



PHOTO: DAN ROSENBERG
Alaska Dept. of Fish and Wildlife

Scoters, Seasonal Visitors to Our Area

By Judy D'Amore, NHE Curator/Educator

If you've been on one of our fall and spring cruises to Protection Island, you're probably familiar with an interesting group of diving sea ducks called scoters. There are three species of these waterfowl locally, surf scoters, the most common, white winged scoters, and black scoters. Male surf scoters are easily recognized by their conspicuous arched bill, marked with red, yellow, white and black. Females are chocolate brown. White-winged scoters and black scoters, distinctively marked but not quite as colorful as surf scoters, are a bit less abundant in our area but more widely distributed worldwide.

Each fall scoters arrive along the Washington coast and in Puget Sound to forage on bottom-dwelling marine life such as blue mussels, small crustaceans and benthic fishes. Rafts of scoters are a common sight along our shores throughout the winter. Every year, scoters molt all primary feathers simultaneously, leaving them completely flightless for a month. In late spring, breeding scoters migrate to boreal and tundra wetlands in northern Canada and Alaska to nest and rear their young. Although little is known about their breeding behavior, we do know that scoters are slower to reproduce than other species, with small clutch sizes and delayed reproduction. They consistently use the same breeding, wintering and molting areas year after year. These factors make them slow to recover from population losses or to colonize new areas.

Although scoters are still a common sight in our area, their populations have declined in recent years. Studies carried out in Puget Sound in the late 1970s and again in the 1990s show their numbers dropped 57% in this 20-year period. Why have scoters become less abundant? Is it related to habitat loss? Limited food availability? Are they susceptible to toxic chemicals such as cadmium, lead and polychlorinated bi-phenyls (PCBs) in their food supply? Or is hunting or human disturbance a factor? Unfortunately we don't know the answers because sea ducks as a group are not very well studied. On the other hand scoters are widely distributed and they depend on the same food webs

as other marine bird, fish and marine mammal species of our area. For these reasons surf scoters have been selected as an indicator species for the Puget Sound Ambient Monitoring Program. Scientists hope these birds will help them learn more about how the biological resources of Puget Sound are changing and how movement of contaminants through the Puget Sound basin is affecting marine life of our region.

On **Thursday, July 7, at 7pm** the PTMSC is hosting researcher Eric Anderson of the University of Wyoming, who will share his recent research on scoter populations. Anderson, working in collaboration with Washington Department of Fish and Wildlife, Simon Fraser University and Canadian Wildlife Service, has been looking into the habitat and food web relationships of these birds. His work has highlighted some interesting connections between scoters, eelgrass and Pacific herring. He has learned that a substantial number of juvenile scoters don't fly north in the summer, but remain locally in places like Padilla Bay with important eelgrass beds.

Anderson and his group are also investigating the importance of herring in the diet of scoters. Herring is an important food source for birds and mammals in Puget Sound, but herring eggs, laid each spring on eelgrass and other marine plants, are especially important in the diet of scoters. Herring have been experiencing a decline in northern Puget Sound, and spawning has virtually disappeared from several bays in our area including Discovery Bay. How is this trend affecting scoters? To learn more about recent research into scoters in Puget Sound, you won't want to miss this timely program (see the Summer Speaker Series in this issue's Insert).

Summer Opening Day is June 15th
Both Exhibits Open Daily 11am to 5pm
Closed Tuesdays

IN THIS ISSUE

- 2**  *Foss Maritime Discovery Lab: Citizens Monitor Algal Blooms*
- 3**  *Puffin Cruises to Protection Island*
 *Sail to Protection Island*
- 4-5**  *Special Exhibits at the Burke*
 *Coming in the Fall*
 *Marine & Earth Science Summer Camps*
 *It's Beachwalk Season!*
- 6-7**  *MSC Pen*
- Insert**  *Schedule of Events*
 *Daily Summer Programs*
 *Summer Speaker Series*

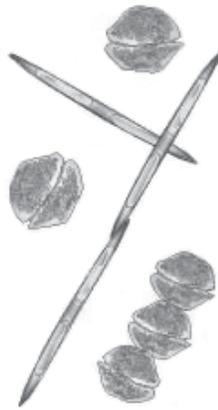


Citizens Monitor Algal Blooms in the Foss Maritime Discovery Lab

The Port Townsend Marine Science Center has a new attraction in its Marine Exhibit. This exciting addition is the Foss Maritime Discovery Lab, which opened on April 9, 2005. The Discovery Lab's purpose is to incorporate more research and laboratory experience into educational programs offered at the PTMSC, to target older students and to get involved in larger-scale research projects in conjunction with environmental/natural resource groups and research scientists.

There are already a few projects underway in the Lab involving community volunteers. One such project is a Harmful Algal Bloom (HAB) monitoring study being done with the Olympic Region Harmful Algal Bloom Partnership (ORHAB) and the National Oceanic and Atmospheric Administration (NOAA). This HAB project not only allows staff and volunteers to get their hands on real science, but it's also an important part of a regional monitoring project that helps scientists understand harmful blooms and the species responsible for them.

By regularly monitoring these blooms, health officials are being notified in time to close commercial and recreational harvest areas where shellfish are ingesting toxic algae. These particular algae are one-celled plankton that drift in the water and are moved by tides, currents and wind to different locations.



Pseudo-nitzschia and Alexandrium catenella

fish, and therefore a reduced risk of humans getting PSP or ASP. Data gathered in this project will provide researchers a broader base from which to gain information about harmful algal species and why they produce toxins. Data from these studies will also be used to educate people about the risks of PSP and ASP.

Facts About Harmful Algal Blooms

- Phytoplankton blooms occur when environmental conditions promote rapid reproduction due to increased sunlight and nutrient levels, usually in the spring or fall.
- HABs can be caused by many different species of marine algae that produce toxins. The diatom *Pseudo-nitzschia* produces the toxin domoic acid and causes Amnesic Shellfish Poisoning (ASP), and the dinoflagellate *Alexandrium* produces multiple toxins (saxitoxin and gonyautoxin derivatives) which cause Paralytic Shellfish Poisoning (PSP). These two types of algae are the primary concern in this study.

So What Exactly is the ORHAB Project?

The Problem: Toxins produced by harmful algal blooms can concentrate in the meat of shellfish through filter feeding, and may cause Paralytic Shellfish Poisoning (PSP) or Amnesic Shellfish Poisoning (ASP) in humans and marine animals that eat the shellfish. Outbreaks of harmful algae must be located and monitored in order to prevent humans from eating contaminated shellfish.

The Project: PTMSC volunteers are collecting weekly water samples from different areas in Port Townsend Bay and Kilisut Harbor to test for the presence of harmful algae and toxins. These samples and the data collected will then be sent to NOAA and analyzed further by researchers.

Why This Project is Important: If outbreaks of harmful algae are monitored, there will be a reduced risk of harvesting contaminated shell-

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Octopress is a quarterly publication of the Port Townsend Marine Science Center, A 501(C)(3) nonprofit educational organization. Your comments, contributions, and support are greatly welcomed and appreciated. PTMSC is located at Fort Worden State Park in Port Townsend, Washington on the Olympic Peninsula.

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The Main Office is located on the 2nd floor of the Fort Worden State Park Office. The Marine Exhibit & Natural History Exhibit are located on the Pier and on the Beach at Fort Worden State Park.

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- Symptoms of PSP include numbness of the lips, face, tongue, and extremities, difficulty talking, breathing, swallowing, and lack of muscle coordination. Symptoms of ASP include disorientation, confusion, and permanent short-term memory loss. Both types of poisoning cause gastrointestinal discomfort, and may lead to death in extreme cases.
- Domoic acid accumulates in razor clams, Dungeness crab, mussels, anchovies, and sardines. Toxins produced by *Alexandrium* accumulate in clams (mainly butter clams), mussels, oysters, scallops, whelks, lobsters, and crabs. When these animals eat the diatoms, the toxin gets concentrated in their tissues. The toxin does not affect these animals, but it causes ASP in other animals that consume them. This is why humans and marine mammals are susceptible to ASP and PSP.
- In the summer of 1998 an outbreak of domoic acid caused the death of over 50 California sea lions along the California coast. Sea lions eat anchovies and sardines which can accumulate the toxin. Domoic acid does not affect these small fish because it stays in the intestines and does not absorb into the muscles, as it does in mammals.
- *Pseudo-nitzschia* can produce domoic acid in different concentrations depending on environmental conditions.
- Domoic acid was first detected in red macroalgae by the Japanese, and was initially used as a deworming agent. The toxin wasn't discovered in shellfish until 1987 when multiple cases of ASP were discovered in people who ate mussels from Prince Edward Island.

Adding two new sites in Jefferson County helps scientists know how widespread toxic algae are during a Harmful Algal Bloom event. By knowing how the cells are spread and over what area, we may be better able to give early warning of such events in the future. Kilisut Harbor, in particular, was the site of a large toxic bloom event in September 2003, and was the site of the first domoic acid closure in Puget Sound.

If you would like to learn more about this study or participate in sample collection and analysis, contact Laura Friedenbergl at lfriedenberg@ptmsc.org or (360) 385-5582 ext. 110.

Seth Bender Memorial Summer Camp Scholarship Fund

2005 marks the PTMSC's seventeenth summer camp season. These weeklong, hands-on, Marine and Earth Science Camps provide educational opportunities for boys and girls ages 8 to 18. Each year the PTMSC receives requests for financial assistance from families located throughout the Puget Sound area. To assist these families, we established the Seth Bender Memorial Scholarship Fund, in memory of a young man who felt passionately about integrating nature in our daily lives.

This fund provides much needed financial assistance for children from families of limited means to participate in these enrichment camps and reduces the barriers that economic hardship imposes.

We want to thank those who contributed toward this summer's scholarships: Allen & Betty Anne McCall, Sarah Patterson & Chuck Kinsey, Sheila Bender, Jim Bender & Ann Venables, Bob & Jacki Belt and Cynthia & Michael Diament. Contributions can be sent to:

Seth Bender Memorial Scholarship Fund
Port Townsend Marine Science Center
532 Battery Way, Port Townsend, WA 98368



Puffin Cruises to Protection Island

It is for a glimpse of the elusive tufted puffin that many visitors make the trip. No guarantee can be made that they will be sighted on every outing, but chances are very good that they will be spotted, especially on the south side of the island. Like rhinoceros auklets, for which Protection Island is the major nesting site, the puffins use burrows in the cliffs and uplands to raise one, or sometimes, two chicks. The chance to see them carrying many small fish at one time in their bills, or even swimming, flying, or diving is exciting. Over 85 bird species and eight mammal species, including sea lions, elephant seals, whales and porpoises, have been sighted on these cruises.

The PTMSC has scheduled five cruises to Protection Island this summer aboard the well-appointed 65-foot motor vessel *Glacier Spirit*. **July 2, 16, 23, 30** and **August 6**. The three-hour cruise departs from the Point Hudson Marina in downtown Port Townsend at **6pm**. Naturalists from the Marine Science Center provide excellent commentary on the history, geology and ecology of Protection Island. These cruises offer a unique opportunity to see one of the major sea bird nesting sites in the State, and to enjoy a stimulating evening out on the water as well.

Tickets are \$45 per person (\$40 for PTMSC, Burke Museum, Audubon or Washington Ornithological Society members) and proceeds will benefit the Marine Science Center's education programs. Contact the Marine Science Center for reservations (see contact info below).

Sail to Protection Island

Every summer the Port Townsend Marine Science Center offers ONE 6-hour sailing adventure to Protection Island National Wildlife Refuge aboard the historic schooner, *Adventuress*. The sail is **Saturday, July 9, 10am-4pm**. Tickets are \$75 per person or \$70 for members of the Marine Science Center, Audubon, or the Washington Ornithological Society.

Join the Port Townsend Marine Science Center for a unique experience. Call us at (360) 385-5582 or (800) 566-3932 or email at cruises@ptmsc.org for reservations and additional information.



PROTECTION ISLAND
SUMMER PUFFIN CRUISES

SATURDAYS, 6 PM TO 9 PM
JULY 2, 16, 23, 30 AUGUST 6

Tickets: \$45 per person
(\$40 for PTMSC, Burke Museum, Audubon or WOS members)

Reservations and information:
(360) 385-5582, (800) 566-3932 or cruises@ptmsc.org
Discounts are available for children and groups

Special Exhibits at the Burke

Arctic National Wildlife Refuge: Seasons of Life and Land opens **June 25** at the Burke. Through spectacular photographs, this exhibit documents the vibrant ecosystem of the refuge lands through all four seasons of the year with stunning shots of caribou and bird migrations, polar bear mothers and their young, flowering plants, breathtaking landscapes, and active Native communities. Along with this exhibit is another you won't want to miss, *Life Abounds: Arctic Native Wildlife Art*, a selection of traditional and contemporary wildlife art, **June 25–Sept. 5**. These beautiful pieces depict arctic animals from the perspective of the Native people who have known, lived with, and depended upon them for thousands of years.



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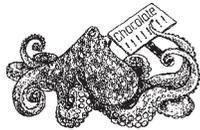


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COMING IN THE FALL:

Chocolate Octopus Dive



On **October 8**, the PTMSC will be hosting an underwater treasure hunt called the Chocolate Octopus Dive. The dive event will take place in front of the kitchen shelter at Fort Worden starting at about **9am**. It will be open to free divers (snorkelers) and scuba divers. This is a benefit dive to raise funds for the operations of the PTMSC. We will be asking various scuba manufacturers, travel agencies and other vendors to donate prizes that will be awarded to lucky divers finding one of the many Chocolate Octopi sitting somewhere on the sea floor. The event will have an entry fee to participate in the treasure hunt. Also, lunch and Chocolate Octopus Dive T-shirts will be available for purchase at the event. For more info and to volunteer to help with this event, please contact PTMSC at 385-5582 or info@ptmsc.org.

Cooking Classes Return in the Fall!

Cooking Classes at the Green Eyeshade will be back again this fall for the third year. Save Tuesday evenings in October and early November to learn cooking tips and techniques from our area's top chefs, with all proceeds benefiting PTMSC. Look for dates and chefs to be announced in the next *Octopress*.

PORT TOWNSEND MARINE SCIENCE CENTER

Marine & Earth Science Summer Camps 2005



Rocks, Fossils, Shakes & Quakes Day Camp
July 11–15 For ages 9 to 14

Marine Science Overnight Camp
July 17–23 For ages 9 to 13

Adventures in Marine Research Overnight Camp
July 17–23 For students entering grades 9–12
ALL REGISTRATIONS FILLED

Marine Science Day Camp
August 1–5 For ages 8 to 12

The Port Townsend Marine Science Center offers a variety of weeklong camps centered around the marine environments of Port Townsend Bay and the Strait of Juan de Fuca.

Rocks, Fossils, Shakes & Quakes—We're excited! This year seismologist scientist John Lahr will be joining the Day Camp crew, bringing lots of fun ways of learning about earthquakes and adding plenty of excitement to the program. Campers will make their own seismographs and experiment with earthquake-proof building designs. They will also explore the geology of the shoreline and learn about animals living there. From experiments in the learning lab exploring rocks and fossils, volcanoes and earthquakes to field sessions on the beach, this camp offers fun, hands-on experiential learning.



In **Marine Science Overnight and Day Camps**, campers are immersed in scientific study, creative activities and respectful play. Activities include sieving through goopy sediments looking for brittle stars, pulling a seine net through eelgrass beds to learn where young fish hide, and observing microscopic life that supports all life in the sea. These activities give campers the opportunity to learn about individual groups of marine plants and animals while taking an ecosystem approach to marine study.

Many Thanks are in order to ...

- ✦ **Kathryn Fleming** for the Fuji Cadenza all-terrain bicycle.
- ✦ **Richard Inman & Chuck's Fabrications** for labor and materials donated toward the construction of the Foss Maritime Discovery Lab.
- ✦ **Dick Scheele** for donating a book on whales, a laser pointer and two laminated field guides.

It's Beachwalk Season!

That means summer and all sorts of interesting stuff happening between sand and surf. On the Friday beachwalks this year we can turn over rocks (and put them carefully back), peek under seaweed and wonder about the forces that make our beaches. The best part will be sharing all this with our visitors — and a chance to do a little educating, teaching about this wonderful but fragile environment and how to take care of it. This year's beachwalks will begin around **11am every Friday from June 17th to September 2nd**. Meet at the portico of the Natural History Exhibit.

NEW & RENEWING MEMBERS

Thanks! To our New & Continuing Members! The following folks have either joined or renewed their PTMSC membership since the Spring '05 *Octopress* was sent!

INDIVIDUAL

Marge Abraham
Mary Lou Boegehold
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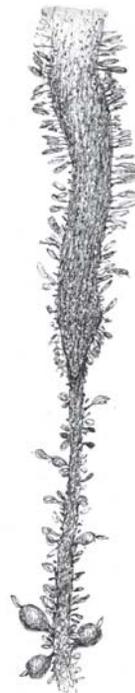
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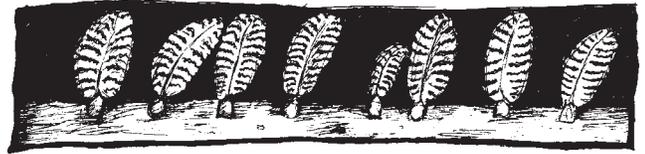
Port Townsend High School student,
Drew Kurata, sets up a three-week study

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G R A P H I C • D E S I G N

MSC PEN



Seth Raymond

Newsletter of Marine Science Center Volunteers

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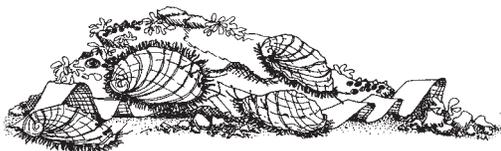
FEATURED VOLUNTEER

— JIM OAKLAND —

Jim Oakland has been a dedicated volunteer at the Port Townsend Marine Science Center since 2003 when he and his wife Helen began volunteering as a team in the Natural History Exhibit. Many of us think of Jim as a Geologist but few know that he has a Ph.D. in Clinical Psychology and spent 10 years as a professor. Jim's interest in the physical sciences stems from his love for hiking, birding, and extensive reading on many topics including geology. He has been an active and regular docent in the Natural History Exhibit for years, developed and lead the Geology Study Group for a year and a half and this winter added aquarium maintenance to his list of skills, as an active member of the Saturday Home Crew. Jim is a huge asset to the Science Center and we appreciate him very much.



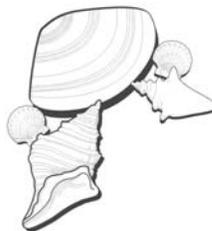
Jim Oakland enjoys spending time outside exploring the wonders of nature, though he can often be found at the NHE sharing his knowledge with others.



UPCOMING EVENTS

Marine Exhibit Docent/Greeter Training: There may still be time to join the June 11th Docent/Greeter Training at the Marine Exhibit from 9am–12pm. If not, then, try our Mentor one-on-one training in the exhibit! Just call Jean to get lined up with an experienced docent so that you can be a docent or greeter yourself!

Summer Opening Day: On Wednesday, June 15th, both the Marine and Natural History Exhibits will open their doors to another summer of fun, exploration, and mingling with visitors from all over! Both exhibits will be open from Wednesday through Monday from 11am–5pm until Labor Day. Bring your friends and family to come enjoy a world of learning at the Science Center.



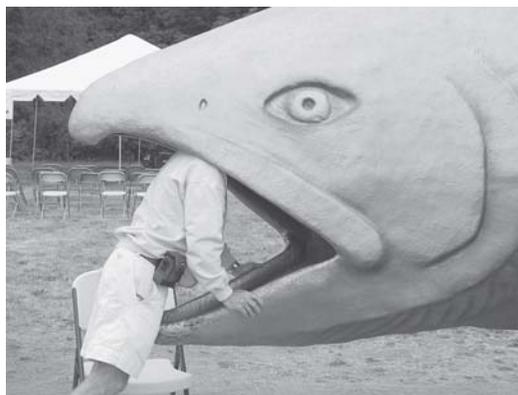
Summer Speaker Series: Eric Anderson will be presenting information on Scoters on Thursday, July 7th at 7pm in the NHE, Dr. Rich Osborne will give a talk on orcas on Wednesday, August 3rd at 7pm in the NHE, and Steve Cowen's film *Farming the Oceans* will be shown on Sunday, August 28th at 1pm at the Rose Theatre. For more information see *Octopress* articles.

VOLUNTEER OPPORTUNITIES

Docents needed for special needs groups: We are looking for two docents that can help with a group of disabled children in both the NHE and ME on July 21st, July 28th, and August 4th from 10–11am. Call Jean at ext. 112 for more information.

Volunteer Needed for Brochure Distribution: Each season, we try to get rack cards and a resupply of our current brochure to businesses catering to visitors such as B&Bs and hotels. We are looking for someone that can help with that this summer.

Docents and Greeters Needed: Summertime at the Science Center is a BUSY time. When both buildings are open six days a week, six hours a day and two volunteers are needed for two shifts per day, per building ... that is 48 volunteers needed each week! So, we are really in need of folks that can take a regular shift or even just a shift or two this summer.



*Looking for some summer fun? ...
Become a docent or greeter in one of our exhibits!*

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ME UPDATE

During the month of May, Port Townsend High School students in Tim Behrenfeld's oceanography class had the opportunity to set up and conduct research projects in the Discovery Lab. They developed research questions based on the eelgrass planting they've been monitoring over the last year at the Northwest Maritime Center pier.

Student Research Questions:

- Does the presence of eelgrass affect the level of dissolved oxygen in a tank?
- Do animals have a preference between algae and eelgrass as habitat?
- Do animals attack their prey differently in an eelgrass environment versus a sandy environment?
- Do animals behave differently in an eelgrass habitat versus a habitat with no eelgrass?
- Does eelgrass grow faster if epiphytes on the blades are removed?
- Will decorator crabs change their decorations depending on their environment?
- Does a Graceful crab detect food by smell or sight?

"I think other students should have an opportunity like this. It was an opportunity to really think on your own and create everything from scratch instead of having it already set up."

—Student Quote

Artificial Habitat Tank

The new artificial habitat tank has become home to Ester, a tiny Rubescent octopus. She has made her home in a green bottle which faces the Discovery Lab doors. You can easily spot an octopus' den because of the mess right outside of the opening. They like to keep the inside of their home neat by pushing out all of the debris. Also, there are lots of tiny hermit crabs in the same tank. Visitors often wonder why these animals have such small shells on their bodies (often covering only the tip of their rear ends), and the reason is not because they can not find bigger shells. This species of hermit crab actually chooses shells that are too small for their bodies because when they are threatened they prefer to drop their shell and run rather than hide inside the shell. This is a happening tank, so be sure to come take a look, now that we are open Wednesday through Monday from 11am to 5pm!

—Laura Friedenbergl

THANKS ARE IN ORDER FOR ...

Marie Wright, Rick Riddle, Coleman Riddle, Brianna Parker, Evan Parker, Dalin Kors, Alison & Juliette Tuuri, Libby Palmer, and Eli White for dancing down Lawrence Street with Ester the Octopus during Rhody Parade!

Keith Brkich for his underwater efforts in collecting specimens for show and tell during the Maritime Center's Bounty of the Sea.

Dick Pierce for all his help with the water systems at the Marine Exhibit, driving the *Octopress* to Silverdale, and many more tasks.

Sharon Niccoli for joining the flyer distribution team and taking rack cards out to all the B&Bs ... Hurray!

Mena Quilici, Marie Wright, Rick Riddle, and Sarah Conner for helping with the Kindergarten groups.

Dan & Soozie Darrow, Karen DeLorenzo, Judy McCutchen, Katie Flemming, Marilyn Hudson, and AJ Proutt for coming together as a Volunteer Advisory Committee to give their much needed advice on updating the Volunteer Program.

Kurt Steinbach for setting up his 'elegant' Octopus for the Discovery Lab opening, Bounty of the Sea and the Rhody Parade.

Karen DeLorenzo and Libby Palmer for leading the Beach Walk trainings for Volunteers.

Linda Dacon and Jamie Parker for stuffing envelopes—a big help!

John Longcore and his **Beach Watcher Volunteers** from WSU for helping monitor the shrimp tagging project at the Research Lab.

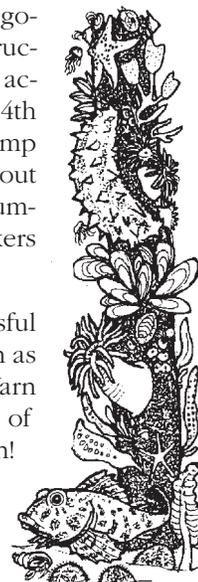
NHE UPDATE

It is finally summer in the Natural History Exhibit! We're in full swing with many, many school groups still coming in. Plus we are looking forward to the exhibit being open six days a week starting on June 15th. We are encouraging docents and greeters to sign up well ahead for all the various shifts this summer. The summer shift schedules will be available on the clipboard in the NHE office. Speaking of summer, we are piloting a new story time program. If you have a big group of kids and you want to bring them together for a story, we encourage you to do so. We are going to have some books available for you to read, so pick one, have the kids grab a carpet square and you can read to them in the portico, the classroom or even the exhibit if you'd like.

We are gearing up for Rocks, Fossils, Shakes & Quakes Day Camp (July 11th–15th). We are going to have a guest scientist as one of the instructors and we are planning some very exciting activities for the kids to participate in. On June 4th we had a sneak peek for the public on what camp will be like; a big thanks to those who helped out with this. We are also looking forward to our Summer Lecture Series featuring a variety of speakers as well as a film at the Rose Theatre.

We had an exciting spring with a very successful botany class taught by Fred and Ann Weinman as well as some fun geology field trips led by Varn Brooks. Thank you all for teaching, and those of you who participated, we hope you had fun! Thank you to those who helped out with this, it was much appreciated. We hope to see you all this summer!

—Casey Clevenger



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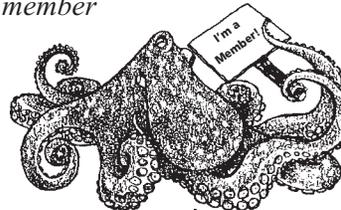
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