7th Annual Heceta Head Coastal Conference
In Partnership with Oregon Sea Grant

October 28 & 29, 2011
Florence Events Center, Florence, OR
Oregon's Ocean: Catching the Next Wave of Discoveries

HHCC 2011 Student Poster Session (Student Name, Institution, Poster Title)

- Katelyn Bosley, OSU, "Population Assessment of Burrowing Shrimp in Yaquina Bay, Oregon"
- Tom Calvanese, OSU, "Movement Behavior of Fishes of the Redfish Rocks Marine Reserve"
- Dan Calvert, OSU, "Watershed councils, salmon recovery and stakeholder engagement: Measuring the intangibles"
- Cameron Carter, OSU, "Population structure and spatial extent of the mud shrimp *Upogebia pugettensis* in Alsea Bay, Oregon"
- Tanya Chesney, OSU, "Working together to investigate the periodic expansion of Humboldt squid in Oregon"
- Caitlyn Clark, OSU , "Seasonal Variation in Gut Condition of Select Juvenile Flatfish Species"
- Rishi Deka, OSU, "The Costs/Benefits of Wave Energy: A Comparison with Conventional and Other Renewable Energy Sources"
- Brittney Dlouhy, UO, "Thread Drifting among Juvenile Bivalves within the Coos Bay Estuary"
- Ryan Reid Easton, OSU, "Evaluation of a novel video drop-camera as a potential fishery-independent survey tool to assess demersal Pacific rockfish (*Sebastes* spp.) on high-relief rocky habitat"
- Peter Freeman, OSU, " Community-Based Valuation of Ecosystem Services Associated with Marine Reserves in Oregon"
- Gabriel Garcia, OSU, "Nearshore Wave Predictions along the Oregon and Southwest Washington Coast"
- Kelsey Gianou, OSU, "Building a Database on Best Management Practices for Pesticide Applications to Aquatic Environments and NOAA Trust Species"
- Amanda J. Gladics, OSU, "How much does dietary overlap of upper trophic level predators vary inter-annually?"
- George Hall, OSU, "Modeling Tidal Range Change in the Delaware Bay Using ADCIRC"
- David A. Honegger, OSU, "Harbor Entrance Wave Modeling at Newport, Oregon"
- Marley Jarvis, UO," Nearshore hydrodynamics and larval dispersal: The effects of fronts on zooplankton off of Sunset Bay, Oregon"
- Timothy S. Lee, OSU, "Using Densities of *Mediaster aequalis* to evaluate Sessile and Mobile Invertebrate Diversities in Continental Shelf Habitats"
- Todd Lemein, OSU, "The Growth Response of Threesquare Bulrush (*Schoenoplectus pungens*) to Large Sedimentation Events"
- Wenwen Li, OSU, "Tsunami amplification and breaking along a vertical wall"
- Michelle A. Maier, OHSU, "Description of a putative oomycete parasite associated with the harmful alga, *Pseudo-nitzschia"*
- Jose T. Montero-Styles, OSU, "GIS as a tool for predicting bycatch of sea turtles in the Pacific Ocean"
- Jitraporn Phaksopa, OSU, "Frequency, spacing, and decay time scale for bubble plume events produced by wave breaking in freshwater"

- Aaron Porter, OSU, "Modeling the Far-field Effects of an Array of Wave Energy Converters"
- Lisa Prendergast, OSU, "Integration of Aquarium Education Programs within Marine Ecotourism"
- Miriah Russo-Kelly, OSU, "The Use of Online Project Management and Collaboration Software in Climate Change Adaptation: An Oregon Coast Case Study"
- Kate Sherman, OSU, "Oregon's Nearshore Research Inventory"
- Kate Sherman, OSU, "Assessing and Addressing Information Needs of Stakeholders Involved in Marine Renewable Energy Development"
- Jedediah M. Smith, OSU, "From Waves to Electricity"
- Jenny Thompson, OSU, "An Analysis of the West Coast Groundfish Fleet One Year After Implementation of the Trawl Rationalization Program"
- Kira Treibergs, UO, "Growth and settlement of the marine bryozoan *Schizoporella japonica"*
- Kirsten Winters, OSU, "Communicating climate change science to coastal leaders: a mental models approach"
- Nathan J.P. Wintle, PSU,"Total mercury in stranded marine mammals from the Oregon and southern Washington coasts"

Student Poster Abstracts

Title: Population Assessment of Burrowing Shrimp in Yaquina Bay, Oregon
Author: Katelyn Bosley
Institution: Department of Fisheries and Wildlife, Oregon State University, Hatfield Marine Science Center, Newport OR
Co-Authors: Brett Dumbauld - USDA–ARS, Hatfield Marine Science Center, Newport OR
Andrew Hill, Dept of Biology, Portland Community College, Portland OR.
Theme Area: Ocean Observations, Monitoring and Predictions

Abstract Text:
The burrowing shrimps *Neotrypaea californiensis* and *Upogebia pugettensis* are essential components of estuarine ecosystems in the Pacific Northwest. Over the last decade population monitoring has shown declines in both *N. californiensis* and *U. pugettensis* which have led to concern regarding the future of these species. Currently efforts are underway to develop a population model for burrowing shrimp in Yaquina Bay, Oregon. In this study, a population assessment was conducted for *N. californiensis* and *U. pugettensis* on Idaho Flats in Yaquina Bay to provide a baseline estimate of abundance for constructing population dynamics models. Shrimp bed edges were mapped with GPS and 100 randomly selected points were visited within each shrimp bed to obtain burrow count information. Twenty core samples were also taken to determine the relationship between burrow count and shrimp density for each species. Total shrimp abundance was then calculated in ArcGIS using an Inverse Distance Weighted interpolation (IDW) of shrimp density in area sampled. The total number of *N. californiensis* was estimated to be 6,330,136 ± 746,956 and the total for *U. pugettensis* was 9,347,844 ± 1,290,002. This assessment will be repeated in 2012 and 2013 to track changes in the burrowing shrimp populations in Yaquina Bay.

Title: Movement Behavior of Fishes of the Redfish Rocks Marine Reserve
Author: Tom Calvanese
Institution: Oregon State University, Department of Fisheries and Wildlife
Co-Authors:
Theme Area: Ocean Observations, Monitoring, and Predictions

Abstract Text:
Marine reserves can be a viable component of conservation and fisheries management by restoring biodiversity and functioning ecosystems, and rebuilding fish stocks. There is evidence of increased biomass within reserves, and spillover to surrounding areas, but these effects are a function of reserve size and the extent of adult movements. My goal is to understand the movement patterns of fishes of Redfish Rocks to help determine optimal reserve size needed to balance protection with spillover, and to contribute to baseline data prior to closure. I am using acoustic telemetry to evaluate movement patterns of six species; the China Rockfish, *Sebastes nebulosis*, Quillback Rockfish *S. maliger*, Canary Rockfish *S. pinniger*, Copper Rockfish *S. caurinus*, Black Rockfish *S. melanops*, and Cabezon *Scorpaenichthys marmoratus*. Surgically implanted acoustic tags transmit coded signals identifying each fish and its depth, which are recorded when the fish swims within detection range of an acoustic receiver. An array of receivers is collecting data that will be used to test three hypotheses; (1) The marine reserve at Redfish Rocks will provide different degrees of protection to different species due to species-specific differences in home range size and movement patterns. (2) The rate of movement between Redfish Rocks and Island Rock, similar habitat outside the reserve, is species-dependent. (3) Habitat associations within the reserve are species-specific. This work will provide information essential to the effective management of a network of marine reserves in Oregon state waters, and will improve our understanding of species-habitat associations.

Title: Watershed councils, salmon recovery and stakeholder engagement: Measuring the intangibles.
Author: Dan Calvert
Institution: Oregon State University
Environmental Science
Co-Authors:
Theme Area: Ocean and Coastal Resources

Abstract Text:
My research interests lie in the evaluation and assessment of collaborative, community based organizations that work to incorporate the wants and needs of local stakeholders into management decisions. I am focusing on this within the context of salmon recovery efforts in the Pacific Northwest and more specifically Oregon by examining the activities of watershed councils under the Oregon Plan for Salmon and Watersheds. I see the human dimension as the least understood and arguably one of the most important elements of ecological restoration and the conservation of marine and coastal resources. Watershed councils are tasked with, among other things, disseminating information in an effort to improve habitat for fish and wildlife populations. Measuring the ecological outcomes associated with these efforts is relatively well understood, but attempting to measure social and cultural outcomes becomes much more

ambiguous and challenging. This represents the crux of my research interests; I'm working with watershed councils, OWEB, Meyer Memorial Trust and Bonneville Environmental Foundation in an effort to add more depth and breadth to current stakeholder engagement, outreach and education evaluative metrics. My research will be both quantitative and qualitative employing interviews, focus groups, surveys, participatory observation and archival record analysis.

Title: Population structure and spatial extent of the mud shrimp *Upogebia pugettensis* in Alsea Bay, Oregon.

Author: Cameron Carter
Institution: Marine Resource Management
College of Oceanic and Atmospheric Sciences
Oregon State University
Co-Authors: John Chapman, Department of Fish and Wildlife, Oregon State University
Theme Area: The Changing Ocean and Coastal Environment

Abstract Text:
The mud shrimp, *Upogebia pugettensis*, is a native suspension feeding burrowing shrimp that ranges from Morro Bay, California to Prince William Sound, Alaska that builds extensive permanent y-shaped burrows in intertidal estuary mudflats. Mud shrimp beds are prominent features of estuary mudflats and provide critical habitat for at least 15 commensal species. Populations of mud shrimp along the eastern Pacific have declined 18% per year or more in all inhabited estuaries over the last decade due to infestation by the introduced bopyrid isopod parasite, *Orthoine griffenis*. Bopyrid isopods cause blood loss and effectively castrate their hosts. This isopod is particularly effective at reducing *Upogebia* populations because they can reduce host fitness to zero without increasing host mortality. The largest remaining populations of *Upogebia* are on the central Oregon coast, and the Alsea Bay population is relatively unstudied. This assessment serves to establish a baseline description of the Alsea Bay *Upogebia* population by estimating abundance, spatial extent and biomass, and to determine the population dynamics such as size-frequency distributions and isopod infestation rates.Our results conclude that the *Upogebia* population in Alsea Bay is significant. These shrimp densely inhabit 22.9% in tideland in the estuary, with a total biomass of 404.4 +/- 157.8 metric tons. Infestation by *Orthione griffenis* is 38%, with females exhibiting much higher infestation rates. Describing this local *Upogebia* population will establish a baseline for continued monitoring in order to better understanding their decline and implement best management practices.

Title: Working together to investigate the periodic expansion of Humboldt squid in Oregon

Author: Tanya Chesney
Institution: Marine Resource Management
College of Oceanic and Atmospheric Sciences
Oregon State University
Co-Authors: Selina Heppell, Department of Fisheries and Wildlife, Oregon State University
Theme Area: Ocean and Coastal Resources

Abstract Text:
Humboldt squid or jumbo squid (*Dosidicus gigas*) have been witnessed periodically off of Oregon for decades with sighting intensity and duration increasing within the last few years. As a

large predator, there is concern that Humboldt squid expansion will result in a decline in valuable commercial and recreational fishery stocks due to their high-energy demands and ability to exploit a variety of food sources. Historical distribution and causation for jumbo squid expansion in Oregon is largely un-documented. With the help of fisherman, scientists and cooperating partners, our goal is to provide baseline data for the extent of jumbo squid in Oregon, mapping correlations between oceanographic variables and prey composition within that range. In order to accomplish our objective, we will interview fisherman and request NOAA observer program and survey data from NWFSC to establish where and when squid have been seen in recent years. We will then map sighting data using GIS and overlay available sea surface temperature, chlorophyll content, dissolved oxygen and phosphate, oxygen minimum layer, sea surface height and climate patterns to determine links between jumbo squid presence/absence and oceanic conditions. Lastly, we will overlay Humboldt squid sightings with tuna and hake efforts in GIS to identify potential overlaps with these commercially important species. Because there is currently no monitored fishery for jumbo squid in Oregon, our project will contribute to understanding squid population expansion, assist ocean users and guide future management efforts.

Title: Seasonal Variation in Gut Condition of Select Juvenile Flatfish Species
Author: Caitlyn E. Clark
Institution: Oregon State University
Hatfield Marine Science Center
National Science Foundation Research Experience for Undergraduates
Co-Authors: Sarah K. Henkel
Theme Area: The Changing Ocean and Coastal Environment

Abstract Text:
This study is a preassessment of the ecological effects of wave energy device installation, focusing on five flatfish species. Butter sole (*Isopsetta isolepis*), English sole (*Parophrys vetulus*), Sand sole (*Psettichthys melanostictus*), Pacific sanddab (*Citharichthys sordidus*), and Speckled sanddab (*Citharichthys stigmaeus*) were collected bimonthly from June 2010 to May 2011. Fish were then analyzed and dissected to determine overall and gut condition. Gut contents were also identified to the lowest taxonomic level possible using light microscopy, and then measured for caloric density via bomb calorimetry. Results from Analysis of Variance (ANOVA) tests suggest that each species of flatfish has a unique feeding ecology that is more pronounced with increased fish size. In some species, overall and gut condition varies significantly over depth and season. The caloric density does not vary significantly over meal types.

Title: The Costs/Benefits of Wave Energy: A Comparison with Conventional and Other Renewable Energy Sources
Author: Rishi Deka
Institution: Oregon State University
Agricultural and Resource Economics
Co-Authors: Professor Bill Jaeger
Theme Area: Ocean and Coastal Resources

Abstract Text:

By 2050, global demand for electricity is predicted to more than double from 18,000 terawatt hours to 39,000 terawatt hours. This increasing demand and the need to mitigate global warming have spurred considerable interest in pursuing renewable sources of electricity. Energy from oceans is one of these sources. The three primary forms of renewable ocean energy derive from waves, tides, and currents. This policy brief looks at wave energy, the most significant type of ocean energy since waves have the highest energy concentrations. The ultimate scope of the brief is to provide an overview on the cost/benefits of wave energy and comparisons with conventional and renewable sources of electricity. Multiple wave energy companies have been contacted for device characteristics, outputs, and costs. Research also looks at the costs and benefits of wave energy. Costs include capital, O & M (operating and maintenance), cable, substation, and levelized costs. Benefits of wave energy include that it is renewable and reliable, has the potential to meet at least 6.5 percent of national demand for electricity, and produces no direct greenhouse gas emissions. Further research looks into barriers that the development of wave energy faces as well as environmental externalities and other conflicts associated with wave energy. Finally, comparisons are made to other sources of electricity, such as conventional fossil fuels and renewables such as biomass, solar, and wind; these comparisons include levelized cost, capital cost, reliability, and energy density.

Title: Thread Drifting among Juvenile Bivalves within the Coos Bay Estuary
Author: Brittney Dlouhy
Institution: Oregon Institute of Marine Biology, University of Oregon
Co-Authors: Alan Shanks
Theme Area: Ocean Observations, Monitoring and Predictions

Abstract Text:
Larval dispersal is an important aspect of life history in many marine organisms, including bivalves. The dispersal period is usually related to the time the larvae spend in the water column. Bivalve larvae that are planktotrophic spend an extended time in the water column until competent to metamorphose at which time the larvae settle into an appropriate habitat. It was previously thought after initial settlement the dispersal stage was over, however, over the past few decades research has indicated this is not the case. Bivalves have the ability and potential to disperse during post-larval and juvenile phases by "byssus drifting," or thread drifting. From August 2009 through July 2011 stratified plankton tows were taken monthly in the Coos Bay estuary to address the effects of physical oceanographic factors including tidal cycle, temperature, salinity, lunar periodicity, and current speed. At least five species of juvenile drifting bivalves, including *Clinocardium nuttalli* and *Mytilus* spp., were collected throughout the water column, ranging in sizes from 1.0 mm to 4.0 mm. Preliminary results suggest tidal cycle and current speed play an important role in the drifting behavior.

Title: Evaluation of a novel video drop-camera as a potential fishery-independent survey tool to assess demersal Pacific rockfish (*Sebastes spp.*) on high-relief rocky habitat
Author: Ryan Reid Easton
Institution: Marine Resource Management
College of Oceanic and Atmospheric Sciences
Oregon State University
Co-Authors: Robert Hannah (MRP/ODFW)

Dr. Selina Heppell (F&W/OSU)

Theme Area: Ocean and Coastal Resources

Abstract Text:
Pacific rockfish are long-lived, late maturing, and slow growing, making them susceptible to overfishing, as well as challenging to manage their recovery from severe depletion. Many demersal rockfish species inhabit high-relief rocky habitats which are difficult to survey using traditional methods. This has potentially led to the underestimation of population biomass and distribution for key demersal species such as yelloweye rockfish (*Sebastes ruberrimus)*. Traditionally, demersal rockfish have been assessed using National Oceanic and Atmospheric Administration (NOAA) bottom-trawl survey data, the International Pacific Halibut Commission's (IPHC) Pacific Halibut long-line surveys, and local commercial and recreational fisheries catch information. Commercial and recreational hook-and-line fishery data is of limited use as some rockfish species are rarely caught, and some such as yelloweye and canary can no longer be retained in Oregon due to their overfished status declared in 2002. Previous fishery independent and scientific surveys of demersal rockfish have included direct observation through both manned submersibles and the use of remotely operated vehicles (ROV's). These types of video surveys are superior as they are able to survey in and around the high-relief rocky habitat that trawl surveys miss. The drawback, however, is that these surveys are not only time intensive but very expensive, making the frequency of their occurrence relatively low. We are evaluating the video lander, an autonomous underwater video camera system, as a practical survey tool for investigating distribution, and habitat association of demersal Pacific rockfish within Oregon's nearshore reef complexes, while also ground-truthing previous multi-beam surveys through a bottom-up approach.

Title: Community-Based Valuation of Ecosystem Services Associated with Marine Reserves in Oregon

Author: Peter Freeman
Institution: Oregon State University
College of Oceanic and Atmospheric Sciences
Marine Resource Management Program
Co-Authors: Randall Rosenberger (OSU)
Gil Sylvia (OSU)
Selina Heppell (OSU)
Michael Harte (WFF Australia)

Theme Area: Ocean and Coastal Resources

Abstract Text:

The implementation of marine reserves (fully non-extractive marine protected areas) in Oregon as a tool of Ecosystem-Based Management requires a framework for assessing associated socioeconomic impacts. Such an assessment should capture the dynamic complexity of social, cultural, economic and ecological processes, as well as uncertainty and tradeoffs associated with marine spatial planning and monitoring. We have developed and implemented a framework to accomplish this task through integrating biophysical data and community-based social and economic evaluation methods. Specifically, our framework develops and links indicators used in

the biological monitoring of marine reserves with indicators of the social welfare of communities in Oregon related to the provision of ecosystem services. The resulting suite of indicators can be used in a survey instrument to allow stakeholders to assign relative value to the provision of various ecosystem services flowing from local marine reserves. These values can then be used to inform and prioritize socioeconomic and biological monitoring efforts at those sites. In order to address the challenges of valuing indicators of ecosystem services through a survey instrument, indicators must correspond to ecosystem services that provide utility to respondents, not present excessive cognitive demands on survey respondents, and explicitly reflect uncertainty implicit in the forecasting of short- and long-term impacts on marine resources. We apply our framework in a case study of two pilot marine reserves in Port Orford and Depoe Bay, Oregon. Our framework, however, can be applied generally to any marine spatial management context at the local, state, national, and international scale.

Title: Nearshore Wave Predictions along the Oregon and Southwest Washington Coast
Author: Gabriel García
Institution: Oregon State University
College of Oceanic and Atmospheric Sciences
Co-Authors: H. Tuba Özkan-Haller, Peter Ruggiero
Theme Area: Ocean observation, Monitoring, and Prediction

Abstract Text:
An increasing interest in understanding the surface water waves along the Pacific Northwest region of the United States of America has been fueled by a multi-decadal increase in wave heights, the potential for harvesting wave energy in the region, and the need to make informed management decisions in an evolving climate. To satisfy these needs, an operational nearshore, high-resolution wave forecasting system was recently implemented for the Oregon and Southwestern Washington coast. This model covers the entire Oregon coast and roughly half of Washington's at a 30 arc-second resolution. The wave model is executed on 4 levels of nested grids with increasing resolution shoreward. At the nearshore level, this implementation is 900 times more resolved than the current operational models. This model has the ability to quantify the alongshore variations of the wave conditions due to multiple complex bathymetric features such as the Astoria Canyon, Stonewall and Haceta Banks, and multiple capes and headlands. An autumn 2009 hindcast, used for model validation, shows that the root mean squared error (RMSE) in significant wave height is around 0.50 meters. During the month of June 2011 the forecasts reported RMSE in the vicinity of 0.30 meters. Quantification of forecast accuracy is being pursued actively. Wave forecasts are produced daily at 1200 UTC for an 84 hour window. The results are disseminated via the Northwest Association of Networked Ocean Observing System (NANOOS) webpage (http://www.nanoos.org); this system integrates a wide variety of coastal information products on one interface including our wave forecasting model.

Title: Building a Database on Best Management Practices for Pesticide Applications to Aquatic Environments and NOAA Trust Species
Author: Kelsey Gianou
Institution: Oregon State University
College of Oceanic and Atmospheric Sciences
Marine Resource Management Program
Co-Authors: Dr. Robert Emanuel, Dr. Samuel Chan

Theme Area: Ocean and Coastal Resources

Abstract Text:
Pesticides are widely used to control undesirable pests and may be applied directly to water or lands directly adjacent to water. Pesticides are an option for habitat restoration but there can be unintended consequences to native, threatened and endangered species. There is very little information on the impacts of pesticides and best management practices (BMPs) on NOAA Trust Species. The purpose of this project is to develop a comprehensive report of pesticide best management practices for use in aquatic environments and relate these BMPs for the protection of aquatic species, specifically NOAA Trust Species. The project focuses on aquatic pesticides including insecticides, fungicides, algaecides, herbicides, *piscicides*, molluscicides and mosquitocides. The final product will include a database of pesticide label information, empirical data on the acute and chronic toxicity of each pesticide and its formulations, and identify gaps in knowledge to pesticide toxicity, synergistic effects and best management practices for NOAA Trust Species. Life history and biogeography data for each NOAA Trust Species can be used along with toxicity data to determine the greatest risk for exposure/impact to help inform BMPs. Challenges of this project include addressing NOAA Trust Species when there is very limited direct impact data as well as extrapolating data from surrogate species which may have more toxicity and impact data. Another challenge is creating a database that is intuitive and useful for managers in making decisions about pesticide use and restoration for NOAA Trust Species.

Title: How much does dietary overlap of upper trophic level predators vary inter-annually?

Author: Amanda J. Gladics
Institution: Oregon State University
College of Oceanic and Atmospheric Sciences
Co-Authors: Robert M. Suryan, Richard D. Brodeur, Leah Segui

Theme Area: The changing ocean and coastal environment

Abstract Text:
During the past decade, the northern California Current has experienced dramatic inter-annual variability in ocean conditions, including both delayed and intensified upwelling, anomalous near-shore hypoxia, and decoupling of conditions between Northern and Southern regions. Managers require a better understanding of the impacts of such variability on marine ecosystems to adapt to increased climate variability and climate change, yet it is not possible to monitor all ecosystem components. Our long term goals are to better understand interannual and seasonal changes in food web relationships and work towards a low-cost index of prey populations to aid coastal monitoring and management. We employed collaborative fisheries research techniques with synoptic observations of a major seabird colony to determine the diets of a suite of upper trophic level consumers on the central Oregon coast. Focal predators, selected based on their ecological importance, abundance, and accessibility for sampling, included common murres (*Uria aalge*) Chinook and coho salmon (*Oncorhynchus tshawyscha and O. kisutch),* black rockfish (*Sebasetes melanops*), and Pacific halibut (*Hippoglossus stenolepis*). Together, these species should reflect food web wide adjustments resulting from subtle biophysical changes in ocean dynamics. We report on 8 years of data for the common murre, as well as preliminary results from our first field season of intensive sampling of all predators. Primary prey items

among predators included Pacific herring (*Clupea pallasii*), smelts (Osmeridae), Pacific hake (*Merluccius productus*), Pacific sand lance (*Ammodytes hexapterus*), and juvenile rockfishes (*Sebastes spp.*).

Title: Modeling Tidal Range Change in the Delaware Bay Using ADCIRC
Author: George Hall
Institution: Oregon State University
Co-Authors: David Hill, Stephen Griffiths, Ben Horton, Simon Engelhart
Theme Area: The Changing Ocean and Coastal Environment

Abstract Text:
Throughout the period of the Holocene, beginning 10,000 years before present day (10kybp), changes in nearshore and deep-ocean bathymetry, due to forcing caused by climate change and plate tectonics, have resulted in significant changes in tidal datums. Tidal range, which is the difference between a high and low water datum, is an important factor in the assessment of coastal environments. Nearshore changes in tidal range are important for assumptions regarding sea level rise and coastal engineering solutions. This study offers a method for analyzing local changes in tidal range that could be applied to many locations including the inlets and bays of the Oregon Coast. Using the Advanced Circulation (ADCIRC) numerical model in conjunction with modeled global changes in bathymetry, the time-varying tidal behavior in the Delaware Bay was simulated. Model runs were conducted on finite element grids representing bathymetry and topography at various time slices between 15kybp and 1000 years into the future. The results indicate that; (i) the Delaware Bay did not contain water until around 5-6kybp, (ii) the tidal range change is significantly higher in the upper bay than it is in the lower bay and, (iii) the tidal range in the bay appears to be increasing at a higher rate when compared to the adjacent portions of the Atlantic Ocean. Future work will incorporate modeled time-varying changes in global tidal forcing to provide more information on the interaction of the bathymetric and external forces on tidal range change.

Title: Harbor Entrance Wave Modeling at Newport, Oregon
Author: David A. Honegger
Institution: Oregon State University
Co-Authors: Dr. Merrick C. Haller
Theme Area: Ocean Observations, Monitoring and Predictions

Abstract Text:
Inlet mouths in the Pacific Northwest often exhibit a combination of strong tidal currents, energetic ocean waves, and shallow bathymetry. These factors can act together to induce rapid changes to the incoming wave field, generating hazardous breaking events focused on the inlet entrance. Our understanding of how these individual processes act together, however, remains limited due to the scarcity of long-term nearshore wave measurements and a poor understanding of how waves break in the presence of strong currents. This study uses available offshore wave data (NDBC Station 46050 and Wavewatch III model output) and recent tidal current surface velocity measurements (CODAR RiverSonde UHF radar) to force a high resolution implementation of the SWAN spectral wave model at the Yaquina Bay jetty mouth. The model results are compared against wave field measurements collected by a land-based X-band radar system located on the Newport South Jetty with the purpose of choosing the most appropriate offshore wave input source and tuning the model's handling of wave breaking. This ongoing effort is intended to lead to a better understanding of wave breaking in the presence of spatially

variable tidal currents, as well as publicly available now-cast wave model output and harbor-entrance wave conditions.

Title: Nearshore hydrodynamics and larval dispersal: The effects of fronts on zooplankton off of Sunset Bay, Oregon
Author: Marley Jarvis
Institution: Oregon Institute of Marine Biology, University of Oregon
Co-Authors: Dr. Alan Shanks
Theme Area: Ocean Observations, Monitoring and Predictions

Abstract Text:
Larval dispersal plays an important role in structuring marine populations with complex, biphasic lifecycles. Larvae of intertidal and shallow subtidal organisms are spawned in the nearshore and either remain nearshore throughout development or have to return to the nearshore when ready to settle. Thus these larvae all interact with nearshore flows. Larvae of many taxa, including bivalves, gastropods, fish, and crustaceans, have been found in highest concentrations within 5 km, and in many studies, within 1 km of shore. One characteristic of nearshore oceanography is the presence of fronts. A front is a boundary between two water masses, and often has an associated convergence at the surface. Despite the frequency of nearshore fronts, very little is understood about hydrodynamics of different front types and how they affect larval dispersal. Fronts may play an important role in structuring intertidal and shallow subtidal communities by altering larval supply to the nearshore. Fronts may act as a barrier to shoreward or seaward transport in addition to transporting larvae in associated convergences. My study focuses on characterizing these physical features of the nearshore ocean off of Coos Bay, Oregon and how they affect larval supply in different taxa.

Title: Using Densities of *Mediaster aequalis* to evaluate Sessile and Mobile Invertebrate Diversities in Continental Shelf Habitats
Author: Timothy S. Lee
Institution: Oregon State University
Co-Authors: Sarah K. Henkel, Oregon State University
Brian N. Tissot, Washington State University Vancouver
Chris Goldfinger, Oregon State University
Theme Area: Ocean Observations, Monitoring, and Predictions

Abstract Text:
The habitats of continental shelf waters of Pacific Northwest encompass wide diversity of macrobenthic invertebrates. However, little knowledge exists about invertebrate assemblages in these waters. Our objective was to begin structuring the general assemblage with densities of influential species and diversity indices. The Vermillion Red Star, *Mediaster aequalis*, is an opportunistic predator and widespread in these waters; thus, their densities may be useful indicators in shaping overall invertebrate richness and diversity. We used *M. aequalis* densities as an explanatory variable and used Shannon Diversity Indices of sessile and mobile invertebrates as response variables to determine if differences of median diversity for sessile and mobile organisms between habitats depend on *M. aequalis* densities. We divided habitats in three categories, based on substrata type and relief: flat (F), ridge (R), and mud (M). For sessile

invertebrates, there is suggestive evidence that Shannon Diversity index differences between different habitats are dependent on *M. aequalis* densities; for a given *M. aequalis* density, median Shannon Diversity Index in F was 0.024 times the median diversity index of M, the median diversity index of R was 0.105 times the median diversity index of M, and median diversity index of R was 0.08 times median diversity index of F. However, for mobile invertebrates, there was inconclusive evidence that Shannon Diversity indices between different habitats are dependent on *M. aequalis* densities. Our results also suggest that diversities of sessile and mobile invertebrates should be evaluated separately to take account of species mobility as a confounding factor.

Title: The Growth Response of Threesquare Bulrush (*Schoenoplectus pungens*) to Large Sedimentation Events

Author: Todd Lemein
Institution: Oregon State University
Environmental Science Program, Ecology

Co-Authors: Dennis Albert, Assistant Professor, Oregon State University Horticulture

Theme Area: The Changing Ocean and Coastal Environment

Abstract Text:
Recent tsunamis have reinforced that coastal environments are subject to large scale natural disasters. Rehabilitation of coastal environments, such as estuaries, has implications for mitigating effects of coastal erosion, restoring wildlife usage, and promoting human recreation. The threat of a tsunami along the Oregon Coast, within the next 100 years, coupled with rising sea levels and increased storm severity, make understanding the ability, and rate, of coastal environments to recover an urgent topic. New information will aid land managers in restoring the function of these systems to their pre-disturbance state. We quantified the growth response of a common estuary species, threesquare bulrush (*Schoenoplectus pungens*), to large sedimentation events. In a controlled experiment, threesquare bulrush was buried with various amounts of sediment to simulate sediment deposition that could result from a severe storm or tsunami, and allowed to grow. The species could not tolerate sediment deposition levels of 80cm, and biomass production was reduced at deposition levels of 40cm, relative to the amount of biomass produced at 10cm and 20cm. The emergence of vegetation was delayed at deposition levels greater than 20cm. The timing of the emergence of vegetation, as well as the amount produced, may influence the quantity of sediment retention and distribution within estuaries, thereby effecting aquatic habitat for invertebrates and nursery habitat for fish populations. Results indicate that when sediment deposition is less than 20cm plants may naturally recolonize an area within a single growing season, while deposition greater than 20cm would necessitate managed restoration efforts.

Title: Tsunami amplification and breaking along a vertical wall

Author: Wenwen Li
Institution: Oregon State University
Co-Authors: Harry Yeh

Theme Area: Ocean and Coastal Hazards

Abstract Text:
When a solitary wave (a model of tsunami in the nearshore shallow water) impinges on a reflective vertical wall, it can take the formation of Mach reflection (a geometrically similar reflection from acoustics). The mathematical theory predicts that the amplification at the reflection is not twice, but four times the incident wave amplitude. Evidently, this has an important implication to engineering design practice. Our laboratory experiments verify detailed features of the Mach reflection phenomenon, whereas contradict the theory in terms of the maximum four-fold amplification: the maximum amplification observed in the laboratory was 2.9, instead. The reason for the discrepancy is discussed. In addition, we show that a tsunami along the reflective wall can reach higher than the maximum solitary wave height. Once the wave breaking happens along the wall, the substantial increase in water-surface slope results along the wave crest away from the wall.

Title: Description of a putative oomycete parasite associated with the harmful alga, *Pseudo-nitzschia*

Author: Michelle A. Maier
Institution: Oregon Health & Science University
Center for Coastal Margin Observation & Prediction
Co-Authors: Tawnya D. Peterson
Theme Area: Ocean and Coastal Hazards

Abstract Text:
An epibiotic parasite preliminarily described as a putative oomycete was observed in a laboratory culture on the marine diatom *Pseudo-nitzschia pungens*. *Pseudo-nitzschia* spp. produce a neurotoxin, domoic acid, responsible for harmful algal blooms in coastal oceans. *P. pungens* was isolated from Monterey Bay, CA and grown in non-axenic batch culture for 17 days at 15°C and 80 µE/m^2/s in f/2 medium. Daily samples were taken to measure in-vivo chlorophyll fluorescence and were fixed with glutaraldehyde for epifluorescence and Scanning Electron Microscopy (SEM). Additional samples were taken in the initial, exponential, and stationary phases of the growth cycle for analysis of DNA, dissolved nutrients, particulate carbon/nitrogen, chlorophyll, and domoic acid. Based on SEM photomicrographs, the parasite was spherical, 2.5-5 µm in diameter, and was attached on *P. pungen*s cells in a variety of locations (middle, end, and chain overlap). Cells were stained with Calcofluor White and SYBR Green to identify cellulose (or chitin) structures and nuclei, respectively. The ITS1/5.8S/ITS2 rDNA region of the parasite was amplified with general ITS primers and aligned to sequences in the NCBI database. The 5.8S region of the rDNA aligned with 100% identity to 2 oomycetes (*Halipthoros milfordensis* and *Phytopthora insolita*) and was highly similar to other stramenopiles. The ITS1 and ITS2 regions were not highly similar (>97%) to any ITS sequences in NCBI and will be further investigated. Previous reports of parasitic marine oomycetes and chytrids have been identified on *Pseudo-nitzschia* spp., but their potential role in bloom decline, toxicity, and marine food-webs is unknown.

Title: GIS as a tool for predicting bycatch of sea turtles in the Pacific Ocean
Author: Jose T. Montero Styles
Institution: Marine Resource Management
College of Oceanic and Atmospheric Sciences
Oregon State University
Co-Authors: Selina Heppell
Theme Area: Ocean and Coastal Resources

Abstract Text:
It is well known that bycatch is a central issue in marine fisheries, being one of the central drivers of population decline in several species of marine fauna. Consequently, for conservation of marine fauna is essential to identify and characterize the patterns of bycatch using bycatch rates across fisheries and the factors that increase the probability of a bycatch event. Sea turtles are considered an endangered species internationally, and many turtles are caught annually in gillnets, trawls, and by longline fisheries. For some populations, this fishing mortality is a contributor to population decline. In this context, scientists and wild life protection organizations have tried to develop tools to predict and reduce bycatch to protect sea turtles using statistical models combined with Remote Sensing and Geographic Information Systems (GIS). A "Turtle Watch" system for the North Pacific is currently available for fishermen and scientists to map areas of high turtle bycatch potential. However, there are still many areas where bycatch rates for different fisheries and turtle habitat use are unknown. In this work, I will propose the use of GIS as a tool to predict the bycatch potential of sea turtles in real time by combining oceanographic variables and statistical models. Some of the questions for this project are: Is it possible to improve the bycatch predictive models using GIS? Is the type of habitat influencing the probability of bycatch events? Is it possible to use the models to predict bycatch potential in places that lack some data, like the South Pacific?

Title: Frequency, spacing, and decay time scale for bubble plume events produced by wave breaking in freshwater
Author: Jitraporn Phaksopa
Institution: School of Civil and Construction Engineering
Oregon State University
Co-Authors: Merrick Haller
Theme Area: Ocean Observation, Monitoring, and Prediction

Abstract Text:
The breaking wave process in the ocean is a significant mechanism for energy dissipation, splash, and entrainment of air. When waves break, air and water mix to form "whitecaps" and create a two-phase flow. Underneath the whitecaps, the water is filled with various sizes of air bubbles from a few microns to a centimeter and generally forms a bubble plume. This mixing process plays an important role in momentum transfer between the air and the ocean, air-sea exchange of sensible and latent heat, formation of marine sea-salt aerosols, optical properties of water, and ambient noise generation. During the wave breaking process, bubbles are transported to depth via eddies. However, the relation of breaking waves and bubble plume characteristics is still a mystery because of the complexity of wave breaking and plume generation and the rapid evolution of the bubble plume. This study aims to quantify the separation scale and frequency of

bubble plume events produced by freshwater breaking waves in Large Wave Flume (LWF). The intensity images from five individual wave periods are analyzed by using edge detection technique with Canny method. The result shows that the occurrence of bubble injection is quite periodic for all wave periods. For the length scale, there is no relationship between the length scale and wave period; however it tends to scale with wave height. In addition, the decay time scales of bubble events are quantified.

Title: Modeling the Far-field Effects of an Array of Wave Energy Converters
Author: Aaron Porter
Institution: School of Civil and Construction Engineering
Oregon State University
Co-Authors: Merrick Haller, Pukha Lenee-Bluhm
Theme Area: Ocean and Coastal Resources

Abstract Text:
Recent developments in wave energy converter (WEC) technology has swung open the door to commercialization, but a clearer understanding of how a WEC array will affect the environment, the wave climate in particular, is still under analysis. To accurately predict the effect an installation of a WEC array may have on ocean waves in the near-field and far field, a model verified by scaled laboratory data provides the best chance. There is currently a gap in the link between numerical modeling of WEC effects, WEC performance, and observed WEC effects. Designing a numerical model that closes this gap is underway at Oregon State University using 1/33rd scale, point absorbing WECs (Columbia Power Technologies "Manta"). Our observational data set is from the *WaveBuoyArray* experiment, conducted in partnership with Columbia Power at the Tsunami Wave Basin in the O.H. Hinsdale Wave Research Laboratory in Corvallis, Or, USA. Trial conditions varied between regular waves of 0.9s to 2.8s; a suite of different real seas simulations; and arrangements of one, three or five WEC arrays. To collect and verify data, twenty eight different in-situ instruments were placed in and around the wave basin. Preliminary observational data show the WECs create a wave period dependent wave shadow in their lee. The wave shadow is deeper (lower wave heights) with shorter period waves and larger WEC arrays. The shadow grows linearly with different amplitude waves. Parameterized numerical models of the experiment verified these findings.

Title: Integration of Aquarium Education Programs within Marine Ecotourism
Author: Lisa Prendergast
Institution: Oregon State University
College of Oceanic and Atmospheric Sciences
Marine Resource Management
Co-Authors: Dr. Mark Needham
Theme Area: The Changing Ocean and Coastal Environment

Abstract Text:
Tourism is considered to be one of the world's largest and most influential economic sectors. This expansive industry plays a dominant role in the economy of coastal regions in particular (Foundation for Environmental Education 2006). When not properly managed, tourism activities

can lead to negative impacts on the environment. This led to the creation of ecotourism, as well as the promotion of education to be used as management strategies to minimize these adverse effects while enhancing visitor conservation knowledge, views, & behaviors. Success of the overall educational experience, however, depends on a number of factors including the program design and training for educators (Beaumont 2001). The conservation and education expertise of accredited aquariums under the Association of Zoos and Aquariums (AZA) may provide such interpretive tools often not effectively met by ecotourism operations. The present research focuses on developing a strategic conservation plan for the Oregon Coast Aquarium (OCA) in Newport, OR that assesses the potential for environmental education standards of the Association of Zoos and Aquariums (AZA) to be utilized by and benefit the ecotourism industry. Qualitative interviews with AZA staff, local ecotourism companies, government officials, and accreditation organizations will be conducted. The overarching objective of this study is to produce a marine conservation model, incorporating an ecotourism component, to be used by AZA institutions. This flagship management strategy has the potential to reinforce aquarium conservation messaging, while decrease the negative impacts caused by coastal recreation & tourism. Success of such institutional partnerships may further lead to the future development of an effective ecotourism certification program under the Association of Zoos and Aquariums.

Title: The Use of Online Project Management and Collaboration Software in Climate Change Adaptation: An Oregon Coast Case Study

Author: Miriah Russo Kelly
Institution: Environmental Science
Oregon State University
Co-Authors:

Theme Area: The Changing Ocean and Coastal Environment

Abstract Text:
Throughout the United States coastal communities are implementing programs and projects in response to the current and impending impacts of climate change. Many communities have discovered and continue to seek innovative ways to integrate novel 21st century technology into the coastal climate change adaptation process. One small rural community on the Oregon coast is using online project management and collaboration software to manage their decision making process. This community is experiencing increased erosion, flooding and severe weather events resulting from changes in the climate. In response to this, a group of concerned citizens, county officials, and University staff have coalesced to address these issues. The software facilitates the project and maintains an ongoing database of many materials relevant to the initiative. Each member of the project committee is given a username and password that allows secure access to the project site. The software allows for the upload of various file types, including text and image documents. It is also capable of maintaining documents that can be collaboratively edited by various members. The poster displays how online project management and collaboration software helps to manage the climate change adaptation initiative in this rural Oregon coastal community. It identifies ways in which the collaborative process is supported and discusses the various benefits and shortcomings of this technology being used in this context.

Title: Oregon's Nearshore Research Inventory
Author: Kate Sherman
Institution: Marine Resource Management
College of Oceanic and Atmospheric Science
Oregon State University
Co-Authors: Andy Lanier. Tanya Haddad. And Paul Klarin of the Oregon Coastal Management Program, Department of Land Conservation and Development
Theme Area: Ocean and Coastal Resources

Abstract Text:
The purpose of Oregon's Nearshore Research Inventory project was to inventory and map the current and future use of Oregon's nearshore ocean environment by the research community for inclusion in the Oregon marine spatial planning process. At this point, research by the scientific community is not represented as a human use of the ocean. Other human uses of the ocean, such as fishing, non-consumptive recreation, and shipping are currently being mapped for inclusion in the current marine spatial planning process. Research being conducted in the nearshore environment off the Oregon coast was inventoried through interviews with individuals conducting research. The resulting data was entered into a database and used to create ArcGIS Shapefiles and Google Earth KML files that spatially define the geographic footprint, including corresponding attributes, of the research community's use of the nearshore environment. The results show that the research community has a large footprint of use along the Oregon shoreline and in the ocean. Research platforms such as buoys and moorings, cruise tracks, and observation and sampling locations were found to exist throughout much of the coast. The project also acted as a way to engage the research community in the marine spatial planning process within Oregon and can be used as a model for inventorying and mapping ocean and coastal research in other states. Overall, a better understanding of what research is being conducted on a national level off of our coasts will result in a more comprehensive state and federal marine spatial planning process.

Title: Assessing and Addressing Information Needs of Stakeholders Involved in Marine Renewable Energy Development.
Author: Kate Sherman
Institution: Marine Resource Management
College of Oceanic and Atmospheric Science
Oregon State University
Co-Authors: Janet Webster, Sarah Henkel. Oregon State University
Theme Area: Ocean and Coastal Resources

Abstract Text:
In order to effectively communicate information about the ecological effects of marine renewable energy development and marine spatial planning, it is important to assess and address the information needs of the stakeholders involved in the marine renewable energy development process. Stakeholders include the marine renewable energy industry, fishers, other commercial users, local and state government, federal and local government agencies, NGO staff, researchers, educators, and graduate students. The Northwest National Marine Renewable

Energy Center (NNMREC) is concerned about broad access to research and information on the environmental effects marine renewable energy development in the Pacific Northwest. The project "Assessing and Addressing Information Needs of Stakeholders Involved with Marine Renewable Energy Development" will result in an effective and relevant system for communicating information about environmental effects of marine renewable energy to stakeholders and across stakeholder groups involved in the marine spatial planning process. Through interviews and surveys of stakeholders, information will be collected on what type of information is needed by each stakeholder group in order to make the best decisions in the marine spatial planning process. The overall goal of the project is for Oregon State University, and specifically NNMREC, to become a hub of information about the environmental effects of marine renewable energy development for different stakeholders within the Pacific Northwest by facilitating information sharing across stakeholder groups. This will include an up-to-date website of information about marine renewable energy in the Pacific Northwest, relevant to each stakeholder group. The information shared will include, but is not limit to, relevant science, current events, and marine renewable energy development proposals. In addition, and depending on the needs and recommendations of stakeholders, other informative communication outlets will be created, such as a listserv or online newsletter, in order to best meet the information needs of the stakeholders.

Title: From Waves to Electricity

Author: Jedediah M. Smith
Institution: Oregon State University
Marine Resource Management
College of Oceanic and Atmospheric Science
Co-Authors: Kaety Hildenbrand, Mark Farley, Oregon Sea Grant
Theme Area: The Changing Ocean and Coastal Environment

Abstract Text:
This poster was developed as part of a larger exhibition for Hatfield Marine Science Center's Visitor Center to help increase the public's understanding of marine energy. This poster combines the following topics together in a single infographic to help visitors grasp the complexities and intricacies of wave energy:

1) Oceanographic principles pertaining to waves
2) Current technologies under consideration
3) Current areas of research being pursued to better understand potential impacts
4) The stakeholders involved in the process

The infographic combines information gathered from research, collaboration with scientists, wave energy developers, trade organizations, outreach personnel, and qualitative evaluations with the public. Pursuing wave energy along Oregon's coast will be a challenging undertaking. Through this development and refinement process, it is clear that conveying the relevant information to the general public so that they can become informed stewards is equally as challenging. During evaluation of this poster with the public, I found evidence of public misconceptions, unawareness of the variety of technologies, and ignorance of the broader impacts associated with deploying wave energy devices that this poster addresses.

Title: An Analysis of the West Coast Groundfish Fleet One Year After Implementation of the Trawl Rationalization Program

Author: Jenny Thompson
Institution: Oregon State University
Marine Resource Management
College of Oceanic and Atmospheric Science
Co-Authors:
Theme Area: Ocean and Coastal Resources

Abstract Text:
In January of 2011, the Pacific Fishery Management Council (PFMC) instituted a trawl rationalization program for the West Coast groundfish trawl fishery. The program is intended to create a more sustainable fishery and increase economic efficiency through the use of individual fishing quotas (IFQs) and cooperatives (co-op). However, since the new program specifically targets trawling, it leaves the existing management structure of other groundfish fisheries in place. Because of this, new challenges are created to ensure that regulations are set equitably across fisheries. This research reviews the structure and catch of the West Coast groundfish fleet one year after the trawl rationalization program went into effect. In particular, it focuses on changes that have a larger potential impact on local communities.

Title: Growth and settlement of the marine bryozoan *Schizoporella japonica*

Author: Kira Treibergs
Institution: Oregon Institute of Marine Biology
Co-Authors:
Theme Area: Ocean Observations, Monitoring and Predictions

Abstract Text:
The short pelagic larval duration of the bryozoan *Schizoporella japonica* and year-round reproduction in the inner boat basin of Charleston OR make this organism well-suited for the study of settlement behavior and effects of larval size on colony growth. An encrusting cheilostome bryozoan, *Schizoporella japonica* is a common member of the fouling community on the undersides of mussels and on the sides of docks and boats. When exposed to bright light after remaining in darkness for approximately 48 hours, colonies release lecithotrophic coronate larvae. Successful larvae eventually settle on hard surfaces to form the founding colony zooid, the ancestrula. Larval settlement success on varying surfaces was assayed, with the conclusion that larvae have highest settlement success on roughened surface (as opposed to smooth or grooved surfaces). In laboratory settlement studies approximately 40% of larvae settled within 24 hours, and remaining larvae either attempted settlement and failed, or died without settling. In another experiment, larval size was measured at the time of release, and ancestrula size was measured upon settlement. A significant positive correlation existed between larval area and ancestrula area. Ancestrulae were then transferred to the boat basin and photographed over 3 months to monitor colony growth. Significant positive correlations existed between ancestrula area and colony area after 2 to 6 weeks of growth. Results from this study give a clearer picture of the larval settlement dynamics and colony growth of this species.

Title: Communicating climate change science to coastal leaders: a mental models approach
Author: Kirsten Winters
Institution: Oregon State University/Oregon Sea Grant
Co-Authors: Joe Cone, Pat Corcoran
Theme Area: Oregon and Coastal Hazards

Abstract Text:
Helping coastal communities prepare for climate change is a vital concern, as they face potentially significant effects of climate variability during this century. While decision makers may want trusted information on the effects of climate change, and Sea Grant may be a vehicle for providing information support, important questions remain regarding the factors that influence the use of climate information. Our project--a NOAA funded partnership of various Sea Grant states including Florida, North Carolina, South Carolina, Maryland, Minnesota, Washington, and Oregon--has sought to develop and facilitate local knowledge-action networks that assist coastal decision makers with decision-relevant information about climate variability and change. Our ongoing work incorporates methodology addressing risk and uncertainty, based on the risk communication model developed by Morgan and colleagues (Morgan, M. Granger, Fischhoff et al. 2002). This risk communication model derives from decision research and a "nonpersuasive" method of communicating. The process of creating expert models, developing interview protocols, conducting mental model interviews, analyzing and using results will be described. The poster will share the lessons learned in introducing this new procedure to numerous practitioners, the limitations and successes, as well as innovations to the method based on our project's outcomes, which include helping to support decision-makers in increasing resilience in coastal social-ecological systems.

Title: Total mercury in stranded marine mammals from the Oregon and southern Washington coasts
Author: Nathan J.P. Wintle
Institution: Portland State University
Deptartment of Biology
Co-Authors: Deborah A. Duffield, Nelio B. Barros, Ronald D. Jones, James M. Rice
Theme Area: Ocean Observations, Monitoring and Predictions

Abstract Text:
Muscle samples from 105 marine mammals stranded along the Oregon and Washington coasts (2002–2009) were tested for levels of total mercury (THg) by Cold Vapor Atomic Fluorescence Spectrometry. The THg present is in the form of the highly toxic methylmercury. After normalizing tissue to 75% water weight, Steller sea lions and northern elephant seals exhibited the highest mean concentrations of THg followed by harbor seals, harbor porpoises, and California sea lions, 0.34 ± 0.278, 0.34 ± 0.485, 0.21 ± 0.216, 0.17 ± 0.169, and 0.15 ± 0.126 mg/kg normalized wet weight (ww), respectively. The mean normalized values demonstrate limited muscle methylmercury accumulation in these species in the Pacific Northwest. However, actual ww concentrations in some of the stranded carcasses may pose a risk to scavengers. Normalizing muscle mercury concentrations eliminated the variability from desiccation, and

allowed for a clearer indication of the amount of mercury the animal accumulated before stranding.