equipment to each of 27 National Estuarine Research Reserves around the country. This equipment stores water quality data and then transmits it via GOES stationary satellite where it is available to both researchers and the public.



Heath Bohlmann and Nicole Burnette

Water quality data in Padilla Bay are collected every 15 minutes by “YSI 6600 multiparameter data sondes.” These data sondes measure characteristics such as temperature, salinity, dissolved oxygen, and depth. These data are then transmitted hourly and displayed on various websites giving near real time access to the water quality out in Padilla Bay. This helps research staff identify data collection problems or malfunctions when they happen and helps maintain consistent data quality. Quick access to these data may also help shellfish harvesters and resource managers because short term changes in dissolved oxygen, temperature and salinity can harm oysters and other marine organisms.

Research staff have been collecting continuous water quality data in Padilla Bay since 1995. This enables us to understand natural processes and human impacts in Padilla Bay and Puget Sound. By monitoring water quality every 15 minutes around the clock, researchers can learn about short-term variability and long-term changes in water quality of Padilla Bay and gain a better understanding of the natural processes and human impacts on the estuary. Along with other research going on in the Salish Sea, this data can be used to help land owners, resource managers and local governments keep our local waters healthy.

View current weather and water quality conditions in Padilla Bay at www.padillabay.gov. Click Research > Monitoring. For Padilla Bay and other local stations: www.nanoos-shellfish.org.



A New Invader

by Monte Richardson

The waters of Puget Sound are subject to a multitude of invasive species. Species such as cordgrasses, Japanese eelgrass, Oyster drills, Varnish clams, European green crabs, and recently introduced non-native tunicates (sea squirts) have already impacted the native ecology of the Pacific Northwest. Despite increasing regulations to prevent the introduction of invasive species, new invaders continue to work their way into our local waters.

A new invasive species has recently been discovered in the Puget Sound. *Watersipora subtorquata*, a bryozoan of unknown origin, has made its way around the globe including Australia, New Zealand, the United Kingdom and the Western coast of the United States. Bryozoans, or “moss animals,” are aquatic, typically colonial animals that live in many different types of habitats, from ocean trenches to the arctic waters. *W. subtorquata*, was introduced to California in the mid 20th century and has since worked its way north. By the 80s it was well established in San Francisco and Humboldt Bays, by the 90s it was observed in Coos Bay, Oregon, and now it has been spotted in the Puget Sound area.

This raises a number of concerns. *W. subtorquata* is effective at colonizing clean, artificial structures (like docks and boat bottoms), making it highly successful in urban areas. Additionally, *W. subtorquata* is tolerant of copper based antifouling paint. This resistance likely gives it a competitive edge against native bryozoans and in many areas it is now one of the most common introduced species in harbors and estuaries. Once attached to a ship’s hull, *W. subtorquata* also acts as a facilitator for the introduction and spread of other invasive species. It provides a non-toxic surface for the invasive species that normally wouldn’t attach to antifouling paints. Adding insult to injury, *W. subtorquata* can also out compete native species when it survives toxic conditions by lying dormant and then recovering as conditions improve.

Preventing the future spread of species like *W. subtorquata* is important if we hope to preserve the unique diversity of life in the Puget Sound.



Padilla Bay Foundation

How You Can Help

Grassroots involvement is the core of Padilla Bay Foundation’s commitment to protect Padilla Bay and support the Padilla Bay Reserve.

Membership in the Foundation means you are contributing directly to environmental education and research right here in Western Washington.

Categories of membership are:

Senior/Student	\$25
Individual	\$35
Family	\$50
School/Organization	\$50+
Supporting	\$75
Sustaining	\$100+
Small Business	\$100+
Sponsor	\$250
Patron	\$500
Steward	\$1000

Send your contribution to:
 Padilla Bay Foundation
 PO Box 1305
 Mount Vernon, WA 98273
 (360) 757-3234
 a 501(c)(3) organization

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PADILLA BAY FOUNDATION NEWS

Help Us Renovate the Aquarium Room

Construction of new aquariums is finally underway, so be sure to stop by this winter for progress reports. The first phase includes efficient life support systems, one large tank featuring the changing tides, two smaller tanks for special exhibits, and exciting interactive displays about current research in Padilla Bay.

Now we need help completing the project with a second large tank—a walk-through eelgrass meadow, a bird life exhibit, and accompanying interpretive displays. The Padilla Bay Foundation has set an ambitious goal to raise \$85,000 by December 31, 2010. With funds from the National Oceanic and Atmospheric Administration, every dollar donated will be matched by \$2.30, making a \$500 gift grow to \$1650. Call the Foundation at (360) 757-3234 to learn how to make your tax deductible donation.



Name _____	Membership Category _____
Address _____	(see reverse)
City/State/Zip _____	Membership Amount \$ _____
E-mail address _____	Extra Donation \$ _____
	<input type="checkbox"/> Check enclosed
	<input type="checkbox"/> Charge my card (VISA/Mastercard)
mail to: Padilla Bay Foundation P. O. Box 1305 Mount Vernon, WA 98273	Card # _____ Expiration Date _____ Signature _____

“Don’t forget Pojar!”

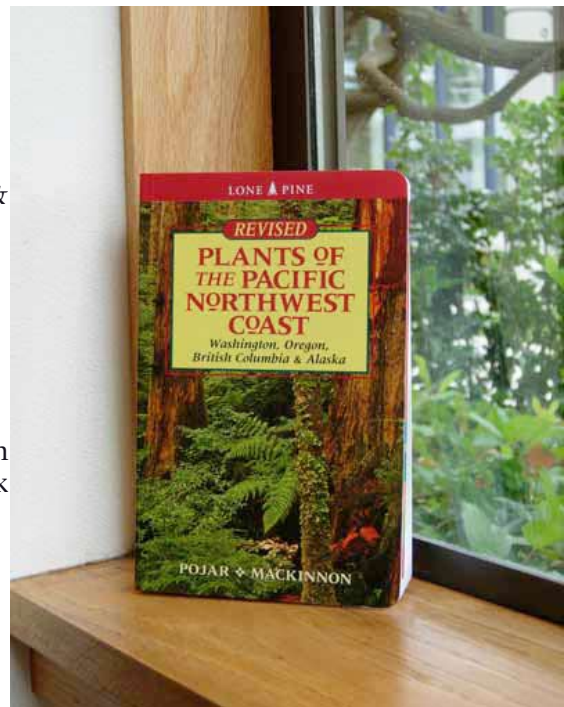
High on the list of books Northwest naturalists refer to by the author’s name alone is this one. Once it’s part of your home library, you’ll say, “Don’t forget Pojar!” before many of your walks and hikes. “Pojar” is *Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia & Alaska* compiled and edited by Jim Pojar and Andy Mackinnon. This sturdily-bound 528-page field guide is the one to take for plant identification and to learn something more. Eel-grass, whose abundance makes Padilla Bay such a very important place? Pojar details this plant’s identifying characteristics and ecology, tells us which indigenous groups dined on it, and maps where it grows. Crowberry, abundant above tree line in parts of the Cascades? We learn to identify it, that its common name derives from the black of the berries rather than the animal eating them (bears!), and that its scientific name means “black on rock.”

Other plant books concentrate on wildflowers or trees or other portions of the wide world of vegetation. *Plants of the Pacific Northwest Coast* is the best compact volume including these plus grasses, sedges, mosses, ferns, lichens - - - and a glossary to illuminate the secret world of botanical terms: “complanate,” “gynobasic,” “schizocarp”!

Even after owning this fine book for years, you’ll continue to discover new things in it: the chart titled “Giants of the genera” with the size and age to which the Northwest’s biggest tree species can grow, a page displaying the distinctive silhouettes of the region’s ferns, essays on indigenous people’s use of plants for food, material, and medicine with a detailed map of their home areas, 2 pages devoted to distinguishing 10 species of blueberries, huckleberries, and cranberries, etc.

Look at a naturalist’s copy of Pojar, and you’ll see a dog-eared, water-stained, much used and loved book. It’s just a terrific field guide. And where can you find this must-have volume for anyone interested in Northwest natural history? At the Breazeale Interpretive Center! (\$24.95)

Review by Tim Manns



Padilla Bay Foundation Membership

Grassroots involvement is the core of Padilla Bay Foundation’s commitment to protecting our estuaries and supporting the Padilla Bay National Estuarine Research Reserve.

Members of the Padilla Bay Foundation contribute directly to environmental education and research at Washington State’s only Estuarine Research Reserve.

Memberships can be for multiple years. Please consider payment of 2 or 3 years at a time, as this will save the Foundation considerable labor and mailing costs and insure that your dues work harder supporting the programs you care about.

Please fill out the reverse side of this form and join today.

Membership Categories

Senior/Student	\$25
Individual	\$35
Family	\$50
School/Organization	\$50
Supporting	\$75
Sustaining	\$100
Small Business	\$100
Sponsor	\$250
Patron	\$500
Steward	\$1000
Benefactor	\$2000

Hand cast brass critters, mounted at the Interpretive Center, are available to donors of \$1000 and above who would like to be acknowledged in this way.



Winter Events

Presentations for December, January and February

Raptor Class

The Skagit Flats are nationally recognized for their hundreds of wintering birds of prey. This in-depth class will teach about our local raptors, emphasizing field identification and the particularly fascinating element of winter behavior. Instructor Bud Anderson has studied raptors for over 35 years, and has an incredible knowledge of local populations and peregrine falcons. The class meets 5 Tuesday evenings from 7:00-9:00PM **January 12 - February 9**, with a Saturday field trip. The class fee is \$150 per person. To register, send check or money order to the Falcon Research Group, PO Box 248, Bow, WA 98232. Class size is limited, so register early.



Birding by Ear in Winter

Though many songbirds are long gone, winter can be a time of raucous activity at Padilla Bay. It's prime time for wintering raptors, waterfowl and many year-round locals. Join naturalist, Libby Mills, for a morning of watching and listening for birds around Padilla Bay and the Skagit Flats. Bring warm, outdoor clothing, binoculars, field guides, and snack or lunch. Each class limited to 15 participants. Please call or register online. **Friday, February 5 and Sunday, February 7, 8:30-12:30.**

Winter Hawks of the Skagit Flats

The Skagit Valley is an incredible area for observing wintering hawks and falcons. Learn to recognize the most common species in our area with raptor biologist, Bud Anderson. A slide presentation from 9:00-11:00 will introduce you to raptor biology, field characteristics, and common behaviors. The afternoon field trip runs until around 2:00 and is limited to 15 participants. **Saturday, January 9, 9:00-11:00.** Register online or by phone.

Swans in the Skagit Valley

The swan as a mythical creature goes back to the earliest human cultures. Each year, the Skagit is the winter home of thousands of swans that nest in the arctic. Swan biologist, Martha Jordan will present swan mythology and life history, as well as current issues and tips for finding and observing swans without disturbing them. **Sunday, January 24, 10:30-12:00** Please call or register online.

Our Underwater Neighborhood: A Video Tour

Join filmmaker John F. Williams for a tour of our local underwater wilderness through the magic of moving pictures on the big screen. A stone's throw from shore is a world that very few get to see, yet it is a major part of our neighborhood. John will be showing excerpts from **SEA-Inside: Pacific Northwest** — the only TV series about what's beneath the surface of our Northwest waters. The evening will include discussion about how art, science, education, recreation, and volunteer service are important to the health of Puget Sound. **Thursday, February 11, 7:00PM.** We will request a \$5 donation for this program. Please call or register online.



The Breazeale Interpretive Center is open to the public Wednesday-Sunday, 10:00-5:00.

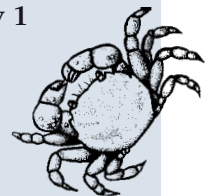
Staff are available 7 days a week.

Closed December 25 and January 1

Register online or by phone.

www.padillabay.gov

(360) 428-1558

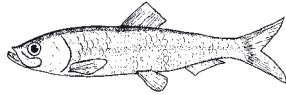


Beachwatchers 2010 Winter Seminar Series

Forage Fishes of Puget Sound

Friday January 8th
Anacortes Public Library
7:00 PM - 8:30 PM

A presentation on the ecology of three forage fishes in Puget Sound by Dan Penttila, Washington Department of Fish and Wildlife - Habitat Program



Carbon Dioxide Increases in the Ocean

Friday February 12th
Anacortes Public Library
7:00 PM - 8:30 PM
Speaker to be determined.

Puget Sound Anemones and Coral Bleaching

Friday March 12th
Anacortes Public Library
7:00 PM - 8:30 PM

Brian Bingham of Western Washington University tells us "What can Puget Sound sea anemones (Aggregating Anemones) teach us about the bleaching of tropical coral reefs?"



Tidal Power Generation

Friday April 9th
Anacortes Public Library
7:00 PM - 8:30 PM

Craig Collar of Snohomish PUD and Shiela Murray of the Department of the Navy tell us about agency plans to test tidal turbines for electrical production in the Admiralty Inlet area. Learn about this technology and evaluations of the potential use of this renewable power source in Puget Sound.

Monthly Youth Programs Offer Fun Learning

Mini Explorers are the 3-5 year old learners. We look at a new topic each month, with stories, games, hands-on observations, art projects, and plenty of action. Call the Interpretive Center to register or register online.

December 9 & 10, 10:00 & 1:00
Wrack and Wreath– *We'll create decorations and food for wildlife with natural treasures from the beach.*



January 13 & 14, 10:00 & 1:00
How Animals Eat–*Some use their pincers. Some use a beak. Others eat with their feet, but none use a spoon or fork!*

February 10 & 11, 10:00 & 1:00
Snails and Sea Slugs–*Sort of slow and sometimes slimy, these cousins are the stars of the estuary fashion show.*

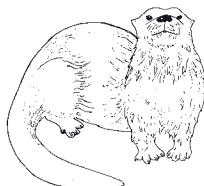


Junior Ecologists are 6-9 year olds who have fun exploring the estuary. Excursions to the beach, science experiments, games, art projects, and studying life in the bay–this program is guaranteed fun! Call the Interpretive Center or register online.

December 11 & 12, 10:30-12:00
Wrack and Wreath– *We'll create decorations and food for wildlife with natural treasures from the beach.*

January 22 & 23, 10:30-12:00
Eagles–*Our largest raptors, eagles are a common sight at Padilla Bay in the winter. Find out more about why the estuary is one of the eagle's favorite places!*

February 12 & 13, 10:30-12:00
Marine Mammals–*Living in the water but breathing air, these amazing creatures have all the tricks for survival.*





Stable Isotopes

Isotopes are atoms of the same element that have different numbers of neutrons; that is, they have the same number of protons (positive charge) and electrons (negative charge), but differ in molecular weight due to different numbers of neutrons (neutral charge). For instance, Carbon usually has 6 protons and 6 neutrons (12 total), but it sometimes has 7 neutrons (13 total) or 8 neutrons (14 total).

Stable isotopes occur naturally in the environment, and are used by plants and animals. Different species of plants use different percentages of stable isotopes of elements like carbon, oxygen, nitrogen and hydrogen. Measuring different isotopes in plant tissue gives scientists a “signature” for each species. These isotope signatures then turn up in the animals that eat the plants, allowing researchers to trace energy flow through food webs in ecosystems.



Saltmarsh like this provides food for organisms far across the tideflats



Following the Food

by Monte Richardson

Estuarine marshes play a key role in coastal ecosystems of the Pacific Northwest and are home to many kinds of birds, mammals, invertebrates and fish. Over the last century, much of Puget Sound’s estuarine marshlands have been filled, drained, or dredged. Despite this loss, research has shown that estuarine marshes still contribute significant amounts of food to animals in habitats outside the marsh. It seems that food produced in one habitat can contribute significantly to nearby habitats, showing the importance of food web connections in Northwest estuaries.

Emily Howe, a graduate student from the University of Washington in the Wetland Ecosystem Team and recipient of a Padilla Bay Graduate Research Fellowship, is studying the food web connections of marshes, mudflats, and eelgrass beds in Padilla Bay. She uses stable isotopes (see sidebar) to determine whether organic matter is produced by salt marshes, eelgrasses, or phytoplankton. This method, combined with a complex computer model, enables Howe to determine the source of organic matter eaten by benthic organisms such as clams. It seems that the relatively small area of marsh contributes significantly to organisms living in the mudflats and eelgrass. The results of Howe’s research reveal that organisms living in mudflats and eelgrass beds in the center of Padilla Bay rely more on organic matter produced by marsh plants than previously predicted.

A second aspect of this study looks at the role of rivers in moving organic matter from marsh areas to intertidal areas. Earlier studies suggested that river flow can help distribute nutrients across estuarine habitats. However, a comparison between Skagit Bay and Padilla Bay contradicts these findings. Howe’s results suggest that river flow in Skagit Bay results in more compartmentalization of food webs compared to Padilla Bay with less freshwater input. River water flowing quickly through the channels in Skagit Bay may actually transport nutrients beyond the estuarine area and out of range of the mudflat communities, thus isolating habitats that seem to be near one another.

As we begin to better understand the connections and processes of estuary food webs, resource managers can create more effective restoration strategies. In light of this study, it is clear that future restoration should consider the restoration of salt marsh habitat. Strategies might include the nearshore removal of levees and hardened shorelines that prevent the establishment of emergent marsh habitats. Thanks to Emily Howe’s dedicated work, coastal restoration projects can better protect this valuable habitat.



Washington Conservation Corps/AmeriCorps

We're pleased to welcome new AmeriCorps staff to Padilla Bay. Over the next year, they will all be involved with a variety of projects related to research, education and facilities management. Here, they are assisting with Stream Team by monitoring the Nookachamps Creek, a tributary of the Skagit River.

Monte Richardson grew up on Lummi Island where he developed a love for the outdoors and a close connection to the ocean and its surrounding wildlife. He received a BS in Envi-

ronmental Science with an emphasis on Marine Ecology from Western Washington University's Huxley College of the Environment. Last year, **Eric Chabot** served a previous AmeriCorps term with the Washington Conservation Corps, performing riparian restoration work and doing invasive plant surveys in the beautiful upper Skagit watershed. Eric is also interested in rock climbing and snowboarding. **Kara Bloch** received a degree in Environmental Planning and Policy from WWU Huxley College. A Whidbey Island native, she first came to Padilla Bay with her fourth grade class. Ever since her nieces became old enough to play outside she knew what an impact being outdoors can have on a child. Padilla Bay is fortunate to have these three staff with such high energy, diverse experience, and big smiles.



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