

Oregon Ocean Policy Advisory Council

Draft Meeting Agenda*

Monday, June 13th, 2016

*Please note that this agenda is an attempt to give notice of the intended sequence of events at the meeting. Time or topics may change up to the last minute. The Chair will try to make sure that there is an opportunity for public comment prior to OPAC making major policy decisions. The most recently updated draft agenda will be posted at www.oregon.gov/LCD/OPAC and www.oregonocean.info.

Regular OPAC Meeting

Oregon Dept. of Fish and Wildlife | 4034 Fairview Industrial Dr. SE | Salem, OR 97302

- 10:00 am Member Introductions – *Scott McMullen* (OPAC Chair)
- 10:05 am Review and Approval of the Meeting Summary for April 5, 2016 (10 min) – *Scott McMullen* (OPAC Chair), *Council Members*
- 10:15 am Marine Debris Exploratory Working Group (60 min) – *Nir Barnea* and *Charlie Plybon* will present the Draft Action Plan current status and seek OPAC feedback on the draft Marine Debris Action Plan.
- 11:15 am Updates from the Oregon Ocean Science Trust (45 min) – *Louise Solliday* will provide an update to OPAC members following release of the Science Summit draft report.
- 12:00 pm Public Comment (30 min) – *Scott McMullen* – will coordinate a public comment period.
- 12:30 pm ** Working Lunch (60 min) ** - Round-table reports from the Council Members.
- 1:30 pm TSP Rocky Shores Inventory Update and Discussion (60 min) – *Paul Klarin* of DLCD will provide an update on the activities of the Territorial Sea Plan Working Group - Rocky Shores Inventory.
- 2:30 pm Resilience Working Group Update (30 min) – *Shelby Walker* from Oregon Sea Grant will lead a discussion regarding OPAC's role in resilience work.
- 3:00 pm **Ocean Acidification Updates and possible action** (45 min) – *Working Group Members* will present results from recent efforts (legislative days, fishermen – scientist roundtable, federal government engagement) and a draft OPAC statement or letter to the Governor on ocean acidification for possible adoption.
- 4:00 pm Marine Reserves Program Update (30 min) – *Caren Braby*, ODFW Marine Resource Program Manager, will provide an update on the activities and research plans for this summer's field season.
- 4:30 pm Adjourn

** Provided only for OPAC Members and Staff. The public is welcome to bring a sack lunch if they desire. There will be a few food trucks located on site at the ODFW parking lot, otherwise a sack lunch is recommended. **

Oregon Ocean Policy Advisory Council

Draft Meeting Summary – April 5, 2016

Issues Decided/Positions Taken

- The Draft Meeting Summary of the December 3, 2015 Ocean Policy Advisory Council (OPAC) was approved by consensus without edits.
- OPAC agreed by consensus to readdress the letter (referenced in the December 3, 2015 meeting summary) to the Governor's office.

Presentations

- *Cristen Don, ODFW Marine Reserves Program Leader* provided a presentation the implementation of the Marine Reserves Program, including: a report on the monitoring work at Cape Perpetua Marine Reserve.
- *Elizabeth Marino, Scientist at OSU Cascades Campus*, provided a presentation on understanding social change and uncertainty in fishing communities.
- *Charlie Plybon and Brianna Goodwin*, provided OPAC a briefing on the Marine Debris Workshop planning.
- *Francis Chan* provided a presentation on the Ocean Acidification and Hypoxia Science Panel findings and report.
- *Paul Klarin* provided a briefing on the TSP Rocky Shores Inventory work group effort.
- *Kessina Lee* provided a briefing on the activities of the Shellfish Task Force.

OPAC Members Attendance

Members Present (voting): **Scott McMullen** (North Coast Commercial Fisheries, OPAC Chair); **David Allen** (Coastal City Official), OPAC vice-chair); **Jena Carter** (Statewide Conservation or Environmental Organization); **Robin Hartmann** (Coastal Conservation or Environmental Organization); **Walter Chuck** (Ports, Marine Transportation, Navigation); **Terry Thompson** (North Coastal County Commissioner); **John Holloway** (North Coast Charter, Sport or Recreational Fisheries); **Charlie Plybon** (Coastal Non-Fishing Recreation). **Brad Pettinger** (South Coast Commercial Fisheries) [9/14]

Members Absent: **Robert Kentta** (Oregon Coastal Indian Tribes); **Susan Morgan** (South Coastal County Commissioner); **Jim Pex** (South Coast Charter, Sport or Recreational Fisheries)

Members Present (ex officio): **Jonathan Allan**, (Department of Geology and Mineral Industries); **Gabriela Goldfarb** (Office of the Governor); **Loren Goddard** (Oregon Coastal Zone Management Association); **Patty Snow** (Department of Land Conservation & Development); **Chris Castelli** (Department of State Lands); **Caren Braby** (Oregon Department of Fish & Wildlife); **Laurel Hillmann** (OPRD); **Steve Shipsey** (Department of Justice). [7/11]

Staff: **Paul Klarin** (DLCD); **Andy Lanier** (DLCD, OPAC Staff); **Dave Fox** (ODFW); Tommy Swearingen (ODFW); Brittany Huntington (ODFW), Jessica Watson (ODFW); **Kessina Lee** (GNRO); **Kelsey Adkisson** (ODFW); **Lorinda DeHaan** (DLCD, OPAC Staff).

Public Comment and Attendance

Public Comment speakers (with affiliation if provided): **Onno Hussing** (Lincoln County); **Paul Englemeyer** (Audubon); **Bob Bailey** (Oregon Shores Conservation Coalition); **David Allen**;

Others in Attendance (with affiliation if provided): **Laura Anderson** (Oregon Ocean Science Trust); **David Gomberg** (Representative, Oregon Ocean Science Trust); **Jim Carlson** (Coast Range Association); **David Brock Smith** (Curry County); **Bruce Koike** (Oregon State University); **John Serra** (Kurt Schrader rep); **Shannon Davis** (The Research Group); **Mark Nystrom** (OCZMA, ASOC), **Arnie Roblan** (Senator)

Acronyms and Initials:

DLCD-Department of Land Conservation and Development; DOGAMI- Oregon Department of Geology and Mineral Industries; DSL- Department of State Lands; OMD – Oregon Military Department; ODFW- Oregon Department of Fish and Wildlife; OPRD-Oregon Department of Parks and Recreation; DOJ – Department of Justice; FACT-Fishermen’s Advisory Committee of Tillamook, WCGA – West Coast Governors Alliance; TNC – The Nature Conservancy

Distributed Materials

1. OPAC December 3, 2015 - Draft Meeting Summary
2. ODFW Marine Reserves Program 2015 Highlights Document
3. TSP Rocky Shores Management Strategy Presentation Handout
4. Oregon Shores Comments to OPAC
5. OPAC OA Ad-hoc Work Group Update
6. OAH Science Panel Handout

Additional Resources

1. [Department of Land Conservation and Development Website](http://www.oregon.gov/lcd/) (<http://www.oregon.gov/lcd/>)
2. [OPAC Website](http://www.oregon.gov/LCD/OPAC): (<http://www.oregon.gov/LCD/OPAC>)

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For a copy of the video record of this meeting, please contact Andy Lanier at the contact information listed below, and complete a public records request available online at:

http://www.oregon.gov/LCD/docs/publications/DO_110.02_PublicAccessstoDLCDRecords_RequestForm.pdf

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Voting Members

Louise Solliday

Executive Director

Laura Anderson

Emily Goodwin Martin

Jim Sumich

Krystyna Wolniakowski

DATE: June 13, 2016

TO: Ocean Policy Advisory Council

FROM: Louise Solliday, Executive Director, Oregon Ocean Science Trust
(OOST)

RE: Priority Nearshore Research and Management Questions

Legislative Members

Sen Arnie Roblan

Rep David Gombert

Please find the following priority nearshore research and management questions identified by the OOST at their regular meeting on June 8, 2016:

- **What are the distribution and abundance of economically and ecologically important species, and the habitats on which they depend, in the nearshore environment?**
- **How are economically and ecologically important species and their habitats affected by changes in the physical, chemical and biological nearshore environment?**
- **How do changes in ocean conditions affect state and local community vulnerability/resilience? What are the local drivers of changing ocean conditions?**
- **What options exist for adapting to, mitigating and possibly minimizing changes in ocean conditions that affect economically and ecologically important species, and the habitats on which they depend, in the nearshore environment?**
- **How does ocean health relate to livability, health and wellbeing, economic prosperity and safety in Oregon and its coastal communities?**

These questions were developed based on information gleaned from a two day science summit involving a number of ocean researchers and agency personnel involved in nearshore decision making. They would serve as the basis for seeking grant proposals to fund priority research and monitoring in the nearshore environment. OOST will be seeking public input on these questions and other issues related to a grant program later this summer and early fall with the goal of developing and adopting administrative rules in early 2017.

OOST has requested a policy option package (budget package) through the Department of State Lands budget to fund operations and a grant program beginning July 1, 2017. The request is for \$1 million in general funds. We hope to leverage state funds to seek federal and private funding to grow the grant fund over time.

OOST would appreciate any initial input from OPAC on whether these are the right priority questions that we need answers to in the nearshore environment.



OREGON OCEAN SCIENCE TRUST SUMMIT REPORT

OREGON OCEAN SCIENCE TRUST

MAY 11–12, 2016
NEWPORT, OREGON

Executive Summary

The Oregon Ocean Science Trust convened 45 ocean experts and agency decision makers in Newport, Oregon May 11–12, 2016 to identify priority research and monitoring funding needs for Oregon's nearshore (territorial sea) area, scalable to budget resources available, that will provide baseline and trend data and inform key research questions related to changing ocean conditions as a result of climate change, shifts in marine habitat, and changes in marine fish and wildlife populations. In addition, the group identified topics that can provide peer-reviewed science that will be of utility for state and federal agencies that have management responsibilities in the nearshore.

Representatives from the Oregon Department of Fish and Wildlife, Oregon State University, and Oregon Sea Grant presented a synthesis of key Oregon nearshore research and monitoring needs, then summit participants articulated and prioritized nearshore research and monitoring needs in four categories relating to (1) the distribution and abundance of nearshore species and habitats, (2) species and habitat associations and interactions, (3) the effects people have on nearshore resources and the effects of nearshore resources on people and coastal communities, and (4) the effects of climate change and ocean acidification on species and their habitats and ecological function.

Summit participants developed research questions to address priorities, focusing primarily on baseline information associated with nearshore species and habitats as well as key threats and stressors to the nearshore ecosystem, e.g., climate change effects, harmful algal blooms, coastal pollution, and ocean acidification, and how ecosystem function is affected by these threats and stressors.

Participants proposed two different approaches to nearshore monitoring. One approach would identify priorities and suggested priorities included measuring ocean variability (La Nina and El Nino, HABs, hypoxia events, etc.) using gliders to provide the basic data and the context for any other research projects and management decisions, followed by secondary priorities to build and instrument shore-based stations that have ocean water intakes, and tertiary priorities to characterize the ocean by repeating the Newport Hydrographic line on southern coast (an area that is currently not monitored). The second approach would measure physical, chemical, biological, and human parameters including both fishery-dependent and fishery-independent sampling, other types of uses (e.g., recreation), and recruitment and ocean variability. With either approach socio-economic changes and impacts could and should be measured as part of the monitoring work.

The summit concluded with a discussion of the core elements of a comprehensive research and monitoring program focused on biodiversity, harmful algal blooms, and vulnerability/resilience, and based on three possible scenarios for biennial funding: (1) less than \$1 million; (2) \$1–3 million; and (3) \$3–5 million. Elements of nearshore research and monitoring program funded at less than \$1 million per biennium, would be modest. Elements include base-level monitoring of physical parameters to determine oceanographic variability and vulnerability to ocean acidification and hypoxia at coastal nodes, recruitment monitoring for species such as mussel, crab and fishes seasonal vessel-based abundance and distribution monitoring of rocky reef species at selected sites, coast-wide socioeconomic monitoring, and data management, integration and synthesis. If \$1–3 million were available per biennium, investigators would build on the previously described effort, adding more sites to the vessel-based surveys of rocky reef species for distribution and abundance information, conducting a benthic habitat inventory, expanding coastal monitoring nodes, conducting ship-based territorial sea sampling of biological, physical and chemical parameters, and conducting small-boat monitoring activities as well as species-level ocean acidification vulnerability

research, predictive modeling of climate change vulnerability/ocean acidification impacts, coupled with activities focused on data integration and synthesis following a model similar to that of the National Center for Ecological Analysis and Synthesis. For \$3–5 million per biennium, investigators would build on the previously described work and expand monitoring of rocky reef species to obtain population assessments, launch a glider below Coos Bay, conduct expanded benthic habitat inventories, sample for pollutants, and enhance data integration and synthesis.

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OREGON OCEAN SCIENCE TRUST SUMMIT

May 11-12, 2016 Newport, Oregon

I. WELCOME AND INTRODUCTIONS

Louise Solliday, Chair of the Ocean Science Trust, welcomed everyone (a total of 46 people attended the summit – See Appendix A), emphasizing the importance of the summit to identify priority research and monitoring funding needs for Oregon’s nearshore (territorial sea) area, scalable to budget resources available, that will provide baseline and trend data and inform key research questions related to changing ocean conditions as a result of climate change, shifts in marine habitat, and changes in marine fish and wildlife populations as well as provide peer-reviewed science for state and federal agencies that have management responsibilities in the nearshore.

Gabriela Goldfarb from the Oregon Governor’s office emphasized the importance of informing near-term ocean management decisions. She described the recommendation of the Ocean Task Force on Nearshore Research as a key driver in the creation of the Ocean Science Trust, acknowledging the presence of two legislators at the summit as a signal of the importance of the summit. Goldfarb described the pressing issues facing Oregon’s nearshore and the need for both human dimensions and natural sciences to inform management decisions.

II. KEY OREGON NEARSHORE RESEARCH AND MONITORING NEEDS

Current nearshore research and monitoring needs were presented by representatives from the Oregon Department of Fish and Wildlife, Oregon State University, and Oregon Sea Grant.

Caren Braby, Oregon Department of Fish and Wildlife Marine Resources Program Manager, characterized the difficulty of sampling in Oregon’s nearshore, but noted the importance of the nearshore to Oregon’s sport and commercial fisheries (e.g., Dungeness crab fishery is largely centered in the nearshore). Insufficient staffing, resources, and solutions drive the need to work with many partners and in numerous management venues. Federal partners rely on Oregon entities to be experts on species that exist in the nearshore, thus it is important to have an actionable strategy to make strategic investments in nearshore research and monitoring. ODFW has developed the Oregon Nearshore Strategy (as part of the Oregon Conservation Strategy) as a State Wildlife Action Plan (SWAP) completed in cooperation with the US Fish and Wildlife Service. The Oregon Nearshore Strategy is not a strategic plan – it’s a statement of what is important and what collaboration opportunities exist to help frame nearshore issues, and it includes education and outreach, research and monitoring, and management and policy strategies – the purpose of the summit is to focus on research and monitoring. The nearshore strategy has been used in policy discussions (e.g., renewable energy siting), and the completed plan ensures that ODFW is eligible to receive federal support to implement the plan.

Francis Chan, Associate Professor, Senior Research, Department of Integrative Biology at Oregon State University, discussed his role as co-chair of the West Coast Ocean Acidification and Hypoxia Science Panel, which was convened by the California Ocean Science Trust. The panel, which consisted of 20

scientists, was charged with advancing understanding of and developing options for addressing ocean acidification. They formulated 14 actions that could be accomplished within the next two years. The goals of the panel were to make science accessible to everyone and create an achievable road map that has impact. It was noted that the scale of what is available to use is mismatched to the information available. Monitoring should:

- Be relevant to management, and scientists should work collaboratively to identify gaps.
- Be question driven – what will it inform?
- Include ecosystem monitoring – simply monitoring the chemistry or fish populations alone is insufficient.
- Build from what currently exists.
- Recognize that it's about the people that interpret the data.

Relative to research priorities:

- The numbers and effectiveness of solutions are proportional to existing knowledge.
- Current funding is unlikely to provide the resources necessary to implement priorities. There is a disconnect between data/information we are generating and what data/information we need to manage.
- The focus is on developing models – we want to be able to evaluate effectiveness. Models have to be validated.
- Research priorities should address exposure, vulnerability, and adaptive capacity.
- The effectiveness of mitigation approaches should be evaluated.

The panel report was released in April of 2016, and outreach has occurred with decision makers, Ocean Policy Advisory Council (OPAC), National Oceanic and Atmospheric (NOAA) administrators (regionally and in DC), and the Environmental Protection Agency (EPA).

Of the 14 action items proposed by the panel in April of 2016, seven are currently being acted upon (e.g., revision of water quality criteria – a bill in California has been introduced to revise water quality criteria). Chan emphasized the importance of prioritizing opportunities and where disproportionate positive impact are projected.

Shelby Walker, Oregon Sea Grant Director, discussed the four new thematic areas established by Oregon Sea Grant's Strategic Plan:

- Ecological, social, and economic aspects of coastal development
- Adaptation to acute or chronic coastal hazards
- Human and natural dimensions of coastal and marine fisheries
- Cultural beliefs, learning, and valuation of coastal and marine issues

She noted the importance of considering cumulative, synergistic effects versus a single discipline focus, integrating the natural and social sciences, and bringing together tools and models as part of a comprehensive synthesis of information. Walker described the balance of long-term investments with short-term flexibility to address emerging ocean issues, and noted the National Science Foundation is investing in a 25-year ocean observing initiative. There is a scale mismatch that exists – we know something about so few places in the nearshore to assess vulnerability. She also emphasized the importance of partnerships.

III. TOP PRIORITIES FOR OREGON'S NEARSHORE RESEARCH AND MONITORING

Summit attendees were asked to convene in three breakout groups to describe Oregon's top nearshore research and monitoring priorities in four categories, characterizing the research priorities as questions:

- I. Distribution and abundance of nearshore species and habitats.
- II. Species and habitat associations and interactions that exist in the nearshore to inform ocean health (ecosystem function).
- III. The effects people have on nearshore resources and the effects of nearshore resources on people and coastal communities.
- IV. The effects of climate change and ocean acidification on species and their habitats and how these key stressors will influence ecological function and species in nearshore habitats in the future.

A. RESEARCH

The compilation of the breakout groups' questions are grouped within each of the four categories:

I. DISTRIBUTION AND ABUNDANCE OF NEARSHORE SPECIES AND HABITATS

How do the geomorphology, oceanography, species present (including key priority focal species), and physical and biological habitats vary within the Oregon's nearshore zone?

- **Methodologies/technologies**
 - What are non-traditional user-informed methods as well as best survey methodologies/new technologies of collecting information on distribution and abundance of nearshore species and habitats (e.g., age structure and life history)?
 - How do we map all habitats, and what are the best methods? How do we understand the variability? What are the key gaps? How do we map the inner shelf?
 - How can we combine research and monitoring efforts to analyze multiple phenomena simultaneously?
 - How can we use species to help describe habitats?
 - Are there key surrogates or proxies?
- **Habitat shifts**
 - Are benthic/pelagic habitats and species shifting (e.g., geospatially) (compared to historical patterns), will they shift over time and how (e.g., variability), and how does this knowledge relate to economics, business, culture and policy decisions?
- **Data**
 - How can we use fishery-dependent data to improve our research and monitoring efforts?
 - What is the distribution and abundance of ecologically and economically important species in Oregon's nearshore ocean and how are these changing over time?
 - Which species and habitats can act as indicators of the status of ecological services, changing conditions or other factors?
 - What are important characteristics (or parameters) that describes benthic and pelagic habitat and how do they vary in time and space?

II. SPECIES AND HABITAT ASSOCIATIONS AND INTERACTIONS THAT EXIST IN THE NEARSHORE TO INFORM OCEAN HEALTH (ECOSYSTEM FUNCTION)

- **Harmful Algal Blooms (HABs)**
 - What ocean conditions and their drivers lead to formation of HABs, and where and when are areas most susceptible to HABs (e.g., off shore vs. shoreside impacts)?
 - What environmental conditions lead to the production of marine biotoxins by HABs in Oregon waters?
 - How do we communicate with people about HABs?
- **Food web relationships**
 - What is the relationship among ocean conditions and fishing behavior on forage fish abundance?
 - What are the impacts and changes in forage fish/prey species abundance?
 - How does the species-specific food chain influence production?
 - What are the roles of copepods, kelp, larval plankton, top level predators (marine birds), juvenile fish, forage fish, and other species in specific habitats, and how do management actions affect these interactions?
- **Recruitment**
 - What causes variability in recruitment and does it correlate to marine organism abundance?
- **Habitats**
 - What are the habitat characteristics/features that correlate to/index with fish stocks?
 - What are the habitat types (oceanic, atmospheric, physical) that exist in the nearshore, and where are they physically located?
 - What are the connections among habitats, and what are the indicator species (and their competition/interactions) that will help identify the connections and inform management?
 - What are the important, sensitive or unique species and habitats within the nearshore, from an ecological and economic perspective, and do we understand ecological succession to assess the effects of individual species over time?
 - What are the drivers (habitats, physical processes < abundance of food) for species distribution and abundance?
 - What specific habitats are limiting?
- **Species-habitat associations/interactions (including people)**
 - What is the strength and persistence of species-habitat association in time and space?
 - What are the primary drivers of shifts in species-habitat associations and interactions?
- **Ecosystem Function**
 - What aspects of ecosystem functions are most important?
 - What aspects of food web nodes, including forage fish and other key species, are most critical to monitor?
 - How do invasive species affect the ecological function of the nearshore?

III. THE EFFECTS PEOPLE HAVE ON NEARSHORE RESOURCES AND THE EFFECTS OF NEARSHORE RESOURCES ON PEOPLE AND COASTAL COMMUNITIES

- **People**
 - How do people relate to protected areas and the ocean generally, and do changes in ocean understanding and knowledge change policy and individual behavior?
 - What are the demographic and/or behavioral changes we can anticipate in Oregon, and how do these changes influence how people value and impact ocean resources, changes in coastal pollution/contaminants (e.g., shifting coastal uses)?
 - What are the effects of human development on nearshore resources and uses?
 - What other factors affect people on the coast?
- **Pollution**
 - Are there places on the Oregon Coast where estuarine inputs influence ocean chemistry greater than ocean upwelling (e.g., ocean acidification), where anthropogenic input outweighs natural offshore changes?
 - What are cumulative impacts of non-industrial, non-point source pollution in the nearshore/mouth of estuary?
 - What are the impacts of land use on water quality in the nearshore and potential synergistic effects with climate change?
 - What is the spatial distribution of pollution inputs on the Oregon coast and of contaminant accumulation in marine organisms?
- **Fisheries**
 - What are the effects of fisheries and fisheries management on coastal communities?
 - How does fishing pressure affect marine populations?
 - What are the effects of perceived or real conflicts in fisheries management strategies on the fishery resource?
- **Ecosystem Services**
 - What is the temporal and spatial value and distribution of ecosystem services and benefits that are derived from the ocean and how do benefits change with changing climate, demographics, technology and institutions?
 - What are the existing or “baseline” values of ecosystem services and how can we utilize ecological and bio-economic modelling to assess tradeoffs, planning and adaptation?
- **Climate change**
 - How will climate change impact the amount, timing, and location of contaminants entering the ocean? How do these changes relate to threshold impacts? How do perceptions of mitigation strategies influence strategy acceptance?
 - How will climate change affect demographics of people in Oregon? Will the demographic changes lead to inequities for certain human groups/communities?

IV. THE EFFECTS OF CLIMATE CHANGE AND OCEAN ACIDIFICATION ON SPECIES AND THEIR HABITATS AND HOW THESE KEY STRESSORS WILL INFLUENCE ECOLOGICAL FUNCTION AND SPECIES IN NEARSHORE HABITATS IN THE FUTURE.

What and where are the primary manifestations of climate change expected on the Oregon Coast?

- **Climate Change Impacts**
 - What are the synergistic impacts on organisms and habitats of the key manifestations of climate change?
 - What are the detectable cultural changes that are manifesting in our communities as a result of climate change?
 - What is the correct spatial and temporal scale to monitor changes?
 - What are projections for climate change variability/ocean acidification (CCV/OA) for Oregon's nearshore?
 - Are there places that are more/less vulnerable to CCV/OA?
 - How are species affected by CCV/OA, and which species are most vulnerable? What are the sentinel species to indicate CCV/OA effects?
 - What are economic, cultural, and political impacts of CCV/OA?
 - Can we mitigate for or adapt to the direct and indirect impacts of harmful CCV/OA?
 - How can we use collaborative research and citizen science to gather climate change data?
- **Ecological Function**
 - What is the most impactful research to understand ecological function in Oregon territorial waters?
 - What are the key indicators for specific habitats?

B. MONITORING

Breakout session participants discussed what, where, and how to monitor Oregon's nearshore to inform key management decisions and to provide a report on the state of Oregon's nearshore periodically. There was discussion about considering major events in which managers needed data and information, but that information may have been missing. Examples of such events include hypoxia, domoic acid and crabs, in-season closure of nearshore fisheries, oyster production and ocean acidification, ocean energy permitting, poor salmon returns, hypoxia events, marine reserve siting, groundfish collapse, RCA closures, harmful algal blooms and seabird die-offs, clam closures.

New monitoring could focus on low hanging fruit and build on existing data sets. It was noted that any new monitoring should fully integrate with Integrated Observing Systems, and that a key first step may be to compile and organize a catalog of existing datasets to identify data gaps as well as existing resources (e.g., the National Marine Fisheries Service California Current report could provide examples of potential indicators; tribal sovereign nation members may collaborate on historical and future use of specific sites).

To address **what is measured**, two approaches were offered:

- A.** One approach would be to identify high priorities and some potential priorities included measurements that inform our understanding of ocean variability (e.g., La Nina and El Nino, HABs, hypoxia events, etc.) to provide the basic data and the context for any other research projects and management decisions. Such an approach would be most effective if the monitoring complements existing ocean observing systems. Physical parameters (temperature, salinity, conductivity, DO, pCO₂, velocity) would be collected at 6–7 sites using gliders. The second priority for this approach would be to build and instrument shore-based stations that have ocean water intakes and/or establish secure monitoring stations on jetties, docks or piers. The third priority for this approach would be to characterize the ocean by repeatedly conducting a nearshore oceanographic cruise (i.e. similar to Newport Hydrographic Line) on the southern coast (in an area that is currently not monitored).
- B.** The second approach (shore-based stations) would involve monitoring a suite of physical, chemical, biological, and human parameters including many of those mentioned in A, above. The number of parameters and spatial/temporal extent of the measurements would be scaled to the funding level and should be closely coordinated with existing monitoring programs. The following parameters were considered high priority:
- Physical and chemical parameters (EOV's)
 - Temperature, salinity, ocean nutrient distributions (nitrates, etc.), dissolved oxygen, pCO₂, velocity, pH, alkalinity, chlorophyll fluorescence, light, emerging contaminants (see research priorities), conductivity
 - Biological Parameters (Biological EOV's)
 - Key indicator species at multiple trophic levels (plankton, fish, seabirds, marine mammals, etc.) – need a selection process to identify these or select an existing indicator framework; include recruitment, HABs, essential biodiversity variables
 - Assessing and monitoring population abundance of nearshore fishery species, especially rocky reef species, including detailed habitat mapping. This will require fishery-independent sampling to directly measure fish abundance and fishery-dependent sampling to monitor changes in fish population parameters (such as population age structure).
 - Recruitment variability
 - HABs
 - Human Parameters
 - Spatial and temporal use patterns, land use, cultural and historical value, economic contribution to coastal communities, attitudes/perceptions WRT the ocean, Surfrider Foundation, Oregon Parks and Recreation Department, counties
 - Demographic data
- Effort shift in fisheries behavior as well as physical and chemical factors

To address **where measurements** occur, participants proposed the following considerations:

- A structured approach based on an initial list of monitoring sites to be reduced and refined based on Year 1 data
- Each biogeographic region along the Oregon coast, or a periodic (i.e. annual) border to border oceanographic cruise to characterize spatial differences in nearshore oceanographic conditions
- Map of Oregon coast (Appendix B) showing 4 representative areas along the coast within which to focus ship surveys, 6 representative sites for coastal nodes and existing and potential new glider lines
- Within each focus area, potential area for monitoring would extend from the intertidal to beyond the Territorial Sea (e.g., out to about 80 meters)
- Outer Continental Shelf
- Political boundaries, counties, population centers as they relate to the map in Appendix B
- Sampling can be coordinated with existing monitoring programs in marine reserves (4 out of 5 of Oregon's marine reserves exist within the areas shown on the map)

Participants address **how often we measure**, noting it depends on the variable being measured, and discussing the need to independently gather physical, chemical, biological and human dimensions data in the winter. Ideally, sampling for the monitoring program should occur quarterly, but at a minimum, sampling should cover summer and winter seasons.

Participants discussed ways to **report results**. Participants proposed the Ocean Science Trust convene a two-day workshop with scientific investigators to build information products (conceptual). Workshop agenda could include the following topics:

- Assess data gaps and data sharing challenges to inform information sharing of long-term datasets and data collection and tool development (data portal);
- Identify priority needs to maintain operations for data set collection that inform the status of the state of the Oregon coast and thus are capable of informing management decisions. (e.g., NH Line)
- Review and consider using the NMFS California Current Integrated Ecosystem Assessment (IEA) report (<http://www.noaa.gov/ica/CCIEA-Report/pdf/index.html>) , Puget Sound Partnership Vital Sign Indicators, CaCOFI (<http://calcofi.org/ccpublications/ccreports/calcofi-reports-toc/276-crtoc-vol-55-2014.html>), and Baja to Bering as potential frameworks
- Identify a manager for State of the Coast datasets
- Possible data catalog system, environmental report card
- Social vulnerability and resilience analyses
- Identify key data gaps

Participants noted that for less than \$1 million per biennium, the state would receive a snapshot of information, with some spatial distribution and seasonal variability. For \$1-3 million, the state would receive an enhanced snapshot with more sampling that could include demographic and economic changes. And for \$3–5 million, more data layers could be added, e.g., habitat, genetic, species, age-structure variability, and that longer-term sampling could be achieved.

C. A COMPREHENSIVE RESEARCH AND MONITORING PROGRAM FOR OREGON'S NEARSHORE

A comprehensive research and monitoring project design that included three themes (Biodiversity, HABs, Vulnerability/Resilience) was proposed:

Elements of **Emerging Technologies, Methods, and Innovation:** Imaging tech, DNA analysis, fisheries-independent methods, recruitment, and pollutants.

Pollution & CCV/OA—What are human impacts on nearshore environment, especially pollution-related impacts?

- Distribution of existing and emerging pollutants (pilot studies)
 - Synergistic and cumulative impacts of pollutants on key species (e.g., keystone species, commercially important species, humans)

The following integrated research and monitoring program reflecting three levels of funding for the comprehensive program was proposed. The funding levels are additive in that each successive funding level includes its list of activities plus funding activities of the previous level.

\$<1 MILLION PER BIENNIUM

Monitoring: (See Appendix A as a reference)

- \$50-100K per coastal monitoring node (one site) (pH/alkalinity, salinity, temp., etc.)
- \$20K per site for recruitment monitoring (Crab, mussels, fishes, etc.)
- \$100K per site per season for vessel-based fishery-dependent abundance and distribution monitoring of rocky reef species (reference site(s)/expandable)
- \$100K for coast-wide socioeconomic monitoring

Research:

- \$50K socioeconomic study
- \$100K Data management
- Data integration and synthesis

\$1–3 MILLION PER BIENNIUM

Monitoring:

- \$200K per year for vessel-based abundance and distribution monitoring of rocky reef species (expand to 3 sites)
- \$300K per year for benthic habitat inventory (locations TBD)
- \$300K per coastal monitoring node (Expand to six sites)
- \$100K per year (two sites, two surveys/year) for ship-based territorial sea sampling of biological parameters
- \$100K per year (two sites, two surveys/year) for ship-based territorial sea sampling of physical and chemical parameters
- \$100K for small boat for monitoring activities (\$2-4K per day and 20 days min. a year)
- Limited availability of state-funded research vessel research (then \$25K/day)

Research:

- \$100K per year for species-level OA vulnerability research
- \$50-100K per year predictive modeling of CCV/OA impacts
- \$250K for “lite” National Center for Ecological Analysis and Synthesis (NCEAS)-style data integration and synthesis (GIS)

\$3-5 MILLION PER BIENNium**Monitoring:**

- \$200–500K per year for vessel-based abundance and distribution monitoring of rocky reef species (expand to 5 sites or coast-wide at upper budget level) – population assessment of rocky reef species
- \$150K for glider line off Cape Blanco (no current gliding below Coos Bay)
- \$300K per year for benthic habitat inventory (locations TBD)
- \$300–\$500/sample for pollutant monitoring

Research:

- \$250K per year NCEAS-style data integration and synthesis
- Develop bio-economic and ecosystem-values models to support development of nearshore resource management solutions.

APPENDIX A. SUMMIT ATTENDEES.

Laura	Anderson	Member	OST	laura@localocean.net
Jack	Barth	Professor	Oregon State University	barth@coas.oregonstate.edu
Brian	Boling	Laboratory Program Manager	State of Oregon Dept. Environmental Quality	boling.brian@deq.state.or.us
Caren	Braby	Manager	ODFW Marine Program	caren.e.braby@state.or.us
Judith	Callens	Natural Resources Policy Specialist	Oregon Department of Agriculture	jcallens@oda.state.or.us
Jena	Carter	OR Director of Oceans and Coasts	The Nature Conservancy	jcarter@tnc.org
Francis	Chan	Associate Professor Senior Research	Oregon State University	chanft@science.oregonstate.edu
Flaxen	Conway	Professor / Director / Extension Specialist	OSU / Oregon Sea Grant	fconway@coas.oregonstate.edu
Shannon	Davis		TRG	shannond@trgsystems.net
Catherine	Dayger	PhD Student	Portland State University	cdayger@pdx.edu
Lisa	DeBruyckere	President	Creative Resource Strategies	lisad@createstrat.com
Xiuning	DU	Post-doctoral Research Associate	Oregon State University	xiuningdu@gmail.com
Steven	Dundas	Asst. Professor	Oregon State University - Applied Economics	steven.dundas@oregonstate.edu
Jennifer	Fisher	Faculty Research Assistant	Oregon State University	jennifer.fisher@noaa.gov
David	Fox	Resource Assessment Section Leader	ODFW	David.S.Fox@state.or.us
Gabriela	Goldfarb	Natural Resources Policy Advisor	Office of Governor Kate Brown	gabriela.goldfarb@oregon.gov
Chris	Goldfinger	Professor	OSU	gold@oce.orst.edu
David	Gomberg	State Representative	Oregon House of Representatives	rep.davidgomberg@state.or.us
Elise	Granek	Associate Professor, Environmental Science & Management	Portland State University	graneke@pdx.edu
Kirsten	Grorud-Colvert	Assistant Professor-Senior Research	Department of Integrative Biology	grorudck@science.oregonstate.edu
Burke	Hales	Professor	OSU	bhales@coas.oregonstate.edu
Sarah	Henkel	Assistant Professor, Sr. Res.	OSU-Hatfield	sarah.henkel@oregonstate.edu
Selina	Heppell	Department Head	OSU-Fisheries and Wildlife	selina.heppell@oregonstate.edu
Jan	Hodder		Oregon Institute of Marine Biology, University of Oregon	jhodder@uoregon.edu

Gway	Kirchner	OR Marine Fisheries Project Director	The Nature Conservancy	gway.kirchner@tnc.org
Paul	Klarin	Marine Program Coordinator	Oregon Coastal Mgt. Program	paul.klarin@state.or.us
Andy	Lanier	Coastal Natural Resources Specialist	Oregon Coastal Management Program	Andy.lanier@state.or.us
Kessina	Lee	Policy Fellow	GNRO	kessina.t.lee@oregon.gov
Kyle	Linhares	Staff	Rep. Gombert's Office	kjlinhares@gmail.com
Emily	Martin	Member	Ocean Science Trust	emily@cascademountainschool.org
Geoff	Ostrove	Staff	Sen. Arnie Roblan	sen.arnieroblan@state.or.us
Bill	Peterson	Dr. and Senior Scientist	NOAA-Fisheries	bill.peterson@noaa.gov
Arnie	Roblan	Senator	Legislature	sen.arnieroblan@state.or.us
Steven	Rumrill	Shellfish Program Leader	Oregon Department of Fish and Wildlife	Steven.S.Rumrill@state.or.us
Bill	Ryan	Deputy Director	Department of State Lands	bill.ryan@dsl.state.or.us
Alan	Shanks	Prof Marine Biology	U of O, Oregon Inst of Marine Biology	ashanks@uoregon.edu
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Tommy	Swearingen	Human Dimensions Project Leader	Oregon Dept. of Fish and Wildlife	thomas.c.swearingen@state.or.us
Gil	Sylvia	Director	OSU-COMES	gil.sylvia@oregonstate.edu
Terry	Thompson	Commissioner	Lincoln County	tthompson@co.lincoln.or.us
Dick	Vander Schaaf	Associate Director Marine Program	The Nature Conservancy	dvanderschaaf@tnc.org
Shelby	Walker	Director	Oregon Sea Grant	shelby.walker@oregonstate.edu
Krystyna	Wolniakowski	Member	Oregon	kwolniakowski@hotmail.com

APPENDIX B. POTENTIAL REPRESENTATIVE SITES FOR MONITORING OREGON'S NEARSHORE.

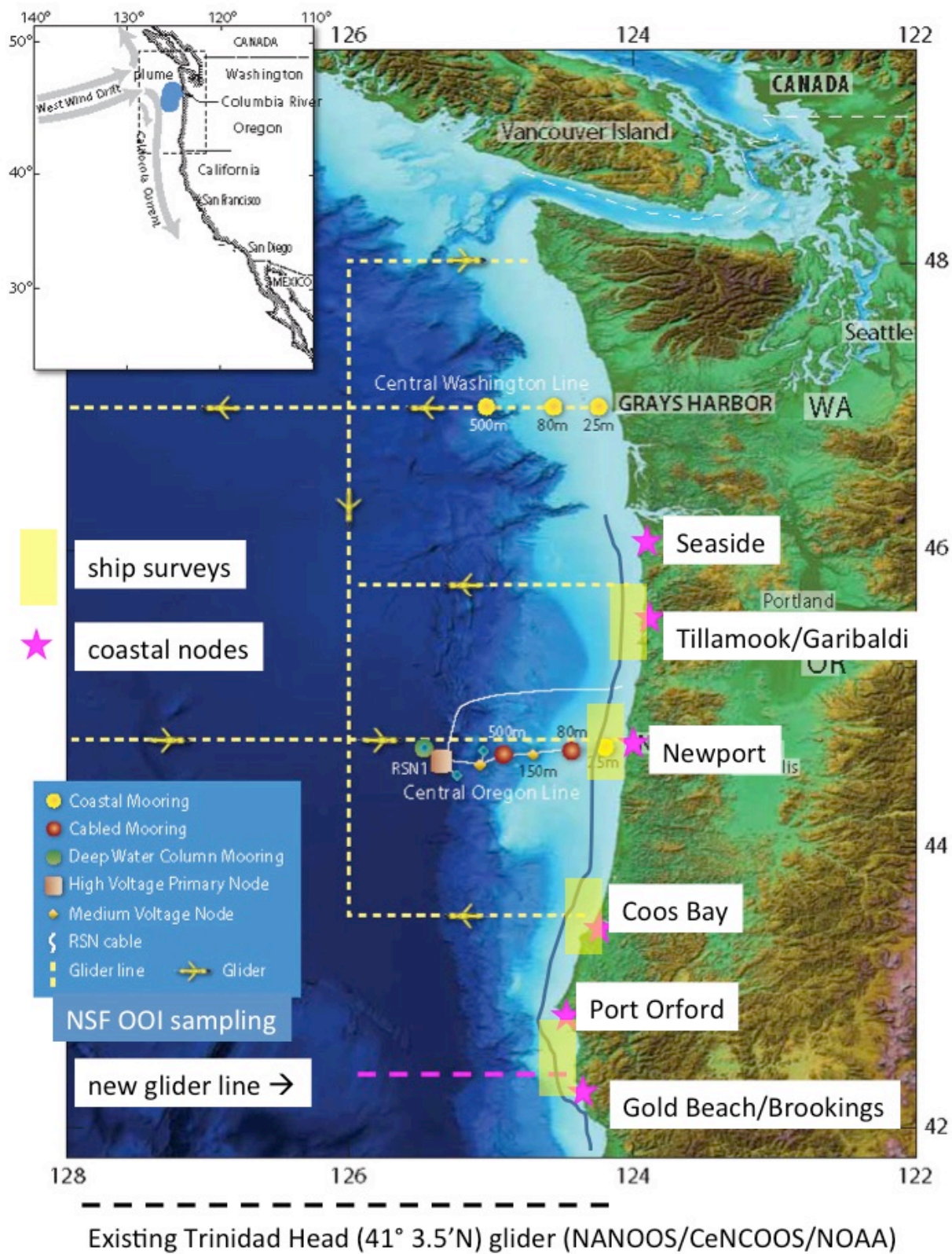




Photo: SOLVE



Photo: Sea Grant

Draft Oregon Marine Debris Action Plan



Photo: Surfrider Foundation



Photo: ODFW

Draft Plan Development

Marine Debris Survey March/April 2016

80+ Priorities

Outreach/Edu
cation

Prevention

Removal

Research

Coordination

Marine Debris Workshop April 2016

Land-Based

Ocean-Based

Education

Objectives (7)

Objectives
(4)

Objectives
(5)

Projects

Projects

Projects

Plan Review Timeline

V1 Review

June 14-July 7

V2 Review

July 13 – August 8

V3 Complete

August 13

2nd Workshop

November 2-3

Draft Final Plan

November-December

Review/Finalize Plan

December-January?



Draft Plan Outline



- Purpose
- Process
- Structure
- Goals, Objectives and Projects
 - Land-Based
 - Ocean-Based
 - Education
 - Derelict and Abandoned Vessels
- Appendices

Land-based

Objective 1: Increase capacity and coordination of response to marine debris in Oregon

Example Projects:

- Increase OPRD ocean shore management capacity, double beach ranger staff.
- Implement volunteer-agency rapid response protocols.
- Coordinate annual regional meetings between NGOs and OPRD regional managers/rangers



Land-based

Objective 1: Increase capacity and coordination of response to marine debris in Oregon

Objective 2: Create or modify existing policies to support marine debris work in Oregon

Conduct a gap analysis of agencies (state, federal, local) policies and responsibilities for marine debris

Land-based

Objective 3: Increase coordination among marine debris entities

Objective 4: Improve data collection, reporting & accessibility



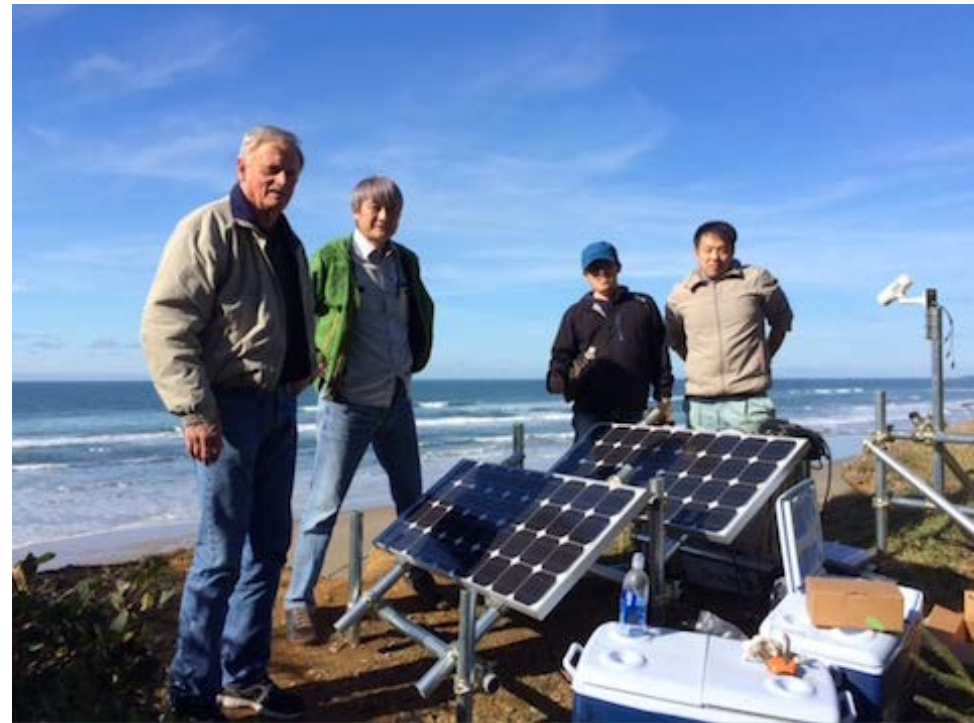
Ex. Project: Compile and improve existing shoreline debris monitoring programs in Oregon

Land-based (cont.)

Objective 5: Enhance our understanding about current and emerging marine debris

Develop research priorities for marine debris in Oregon

Objective 6: Implement behavior change & education campaigns that lead to prevention



Land-based (cont.)

Objective 7: Enhance volunteer and staff safety during debris cleanups



Develop an OMDT volunteer safety working group

Ocean-based

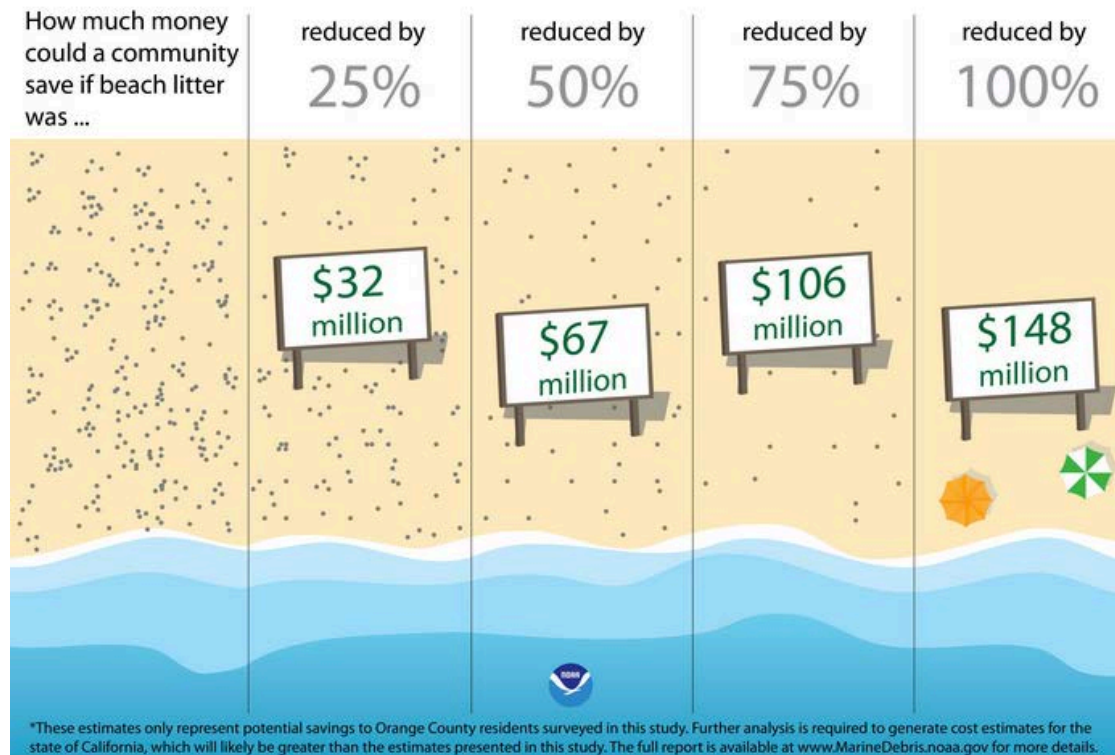
Objective 1: Educate and motivate mariners from commercial fishing boats, recreational boats and industrial vessels on best practices, prevention and impact

Identify and make use of existing direct outreach and training to include marine debris



Ocean-based

Objective 2: Identify, create and pursue funding opportunities and cost savings



Use existing agency funds for marine debris removal and create new fiscal mechanisms to obtain new funding

Ocean-based (cont.)

Objective 3: Prioritization of response and removal of marine debris

Removal of derelict crab pots at dredged material disposal sites

Objective 4: Identify and clarify chain of command, leadership and collaboration with stakeholders

Establish interagency marine debris response team

Education

Objective 1: Engage coastal and inland communities in marine debris prevention and removal through coordinated education and outreach

Develop a portable marine debris exhibit to educate about the issue of and solutions to marine debris

Objective 2: Education to raise awareness and understanding of plastic pollution using integrated education (science and art, etc.)

Education (cont.)

Objective 3: Use consistent, accurate messaging about marine debris, specifically about the sources, impacts, and behaviors

Objective 4: Increase coordination among educators, researchers, and cleanup groups on marine debris topics and events



**WHAT GOES
IN THE OCEAN
GOES IN YOU.**

RECENT STUDIES ESTIMATE THAT FISH OFF THE WEST COAST INGEST OVER 12,000 TONS OF PLASTIC A YEAR. FIND OUT HOW YOU CAN HELP TURN THE TIDE ON PLASTIC POLLUTION AT WWW.SURFRIDER.ORG/RAP

Education (cont.)

Objective 5: Elevate awareness and understanding of marine debris statewide



Designate an Oregon Marine Debris Month

Plan Review Timeline

V1 Review

June 14-July 7

V2 Review

July 13 – August 8

V3 Complete

August 13

2nd Workshop

November 2-3

Draft Final Plan

November-December

Review/Finalize Plan

December-January?



MEMORANDUM

June 13, 2016

To: OPAC Members

From: Paul Klarin

Re: TSP Work Group Progress Report

Overview:

The TSP Work Group has met twice since OPAC assigned it the task of reviewing Part Three Rocky Shores Management Strategy, and making recommendations to the council for amendments to the section. The meetings have been conducted at the DLCD offices in Salem, with internet and phone participation made available to work group members and others who wish to participate. Notice of the meetings has been posted on the OPAC website.

The Work Group efforts are being guided by the instructions for future amendments that were incorporated into a previous amendment of Part Three, which OPAC recommended and was approved by LCDC in 2001 as Section H. Rocky Shore Management at Cape Arago. Those instructions were as follows:

“OPAC staff suggests that this provides an opportunity to re-format the entire rocky shore section to reflect the organization of rocky shore sites into larger cells as shown on the maps in the Appendix of the Territorial Sea Plan, pp 225-226. Such re-formatting will set the stage for future amendments based on assessments of entire cells that encompass related sites, which the OPAC is actively considering, and can be accomplished without changing the existing substantive management requirements now contained in the officially adopted plan.”

Work to Date:

The Work Group initiated the process through a deliberative section by section review of the Part Three text, with the intention of providing the council with suggested changes. Those suggested changes, along with comments and questions that the work group is asking the council to consider, are embedded in the attached draft review document which is provided in a track change format to show the suggested edits and additions.

As a general observation, the Work Group found that the certain sections of text in Part Three were outdated and did not reflect the current state of knowledge or understanding for ocean conditions and the increasing threats to the health of the rocky intertidal ecosystem. Many of the changes being suggested reflect that need to account for those challenges.

The Work Group identified several issues that OPAC may want to discuss and provide feedback on for incorporation into the working draft. (These issues are in *italic bold* in the track change version of the attached document).

Work to Do:

The upcoming sections of Part Three, including sections E, F and G, may need to be contracted, deleted or replaced in their entirety depending on the direction that OPAC recommends for amending the plan.

Section D: Existing Rocky Shores Management. This section is an extensive list of those authorities and management plans that were in place at the time the TSP was adopted in 1994. They are site specific in some instances, or have been modified or amended over the several decades since that time. The Work Group recognizes that bringing this section up to date would be repeating a mistake, since future changes would immediately make this information out of date. It would be better to provide simple citations for the statutory or regulatory authorities of the various agencies, with general descriptions of their content, and omit any site specific closure or restrictions that may apply currently but could well change in the future.

Section E: The Context of Management. This section seeks to provide an overview of the current state of knowledge about resources and uses of Rocky Shore areas, and the ecosystem management approach that is being applied by state and federal agencies. As such, it is a compendium of highly condensed information about ocean conditions and a tutorial on the preferred method for managing them. If OPAC decides this section is worthy of retention, it may be worthwhile asking the STAC to review its content and suggest revisions.

Section F: Site Analysis & Categories and Section G: Site Designations contain several forms of the spatial data and analysis related to RS sites. Given the OPAC instructions for revising the method for identifying and categorizing RS sites contained in the 2001 (listed above), these sections will need to be combined and restructured under a new format. The state agencies will need to compile current data and maps, and conduct a spatial analysis of the sites and the proposed cells that would be incorporated into the new section. It would be helpful to the Working Group for OPAC to confirm this to be the preferred intention prior to beginning that effort.

Timeline:

Based on the pace of the work to date, what needs to be completed, OPAC's schedule and the staff and funding resources available, it seems likely that the public engagement phase of this effort won't be initiated before the summer of 2017. It could take up to a year for that to conclude and another year for OPAC to complete a package of recommendations that could be brought to LCDC for consideration as an amendment to

the TSP. That would be conducted as a routine administrative rule process and would have its own timeline dependent upon the commission's schedule and other factors.

OPAC Ocean Acidification Working Group

June 2016 Update

Background and Purpose:

In December 2015 the Ocean Policy Advisory Council (OPAC) established an ocean acidification (OPAC-OA) work group. Current members of the work group include Caren Braby, Jena Carter, Gabriela Goldfarb, Terry Thompson, and Shelby Walker. Work group members developed a common understanding of the role that this group can play to meet the intent of OPAC's December 2015 strategic planning and work group formation process. The work group focuses on four objectives: through updates at OPAC meetings, provide a **public forum** opportunity to share information on OA issues in Oregon; provide **documentation** of the many groups, meetings, and sources of information on OA in Oregon; highlight opportunities for OPAC to **comment on OA topics or events**; develop for OPAC consideration formal **comments on policy/legislation/research** program development in Oregon.

1) Recent OA-related activities:

- a) February 18: Members of state and federal agencies, NGOs, and scientists met in Newport to discuss an Oregon OA monitoring initiative (organized by Tillamook Estuary Partnership).
- b) April: West Coast Ocean Acidification and Hypoxia Science Panel – official release of Panel recommendations, presented in numerous forums including at the April 2016 OPAC meeting (<http://westcoastoah.org/executivesummary/>).
- c) April 14: Op-Ed 'Time for Oregon to take the lead on ocean health,' by Senator Arnie Roblan (with input from Jack Barth and Francis Chan of the WCOAH Science Panel) in The World (http://theworldlink.com/news/opinion/local/time-for-oregon-to-take-the-lead-on-ocean-health/article_f15db945-c858-58a4-b533-62e2ebfe8bfa.html).
- d) April 17: Congressman Kurt Schrader's Fishermen's Roundtable included OA as a topic (Francis Chan participated).
- e) April 18: Fishermen-Scientist Roundtable, Newport, discussed need to identify ocean vulnerability (collaboration of Lincoln County, Oregon Sea Grant, OSU and ODFW; for information contact Shelby Walker, shelby.walker@oregonstate.edu).
- f) May 11-12: Oregon Ocean Science Trust Science Summit, Newport. Several OPAC members attended including Caren Braby, Jena Carter, Gabriela Goldfarb, Terry Thompson, and Shelby Walker (report will be posted at http://www.oregon.gov/dsl/Oregon_Ocean_Science_Trust).
- g) May 24: Oregon Legislature House Interim Committee on Energy & Environment Informational Meeting on Ocean Issues (Louise Solliday, Executive Director of Oregon Ocean Science Trust, Dr. Francis Chan, Dr. Jack Barth).
- h) May 25: Joint White House Interagency Working Group on Ocean Acidification call regarding OAH Monitoring Task Force; Burke Hales will serve for Oregon.
- i) June 1-2: Clean Energy Ministerial, San Francisco; Pacific Coast Collaborative Refresh identified ocean acidification as one of three top priorities.
- j) OPAC OA workgroup convened by phone on June 9: Jena Carter, Gabriela Goldfarb, and Shelby Walker participated.

2) Anticipated OA-related actions and events:

- a) Pacific Coast Collaborative Ocean Acidification subgroup letter to President Obama and Prime Minister Trudeau requesting increased investment and collaboration regarding ocean acidification on the Pacific coast; possible PCC-OA participation in Secretary of State Kerry's Our Ocean conference in September; IWG-OA Monitoring Task Force, followed by a Workshop in Fall 2016.
- b) At December meeting, discuss possible draft OPAC letter to Governor on climate impacts to Oregon's ocean and the policy, management, and science needed to address the threats posed by ocean acidification and changing ocean conditions to Oregon's ocean and coastal interests.
- c) At December meeting, update on California and Washington OA-related legislative efforts.