8th Annual

Heceta Head Coastal Conference

"Oregon's Ocean: Bringing the High Seas Home"

Florence Events Center ~ October 26 & 27, 2012

SUMMARY OF CONFERENCE PROCEEDINGS

Friday, October 26

Dinner with Cylvia Hayes

"Healthy Ocean, Healthy Economy, Healthy Oregon"

One third of the world's fisheries are in a state of depletion and decline. Importantly, Oregon fishers have been national leaders in sustainable fisheries management, with four fisheries receiving Marine Stewardship Council (MSC) certification. Oregon has also established a system of marine reserves to revive fish populations.

Oregon's coast and beaches are under constant assault from plastic trash but we have added insult to injury with the Japanese tsunami debris headed our way on the currents of the Pacific. As much as 1.5 million tons is still afloat and headed our way.

An emerging threat is increasing acidity of our oceans, which has risen by 30% as a result of carbon dioxide emissions from burning fossil fuels. This problem is exacerbated in the Northwest because we have a uniquely structured seafloor and system of ocean currents that brings older water to the surface and this older water has absorbed an unusually high level of carbon. If acidity levels become too high it eats away the shells of oysters and other shell-bearing creatures that comprise the foundation of the food web.

Oceans are facing some big challenges and beyond individual and state actions, what's needed is a new economic model -- one that increases prosperity while preventing environmental damage and reducing carbon emissions. This clean economy includes renewable energy, energy efficiency, green building, clean transportation and environmental protection fields. Studies show that more than 500,000 Pacific Coast residents are cashing full-time clean economy paychecks right now.

The Clean Economy is producing jobs faster and paying better than conventional economic sectors. Over the next ten years, the transition toward a cleaner economy could generate one million net new jobs, and an economic contribution of $143 billion.

Healthy oceans have a special role to play. As world population climbs toward ten billion people the need for sustainable seafood products and renewable ocean energy resources will only grow in importance. And the oceans' role in regulating our climate will be more important than ever.

Economic *recovery* is the wrong goal. Recovery has a sense of going back to the way things were. But the way things were haven't really been working for quite some time. Many of our rural communities have never recovered from the recession of the 1980s. Over the past 20 years the GDP might have been growing but so were carbon dioxide emissions. Unemployment was low but more and more of those jobs failed to pay a living wage.

We don't need economic recovery. We need economic *reinvention*. This kind of reinvention and bold innovation is in our American cultural DNA – it's what we do best. We can do it again, now, by meeting the tremendous global need for sustainable seafood, energy and forestry products.

Cylvia Hayes, Oregon's First Lady, returned only the day before the Conference from a trip to Asia with Governor Kitzhaber. Her spirited and entertaining presentation reflected her background, including: 22 years of professional experience in sustainable economic development, clean energy, workforce development, green building, and waste prevention. Cylvia is the founder and CEO of 3EStrategies, a clean economy consulting firm; is a Fellow of the Washington, DC-based, Clean Economy Development Center, the Center for State Innovation, and the American Leadership Forum; and has expertise in collaborative leadership skills.

[For viewing a video recording of her talk, see Channel 10, Public Television, Florence]

Marine Debris Art *The Conference sponsored an Art Contest to raise awareness of marine debris. Five works were submitted and displayed at the dinner. All artists will be given complimentary registration to next year's Conference.*

Saturday, October 2 **Presiding** -- Stephen Brandt, Director, Oregon Sea Grant

"Oregon's Coastal Communities: Challenges and Opportunities"
Representative Arnie Roblan, State Legislature

Inspired by the State Legislative Leadership forum back in March, Co-Speaker Roblan decided to convene the first annual ***Oregon Coast Economic Summit*** in May, as he stated, "to bring federal, state and local officials, policy stakeholders, small business leaders, economic development professionals, local government and coastal community leaders -- all in the same room together."

Representative Roblan, nationally recognized as one of eight "2012 Public Officials of the Year" by Governing Magazine, explained that the purpose for the summit was "to have the kind of conversation that focused on bringing jobs back to the coast and rural communities – those communities that are being left behind" in the greater Pacific and natural resource economy.

During the keynote address, Speaker Roblan shared with audience what Thomas L. Friedman and Michael Mandelbaum called "The Five Pillars of Prosperity" from their new book "*That Used to Be Us*." Speaker Roblan stated the authors' premise on the "five pillars that together constitute the country's own version of a partnership between the public and private sectors to foster economic growth." He then expanded on these five interrelated *Pillars* to highlight how the Oregon Coast interaction with the wider Pacific Northwest will usher in a more dynamic economy in support of marine research and coastal management.

These pillars include: 1) public education; 2) modernizing our infrastructure; 3) immigration; 4) government backed research and development; and 5) regulation of activities. Roblan said that together, these five pillars will help us preserve the economic contributions of rural and coastal Oregon, while continuing to maintain a way of life that is vital to commercial and recreational fishing communities.

As Oregon rebuilds from the global recession, Roblan concluded that we are faced with choices that will lead our coastal communities on a path back to economic prosperity – one that focuses on making the right investments to rebuild our state and rural communities. Roblan stated that while he recognizes the need to improve our understanding of nearshore ecosystems and advance marine research, accommodating new uses of the ocean -- marine reserves, undersea cables, wave energy -- a system designed in collaboration with Oregon fishermen and Timber communities is the only way to create realistic solutions.

"**Across the Wide North Pacific"**
Jack Barth, Professor and Associate Dean for Research
College of Earth, Oceanic, and Atmospheric Sciences, OSU

Oregon's coastal waters are linked to the entire North Pacific ocean and the atmosphere above. The ocean circulation and water properties are forced by the atmosphere, mostly through direct wind forcing. During summertime off the Oregon coast, winds are from the north – oceanographers call these "southward" winds – and drive surface currents southward and offshore due to the rotation of the earth. As surface waters move offshore, they are replaced from below by cold, salty, nutrient-rich, and low-oxygen waters from depth. When the nutrient-rich waters upwell into the sunlit upper ocean near the coast, large phytoplankton blooms occur and fuel the base of our productive Oregon coastal ocean ecosystem.

In winter, winds are from the south and force currents to go swiftly to the north, offshore surface waters to approach the coast, and the lack of nutrients (and limited light) result in little phytoplankton productivity.
The fastest phenomenon to cross the North Pacific Ocean are tsunami waves forced by earthquakes. These waves travel at the speed of a jet airplane (~500 miles per hour) and can cross the North Pacific, which is about 5000 miles wide, in about 10 hours.

Tsunami debris swept out to sea after the March 11, 2011, Great East Japan Earthquake off northern Japan is carried by the Kuroshio and North Pacific Currents toward North America. Along the way, much of the debris can sink, through becoming water logged or being weighed down by biological growth. Much of it will head into the North Pacific Garbage Patch, that region of weak currents north-northeast of Hawaii. Using an average speed of the North Pacific Current, 7 miles per day, the tsunami debris is expected to reach the U.S. west coast in about 2 years (5000 miles at 7 miles per day = 714 days). Because some debris, notably the large floating dock that reached Newport, Oregon, on June 6, 2012, arrived earlier indicates that the west-to-east winds must have helped push the debris. For a typical 10-knot (12 miles per hour) wind, just 2% windage will double the speed of the drifting debris and cut the time to reach the U.S. west coast in half.

Waters that upwells off Oregon in are from about 150 m depth from seaward of the continental shelf break, about 20-35 miles offshore. These dense waters travel to this location off Oregon from their formation region in the northwest North Pacific. The water takes two paths, one heading east directly toward the U.S. west coast following a northern path. The other path is convoluted and involves the water heading south, then west, before heading north along the U.S. west coast in the California Undercurrent. The deep water found off Oregon is a mixture of these two pathways. It takes decades for the water to reach Oregon since subsurface water velocities are so slow and the pathways are long. Since the waters are "old" when they arrive off Oregon, they are low in oxygen and high in carbon dioxide (the high carbon dioxide leads to low pH, or increased ocean acidification). When these deep "old" waters are upwelled to the surface off Oregon, they contribute to the low-oxygen and low-pH found off our coast.

"**3 and 200: 2 Ocean Jurisdiction Numbers to Remember"**

Richard Hildreth, Kliks Professor of Law, and
Director of Ocean & Coastal Law, U of O

U.S. governmental ocean resource management roles are best understood in terms of two numbers, 3 and 200. Under the international law of the sea the U.S. controls all living and non-living resources within 200 nautical miles of our coast. And Congress has chosen to make coastal states like Oregon the primary resource manager within 3 nautical miles of the coast.

Furthermore, for a variety of ocean uses taking place between 3 and 200 miles offshore, Congress has enacted separate laws governing fishing, marine mammal protection, offshore oil and gas, offshore wind energy and marine pollution that place the state in different shared decision-making arrangements with the federal government depending on the particular use involved. And for wave energy development occurring any distance off the coast of Oregon and other states, Congress has made the Federal Energy Regulatory Commission (FERC) the lead decision maker.

Despite this complicated legal framework, the state and coastal residents, often allied with California and Washington, have been quite successful in projecting their interests offshore on major ocean policy questions affecting the state.

"What Causes Variation in the Abundance of Crabs?"

Alan Shanks, Professor, Oregon Institute of Marine Biology

For 11 years (1997-2001, 2006-2011) daily abundance of *Cancer magister* megalopae has been measured in Coos Bay, Oregon. From 1997 through 2006, settlement season catch(April through September) varied from 2000 to 80,000 megalopae. In 2007, the settlement season catch jumped by > 10 times and has varied from 164,000 to 2.3 million megalopae.

The step change from lower to much higher catches appears to be related to the regime shift in the Pacific Decadal Oscillation (PDO), higher annual returns tend to occur during periods of negative PDO. During periods of both lower and higher catches, the annual return of megalopae was significantly negatively correlated to the day of the year of the spring transition and positively correlated to the amount of upwelling during spring and early summer.

The size of the commercial catch lagged four years to allow for growth of the megalopae into the fishery is set by larval success as measured by the number of returning megalopae; the relationship is parabolic. At return

rates between ~2000 and 100,000, the population is recruitment limited; the commercial catch varies directly with the number of returning megalopae. At higher return rates, density dependent effects predominate and set the size of the commercial catch. If the recent very high return rates are due to a PDO regime shift, then for years to decades the commercial catch may be set by density dependent effects following settlement and the huge numbers of returning megalopae may impact benthic community structure.

"Radionuclide Transport in the No. CA Current Food Web: Impacts of Fukushima & Migratory Albacore Tuna"

Delvan Neville, OSU Radiation Health Physics PhD Candidate

[Names attached to the study: Delvan Neville, Richard D. Brodeur, A. Jason Phillips, Kathryn Higley, contamination into the environment.]

With the predominant wind and current flow in this part of the North Pacific, these radionuclides will gradually spread to the US West Coast waters after a suitable period of time, raising concerns on whether this will affect this ecosystem or food safety (humans). In addition to the passive transport by currents and winds, the migratory pathways of large pelagic fish extend from Japan to the Northern California Current.

These organisms can serve as transport vectors for these nuclides, given their capacity to concentrate radionuclides from surrounding waters and prey. We are examining the amount and distribution of important radionuclides in the Northern California Current ecosystem from the plankton to larger fish based on archived and post-accident organisms.

In particular, we focus on albacore tuna as a target species that migrates across the North Pacific Ocean feeding throughout its range and is commercially important along the U.S. West Coast. By predicting the radio-biologic stress (if any) for a managed species as more Fukushima-related radionuclides are up-taken, appropriate action may be taken before significant population effects have occurred. Determination of natural background concentrations and high quality transport models produced from these data also aid in management in the event of a future accidental release, and in regulating safe activity releases.

"Understanding Ocean Use and Users"

Flaxen D. L. Conway, Marine Resource Management Program,
College of Earth, Ocean and Atmospheric Sciences, OSU

"Understanding Oregon's ocean use and user's interest, awe, excitement, and concern: all themes that emerge from descriptions of the ocean – our public space and place. Ask the public about the ocean and they might talk about how vast it is or their most recent coastal vacation when they spotted a whale from Cape Perpetua or the sunset from Cape Arago.

Ask potential ocean industrial users and they'll describe a place filled with new opportunity and potential benefits. Ask existing commercial and non-commercial ocean users about the ocean and most will tell you that it is a big, wild, and yet busy place that is starting to feel increasingly more complicated, crowded, and regulated despite how much we still don't know.

This is where science comes in… specifically human dimension science. Human perspectives and realities can and are being discovered and captured via social, cultural, economic, legal, historical, and political research. This science can and should be used by current and potential ocean users to aid in coastal and ocean resource planning and decision-making.

Despite the fact that we need human dimension science and it's certainly helpful, most folks are unfamiliar with how to use it. This presentation shares products and lessons learned from a few different state and federally-funded research projects, including a recent nationwide project regarding how ocean users characterize their use of ocean space and place and what we can learn about existing conflict resolution and cooperation needed to survive and thrive out there.

But more importantly, it reminds us that the ocean is a peopled seascape and all of us can participate in and use human dimension science. If we do, we will better understand and plan communication strategies that engage stakeholders and the public in trade-off decision making that avoids conflict and maximizes benefits for everyone.

Student Poster Session ~ Students at Oregon's Universities submitted 33 Posters.
Abstracts available at this Web site.

Panel 1 – Hypoxia and Ocean Acidification in the Pacific:

"Understanding the Science of OA"

Francis Chan, Assistant Professor, Department of Zoology, OSU

Oregon's coastal oceans encompass some of the world's most productive ecosystems. At the same time, emerging scientific information point to the development of zones of low oxygen and increasing acidity in our coastal waters. In some areas, oxygen and acidity changes have already reached levels that can cause harm to marine life.

For Oregon and other ocean states, understanding the connections between low oxygen and ocean acidification, why such changes in ocean chemistry are occurring, what impacts such changes will have and what actions should be taken is critical. In this conference, Chan examined these questions and the role that Oregon marine science is playing at the forefront of this national and global ocean health challenge.

"How Growers Are Dealing with OA"

Alan Barton, Pacific Shellfish Association

GREETINGS FROM THE COAL MINE: A SUMMARY OF THE U.S. PACIFIC COAST SHELLFISH INDUSTRY'S ATTEMPTS TO MAINTAIN PRODUCTION IN THE RAPIDLY ACIDIFYING WATERS OF THE PACIFIC NORTHWEST

Dramatic mortality events observed in commercial shellfish hatcheries since 2007 have led to a significant decrease in seed production, and pose an ongoing threat to the Pacific Northwest shellfish industry. Recent research conducted at Whiskey Creek Shellfish Hatchery in Netarts, Oregon indicates a strong correlation between these mortality events and the intrusion of upwelled, acidified seawater into historically productive bays along the Oregon and Washington coast (Barton et al, 2012).

Summertime upwelling in the Pacific Northwest is a natural process, bringing deeper, highly respired water masses to the surface. In addition, nearshore waters in the Pacific Northwest naturally have a low carbonate saturation state, making this region particularly susceptible to the effects of ocean acidification (Gruber et al, 2012).

In recent years, a threshold has been crossed- summertime upwelling events have brought *highly* acidified waters into the nearshore environment along the Oregon coast (Feely et al, 2008), posing a direct threat to the survival of sensitive calcifying species in the region.

To address this emerging problem, the Pacific Coast Shellfish Growers Association (PCSGA) has developed a monitoring network in coastal regions of commercial importance to the industry, with the expressed goal of restoring larval production in the face of increasingly challenging seawater conditions.

These efforts have greatly increased the industry's understanding of seawater carbonate chemistry, and careful water quality monitoring, along with the use of commercial scale water treatment systems, has restored a significant amount of production in hatcheries, and improved the supply of oyster seed to growers throughout the region.

Nevertheless, predictions for the acidification of surface ocean waters in the next 20-30 years are grim, particularly in upwelling regions similar to the Pacific Northwest.

These changes will likely have dramatic consequences for the Pacific Northwest shellfish industry, and the production failures already observed at Whiskey Creek make the hatchery a proverbial 'canary in a coal mine' for the effects ocean acidification may have on shellfish species around the world in the decades to come.

"WA Blue Ribbon Panel on OA"

Brad Warren, Sustainable Fisheries Partnership and
Director, Global Ocean Health Program, SFP/NFCC

Biting Godzilla: How shellfish producers, scientists, and coastal states are ganging up on ocean acidification

Shellfish producers in Oregon and Washington have been the first to suffer serious losses from ocean acidification and know it. Because they were able to deploy monitoring systems and document impacts, lessons from the "seed crisis" in the region's shellfish aquaculture industry have spread across the continent, germinating both scientific and policy initiatives.

At the request of shellfish growers and treaty Indian fishing tribes, Washington Gov. Gregoire last winter created a Blue Ribbon Panel on Ocean Acidification, believed to be the first initiative of its kind. The panel is due to release its recommendations on November 27, 2012. Despite limited jurisdiction over the global CO_2 emissions that are the primary driver of acidification, the panel has found ample room for maneuver. State and local actions can reduce harm, control local waste streams that aggravate acidification and related chemical changes, and strengthen capacity to understand and begin to manage the consequences of acidification for shellfish production and marine ecosystems.

Now California has tasked a standing scientific advisory committee to prepare their own recommendations to address the problem. Virginia is funding a chemical monitoring initiative to help shellfish hatcheries cope with severe larval mortality in Chesapeake Bay associated with changes in seawater chemistry. In May 2012, Alaska's legislature responded to appeals from seafood producers and appropriated $2.7 million for ocean acidification research and monitoring. Other states are expected to follow with their own initiatives to confront acidification.

Panel 2 – Tsunami Debris:

"Overview of Tsunami Debris Background and Response"

Rick Brown, Captain (Ret), NOAA

Federal agencies have various programs and authorities to address the problem of marine debris, including reducing risks to navigational security, mitigating hazardous wastes and pollutants, monitoring, and collecting and sharing data. Federal agencies are fully engaged and taking extra steps to address Japanese tsunami debris, in partnership with States and local governments, tribes, and other local stakeholders, beyond traditional measures already in place to respond to marine debris.

In addition, NOAA and other Federal agencies are working with States and local communities to develop contingency plans, which will include guidance and protocols for the mitigation of marine debris that pose a hazard to navigation, substantial threat of pollution, and adverse impact to public safety or health. This presentation provides descriptions of the event and the Federal agencies' roles and authorities to address Japanese tsunami debris.

"Invasive Species & Tsunami Debris"

Jessica Miller, Hatfield Marine Science Station, OSU

The tsunami that was generated as a result of a magnitude 9.0 earthquake off the coast of Japan on 11 March 2011 resulted in devastating loss of human life and extensive damage to infrastructure. A large floating dock (66' x 19' x 7') that was torn from its pilings in Misawa, Japan during the tsunami arrived at Agate Beach, Oregon in early June 2012 and has focused concern in regard to the tsunami debris. A diverse community of marine life was found on all sides of the dock (>90 species overall). The community included species commonly observed on oceanic floating debris, such as pelagic barnacles (*Lepas* sp.), but there were also many other intertidal and subtidal species on the structure that are not currently present in Oregon.

With the assistance of numerous taxonomists, at least 12 species known to be invasive in other regions of the world have been identified including the European blue mussel, *Mytilus galloprovincialis* (an invader of Japan

itself), the Asian brown seaweed (*Undaria pinnatifida*), the Asian shore crab (*Hemigrapsus sanguineus*), the Japanese seastar (*Asterias amurensis*), the Asian pink barnacle (*Megabalanus rosa*), and a small tubeworm, (*Hydroides ezoensis*).

Additionally, we collected other mollusks, cnidarians, foraminiferans and echinoderms. Currently, we are summarizing the taxonomic identification and life history information for animal species collected from the dock; developing a digital on-line library of biota associated with the dock (and potentially other tsunami debris); determining the size structure of the European mussel and other abundant species on the dock; and completing preliminary structural and chemical analysis of bivalve shells to examine their growth history during transoceanic transport.

Additional efforts to better understand the delivery of species associated with the tsunami debris are on-going at university, state, and federal levels.

"Community Response & Volunteer Engagement"

Charlie Plybon, Surfrider Foundation

In January 2012, Surfrider Foundation, in partnership with CoastWatch, SOLVE, Oregon Sea Grant and Washed Ashore, initiated a statewide effort to educate and identify opportunities for citizens to better engage and understand the issues created by Japanese Tsunami Marine Debris (JTMD). Since then, along with our partners, we executed 12 coastal workshops bringing together local, state and federal agencies to address the issue to over 400 coastal Oregonians. The workshops helped set in motion an official state JTMD Coordination Group, led by the Office of Emergency Management and various state agencies, NOAA, the Coast Guard and the Governor's office.

In early June 2012, large volumes of debris began making landfall on Oregon beaches, nearly one year earlier than NOAA and other scientists had predicted. In response to volunteer, media and public inquiry, Surfrider Foundation worked with our partners to formalize plans between agencies and our respective volunteer groups to execute a cleanup and monitoring response plan. The expertise of our various groups in ongoing beach cleanups and the many volunteers we collectively engage in environmental stewardship initiatives led us to formalizing our partnership, creating the Oregon Marine Debris Coordination Team.

In collaboration with local and state agencies, we have now created a framework to respond to JTMD issues that are too big for agencies to handle alone, yet are small enough and safe enough for activating citizen engagement.

"Oregon State Parks: Beach Debris and So Much More"

Trisha Wymore, Central Coast Beach Ranger, Oregon State Parks

Thanks to the 1967 Beach Bill, Oregon's beaches became open to the public as the Ocean Shores State Recreation Area. This area from low mean tide to the vegetation line is now managed by Oregon Parks and Recreation Department. The narrow 362 mile strip of sand is extremely dynamic in nature and politics. The Japanese Tsunami in 2011 brought yet another layer of complexity to the management of the beaches.

This talk will focus on how Oregon State Parks manages the ocean shores, what debris has already been seen from the Japanese Tsunami, what actions have been set in place to monitor current effects, and how we plan to mitigate effects now and into the future**.**

Keynote Address: "Oregon's Ocean: Whale Migrations & Critical Habitats"

Bruce Mate, Director & Endowed Chair, Marine Mammal Institute
Hatfield Marine Science Center, Newport

Oregon, like much of the rest of the world, has whales offshore every month of the year with spring through early winter feeding and migrations to more subtropical regions for winter breeding and calving. Calves migrate with their mothers from the reproductive area to her foraging grounds and thus inherit her feeding area, resulting in matrilineal relationships for animals in specific feeding areas. Gray whales are 90% of the large whales seen from shore in Oregon.

During the foraging season, ~1% of the total gray whale population inhabits an area from Northern California to SE Alaska and are termed the Pacific Coast Feeding Group (PCFG). OSU has tracked PCFG grays from Oregon to Mexican breeding areas and as far north as Kodiak Alaska. Gray whales are the only whale species to have recovered from endangered status and in the process seem to have exceeded the Bering Sea carrying capacity for summer foraging. Now most of the population inhabits Arctic areas north of Bering Straits.

Anthropogenic activities such as fishing, shipping, and oil and gas development are typical concerns for PCFG whales and other less well-recovered species. Recent studies for wave energy development have focused on the distance of PCFG whales from shore and their migratory timing along Oregon to evaluate their vulnerability to "collisions" with wave energy devices. An acoustic deterrent to alert animals and thus reduce impacts is under development.

The recent tracking of western North Pacific gray whales (WGWs) from Sakhalin Island, Russia, into the migratory path of eastern North Pacific gray whales raises questions about the true status of the western stock, and adds confusion to regulatory issues off the Pacific NW, including Makah hunting interests.

Additional OSU studies determining the migrations and preferred habitats of endangered large whales in the eastern North Pacific have included blue, humpback, fin, and sperm whales. Data are being merged with oceanographic variables to make predictive distributions and reduce shipping impacts. New tags with accelerometers now measure foraging effort of deep diving sperm whales and make it possible to determine which sounds and at what levels may cause disturbances to whale feeding behavior. These recoverable tags provide up to 6 weeks of uninterrupted dive data showing that whale food can be very patchy, explaining why some species travel over such large areas.

OSU tag technologies provide new insights into the seasonal movements and behaviors of species that are otherwise very hard to study. Some of these "discoveries" are extremely valuable in protecting habitats and the recovery of depleted populations

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Heceta Head Coastal Conference, Inc. *...*

. . . *8*is a nonprofit corporation whose mission is to inform and educate the public of the need for a healthy, productive, and resilient marine ecosystem in the Pacific Ocean off the Oregon coast. The Conference brings together a diverse group of leaders, providing a balance of viewpoints, from the worlds of science, fishing, conservation, government, education, business, and philanthropy.

Oregon Sea Grant . . .

. . . develops and supports research, outreach and education programs that help people understand, use and conserve marine and coastal resources.