

# West End Natural Resources News

A publication of the North Pacific Coast Marine Resources Committee (NPC MRC) and NPC Lead Entity for Salmon Recovery.

Issue No. 7 July 2014



## Inside:

- Students on the Shore ....4
- Clallam County Price Tags on Nature.....5
- Veterans WCC Crews...6
- Smelt Spawning.....7
- Coast Planning.....8
- New Film for Kids.....8
- 2014 Cleanup.....9
- MRC Summit.....10
- Ocean Acidification .....11
- Thank You, Forks.....12
- Invasives App .....13

## Calling All Hands to Solve a Problem: Bogachiel Floodplain Opportunity

by Cathy Lear and Tami Pokorny

Put yourself on the western side of the Olympic Mountains, in the Quillayute Watershed where a mighty system of four rivers meets the Pacific Ocean. Two of these rivers, the Bogachiel and the Sol Duc, flow together to form the Quillayute River just 5.5 river miles upstream of La Push. The area where they meet is known as Three Rivers, and this vicinity is the subject of our concern.

In its lower reaches, the Bogachiel River should have the features of a mature floodplain with lots of winding meanders. However, many of these meanders have been cut off by recent and frequent flooding and the loss of wood structures. Stream velocity and erosion have increased and led to adverse impacts to the channel, floodplain, public and private infrastructure, and salmon habitat.

In the area around Three Rivers the problem has become so severe that only two major meanders remain in place to control velocity. If either of them is cut off by future floods, there could be serious consequences that extend well downstream – including potential damage to roads and bridges. There's a real risk that the river could shift out from under the SR 110 Bridge and wash out the road to the village of La Push – along with

*Continued on page 2*



*Flooding in 2003 just upstream of Three Rivers. Photo: Tony Foster, Quillayute Chief of Natural Resources Enforcement*



*Cathy Lear, habitat biologist for Clallam County, describes conditions on the floodplain during a site visit this spring attended by members of the North Pacific Coast Lead Entity (<http://www.wcssp.org/northpacific.html>), and Miles Batchelder, director of the Washington Coast Sustainable Salmon Partnership, to her right. Photo: Tami Pokorny*



that community’s electricity and water supplies. Such a meander breach would also deposit large amounts of sediment at the mouth of the Quillayute River which could worsen flooding in La Push and interfere with vessel traffic.

We are concerned about flooding to homes and businesses along these reaches as well, although this is a rural area and there are not a great number of them. In the Quillayute Valley as elsewhere, some of the best land often lies near rivers and tends to be settled first. Pasture land, barns, and family homesteads are vulnerable, especially where they coincide with the FEMA-designated “100-year floodplain” – the area

badly that they had to be condemned, and the streets around Old La Push Road were covered by several feet of water. SR 110 was briefly flooded as well. Once again the Corps, which is only authorized to act after an event and not prospectively, met with the Quileute Tribe, the county, and landowners to consider what else could be done. Some in-stream structures were planned and installed to help stabilize the bank and deflect current away from it, but the river is already in the process of dismantling those.

Over the past year, Clallam County DCD, North Olympic Land Trust, the Quileute Tribe, and Clallam County



Part of the project focus area just downstream of the Hwy 110 Bridge near Three Rivers. The area cross-hatched in blue is the 100-year floodplain as designated by FEMA. Image courtesy of Clallam County.

that will be inundated by the flood event having a one-percent chance of being equaled or exceeded in any given year.

Thanks to a gage installed at the State Route 110 Bridge near Three Rivers, we know that ‘flood stage’ on the Bogachiel at that site is 37 feet. Since 2002, the Bogachiel River has reached the flood elevation at least 19 times. Floods in 1999, 2003, 2006 and 2010 have threatened safety and caused property damage. Eric Carlsen, retired WDNR road engineer who now works with North Olympic Peninsula Lead Entity for Salmon, also recalls that on December 14, 1979, the river blew out a 1925 bridge south of Forks on US Highway 101 which is several miles upstream of Three Rivers (now called the Russell Barker Memorial Bridge after the trucker who lost his life when it collapsed).

In the 1990s, public resources were brought to bear in an attempt to tame the Bogachiel near Three Rivers. Clallam County and the Army Corps of Engineers armored a long stretch upstream of the SR 110 Bridge with a rip rap of very large boulders. The 2002 flood damaged several homes so

### Historical Crests for Bogachiel River near La Push

42.61 ft on 11/06/2006	38.45 ft on 12/10/2004
42.52 ft on 10/17/2003	38.16 ft on 01/17/2005
41.61 ft on 11/17/2009	38.12 ft on 11/20/2009
41.61 ft on 01/07/2009	37.50 ft on 01/11/2014
41.43 ft on 12/12/2010	37.50 ft on 01/11/2014
41.32 ft on 12/03/2007	37.44 ft on 01/15/2010
39.19 ft on 03/12/2007	37.32 ft on 11/12/2008
38.80 ft on 10/20/2003	37.13 ft on 01/11/2010
38.52 ft on 01/02/2007	37.04 ft on 11/15/2006
38.50 ft on 03/13/2003	

See also: <http://water.weather.gov/ahps2/hydrograph.php?wfo=sew&gage=bogw1>

Conservation District have initiated a new set of meetings to discuss options for working with the Bogachiel River more proactively. A first step would likely involve giving floodwaters in key locations more room to spread out without causing so much harm. We would also like to bring back riparian forests and install engineered wood jams where they could effectively serve multiple objectives.

Our area of focus is the meander section downstream of the SR 110 Bridge to Leyendecker Park, but this is subject to change and expansion. We intend to seek grant funding and work with willing landowners to acquire floodplain properties at fair market value and restore them to native habitat. Structures, septic systems, and utilities would be decommissioned, invasive vegetation such as Scotch broom, knotweed, thistle, reed canarygrass and Himalayan blackberry removed, and the area replanted in native riparian forest species. As of this writing, three properties in the affected area are available for sale. At least one of the parcels in the past has required flood protection; all are located in the 100-year floodplain.

We would appreciate hearing your perspectives, stories, concerns and ideas that would help us work with the Bogachiel River to achieve the best possible outcomes for communities and agencies affected by flooding and to improve



*When a river falls off of its channel and cuts across a meander bend to form a straightaway, the disconnected channel is left behind. These features are visible on aerial and LiDAR images and help FEMA define the 100-year flood plain. Image courtesy of the Quileute Tribe.*

habitat for fish. In the near term, we are also reaching out to landowners who are interested in planting forest buffers along streams and rivers on their property and re-establishing other kinds of habitat features.

There's no single solution to the complex problem of flooding, but where there are challenges, there are also opportunities. We invite your help and input as we further define our approach. Contact Cathy Lear at [clear@co.clallam.wa.us](mailto:clear@co.clallam.wa.us) or Frank Geyer at [frank.geyer@quileutenation.org](mailto:frank.geyer@quileutenation.org).

*Special thanks to Katie Krueger, staff attorney and policy analyst for the Quileute Tribe and NPC MRC member, for researching and spearheading this article and sourcing many of its photos.*



*Attempts to control bank erosion at the Al Kitchel property have met with limited success. Photo: Tami Pokorny*



*La Push also experienced severe flooding in 2003. Allowing floodwaters to spread out on a forested floodplain upstream may help reduce the peak stage of the flood downstream. Photo: Tony Foster, Quileute Chief of Natural Resources Enforcement*

# Students on the Shore

By Ian Miller and Dan Lieberman

The thin strand of beach between the Pacific Ocean and the dry land of the Olympic Peninsula is subject to extreme forces and is constantly on the move. This is obvious during massive storms, when waves and storm surges can completely reconfigure large sections of the beach in just a few hours. If you look closely, though, you can also see that the sand and cobble that compose the shoreline are on the move during even the relatively calm conditions between extreme events. This then begs the question: How is it that such a dynamic landscape can, in some cases, remain stable over long periods of time? Why do some beaches erode, and other don't? These questions are particularly important since beaches are often the only barriers protecting coastal communities from the raging ocean during storms. When those barriers fail, lives and property can be at risk. Furthermore, sea level rise and a changing ocean climate are expected to put a strain on the protective function of shorelines over the coming decades.

To get a handle on some of these problems Washington Sea Grant initiated a pilot shoreline morphology monitoring program in 2012 as part of its Climate Extension Program, with an initial goal of setting up 10-15 sentinel shoreline sites around the Olympic Peninsula. Shoreline morphology refers to the "shape" of the shoreline and includes the position, orientation and slope of the beach, the elevation of the beach berm, and the size of

grains composing the beach. While most of the west coast of the United States has had this sort of information available for years or even decades, there is little such data available for areas north of Point Grenville on the Quinault Indian reservation.

That is where Forks High school students come in. The Natural Resources Options Program at the Quillayute Valley School District connects high school students with natural resources professionals in order to help students accomplish their graduation requirements while providing them with real-world technical training and experience. A partnership between Washington Sea Grant, the Natural Resources Options Program and the North Pacific Coast Marine Resources Committee was established in order to get students working on the beach to help conduct surveys, collect needed information about the shoreline, and work with relevant equipment and scientific protocols. To date, surveys have been conducted on beaches managed by Olympic National Park and the Quileute Tribe.

Shorelines are surveyed using a special type of surveyor-grade GPS equipment, which works by having two GPS systems (a "base" and a "rover") communicating with each other. The base GPS is set up on a surveyed location and it sends a set of corrections out to the rover. Using this system, the position of the GPS rover can be accurately determined down to about one inch. The equipment is complex and expensive, but operating it is pretty straightforward. The surveys become a relatively simple matter of mastering the art of working "in the field" – staying focused and working to a set of instructions in a variety of weather conditions.

Since December 2013 students have contributed to surveys at multiple beaches on the west coast of the Olympic Peninsula, including Rialto, Kalaloch and First Beach. While the first few surveys comprise a baseline, over time as more surveys are conducted patterns about individual beaches emerge that will contribute to the management of shorelines and the resilience of communities in the face of ocean hazards.



*Example grain size photo from Rialto Beach. The ground scale in these photos can be used to automatically generate information about the size of grains on the beach - which can then be compared to data collected in future surveys. Photo: Ian Miller*



*Mario Bello collects beach topography information on Kalaloch beach. Photo: Ian Miller*



*A GPS Base Station set up on First Beach, La Push, WA. Photo: Ian Miller*



*Miguel Rodriguez learns how to log beach profile data in a high resolution RTK-DGPS system with Dr. Ian Miller at Rialto Beach. Photo: Daniel Lieberman*

## Clallam County Puts Price Tags on Nature

by Tami Pokorny and Cathy Lear

Clallam County took its first step towards formally assessing the worth of its coastal ecosystems in *Nature's Value in Clallam County*. According to the report, the goods and services produced by nature are called ecosystem services – the economic benefits that natural systems provide to people. These services underpin the economy on the most basic level – the air we breathe, the water we drink, the fish we catch. Understanding the economic value of ecosystem services (such as flood protection or clean water) is essential to good decision-making. The report states that, “...the natural landscapes along shorelines, and mountains provide a rich quality of life for county residents; benefits generated by diverse ecosystems serve as the foundation for the stable and growing Clallam County economy.”

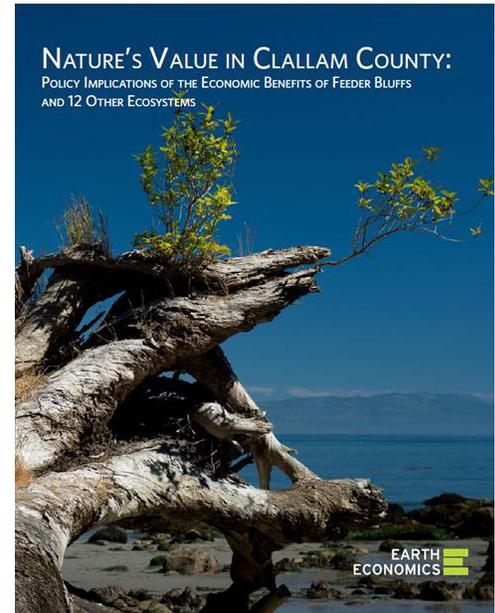
Ecosystem services valued in the report include the flow of sediment along the shoreline, wildlife habitat, carbon storage – particularly in wetlands and eel grass beds – and recreational and commercial fishing. A primary focus of the report was valuing the flow of sediment along the Strait of Juan de Fuca. The sediment, which travels and is deposited along the shoreline with the currents, provides nursery areas for fish and crab and, by nourishing and widening beaches at the base of tall bluffs, reduces the threat of landslides and property damage. The value of sediments that naturally erode from the tall “feeder” bluffs was calculated to be \$10-20 per ton of beach sediment. As a result, shorelines armored by concrete or rock have a diminished, and less valuable, flow of sediment. In fact, the sediment flux is less than half that of unarmored shorelines.

Shoreline areas include habitat for the smaller “forage” or “bait” fish near the base of the ocean food web, provide nursery areas for a wide range of species including Dungeness crab and salmon, store carbon in wetlands and seagrass, and contribute to climate stability.

The report also calculated a price for the services provided by forests and forest soils as carbon storage. In the US, the growth of forestland trees removes almost as much CO<sub>2</sub> as 135 million passenger cars emit. The value of Clallam County forests for storing carbon in the study area is estimated at \$314/acre/year totaling \$1.6 million per year.

Where natural processes are intact or well managed, forests and fisheries produce products that are considered fundamental to the economy and way of life for residents of the Olympic Peninsula. Coastline ecosystems are increasingly vulnerable to the impacts of development, climate disruption, and ocean acidification – which undermine business as usual in both the natural and human domains. Attempts to rescue development placed too close to the edge of bluffs may compromise habitat at the toe of the slope with bulkheads and seawalls that remove and degrade natural habitat for important bait fish and other species.

The report is a first step to understand the economic value of natural systems and the county hopes to refine the numbers when the opportunity arises.



## Veterans WCC Crews Remove Debris from Remote Beaches

by Liam Antrim and Chiggers Stokes

In the summer of 2011, Tony Petrillo spent ten days hiking the wilderness coast of the Olympic National Park. Like many before him, he returned home impressed by nature's beauty and disturbed by the amount of plastic and other marine debris he had seen. But instead of resignation, he chose action. Tony, who is a member of the Jefferson County MRC in Port Townsend, drafted a plan for remote beach debris cleanup and brought it before the North Pacific Coast Marine Resources Committee (NPC MRC) in early 2013. Options outlined in his plan included hauling debris out by land, by air, or by water and discussed pro's and con's: the land route takes lots of person power and time; the air and water options involve less human labor but intersect with government bureaucracy due to Park and Olympic Coast National Marine Sanctuary's (OCNMS) access restrictions intended to minimize wildlife disturbance and maintain the character of designated wilderness.

While the NPC MRC members discussed options for facilitating remote beach debris cleanups, a gift was delivered by the Washington State legislature.

Fully-funded veterans conservation crews working for Washington Department of Ecology's Washington Conservation Corps (WCC) were made available to the coast as part of this program to provide jobs and educational opportunities for Gulf War II era military veterans. Here was an immediate means of implementing part of Tony's plan. Debris removal from outer coast beaches has long been the mission of Washington CoastSavers. Hundreds of CoastSaver volunteers clean up beaches each April and September where they have safe access and can get out and back with loads of debris in one day's effort. The more remote "red zones" on CoastSavers maps were the logical targets for WCC veterans crews – places too challenging

to send untrained volunteers. These areas include Goodman to Mosquito Creek, Toleak to Scott's Bluff, south from Sand Point, and Duk Point. In late October 2013, a WCC veterans crew arrived at Neah Bay for their first assignment: to wrestle with debris on the far stretches of Shi Shi Beach and on the Makah Reservation. Aaron Parker, a Makah tribal member and employee, led the crew down unimproved trails to beautiful and remote shorelines fouled with debris.

The veterans crews' work on the outer coast has been coordinated and supported by OCNMS, the Makah Tribe, Olympic National Park, and NPC MRC members. OCNMS staff trained the crews to collect data on the types and weight of debris and to identify and respond properly to hazardous waste, Japan tsunami marine debris, invasive species on debris, marine mammal strandings, and sea star wasting disease.

Since that first visit last October, the crews have been out there for a total of eight weeks being chased by tides, slogging through mud and rain, and hauling heavy loads up steep bluff trails and out to the nearest road. Thus far, over a ton of plastic, foam, metal, rope and other debris has been gathered and removed from the marine environment by these WCC crews.

The goal is to keep the remote outer coast shorelines as regular destinations on the WCC veterans crews' schedules for the duration of their

funding—at least through June 2015. In addition to removing debris, the crews are documenting the locations of things left behind. Generally these are objects too heavy or awkward to haul out over trails. With time, the crews' data will be used to measure the cost effectiveness of this approach to remote beach cleanup. It is likely that a combination of approaches – volunteers, field-hardened crews, and boats or helicopters – will be required to keep our wilderness coastline from looking like a trash dump. In the meantime, the WCC veterans crews are a gift we are making the best use of, as often as possible.

"The AmeriCorps and Veteran Corps programs through the WCC allow environmentally concerned individuals to do



*This WCC crew included Edward Hueghs, Aurelio Elliott, Peter Fritzerald, Justin Bebee, and Mikeal No-Line (not pictured) and was led by Aurelio Elliott Aurelio of the WA Department of Ecology. Photo: Mikeal No-Line*



*Tony Petrillo.  
Photo: Peggy Myre*

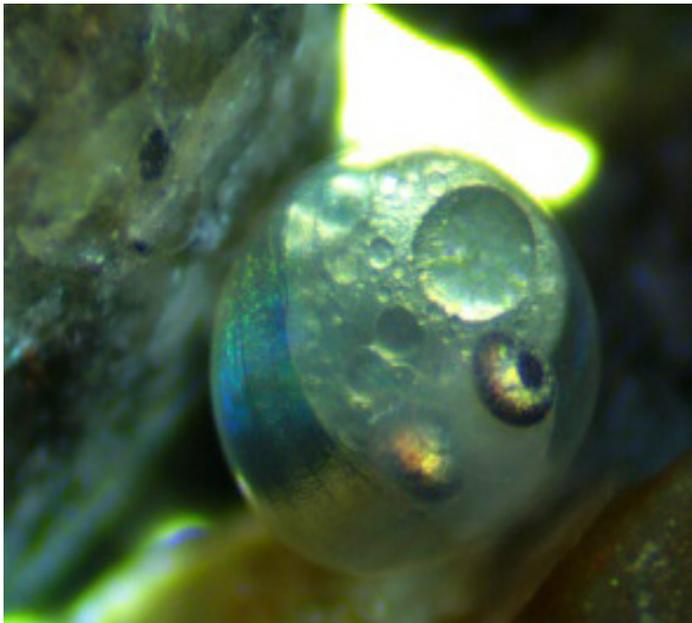
many things to improve the many unique habitats of Washington State. We have removed at least one ton of debris from the shorelines of our home state. This restoration work is vital to keeping our beaches clean and aesthetic. To put it almost bluntly, we pick up the ball while others toss the ball around waiting for someone else to score,” comments crew member Mikeal No-Line.

Coastal visitors are certainly benefiting from the labors of these dedicated crews. If you see them out there, express your appreciation for their hard work and service to our nation.

## Smelt Spawning Survey – New Findings

By Tami Pokorny, Jefferson County

A year’s worth of new information on smelt spawning across Washington’s Pacific beaches has now been collected and analyzed. While smelt spawning has been studied for more than 35 years in Puget Sound, data for the coast has been extremely limited. Smelt and other smaller “forage” or “bait” fish are important to our coast and the marine environment because these species convert zooplankton and other tiny food sources into a form of protein that fish, such as salmon, seabirds, and marine mammals can efficiently catch



*Smelt egg found near the Hoh River in March of 2014. Photo: Mariko Langness*

and eat. As in Puget Sound, spawning beaches on the Pacific are very vulnerable to the ravages of oil spills.

A team of researchers from WDFW and the Makah, Quileute, Hoh and Quinault tribes looked for smelt eggs on a monthly basis on beaches spanning the entire coast from

October 2012 to September 2013. Eggs were found at a total of 41 locations on the central coast, including 28 sites where forage fish spawning had not been previously documented. Eggs were found as far north as a site near Ellen Creek north of La Push and as far south as Wreck Creek between Grenville Bay and Moclips. The study also revealed that spawning begins a month earlier than expected (February) and continues each month through September. Not surprisingly, it also found that spawning activity peaks in June and July. Some beaches had signs of multiple spawning events beginning in late winter.

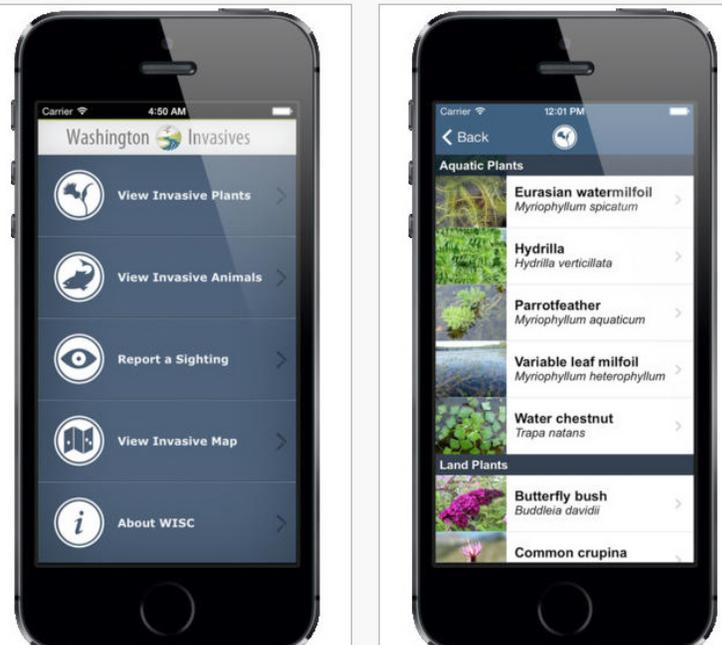
The team will continue to sample for another full year. “So far, our second year of sampling has allowed us to document additional smelt spawning sites and months. I expect that further sampling will continue to identify a broader spatial and temporal range of smelt spawning on the outer coast,” commented Mariko Langness, WDFW fish and wildlife biologist and project lead. Funding for this work was provided through a grant from DNR to inform Marine Spatial Planning. Visit [wdfw.wa.gov](http://wdfw.wa.gov) to download the full report (FPA 14-01).

## Mobile App for Invasive Species

A smart phone app is available now to help people identify and report invasive species. See below are the links to the “WA Invasives” apps, or use a keyword search with WA Invasives or WISC:

iOS mobile app: <https://itunes.apple.com/us/app/wa-invasives/id826772026?ls=1&mt=8>

Android mobile app: <https://play.google.com/store/apps/details?id=gov.wisc.wainvasives>





## The Future of the Coast Requires Planning

by Jennifer Hennessey

When you look at the Pacific Ocean, what do you see? Crashing waves, a sandy or rocky beach, maybe some fog, rain, or, if we're lucky, blue sky stretching out over the water. What else? Maybe you see a fishing boat, a container ship, a whale, a kelp forest, an offshore island, or a kayaker? While at times the ocean may seem vast or even empty, our Pacific Ocean is an important and busy place for lots of reasons and lots of people. But, how do we make sure that the way humans use the ocean now can coexist in harmony with new uses that may be proposed in the future like renewable energy and with the needs of the ecosystem? The simple answer is planning, or marine spatial planning.

Planning brings together and collects a wealth of important data on the natural resources, human activities, and proposed new uses to plan for and guide new uses. The aim of planning is to minimize conflicts and protect important resources and uses while allowing for new opportunities. A plan also helps different levels of government have the same information and analyses available to inform their decisions without adding regulations.

Planning brings together people – diverse interests, coastal communities, science, and governments – to understand perspectives, to build data and information, and to inform options. One way is through the Washington Coastal Marine Advisory Council, on which coastal Marine Resource Committees all have a seat. But, there are other ways for citizens to learn about and inform planning. Meetings, forums, workshops and public comment periods are also important parts of developing a plan.

Washington agencies are continuing the development of a marine spatial plan for Washington's Pacific Coast over the next year. Your involvement and input is important to help shape the future for the coast.

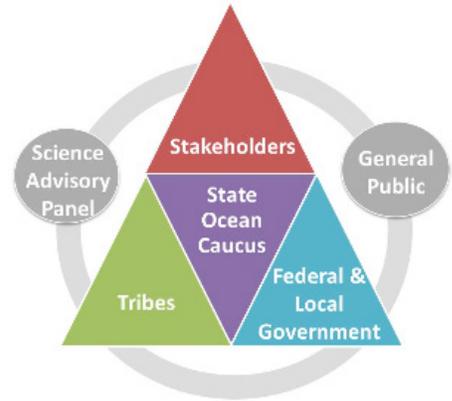
To find out more about Marine Spatial Planning, visit our website at: [www.msp.wa.gov](http://www.msp.wa.gov). On the website, you can:

### Get Involved.

Sign up to get updates by email, read news updates, ask a question, and check out the calendar to learn about upcoming events or public comment periods.

View data and interactive maps. Look at information on places that are used for different activities and on location of natural resources and coastal processes.

Learn more about the planning process. Review recent planning documents and project reports.



*A very special seal invites you to explore life along the North Pacific Coast. Photo: Florian Graner*

## A Film Dedicated to Coast Kids

Local kids will soon have an opportunity to explore their back “yard” through the eyes of a harbor seal in *Discover the Olympic Coast: A Seal's Tour*. *Tour* was filmed and produced by Florian Graner of Sealife Productions. It's directed towards younger ages but contains images and information of interest to everyone. The film will be available to local schools during the 2014-15 school year and shown next April at the River & Ocean Film Festival in Forks.

## 2014 WA Coast Cleanup Covers New Ground

Another ten tons of marine debris has met its match during the Washington Coast Cleanup this April 19 thanks to the dedication and perseverance of more than a thousand volunteers who, despite the wind and rain, refused to let the opportunity to help restore beauty and health to our state's glorious Pacific beaches slip away. For the first time, the cleanup not only spanned the entire Pacific Coast but also wrapped into the Strait of Juan de Fuca as far east as Port Townsend. "I'm always amazed at the tenacity of our volunteers, they are an inspiration for those of us who want to support active stewardship of our marine environment," remarked Jon Schmidt, Washington CoastSavers coordinator.



*A huge thank you to all the volunteers, partners and sponsors who made this Washington Coast Cleanup successful! Photo: Nancy Messmer*

### MARK YOUR CALENDARS

**International Coast Cleanup**  
September 20, 2014

**RainFest River & Ocean Days**  
Week of April 20, 2015

**The WA Coast Cleanup**  
April 25, 2015

The weight of debris collected from individual dumpsters was also reported by location for the first time. The resulting data will be entered into the West Coast marine debris database to give scientists a better idea of where debris accumulates and how to focus future cleanup efforts. A portion of the collected debris was set aside to be incorporated into future marine debris art installations.



*The new CoastSavers display. Created and photographed by Jon Schmidt.*

CostSavers received funding from the Grays Harbor and North Pacific Coast MRCs which they used as match for a \$16,000 Hollings Grant from the National Marine Sanctuary Foundation to implement marine debris cleanups and create a traveling exhibit called "Bottles, Foam and Rope: Talking

Trash on the Washington Coast". The new exhibit was on display at the Forks High School during RainFest and will be installed at the Coastal Interpretive Center in Ocean Shores for the summer. Its purpose is to increase the public's awareness of the dangers of marine debris.

## MRCs Gather in Cathlamet: Wahkiakum County MRC Hosts a Great Summit

by Katie Krueger

Every year the MRC Summits get better and better. This is no reflection on the past efforts. It's a reflection on us – as we get smarter, have a better idea of what we are about, understand how we can work together, and build partnerships. Special thanks for the successful event, held November 7th -9th, are due hosts Carrie Backman, Carol Ervest, Wahkiakum County MRC, and the entire Cathlamet community, as well as Casey Dennehy and the Surfrider Foundation. It helps us so much when large organizations lend their expertise, connections, and time to connect us with such a fine suite of speakers. We couldn't do what we do without them. Several of the presentations can be viewed at: <http://surfriderwashing-toncoast.blogspot.com/2013/11/2013-coastal-marine-resource-committee.html>.

The Summit opened with a close look at how to run effective meetings and facilitate group decision making. Afterwards, there was a casual gathering at Tsuga Art Gallery where folks from the different MRCs and other attendees had a chance to interact and learn about each other. Day 2 began with each attending MRC presenting a summary of



Jennifer Hennessey, Kim Van Zwalenburg, Cedar Bouta (Ecology), and Cathy Lear (Clallam) field questions about Shoreline Master Program updates. Photo: Katie Krueger



The meeting site for the Summit was the historic Pioneer Church. Photo courtesy of Wahkiakum Chamber of Commerce

its activities over the past year. This was followed by a presentation of Columbia Fishing Regulations and Impacts on Coastal Fisheries by Mike Burner, salmon staff officer of the Pacific Fisheries Management Council

(PFMC). Tom Kollash and Eric Delvin of The Nature Conservancy and Rich Osborne presented the Washington Coast Restoration Initiative – an effort by many organizations and agencies on the coast to secure funding from the legislature for ecosystem restoration projects.

Some of us have been active in our respective county's Shoreline Management Plan (SMP) Update but there were still new aspects to learn. The state does not yet require counties to include climate change in their plans, but Clallam got a grant from EPA to do just that. Cathy Lear, habitat biologist at Clallam County, will be glad to share with other counties what Clallam learned (see article, page 5).

The final day, began with a series of related talks on ocean acidification by Eric Swenden of the Global Ocean Health Program, Mike Rust of NOAA, and Brad Warren (Global Ocean Health Program and member of Washington's 28-member Blue Ribbon Panel on Ocean Acidification). "Ocean acidification" describes a process of ocean water becoming corrosive as a result of absorbing nearly a third of the carbon dioxide released into the atmosphere from human sources. There is now direct evidence that corrosive waters upwelling along the U.S. Pacific Coast are causing harm to the sea creatures at the base of the marine food chain – by dissolving their shells. Marine snails, called pteropods, provide food for pink salmon, mackerel and herring.

Dr. Rust described the shallow coastal seas around continents as a necklace of growth where marine vegetation can help us lessen the effects of ocean acidification in some areas. In another presentation, Brad Warren pointed out that salt marsh buries more than ten times as much carbon per acre per year than the Amazonian rainforest. But the situation is subject to change with sea level rise – can our land use practices adapt to help ensure that there will be room for salt marsh to move uphill?

A presentation by Dr. Angel White, a microbiologist at Oregon State University, focused on the Pacific Plastic Gyre – which is not a giant plastic island, but an extensive area where fine plastics accumulate. The plastics are so fine and widely dispersed, however, that they are not readily visible. She also discussed where plastic is accumulating on the sea floor and what common plastic materials are the biggest contributors to the problem.

The meeting closed with a superb presentation on hatchery science and reform by hatchery expert biologists Andy Appleby, formerly with WDFW and now with D.J. Warren Associates, and Steve Smith of the Hatchery Scientific Review Group. I confess that despite working off-and-on with our hatchery biologists at Quileute for over ten years in various tangential ways, I never understood the way hatchery influence on natural fisheries was

calculated. This presentation gave clear formulas for it and rationales for these formulas; and I encourage everyone who needs to understand this subject to go to those online presentations.

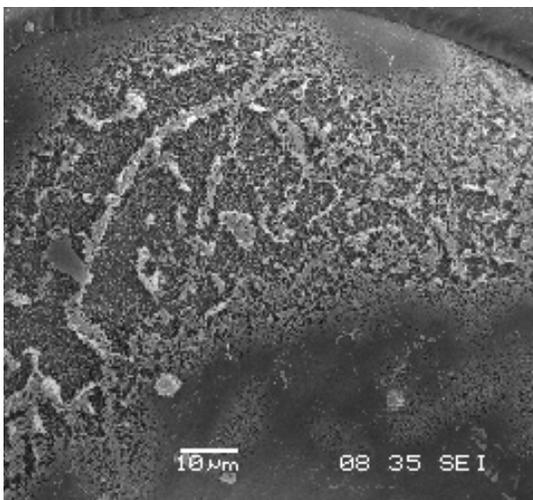
It was amazing how many broad issues the MRCs have in common. All of us are concerned about public education, marine science in the school systems, heightening awareness of the issues such as climate change and its impacts on our shorelines and fisheries. Many MRCs are dealing with marine



*Dr. Mike Rust, science coordinator for NOAA's Aquaculture Office, presents information on mitigating ocean acidification during a session at the Pioneer Church in Cathlamet. Photo courtesy of Surfrider Foundation.*

debris, a chronic problem made worse by the tsunami in Japan. And all of us want to assure a healthy economy with sustainable fisheries. What made last year's Summit special, in this writer's opinion, was the focus on solutions to problems or alleviation of fears on matters many view as insurmountable: rising ocean acidification, or plastics in the North Pacific Gyre.

## Ocean Acidification Damaging West Coast Marine Snails.



*Image from a scanning electron microscope of dissolution of a pteropod shell. Photo: NOAA*



*(Left) A healthy marine snail called a pteropod. Photo: NOAA*



*(Right) A wild caught pteropod with signs of damage from ocean acidification. This year, NOAA scientists published the first direct evidence that the shells of marine snails in the natural environment along the U. S. West Coast are dissolving. By 2050, coastal waters are on track to become 70 percent more corrosive than pre-industrial times due to human caused acidification from the release of CO<sub>2</sub>. Photo: NOAA*

# RainFest

## River & Ocean Days:

April 16 – 20, 2014

## THANK YOU, FORKS!

The NPC MRC joined with the West End Olympic Arts Council (WOCA), the Piece Maker Quilt Club, the West End Art League and many other local partners to expand RainFest this year to include new events and activities in the form of "River & Ocean Days". The weather graciously threw in extra wind and rain for good measure.

It all began Wednesday evening with a drum circle in La Push, followed on Thursday by an amazing art display and jazz at JT Sweet Stuff, and continued on Saturday with the Washington Coast Cleanup, all along the coast as well as several activities in downtown Forks. These included a book giveaway at Peninsula College and an umbrella decorating workshop with a marine twist leading to a children's parade down Main Street to the ground breaking ceremony at the new arts center. This was followed by sidewalk chalk art at JT Sweet Stuff and an Easter egg hunt at Tillicum Park. That evening, about sixty people enjoyed river- and marine- themed films at the inaugural River & Ocean Film Festival organized by Washington Sea Grant at Forks High School. Booths and exhibits from Stream Keepers, The Nature Conservancy, Pacific Coast Salmon Coalition, CoastSavers, and the MRC were on display in the lobby. On Easter Sunday, River & Ocean Days concluded with a pancake breakfast at the Elks Lodge.

Thank you, Forks, for this wonderful opportunity to support stewardship of the coast and to build awareness of the MRC and its activities. A huge thank you goes out to everyone who helped make it happen. We'd especially like to thank:

\* **Carl and Staci Chastain** - We think the rain wouldn't know which way to fall without you! Thank you for taking on - well, just about every-

thing - with such good humor, patience and creativity.

\* **Ian Miller** - for orchestrating an amazing inaugural film fest complete with the biggest bag of popcorn we've ever seen.

\* **Forks High School** and the district office - for your fabulous auditorium, making us feel so welcome and fielding countless questions and special requests.

\* **Teacher Wendy Bennet**, students and interns for creating a simply beautiful marine art sculpture.

\* **Teacher John Hunter**, for taking time to help host the film fest and, probably, a dozen other things.

\* **Rod Fleck** for officiating at the ground breaking ceremony. We look forward to including the new arts center on the schedule of events next year!

\* **Chiggers Stokes** for the ancient wood exhibit and serving as projectionist at the film fest.

\* **NPC MRC interns**, Mario Bello, Miguel Rodriguez, Julian Ortiz and Christian Martinez for their art and displays at the film festival.

\* **First Federal Bank and WDFW** for contributing funds to help support these events.

\* **STR8 Jacket T's** for a wonderful new street banner.

# RIVER OCEAN FILM FESTIVAL



*River & Ocean Film Festival attendees gather around The Nature Conservancy table during intermission. Photo: Katie Krueger*



The beautiful Marine Art Glass Sculpture created by Wendy Bennett and her art students. The box was assembled by Julian Ortiz of the Pacific Coast Salmon Coalition. Photos: Tami Pokorny and Carl Chastain

*Celebrating the arts and environment in the heart of the rainforest.*



North Pacific Coast MRC  
 c/o Tami Pokorny  
 JCPH 615 Sheridan Street  
 Port Townsend, WA 98368

**NPC MRC**

Tami Pokorny  
 Coordinator, Editor  
 Jefferson County Water Quality  
 615 Sheridan Street  
 Port Townsend, WA 98368  
 Phone: 360-379-4498  
 tpokorny@co.jefferson.wa.us

- Steve Allison (Hoh Tribe)
- Katie Krueger (Quileute Tribe)
- Dana Sarff (Makah Tribe)
- Rod Fleck (City of Forks)
- Tami Pokorny (Jefferson County)
- Cathy Lear (Clallam County)
- Roy Morris (Citizen 1, Clallam)
- Rich Osborne (Citizen 2, Clallam)
- John Hunter (Citizen 3, Clallam)
- John Richmond (Citizen 1, Jefferson)
- Chiggers Stokes (Citizen 2, Jefferson)
- Jill Silver (Citizen 3, Jefferson)



Printed on 30% Post Consumer Waste Recycled paper

**Ship News:**

Track ships around the world in real time at this website: <http://www.marinetraffic.com/ais/home>. Click on a vessel's icon for a photo and more information about the vessel such as name, speed and course, destination, flag, ship type, size and draught or call up the vessel's track.

Flag: Liberia	Ship Type: Cargo - Hazard A (Major)
Length x Breadth: 282m X 32m	Draught: 10.5m
CALL SIGN: A8EW2	IMO: 9248083
Received: 9 minutes ago (AIS Source: 119 Columbia River Bar Pilots) Status: Underway Speed/Course: 15.1kn / 22° Destination: TACOMA ETA: 2014-06-11 06:30 (UTC)	<ul style="list-style-type: none"> <li>• Show Vessel's Track</li> <li>• Distance to...</li> <li>• Itineraries History</li> <li>• Position History</li> <li>• Port Calls</li> <li>• Nearby Vessels</li> <li>• Add to My Fleet</li> </ul>

[Vessel's Details »](#)