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Upcoming Events

Sat. Sept. 19 International Coastal Cleanup! Join Washington's third annual participation in International Coastal Cleanup and register at www.coastsavers.org.

Fri. Sept. 25 Sanctuary Advisory Council meeting at Quinault Community Center, Taholah from 10:00am-3:30pm. Open to the public. http://olympiccoast.noaa.gov/involved/sac/sac_meetings2015.html

Sept. 25-26 16th Annual Dungeness River Festival in Sequim. <http://dungenessrivercenter.org/dungeness-river-festival>

Oct. 9-11 14th Annual Dungeness Crab and Seafood Festival, Port Angeles. <http://www.crabfestival.org/>

THANK YOU ALL!

Our 2015 season is already winding down, with Labor Day weekend soon approaching. During the month of June, OCDC received **1,177** visitors (down 383 from June 2014), with a total of **9** docents contributing **106** volunteer hours. In July, **11** docents welcomed **1,872** guests (up 225 from July 2014), for a total of **115** volunteer hours. In August, **1,610** visitors (down 196 from August 2014) were greeted by **8** volunteers who dedicated **113.5** hours in the OCDC.

Do you have a topic you would like to learn more about? Please send ideas or suggestions to Karlyn for fall/winter brown bag presentations and/or field trips!



Big Blue LIVE Brings Monterey Bay National Marine Sanctuary to the World

On August 31-September 2, did you catch "Big Blue LIVE," the global television and online event hosted by PBS at the Monterey Bay Aquarium and in Monterey Bay National Marine Sanctuary (MBNMS)? The series of three live broadcasts, each one-hour long featuring marine experts, showcased the successes of ecosystem and wildlife conservation at the sanctuary. Programs highlighted many organisms that overlap with our sister sanctuary to the south: humpback whales, sea lions, Pacific white-sided dolphins, brown pelicans, sooty

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shearwaters, elephants seals and sea otters (although California has the southern sea otter, cousin to our northern sea otter). Additionally, live coverage of great white sharks and blue whales was captured.

Scientists, filmmakers, photographers and other experts filmed and photographed marine life feeding in MBNMS this time of year, and their research vessel, R/V *Fulmar*, was used as a platform. Thanks to the California Current Ecosystem, which features an annual upwelling of cold, nutrient rich waters, MBNMS holds one of the world's most extraordinary and biologically diverse marine ecosystems. Footage from air, sea and underwater yielded awe-inspiring videos and photos of these amazing creatures.

If you missed out, it is not too late to view the special online. The episodes are available to stream until October 1 at: www.pbs.org/big-blue-live/home.

- **Episode 1** follows migrating whales, sharks and various birds as they join sea otters, sea lions and other species that live full-time in Monterey Bay. Watch reports from Monterey Aquarium and NOAA research vessels and get facts about humpback whale anatomy.
- **Episode 2** dives into the hidden world of Monterey's sea lions and hear about the bay's rejuvenation through sea otters' return. Join a scientist who is trying to help solve the mystery

of shark migration and study the anatomy of white sharks and elephant seals.

- **Episode 3** follows the team on the water and in the sky as they search for the giant of the sea: the blue whale. Venture inside the whale with Dr. Reidenberg and join Sanjayan on an incredible journey to get up close and personal with these giants of the deep.

Get Into Your Sanctuary Day!

On June 27, Olympic Coast National Marine Sanctuary and partners hosted an all-day event at Kalaloch Lodge and beach, themed "Healthy Ocean, Healthy You." Karlyn, representing Poser Yoga, brought her passion for yoga and kicked off the day with a marine-themed class on the beach. What better place to breathe in fresh air and feel the rhythm of your heart than in front of the sanctuary? Surfriider Foundation's Olympia Chapter and sanctuary staff followed with a mid-day beach cleanup, attended by Congressman Derek Kilmer's field representative, Judith Morris. Orca expert Lynne Barre, from NOAA Fisheries, presented on our local southern resident killer whale population and threats, highlighting new data collection of the orcas' use of sanctuary waters. She brought her crowd-pleasing sidekick, "Mike", a life-sized inflatable orca representing J-26 individual from the southern resident killer whale population. We hope to have Lynne back in the near future to share her work with the public here in Port Angeles! To cap off the event, Kalaloch Lodge restaurant, a member of the Olympic Culinary Loop, offered dinner specials that promote sustainable seafood. Thanks to all our event partners and participants!



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Jessie Hale, Our Nancy Foster Scholar!



I am currently a graduate student and NOAA Dr. Nancy Foster scholar at the School of Aquatic and Fishery Sciences at the University of Washington (UW). I am a Seattle native, and attended UW as an undergraduate. My passion is for invertebrates and marine conservation; I am particularly interested in the relationships between vertebrate predators and invertebrate prey. I have conducted research on everything from fungus, bacteria, and earthworms, to marine snails, aquatic bugs, frogs, and sea otters.

I recently completed my work on the effect of invasive bullfrogs on aquatic invertebrates in Arizona. Other past research focused on novel tagging methods as part of the Pinto Abalone restoration project in Washington. I am currently studying the Washington sea otter population (how many there are and where) and what they are eating. I am interested in how what sea otters eat has changed over time, how sea otters use the habitats they occupy and where and how many sea otters we will have in Washington in the future.

As a NOAA Dr. Nancy Foster Scholar, I have the opportunity to collaborate with a national marine sanctuary office. While I am at the Olympic Coast National Marine Sanctuary (OCNMS) office, I will evaluate ecosystem indicators and metrics identified

by the marine spatial planning process for the State of Washington and Olympic Coast National Marine Sanctuary Advisory Council Science Work Group based on indicator evaluation criteria used by the Integrated Ecosystem Assessment group (i.e. is the indicator theoretically sound, relevant to management concerns, responds predictably? etc.) for the sanctuary's next condition report. In addition to updating the OCNMS condition report, I will be involved in sanctuary outreach.

I will also conduct field work on the weekends, and visit sites along the outer coast to record data on what sea otters eat. I use a telescope to watch sea otters from land, and record the type, number and size of prey items that sea otters eat.



I also blog about science at halejessie.wordpress.com and tweet about science as @HaleJessie when I am not watching sea otters on the coast (and sometimes during)!

On September 25, Jessie will present her work on ecosystem indicator reviews for OCNMS at the sanctuary advisory council meeting in.

91st Makah Days in Neah Bay

From August 28-30, education and outreach staff Jacqueline and Nicole participated in the 91st Annual Makah Days, "Honoring our Fishermen," held in Neah Bay. The event brought out thousands of people to celebrate the Makah Tribe's cultural and maritime history. Festivities included traditional dancing, singing and



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canoeing, as well as an ongoing street fair and parade. Friday's "Locals' Day" was sunny and warm, allowing

locals to enjoy the street fair, carnival and fireworks display, and the OCNMS education and activity booth. On Saturday, hurricane force winds, with wind gusts recorded over 80 miles per hour, startled



the crowds. Despite the heavy winds and local damage, Makah Days proceeded, following a community cleanup, with traditional dancing, singing and canoeing, and the street fair and parade continued. The Makah Tribe offered emergency shelter and food for their guests throughout the weekend.

Whale Watching Field Trip

On August 30, active docents were invited aboard *Island Explorer 4* for an opportunity to learn more about our local marine wildlife. Although we cruised in the Strait of Juan de Fuca, we observed species that inhabit or migrate through Olympic Coast National Marine Sanctuary in closer proximity. Elizabeth C.,

Leslee C., Carol T., Cindy W. and I joined the *Island Adventure 4* out of Port Angeles on a magical day!



It did not take long to spot our first marine mammals: harbor seals stealthily poked their curious heads out of the water in the marina, and shy harbor porpoise arched their chocolate-chip shaped dorsal fins not long after departing into the Strait of Juan de Fuca. We were soaking up the sunshine and spectacular views when we came across a very large group of southern resident killer whales, at least 40 members of the J-pod and L-pod! The orcas were moving slowly in the water in smaller sub-groups spanning across the entire horizon, making it difficult to decide where to focus our attention. Individual orcas breached, spy-hopped, cartwheeled, tail/fin-slapped and more!

Elizabeth noted how amazing it was that we were able to stay in their vicinity for so long. Cindy was impressed by the number of fish they were required to consume on a daily basis, and how birthing orcas sometimes need assistance from other females in the pod, acting as "midwives" to deliver a newborn calf. We were all surprised to learn that gestation lasts up to 17-18 months, and that baby orcas have jaundice, appearing yellow, for up to a one year after birth! Leslee found it fascinating that sons are so bonded to their mother in these matriarchal societies, with 60% of them dying within a year of their mom's death in this population. Carol remarked about the orcas' language, and how information is passed on from the mother.

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After soaking up such a blissful encounter with the orcas, the captain continued

cruising in search of reported humpback whales, which can be more difficult to spot as they typically dive for 5-15 minutes. Alas, not far from the M/V *Coho* ferry, a humpback was sighted and arched above the water's surface several times before diving down, revealing the individualized pattern of its fluke or tail before disappearing. After watching the humpback resurface and dive three more times, we ventured over to the Race Rocks lighthouse for a final treat.

This time it was the pinnepeds, mostly steller sea lions, stealing the show. Dense numbers of basking and frolicking sea lions, along with smaller isolated groups of hauled out harbor seals, use the exposed rocks near Canada's coast along the strait.

We could not have asked for a better day of weather and wildlife sightings, and feel so grateful to these charismatic creatures in our home of the Pacific Northwest. I am confident that we will all be better



interpreters for our Olympic Coast Discovery Center guests when we share information about our iconic and beloved marine mammals!



COASST/ News From the Field

This year has been quite an interesting year for Coastal Observation and Seabird Survey Team (COASST) volunteers. Currently, about 3-6 times the long-term average number of dead common murre are washing ashore, seemingly an earlier annual "wreck" of these birds. COASST and partners are working to figure out what might be the cause of these deaths. Data on when and where other bird species are dying could help provide information based on long term trends. Almost all of the beached murre found are emaciated; this fact likely indicates starvation. Some of the possible reasons for starvation could include food scarcity, toxins from the harmful algal bloom, inclement weather, juvenile ineptitude or a combination of multiple factors.

Dr. Julia Parrish, Director of COASST and University of Washington professor, delivered a powerful presentation at our sanctuary advisory council meeting in July, telling the story of last winter's Cassin's auklet wreck. She laid out four hypotheses as to what caused the wreck:

- (1.) winterkill,
- (2.) surplus production offspring,
- (3.) ecosystem shifts of change in food or lack of food and
- (4.) habitat compression, or a change in where the food is found.

Data indicated a shift change in the ecosystem, with a much higher abundance of the lower-value southern copepod compared to the usual fatty-rich northern copepods. This resulted in animals in the food web having access to the less nutritious

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zooplankton available during the season, but not strong enough to impact forage fish. There was evidence for the fourth hypothesis with an anomaly of warmer water temperatures developing in the fall of 2013. Now commonly referred to as “the blob,” the



warmer waters created a much narrower belt of favorable food life close to shore, creating a loss of cold water refuge containing the nutrient-rich northern copepods. While there is evidence of habitat compression, it is uncertain as to whether the mortality of Cassin’s auklets was actually higher than long term averages. Mortality could have been normal, with higher deposition on beaches due to the nearshore location of where Cassin’s auklets would have been feeding. Further research may provide additional answers to this question.

Other interesting summer finds:

In July, Keith found tubeworms in Ocean Shores. Tubeworms secrete calcium carbonate to surround and protect them from predation and other environmental dangers. Anchored on rocks or other

hard substrates, they grow in colonies and can sometimes be observed at low tide in tidepools.

During a field trip to Ocean Shores, COASST interns discovered a Russian vodka bottle. Sarah, a volunteer translator, noted that the brand, Кристалл/Kristal, is no longer in production, but is high-quality vodka from a company founded in 1901. Before ending up on our beaches, this bottle itself was produced in a factory in Moscow, Russia!

Learn more about the latest at

<http://blogs.uw.edu/coasst>.



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Creature Feature

Six-gill Shark (*Hexanchus griseus*)

Every July, “Shark Week” celebrates one of the most infamous groups of fish. Six-gill sharks are the third largest predatory shark species (11-16 ft), similar in size to the great whites, and one of the most widely distributed shark species, with a global presence in both temperate and tropical seas. Typically dwelling in deeper waters (up to 2,500 meters deep), six-gills are elusive and not well-understood; however, scientists in the region are trying to change that research gap. Representatives from Seattle Aquarium, NOAA Fisheries, University of Washington, Point Defiance Zoo and Aquarium, and Washington Department of Fish and Wildlife are trying to learn more about their population dynamics, home range, breeding patterns and more.

Characterized with a heavy body shape, a blunt, rounded snout, fluorescent green eyes and six saw-like teeth on each side of the lower jaw, six-gill sharks have unique features in common with the three other species of cow sharks (all in order Hexanchiformes): (1.) they have either six or seven gills instead of the typical five found in other shark species (hence their name), (2.) they possess a single dorsal fin and (3.) they lack the transparent nictitating membrane which protects and moistens their eyes while allowing visibility.



Photo credit: Seattle Aquarium

Six-gill sharks have occupied our oceans since before the time of dinosaurs! These apex predators nocturnally feed on skates, dogfish (smaller species of shark) and other bony fish, but are also known to scavenge for organisms such as squid, crabs, seals and more. Often found near continental shelves or upper slopes, adults stay in deep waters, swimming near the water’s surface at times, visiting the shallow research station under Pier 59 (Seattle Aquarium) in Elliot Bay.

Seemingly solitary, except during mating, six-gill shark reproduction is ovoviviparous, where a shark’s eggs hatch within its own body. Eggs are stored in the female’s brood chamber, and they can birth between 20-100 live baby sharks after a lengthy gestation period — some estimate up to two years! These long-lived and highly migratory sharks are listed as “Near Threatened” on the International Union of Conservation of Nature’s (IUCN) Red List of Threatened Species.

Photo credit: Arkive.org

