



## Oregon Coordinating Council on Ocean Acidification and Hypoxia

### ***Draft Agenda Topics***

Wednesday, May 23<sup>rd</sup>, 2018

10:00 AM – 3:00 PM

US Fish and Wildlife Newport Field Office  
2127 SE Marine Science Drive, Newport, OR 97365

Please join my meeting from your computer, tablet or smartphone.

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- |         |  |
|---------|--|
| 10:00am | Getting Started (Co-chairs) <ul style="list-style-type: none"><li>• Brief introductions</li><li>• Vote to adopt: April 17<sup>th</sup> meeting summary and revised agenda, Working Group meeting minutes (1<sup>st</sup> and 2<sup>nd</sup> meetings), May 23<sup>rd</sup> meeting agenda</li><li>• Current events, updates (roundtable)</li></ul> |
| 10:20am | Update on Federal OAH NOAA initiatives and Ocean Acidification Information Exchange (Presentation from Dr. Jewett and Dr. Busch, Council discussion)   |
| 11:00am | Working Group Updates 15 – 20 min per working group <ul style="list-style-type: none"><li>• Reporting on interim meeting</li><li>• Recommendations draft</li><li>• Focus statement draft</li></ul>   |
| 12:15pm | Working Lunch <ul style="list-style-type: none"><li>• Mock-up of outreach event display (for exploration, comment)<ul style="list-style-type: none"><li>○ What is OAH one-pager, OAH Council one-pager</li><li>○ OA CO2 experiment</li><li>○ Visitor logbook/survey designs</li></ul></li></ul>  |

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|--------|---|
| 1:00pm | Socioeconomics – Status of the Science describing coastal economies and potential needs for how OAH will impact (Presentation from Dr. Davis)   |
| 1:30pm | Public Comment  |
| 1:45pm | Report Documents Review <ul style="list-style-type: none"><li>• Report Outline and Crosswalk (with SB 1039)</li><li>• Report Mission/Vision Statement</li><li>• Report Cover Page</li></ul> |
| 2:45pm | Council Business (Co-Chairs) <ul style="list-style-type: none"><li>• Future Council meeting planning (schedule, locations)</li></ul>  |
| 3:00pm | Adjourn   |
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***OregonOcean.info***

***Comments or Questions? Please contact***

***Council Co-Chairs [Caren.E.Braby@state.or.us](mailto:Caren.E.Braby@state.or.us) or [Jack.Barth@oregonstate.edu](mailto:Jack.Barth@oregonstate.edu)***

***Council staff [Charlotte.M.RegulaWhitefield@state.or.us](mailto:Charlotte.M.RegulaWhitefield@state.or.us)***



## Oregon Coordinating Council on Ocean Acidification and Hypoxia

### **DRAFT: Meeting Summary**

Tuesday, April 17th, 2018

Location: Remote

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### **Attendees**

OAH Council members: Dr. Kristen Sheeran, Dr. Jack Barth, Dr. Caren Braby, Frank Barcellos, Karen Tarnow, Andy Lanier, Dr. James Sumich, Dr. Shelby Walker, Dr. Aaron Galloway, John Schaefer, Fran Recht, Liu Xin and Al Pazar.

Guest presenters: California Ocean Protection Council (OPC) – Deborah Halberstadt; Washington Marine Resources Advisory Council (MRAC) – Martha Kongsgaard

OAH Council Staff: Dr. Charlotte Regula Whitefield

Audience attendees: Deanna Caracciolo (DLCD), Stacey Jochimsen (US Sen. Merkley), Tyler Janazah (State House Dist. 10), Shannon Davis, and Jena Carter.

### **Meeting Materials**

Copies of all power point presentations, video recordings, and meeting documents are available on the Council website at: <http://oregonocean.info/index.php/ocean-acidification>

### **Meeting Agenda (Actual) Summary**

[Video/Audio Recoding]:

- |         |  |
|---------|--|
| 10:00am | Getting Started (Co-chairs) <ul style="list-style-type: none"><li>• Formal greetings provided by Co-Chairs (Caren Braby and Jack Barth)</li></ul>  |
| 10:10am | California: <a href="#">OAH Action Planning process</a> (OPC, Halberstadt) <ul style="list-style-type: none"><li>• Described California's recent actions in absence of a formal OAH Action Plan, as well as their current process to formalize. CA Action Plan targeted to be completed by early 2019.</li></ul> |
| 10:30am | Washington: <a href="#">Blue Ribbon Panel process, OA Action Plan</a> (MRAC, Kongsgaard)   |

- Described the Washington’s original and recently updated (2017) Blue Ribbon Panel reports, origins. Represents WA’s OAH Action Plan.

11:00am Break

11:30am Working Group Updates and Meeting Summaries

- WG1: [Scientific Understanding and Data Gaps](#)
- WG2: [Reducing Causes of OAH](#)
- WG3: [Building Adaptation and Resilience](#)
- WG4: [Expand Public Awareness](#)

12:00pm Oregon public processes: [Rocky Shores Process and Territorial Sea Plan](#) (Lanier)

- Described the TSP and on-going Rocky Shores (Part 3) revision process.
- Council was interested in exploring the intersect between this plan, the OAH Council plan, and the Oregon Ocean Science Trust priorities.

12:15pm Public Comment

- No public comment provided

12:45pm Council Business (Co-Chairs)

- Update on report development process, draft vision statement development
- Working group meetings will be scheduled before the May 23<sup>rd</sup> Council meeting (needing 48 hour notice for posting)
- US Representative Bonamici’s federal OAH legislative initiatives

1:00pm Adjourn

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***Council staff [Charlotte.M.RegulaWhitefield@state.or.us](mailto:Charlotte.M.RegulaWhitefield@state.or.us)***



## **Oregon Coordinating Council on Ocean Acidification and Hypoxia**

### ***Draft Agenda Topics***

#### **REMOTE MEETING**

Monday, Jun 25, 2018 10:00 AM - 1:00 PM

**Please join my meeting from your computer, tablet or smartphone.**

<https://global.gotomeeting.com/join/688645469>

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United States: +1 (872) 240-3212

**Access Code: 688-645-469**

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- 1) Presentation from Dr. Wrathall, Dr. Waldbusser, and/or Dr. Kling (30 min with Q/A)**  
"Vulnerability and Adaptation to Ocean Acidification among Pacific Northwest Mussel and Oyster Stakeholders"
  - 2) Working Group Updates (15 – 20 min per working group)**
    - a. Reporting on interim meetings
    - b. Information and data needs
    - c. Review of combined Council recommendations
    - d. Recommendations Timelines
  - 3) Review of Report Sections**
    - a. Appendix Documents: Title layout, Council members bio pages, OAH seascape, OAH history road map
    - b. Review and utilize relevant scientifically supported information
      - Update on the Pacific Coast Collaborative Data Monitoring site
      - Recently funded OAH research in OR
    - c. Agencies descriptions outline
    - d. OAH Action plan public process
      - *What do we want as Post September report actions?*
    - e. Ocean Science Trust (OST)
      - *What do we want from the relationship?*
  - 4) Presentation from Oregon Global Warming Commission – Angus Duncan (30 min with Q/A)**



## **Oregon Coordinating Council on Ocean Acidification and Hypoxia**

### **Council Member Updates – Meetings and Events**

Wednesday, May 23<sup>rd</sup>, 2018

10:00 AM - 3:00 PM

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### **Key Oregon OAH Meeting and Events since April 17<sup>th</sup> 2018**

#### **Congressman Schrader's Annual Fishermen's Roundtable**

Friday, April 20<sup>th</sup>, 2018

Newport, OR

Oregon U.S. Congressman Kurt Schrader (OR 5th District) hosted his annual Fishermen's Roundtable at the Oregon Coast Aquarium to speak with local fishermen and local resource managers (i.e., ODFW, NOAA) to hear their concerns. ODFW OAH and fisheries staff attended the meeting to provide an update on the Oregon Coordinating Council for OAH and discuss the importance of OAH to Oregon fisheries. The Congressman requested more information on the effects of OA on salmon fisheries.

#### **Lincoln City Ocean Summit**

Sunday, April 29<sup>th</sup>, 2018

Lincoln City, OR

The Coast Range Association, Surfrider Foundation, and the Economic Development Alliance of Lincoln County hosted a policy and science forum about three active threats to Oregon's coastal economic future: sea level rise, ocean acidification and oil and gas drilling. The event started with brief updates on each issue followed by guest lectures. Dr. George Waldbusser, OSU professor, discussed OA and its impact on coastal fisheries as well as provided a brief update on the Oregon OAH Coordinating OAH Council. Members of the OAH Council were also present and provided handouts on the Council. The forum concluded with a question and answer period between the panel, members of local and regional governments, and the audience.

#### **Vulnerability and Adaptation to Ocean Acidification among Pacific Northwest Mussel and Oyster Stakeholders**

*First of three Steering Committee Meetings*

Thursday, May 10<sup>th</sup>, 2018

Portland, OR

With close to \$300,000 in funding from NOAA's [Ocean Acidification Program](#) in their 2 year study, [Dr. David Wrathall](#) (OSU), [Dr. George Waldbusser](#) (OSU), [Dr. David Kling](#) (OSU), and [Bobbi Hudson](#) (PSI), will identify and characterize associated costs of adapting to OA, assess potential constraints on adaptation that stakeholders may confront, and identify long-term adaptation pathways that are likeliest to

succeed. As a preliminary aspect for their grant, a steering committee of 8 representative stakeholders and managers were formed, including representation from ODFW.

Specifically, the research team will:

- Develop interactive mapping tools to enable public understanding of current and future OA exposure
- Build models of shellfish aquaculture firms facing OA risk that account for both biology and microeconomics
- Identify technological, institutional, legislative, financial and cultural barriers to OA adaptation;
- Identify feasible long-term pathways to OA adaptation
- Evaluate the value of those pathways
- Develop behavioral models to predict the likelihood of users adopting feasible OA adaptation pathways

### **Oregon: Ocean Acidification**

#### **An Early Warning Geographical Hot-Spot for Monitoring Ocean pH Levels**

Launch of a new informational website -

**<https://www.arcgis.com/apps/Cascade/index.html?appid=7475fc3168d84fc9ab64d525cd71a708>**

Dr. Francis Chan from the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) and Charlie Plybon from Surfrider Oregon collaborated to make an informational website based around OAH monitoring within the Oregon Marine Reserves.

**Large-scale OA-related activities: (Since creation of the OAH Council)**

- a) Council of Parties (COP) 23, Bonn, Germany (November 2017): Governor Kate Brown attended, along with other West Coast and US leaders to negotiate climate and ocean acidification actions.

**COLLABORATIVE/ENGAGEMENT**

- b) Oregon's OAH Council (SB 1039): OSU and ODFW co-chairs; 11 additional Council members (State agencies, tribal government, and stakeholders). Council will develop recommendations to the State on OAH issues, and will develop Oregon's OAH Action Plan. Meeting materials, summaries and supporting meeting schedules are available on the Council website:

**COLLABORATIVE/ENGAGEMENT/LEGISLATIVE**

- 1<sup>st</sup> Meeting January 2018 – Introductions and overview of OAH science
- 2<sup>nd</sup> Meeting February 2018 – Status of OAH monitoring and OAH recommendations brainstorm
- 3<sup>rd</sup> Meeting March 2018 – Development of internal working groups and report audiences
- 4<sup>th</sup> Meeting April 2018 – Status of other regional OAH plans and preliminary OAH recommendations review
- 5<sup>th</sup> Meeting May 23, 2018 (Newport). Additional meetings listed below.

- c) OAH Monitoring Inventory Task Force (winter/spring 2018): The Task Force is reaching the completion of the Pacific Coast monitoring inventory, which includes a spatial catalog of OAH-related monitoring projects. Oregon, California, Washington, British Columbia, and Alaska data sets are in various stages of completion; current completion estimated for summer 2018. Future steps for gaps analysis and prioritization are currently being planned. **COLLABORATIVE/ENGAGEMENT**

- d) Tillamook Estuary Partnership (TEP) Grant award (January 2018): The TEP, in collaboration with several other members of the Oregon OAH Monitoring Group, received an Oregon Watershed Enhancement Board (OWEB) to administer a 2 year OA monitoring program in the Tillamook Estuary.

**COLLABORATIVE/ENGAGEMENT**

- e) Oregon OAH Monitoring Group Quarterly Meetings (February 2018): Oregon OAH monitoring experts from state and federal government agencies, Tribes, NGOs and academic institutions met to discuss priorities of the OAH monitoring inventory, and start planning for a gaps analysis.

**COLLABORATIVE/ENGAGEMENT**

- f) Ocean Sciences Meeting (February 2018): ODFW staff presented on OAH issues and the newly formed Oregon OAH Council to an audience of national and international scientists. **ENGAGEMENT**

- g) Mid and North Coast Water Monitoring Summit (February 2018): ODFW staff presented on OAH issues and data collection to an assembly of regional watershed managers and stakeholders. ODFW staff also provided an interactive tutorial on the preliminary interface for the Oregon OAH Monitoring inventory. **ENGAGEMENT**

- h) Columbia River Estuary Conference (April 2018): ODFW staff presented on OAH issues and the newly formed Oregon OAH Council to an audience of regional scientists, management personnel, tribal governments, and interested stakeholders. **ENGAGEMENT**

- i) OA Alliance Webinar (April 2018): A webinar for OA Alliance members and interested parties on current global activities on OAH. Presentations ranged geographically from British Columbia, Chile, Fiji, and Oregon. **COLLABORATIVE/ENGAGEMENT**
- j) OA Alliance Webinar (May 17, 2018): Presentation on NOAA's new Ocean Acidification Information Exchange (OAIE). **COLLABORATIVE/ENGAGEMENT**

**Anticipated large-scale OA-related actions and events:**

- k) Workshop to support PFMC's Fishery Ecosystem Plan, Climate and Communities Initiative (Portland, Oregon, May 2018).
- l) Oregon's OAH Council (SB 1039): Upcoming meetings and deadlines:
- a. May 23, Newport (10 a.m. – 3 p.m.)
  - b. June 25, remote meeting (10 a.m. – 1 p.m.)
  - c. July 18, Corvallis (10 a.m. – 3 p.m.)
  - d. Aug 17, remote meeting (10 a.m. – 1 p.m.)
  - e. September 2018 – Report to legislature and OPAC.
  - f. June 2019 – Oregon OAH Action Plan.
- m) Global Climate Action Summit; concurrent meeting of the OA Alliance (California, September 2018). **COLLABORATIVE/ENGAGEMENT**

**SUMMARY TABLE:**

<b>Recent events/activities</b>	<b>Collaborative</b>	<b>Legislative</b>	<b>Engagement</b>
a. Council of Parties (COP) 23, Bonn, Germany	<b>x</b>		<b>x</b>
b. Oregon's OAH Council (SB 1039)	<b>x</b>	<b>x</b>	<b>x</b>
c. OAH Monitoring Inventory Task Force	<b>x</b>		<b>x</b>
d. Tillamook Estuary Partnership Grant			<b>x</b>
e. Oregon OAH Monitoring Group Quarterly Meetings	<b>x</b>		<b>x</b>
f. Ocean Sciences Meeting			<b>x</b>
g. Mid and North Coast Water Monitoring Summit			<b>x</b>
h. Columbia River Estuary Conference	<b>x</b>		<b>x</b>
i. OA Alliance Webinar	<b>x</b>		<b>x</b>
j. Workshop to support PFMC's FEP	<b>x</b>		<b>x</b>
<b>Anticipated events/activities</b>	<b>Collaborative</b>	<b>Legislative</b>	<b>Engagement</b>
k. OA Alliance Webinar	<b>x</b>		<b>x</b>
l. Global Climate Action Summit; OA Alliance	<b>x</b>		<b>x</b>
m. Oregon's OAH Council (SB 1039): 1st Report	<b>x</b>	<b>x</b>	<b>x</b>



## **Oregon Coordinating Council on Ocean Acidification and Hypoxia**

### **Council Member Updates – Community Outreach**

Wednesday, May 23<sup>rd</sup>, 2018

10:00 AM - 3:00 PM

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#### **Ongoing Outreach Initiative:**

Mini Marine Science Day	OSU Hatfield, Newport OR	February 18 <sup>th</sup> 2018
Sportsman Show	State Fair Grounds, Salem OR	February 24 <sup>th</sup> 2018
Marine Science Day	OSU Hatfield, Newport OR	April 14 <sup>th</sup> 2018

#### **Anticipated Outreach Initiatives:**

World Oceans Day	Oregon Coast Aquarium, Newport OR	June 30 <sup>th</sup> 2018
MBARI Earth Workshop	OSU/MBARI, Newport OR	June 24 <sup>th</sup> -29 <sup>th</sup> 2018
Oregon State Fair	State Fair Grounds, Salem OR	August 24 <sup>th</sup> -September 3 <sup>rd</sup> 2018



## **Oregon Coordinating Council on Ocean Acidification and Hypoxia**

### **Working Group 1: Scientific Understanding and Data Gaps Meeting 2 - Summary**

Thursday, May 3<sup>rd</sup>, 2018 10:00am – 12:00pm  
Location: Remote

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#### **Attendees**

OA Council members: Dr. Jim Sumich, Liu Xin, Al Pazar, Andy Lanier, Dr. Caren Braby, Dave Fox.  
Absent: Dr. Shelby Walker.

Guest presenters: None

OA Council Staff: Dr. Charlotte Regula Whitefield

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**10:00am      Getting Started (Council Co-chair Caren Braby)**

**10:07am      Oregon Ocean Science Trust Update (presented by Jim Sumich)**

- There is currently proposed an Oregon legislative policy package for funding the OOST's 5-year granting plan at 3.5M (2M for monitoring, 1M for research, 0.5M for administrative services).
- Specific projects of interest including: 1) Effects of OA on crab and shrimp larvae; 2) Effects of OA on mussel and other non-commercial species; 3) Continued monitoring in OR Marine Reserves; 4) Building out additional monitoring lines and sites throughout Oregon.
- OOST is building a partnership with the Oregon Community Foundation to help with financial logistics.
- Suggestions for "next steps": 1) OOST consideration for both a RFP (completive grants) and a non-RFP (direct grant) funding pathways; 2) Considering the value of supporting the Newport Oceanographic Line; and 3) Reinstate operation of the EPA's OAH monitoring system at Yaquina Bay.

**10:32am      Current research: Socioeconomic assessments (presented by Charlotte Whitefield)**

- Discussion on the newly developed marine bivalves responses to OA - [visualization web tool](#) and the shellfish aquaculture industry (NOAA, PSI, OSU Grant)
- Dr. George Waldbusser – Invited to full OAH Council meeting on June 25<sup>th</sup>

**10:50am      Review and Discussion of Prioritization Document**

- DRAFT: Crosswalk Document
- DRAFT: Combined WG priorities

**11:50am      Information/Data needs to support further WG discussion**

- Review Focus Statement  
*“Identify missing information that convinces ourselves and others to continue to build and collect the best available data for the purposes of science, adaptation, and mitigation of ocean acidification and hypoxia throughout Oregon.”*
- Feedback on the Log-book mock-up

**12:00pm      Adjourn**

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**Council staff** [Charlotte.M.RegulaWhitefield@state.or.us](mailto:Charlotte.M.RegulaWhitefield@state.or.us)

## Themes and tasks, as discussed by OAH Council, WG1 Scientific Understanding and Data Gaps May 3, 2018

**WG1 Focus:** Identify missing information that convinces ourselves and others to continue to build and collect the best available data for the purposes of science, adaptation, and mitigation of ocean acidification and hypoxia throughout Oregon. (as stated in draft form during April 5 WG meeting)

**Theme 1:** Robust monitoring network of oceanography trends (pH, oxygen, temperature, salinity), through collaborative efforts in state and region. (*Sec 3.1.a and Sec 3.1.b.B/G*)

1. Model validation to identify where in the monitoring network we need additional measurements, to give us an **Oregon-wide model of OA vulnerability and trends**.
  - a. Ask ODFW & DEQ (?) & OOMG to work with modelers on identifying areas of uncertainty and high-value for data collection.
  - b. Use recently completed monitoring inventory
  - c. Build in Oregon's data that are not yet reflected (Francis' Netflix model data? Marine reserves data?)
  - d. Work with modelers who are developing longer-term projections (Live Ocean projects for 3 days; we want annual, multi-year, decadal scale)
  - e. Will instrumentation in MRs be useful?
2. Invest in **monitoring station for Yaquina Bay**, the only of Oregon's 3 largest estuary systems (for oyster production) that is not instrumented
  - a. Ask legislature for \$\$\$ and mandate that this be developed in collaboration with OSU, Yaquina industry, ODFW and maintained collaboratively.
  - b. Build on the past EPA data set from this region. Establish a new sensor to add to "historic" data
3. Support **vessel-based OAH monitoring** data collection in Oregon (fishing vessels, research vessels, ROVs/landers, etc.)
  - a. OAH Scientist-Fishermen Roundtable has identified this as a project of interest. Instrument vessels to collect data. Would need instrumentation identified (cheap, easy to deploy, easy to upload data) and would need a student/staff person to coordinate and use data.

**Theme 2:** Robust monitoring of biological impacts to oceanography trends, through collaborative efforts in state and region. (*Sec 3.1.a/b, Sec 3.1.b.B/G, Sec 3.3.a-c*)

4. **Build scientific capacity** to tackle specific OAH Council needs/requests.
  - a. Ask legislature to support on-going fellowship program, collaboratively supervised by OOST, OAH Council (OSU and ODFW co-chairs), to address changing ocean conditions priorities, relative to biological monitoring.
    - i. Remove institutional barriers among these institutions so that collaboration is easy. (legislative mandate helpful here?)
    - ii. Fund (seed funding) the OOST, allow outside funds to flow into OOST, so that priorities can be funded.
    - iii. Build capacity in OOST to earmark/allocate funds, in addition to running competitive RFP for projects (?)

- b. Immediately, grad student/post-doc project to develop biological monitoring indices
- 5. Support/facilitate/utilize the work of academics and other sources on **developing the “best” biological metric indices**, proxies, model systems. Collaborations and connections with other groups:
  - a. Center for Ocean Solutions 2017 workshop, which followed the WC OAH Science Panel recommendations to develop water quality criteria (both oceanographic and biological). This workshop discussion was focused on what organisms could serve as experimental end-points, not necessarily what organisms should be the subject of long-term populations trend monitoring. Invertebrate systems recommended:
    - i. Pteropods, Mussels, Oysters, Urchins, rockfish behavior (for experimental set-up)
    - ii. For long-term monitoring, Oregon might want to consider: Dungeness crab (e.g. Shanks megalopae light traps).
  - b. PISCO datasets (20+ years of biological trend monitoring including mussels, urchins, stars, others)
  - c. Marine reserves indicator workshop – OR/CA
  - d. Oregon Ocean Science Trust – research and monitoring priorities
- 6. Set **goals for selection of biological monitoring index**/program for Oregon:
  - a. Model organism/metric should be feasible for i) researchers vs. ii) agencies vs. iii) citizens/volunteers?
  - b. Standardization and adaptability framework of goals and priorities among groups; make sure the monitoring framework can respond to changes in knowledge (how and what we think we should be monitoring).
  - c. Focus on species we care about (human-connected species)
    - i. Commercial, recreational (crab, bivalves, salmon)
    - ii. Other reasons (whales, birds)
  - d. Ecosystem health is also important
- 7. Facilitate/support the **Newport Line** currently funded by NOAA (request of legislators to consider and lobby for continuing). This is a keystone of our understanding of biological response in Oregon (and the West Coast), and in past budget cycles has been financially vulnerable.
  - a. Make sure both the NWFSC at NMFS and the Ocean Acidification Program (Research Office at NOAA) are both aware of Oregon’s interest.

**Theme 3:** Scientific understanding of the benefits of specific local actions (for mitigation, resilience). (*Sec 3.1.a and Sec 3.1.b.A/B/G*)

- 8. Characterize **local sources** impacting watershed/estuary/coastal water quality that amplify/exacerbate OAH conditions
  - a. Where? Scale? Could regulatory change be meaningful? Water based (outfalls)? Air based (local emissions)?
    - i. Fish processing waste example
    - ii. Tracer studies of point sources and “end” locations (research priorities)
    - iii. State actions and research ideas
      - 1. Non-regulatory: Public awareness on local sources
      - 2. Regulatory: Total maximum daily loads (TMDLs) – multiple stressors on a single area with the science of OAH incorporated (what science would feed into this process)

9. **Seagrass/kelp** protection restoration – where and how should this occur to provide best benefit to water quality? Blue carbon (long term sequestration of CO<sub>2</sub>) vs. buffering (short term mitigation during summer upwelling)
  - a. If this was maximized, what would the benefit be? Would it be on a scale that makes the tradeoffs worthwhile?
  - b. Management process to insert this consideration into. Currently it is built into:
    - i. ODFW mitigation of estuary development projects. Is it successful?
    - ii. Others?

**Theme 4:** Characterize socioeconomic issues (*Sec 3.1.b.D, Sec 3.2.a-c*)

10. Identify human community vulnerability and impacts to intensifying OAH

**Theme 5:** Research priorities (*Sec 3.1.b.A/B/E, Sec 3.3.a-c*)

11. Raise awareness about research needs in scientific and granting community, by building a **research needs reference list** for outside parties to use (OOST, academics, NGOs), as desired
  - a. All of the items listed above
  - b. Others:
    - i. ??
12. Raise awareness about research needs in scientific and granting community, by developing a **seminar series** by academic presenters for both community members and academics audiences
13. Recommend to OSU to build a **Center of Excellence on OAH**, as proposed in OSU's MSI Strategic Plan.



## Oregon Coordinating Council on Ocean Acidification and Hypoxia

### Working Group 2: Reducing Causes of OAH Meeting 2 - Summary

Friday, May 4<sup>th</sup>, 2018 2:00pm – 4:00pm

Location: Remote

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#### Attendees

OAH Council members: Frank Barcellos, Dr. Jack Barth, Karen Tarnow, John Schaefer, Fran Recht, and Dr. Caran Braby. Absent: Dr. Kristen Sheeran

Guest presenters: None

OAH Council Staff: Dr. Charlotte Regula Whitefield

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**2:11pm**      **Getting Started (Group Leader Karen Tarnow and Charlotte Whitefield)**

**2:15pm**      **ODEQ Point Source Land-Sea Pollution Reports Update (presented by Karen Tarnow)**

- 2011/2013 reports were provided to act as reference for the types of information that DEQ has collected in the South and North coast regions.
- Synthesis identified with WG1 on identifying, and then filling, data gaps in estuary discharge and monitoring programs at DEQ.
- Synthesis identified with WG1 on “Back of the Envelope” calculations of the relative impacts of each identified point source pollution location and their effects on surrounding macro- and micro-environments. Focus recommendations for site reductions that make the largest differences.
- York Johnson (DEQ North Coast Basin) and David Waltz (DEQ Mid Coast Basin) have been invited to the next working group meeting to discuss:
  1. *What are the main things you work on in your geographic area?*
  2. *In what ways does your work touch upon issues related to OAH?*
  3. *What ongoing projects/activities are you aware of that you believe are important to advance OAH interests?*
  4. *What kinds of things do you think the Council should consider when it formulates its recommendations for actions needed to advance Oregon’s efforts to address OAH?*

**2:30pm**      **Oregon Global Warming Commission OGWC (presented by Charlotte Whitefield)**

- Discussion on the status of the commission and potential overlap with the OAH Councils recommendations.
- An invitation was extended to the OAH Council for them to attend the OGWC June Commission meeting and to cross-post on website.
- Angus Duncan (Chair of OGWC) was invited to full OAH Council meeting on June 25<sup>th</sup>.

**3:00pm**

**Review and Discussion of Prioritization Document**

- DRAFT: Crosswalk Document
- DRAFT: Combined WG priorities

**3:50pm**

**Information/Data needs to support further WG discussion**

- Review Focus Statement  
*“Develop an understanding of work being done by others to identify and evaluate land-based drivers of OAH impacts in Oregon's estuaries and coastal waters, and make recommendations on how to assemble this information and/or address data and information gaps to support the Council's efforts to identify priority actions and initiatives to address Oregon's vulnerabilities to OAH.”*

**4:00pm**

**Adjourn**

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***Council staff [Charlotte.M.RegulaWhitefield@state.or.us](mailto:Charlotte.M.RegulaWhitefield@state.or.us)***

## Themes and Actions, as discussed by OAH Council, WG2 Reducing Causes of OAH May 4, 2018

**WG2 Focus:** Develop an understanding of work being done by others to identify and evaluate land-based drivers of OAH impacts in Oregon's estuaries and coastal waters, and make recommendations on how to assemble this information and/or address data and information gaps to support the Council's efforts to identify priority actions and initiatives to address Oregon's vulnerabilities to OAH.

### **Theme 1: Promote strategies for the mitigation of land-sea stressors on OAH. (Sec 3.1.b.A)**

1. **Identify sources of water pollution** to facilitate reductions in statewide and local water pollution that amplify or exacerbate OAH. (Nexus with WG1)
  - a. Formulate an understanding the relative importance of different types of sources, and build off that to identify missing data and/or regulations that need to be addressed. ([Short term](#))
  - b. Recommend funding for state agencies to develop estimates of the amplitudes and extents of specific regional point source discharge impacts on sounding environments. ([Long term](#))
  - c. Identify potential sources and intensities of contributions to OAH in Oregon Waters other than carbon emissions (e.g. at sea fish processing, sewage discharge, road runoff into watersheds). ([Short / Long term](#))
2. **Support reductions in water pollution**, for statewide and local waters that amplify or exacerbate OAH.
  - a. Reduce identifiable pollution sources by amending allowed water uses, update wastewater and storm water treatment requirements, and other actions to prevent and reduce water quality issues exacerbating coastal acidification. ([Short term](#))
  - b. Build and enhance programs to ensure that enforcement of existing WQ regulations is a priority. ([Short term](#))
  - c. Aid DEQ and other relevant state agencies in furthering their monitoring and enforcement staff through the identification of additional resources and education programs. ([Long term](#))
  - d. Promote consideration of OAH in local water quality and permitting decision, as an issue of concern and point to review. ([Short term](#))
  - e. Support upgrades to sewer treatment for coastal municipalities for use of advanced treatment technologies on sewage treatment systems to mitigate local water quality impacts ([Short / Long term](#))
  - f. Encourage septic system inspections by local governments and municipalities to reduce the potential for water pollution. ([Short term](#))

### **Theme 2: Develop and maintain OAH coordination strategies among state agencies, federal agencies, academia, and industry that promote the reduction in causes of regional OAH. (Sec 3.1.b.F)**

3. **Build and leverage partnerships among government** institutions that are pursuing carbon mitigation activities (agencies, commissions, committees, task forces) to include oceans and OAH in their work, and to reduce redundancy in OAH Council recommendations and other government activities (Nexus w/WG4)

- a. OAH Council-Oregon Global Warming Commission partnership: understand and support the OGWC mission and activities to reduce local carbon dioxide emissions, including but not limited to the use of green energy (CO2 scrubbing); export information about OAH and the importance of oceans to the OGWC, for use in OGWC rationale and evaluation of OGWC outcomes. ([Short term](#))
  - b. OAH Council-Oregon Carbon Policy Office partnership: to provide oceans/OAH context, data and rationale to inform development of carbon emissions reduction policies, including but not limited to programs such as a cap and trade program or a carbon tax. ([Long term](#))
  - c. Establish the link in public opinion between OAH and other climate issues through collaboration with other commissions and working groups including the Oregon Global Warming Commission. ([Short term](#))
- 4. **Coordinate with and leverage preexisting** networks, programs, and regulations to support OAH reduction actions in Oregon
  - a. Utilize and expand existing environmental quality laws and policies to promote best practices, permanent improvements (i.e. support participation in programs that leverage national or regional infrastructure and collaborations). ([Short term](#))
  - b. Leverage voluntary actions and contributions tied to “best-practices” for local land-based sources and practices. ([Short term](#))
  - c. Focus on what each “individual” can do to make a difference (whether through regulatory or voluntary actions) by packaging existing information to make it easily accessible and meaningful in the context of existing programs, community dialogues, etc., ([Short term](#))

**Theme 3: Pursue OAH mitigation strategies that also enhance the resilience of marine organisms and ecosystems (Sec 3.3.c)**

- 5. **Enhance natural systems of marine organisms** and ecosystems to reduce causes of OAH.
  - a. Support research needed to investigate the use of marine habitats as carbon sequestration projects. ([Long term](#))
  - b. Determine which regional estuaries and riparian buffer zones have the greatest potential for natural carbon capture and sequestration, and promote the protection and restoration of these areas. ([Long term](#))
  - c. Determine the ability for Oregon Native Oysters to act as short term regional buffering through estuary shell bed restoration and long term blue carbon sources through shell carbon burial. ([Long term](#))
  - d. Promote research and development of Kelp forest and eel grass bed restoration as well as the use of plant aquaculture for carbon capture and removal from ecosystems. ([Long term](#))



## Oregon Coordinating Council on Ocean Acidification and Hypoxia

### Working Group 3: Building Adaptation and Resilience

#### *Meeting 2 - Summary*

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#### REMOTE MEETING

Tue, May 22, 2018 2:00 PM - 4:00 PM PDT

Location: Remote

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*OAH Council membership:* Dr. Caren Braby, Frank Barcellos, Fran Recht, and Dr. Aaron Galloway

Guest Presentation: Dr. Steve Rumrill (ODFW)

OAH Council Staff: Dr. Charlotte Regula Whitefield

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- |               |  |
|---------------|--|
| <b>2:00pm</b> | <b>Getting Started (Council Co-chair Caren Braby)</b>  |
| <b>2:09pm</b> | <b>Review and Discussion of DRAFT Focus Statement (Caren Braby)</b><br>Propose activities and initiatives that aid Oregon coastal communities and ecosystems to adapt to changes in OAH conditions and build resilience strategies into management to stabilize Oregon's socio-economic and ecosystem assets in the face of future OAH conditions.   |
| <b>2:20pm</b> | <b>Review and Discussion of Prioritization Document (Caren Braby)</b>  |
| <b>3:20pm</b> | <b>Oregon Aquatic vegetation and Shellfish update (Steve Rumrill)</b> <ul style="list-style-type: none"><li>• Eel grass beds are considered carbon "sinks" in most scientific literature, and experience daily and annual fluctuations in carbon capture.</li><li>• Regionally, Coos Bay and Netarts Bay have been studies for site specific vulnerability in eel grass carbon capture</li></ul> |
| <b>3:30pm</b> | <b>Information/Data needs to support further WG discussion</b> <ul style="list-style-type: none"><li>• <a href="#">Hofmann et al 2011 – High frequency dynamics of Ocean pH: A Multi-ecosystem Comparison</a></li><li>• <a href="#">Kelly and Caldwell 2013 – Harvard Environmental law review</a></li><li>• Lessons learned from the <a href="#">Shellfish Initiative</a></li></ul>             |

3:45pm

Adjourn

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**Council staff [Charlotte.M.RegulaWhitefield@state.or.us](mailto:Charlotte.M.RegulaWhitefield@state.or.us)**

**Themes and tasks as discussed by  
OAH Council, WG3 Building Adaptation and Resilience  
May 22, 2018**

**WG3 Focus:** Propose activities and initiatives that aid Oregon coastal communities and ecosystems to adapt to increasing OAH conditions and build resilience strategies into management to stabilize Oregon's socio-economic and ecosystem assets in the face of future OAH conditions.

***Theme 1: As a first step in building resilience strategies, first Identify assets that are at risk and/or vulnerable to OAH impacts [Sec 3. (1) (b) (C)] (Note: overlap with WG1)***

1. Habitats [Sec 3. (1) (b) (C)]
2. Species
3. Human Communities
  - a. Socio-economic vulnerability assessment [Sec 3. (1) (b) (D); Sec. 3. (2)]

***Theme 2: Incorporate risks of OAH into decision-making, by identifying opportunities in existing (and future new) management processes and activities to build resilient communities and ecosystems. [Sec 3. (3) (c)]***

1. Incorporate OAH resilience into current/existing management processes; anticipate future management needs as well. Reduce co-occurring stressors that exacerbate the effects of OAH, by managing resources and human activities. Example management processes include:
  - a. DLCD land use planning,
  - b. DEQ water runoff planning);
  - c. Food safety management programs (ex: HAB biotoxins in crab meat)
  - d. Aquaculture practices improvement (not as a mitigation for OAH)
    - i. Biodiversity of Marine stocks / aquaculture – maximize
2. Align actions and timing of future OAH Council recommendations with anticipated management and regulatory decision points. For example:
  - a. Rocky Shore/Territorial Sea Plan (DLCD/OPAC) review process (timeline 2019)
  - b. Marine Reserves Program review (timeline 2023); consider placement of Oregon's sites relative to OAH hotspots and refugia.

***Theme 3: Develop initiatives to sustain habitats and species that support Oregon's socio-economic relationship to living ocean resources and thereby promote resilience. [Sec 3. (1) (b)]***

1. Restore and sustain submerged aquatic vegetation (SAVs)\*\* for the potential for short-term buffering, but also for other general ecosystem services provided by SAVs such as nursery habitat for many fisheries species targets, for promotion of biodiversity, for forage and predator avoidance.
  - a. Preserve and restore SAVs, algae, seagrasses, kelps
  - b. Promote research to understand the roles of estuaries SAVs, algae, seagrasses, kelps in OAH mitigation
2. Native oyster restoration, a species that is more resilient to OAH impacts and a key member of healthy estuary communities.

\*\* Note: current state based policy is “no net loss” for eelgrass but there are no active restoration programs.

***Funding Theme for Council/Working Group: Mitigation revenues should be considered for OAH resilience [Sec 3 \_\_\_\_\_] Recommendations to OOST and others for research***

1. Oregon is in need of funding to build resilience in communities, fisheries, and other ocean resources that are at risk due to OAH impacts. As the state develops revenue streams from mitigation (e.g. fees from carbon cap program, development mitigation banking, etc.), those funds should be considered for use in understanding and building resilience to OAH, as one of the major projected impacts from combustion of fossil fuels.
2. Invest State funds that are earmarked for understanding and building resilience to OAH impacts in the Oregon ocean science trust and encourage further implementation of the legislative vision for that funding entity, including funding nearshore research needs by competitive proposals and by targeted strategic direct investment in projects.
  - a. Coastwide monitoring network, OAH impacts, etc..



## **Oregon Coordinating Council on Ocean Acidification and Hypoxia**

### **Working Group 4: Expand Public Awareness Meeting 2 – Summary**

Monday, May 21<sup>st</sup>, 2018 8:00 AM - 9:40 AM  
Location: Remote

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#### **Attendees**

OAH Council Members: Dr. Jack Barth, Dr. Shelby Walker (group leader), Al Pazar, Karen Tarnow, and Andy Lanier. Absent: John Schaefer

Guest Presenters: Brian Erickson (OSU graduate student)

OAH Council Staff: Dr. Charlotte Whitefield

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**8:00am**

#### **Getting Started (Charlotte Whitefield and Jack Barth)**

- Brief introductions and updates from the full OAH Council

**8:08am**

#### **OA Education Curriculum Development (Brian Erickson)**

- Presentation of outcomes from a 4 day, 50 minute each day, OA lesson series given to 3 classrooms in Lincoln County (roughly 300 high school students). Post testing occurred 10 days after final lesson, and were used to measure outcomes and information retention by students.
- Three main findings were presented: 1) Student knowledge increased and remained elevated post testing; 2) Post testing showed no significant long-term change in attitudes; 3) Short-term impacts of learning about ways to address ocean acidification faded with time in post testing.
- Council members made parallels with other environmental education/messaging topics (e.g., protecting ozone, acid rain reduction), with how simple/positive messaging can result in long lasting change in action and perceptions

**8:40am      Review and Discussion of DRAFT Focus Statements (Shelby Walker)**

**WG4: Increasing public awareness (Broad Theme):**

**Vision:** Oregon residents and visitors are aware of the causes, extent, and impacts of ocean acidification and hypoxia, and work collectively to promote strategies to mitigate OAH.

**Mission:** Targeted strategies reflecting different audiences are developed and implemented to expand public awareness and implement local and regional mitigation efforts.

**WG4-specific working group activities:**

**Vision:** Opportunities to educate and inform students, industry, media, and decision-makers are identified and advanced for the next 10 years.

**Mission:** Working with Oregon stakeholders to develop K-12 curricula and work with K-12 educators; engage with media and informal educators to promote stories; and educate the public and local, state, and federal decision-makers on ocean acidification science, impacts, and mitigation options.

**9:00am      Review and Discussion of Prioritization Document (Shelby Walker)**

**9:30am      Information/Data needs to support further WG discussion**

- Leverage surveys conducted in other regions (e.g., [Capstick et al 2016](#) – England; [Frisch et al 2015](#) – Alaska)
- Washington State OAH survey methods and questions

**9:40am      Adjourn**

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Council staff [Charlotte.M.RegulaWhitefield@state.or.us](mailto:Charlotte.M.RegulaWhitefield@state.or.us)***

**Themes and tasks, as discussed by  
OAH Council, WG4 Expand Public Awareness  
May 21, 2018**

**WG4: Increasing public awareness (Broad Theme):**

- **Vision:** Oregon residents and visitors are aware of the causes, extent, and impacts of ocean acidification and hypoxia, and work collectively to promote strategies to mitigate OAH.
- **Mission:** Targeted strategies reflecting different audiences are developed and implemented to expand public awareness, and implement local and regional mitigation efforts.

**WG4-specific working group activities:**

- **Vision:** Opportunities to educate and inform students, industry, media, and decision-makers are identified and advanced for the next 10 years.
- **Mission:** Working with Oregon stakeholders to develop K-12 curricula and work with K-12 educators; engage with media and informal educators to promote stories; and educate the public and local, state, and federal decision-makers on ocean acidification science, impacts, and mitigation options.

**Theme 1:** *Developing long-term coordination strategy with State agencies and programs, formal and informal educators, and industry groups [SB1039 Sec3. (1)(b)(F)]*

1. Formulate an Oregon “needs assessment” based on what information people already know and what information people need/want to know more about
  - a. Formal General Public Surveys (**short-term**)
    - i. Leverage Washington State public survey methodology
    - ii. Leverage surveys conducted in other regions (e.g., [Capstick et al 2016](#) – England; [Frisch et al 2015](#) – Alaska)
  - b. Informal Logbooks surveys – “free thought” exercise for general public to write questions or concerns with prompt (**short-term**)
    - i. At seafood stores, restaurants, and festivals (e.g., Newport Seafood & Wine Festival, and other regional crab festivals)
    - ii. Part of exhibits (e.g., Oregon coast aquarium, OSU Hatfield visitor center, state park visitors’ centers) – in collaboration with formal educators
2. Messaging - Simple, positive, local connections
  - a. Connect education and outreach actions with audience values – including monetary gains and savings, personal time, outdoor recreation (**variable**)
    - i. Develop economic impacts from OAH at local/regional levels and embed into outreach documentation and materials
    - ii. Incorporate economic elements to mitigation actions – incentivizing actions
  - b. Newsletter of updates - Recognition of impacts of mitigation actions - highlight our successes (**variable**)

- c. Look into similar environmental messaging that was successful – (e.g., protecting the ozone, reducing acid rain) **(short-term)**
      - i. Techniques that can be borrowed and lessons to be learned
- 3. Coordination of Messaging
  - a. Developing resources (portal) for outreach materials (e.g., one-pagers, curricula)
  - b. Standardized “Roadshow”: Prepared PowerPoint slides and one pagers **(short-term)**
  - c. Facilitate public conversations with key facts and summaries of the OAH issue (e.g. convene discussion panel, write articles, etc.) **(short-term)**
    - i. Provide documents, one-pagers, and “kits” publically for others to engage the public with – expand outreach past just the Councils actions
  - d. Outreach events – informal conversations with the public (e.g., OSU marine science days, Oregon Aquarium’s Our Oceans Day, State Fair, State of the Coast) **(short-term)**
    - i. Full list to be developed-need to incorporate industry connections

**Theme 2:** *Take steps to increase public awareness and dispel misconceptions of OAH science, impacts, and solutions through targeted messaging to specific audiences.*  
 [SB1039 Sec3. (1)(b)(E)]

- 1. “Next generation” engagement with local based school curriculum development- in alignment curriculum standards (e.g., Next Generation Science Standards (NGSS), common core, etc)
  - a. Encourage the funding of OAH STEM curriculum supplies in public schools and after-school education programs **(long-term)**
  - b. Work with the Department of Education to incorporate OAH science into Oregon State education standards at multiple education levels (elementary, middle, and high school) **(long-term)**
    - i. Include state wide efforts on how OAH affects not only the Oregon Coast - focus on inland schools
  - c. Teacher training programs – “Best methods” for long term information distribution (work with STEM Hubs) **(mid-term)**
  - d. Help educators develop, adapt, and implement curricula on OAH and associated climate issues for primary, secondary, and higher education **(long-term)**
    - i. Provide experiential learning opportunities – field trips for schools
- 2. Informal education opportunities
  - a. Partner with informal venues (e.g., Hatfield Marine Science Center Visitor Center, Charleston Marine Life Center, Oregon Museum of Science and Industry, Creative Minds Learning Centers) to develop and showcase exhibits on OAH **(short-term)**
  - b. Working with industry to provide informal experiential opportunities for general public **(long-term)**
    - i. Regular tours and open houses of industry and educational locations

3. Targeted outreach materials and messages to Policy makers and legislative staff
  - a. Participate in legislative days, with clear messages on OAH science, impacts, and mitigation strategies (short-term)
  - b. Provide “field trip” opportunities for legislative staff to visit science laboratories and industry sites (e.g., fishing boats, shellfish farms) (short-term)
  - c. Provide “science in Salem” opportunities where hands-on information is brought to the legislative offices (short-term)
  - d. Encourage the appointment of funded positions in State agencies with dedicated focus on oceans, including local impacts of OAH and local actions to combat OA within government and resource management at every level (long-term)
4. Utilizing the “Public Arena” – information access, media “take homes”
  - a. Develop visuals and clear messages for media to use (short-term)
  - b. Encourage media focus on actions and solutions, with positive messages (short-term)
  - c. Develop a OAH media strategy, with clear timeframes and measured messaging outcomes (short-term)
5. Share information with OAH vulnerable industries and professions
  - a. Convene specialists and/or industry representatives across industries and regions using round tables and workshops (long-term)
  - b. Engagement with seafood processors and food industry (i.e. chefs and restaurants) (long-term)
  - c. Work with existing industry / science partnerships to develop unified messages and communication strategies (i.e. OSU/PSI Shellfish Stakeholder Initiative; Shellfish Growers Climate Coalition) (short-term)
  - d. Teacher training programs – “Best methods” for long term information distribution (long-term)
    - i. Help educators develop, adapt, and implement curricula on OAH and associated climate issues for primary, secondary, and higher education

# Oregon Coordinating Council on Ocean Acidification and Hypoxia

## REPORT OUTLINE

	PAGE
<b>Council Members and Affiliations</b>	#
<b>Executive Summary</b>	#
<b>Letter from the Co-chairs – by Dr. Jack Barth and Dr. Caren Braby</b>	#
<b>Current Regional and State OAH Policy Initiatives</b>	#
<b>Connections to Past Regional and State Science Initiatives</b>	#
<b>“The Cross Walk” table</b>	#
<b>Council Recommendations</b>	#
<i>Overall Council operating premise (general mission and vision statement)</i>	
<i>Description of the four working groups – each working groups goals statement</i>	
<i>Council integrated working group recommendations</i>	
<b>Collaboration with the Oregon Ocean Science Trust</b>	#
<b>Connections of State Agencies to OAH</b>	#
<i>Department of Fish and Wildlife</i>	
<i>Department of Environmental Quality</i>	
<i>Department of Agriculture</i>	
<i>Department of Land Conservation and Development</i>	
<b>Continuing Work of the Council</b>	#
<i>Process for the Action Plan – to the International Ocean Acidification Alliance</i>	
<b>Appendix 1: Council Procedures</b>	#
<b>Appendix 2: OAH Council and Working Group Meeting Summaries</b>	#
<b>Appendix 3: Referenced Documents</b>	#
<b>Appendix 4: Regional Outreach</b>	#
<i>Invited speakers to the OAH Council</i>	
<i>Outreach engagement</i>	
<i>Oregon OAH Timeline</i>	

## “The Cross Walk”

*Senate Bill Enrolled 1039 legislative text and OAH Coordinating Council Report*

<b>SB 1039</b>		<b>OAH Council Report Section</b>	<b>Page</b>
<b>Sec 1</b>	<i>General legislative findings and declarations</i>	<b>Executive Summary</b>	
<b>Sec 2.(1)</b>	<i>Council establishment and makeup</i>	<b>Council Members and Affiliations</b>	
<b>Sec 2. (2 - 8)</b>	<i>Terms of service and operating framework</i>	<b>Appendix 1</b> <b>Appendix 2</b>	
<b>Sec 3. (1) (a) (A – B)</b>	<i>Review and utilize relevant scientifically supported information</i>	<b>Connections to Past Regional and State Science Initiatives</b>	
<b>Sec 3. (1) (b) (A-G)</b>	<i>Identify actions and initiatives</i>	<b>Council Recommendations</b> <b>Connections of State Agencies to OAH</b> <b>Appendix 3</b>	
<b>Sec 3. (1) (c)</b>	<i>Advise and assist the State agencies in coordinating and conducting actions and initiatives</i>	<b>Connections of State Agencies to OAH</b>	
<b>Sec 3. (2) (a-c)</b>	<i>Develop a Socioeconomic Vulnerability to Ocean Acidification Report</i>	<b>Council Recommendations</b> <b>Continuing Work of the Council</b>	
<b>Sec 3. (3) (a-c)</b>	<i>Recommendations for the Oregon Ocean Science Trust, State agencies, academia, or other organizations</i>	<b>Council Recommendations</b> <b>Oregon Ocean Science Trust</b>	
<b>Sec 3. (4)</b>	<i>Biennial report to the Legislative Assembly and the Ocean Policy Advisory Council</i>	<b>Appendix 4</b> <b>Continuing Work of the Council</b>	
<b>Sec 3. (5)</b>	<i>Agencies assistance to the coordinating council</i>	<b>Appendix 1</b> <b>Connections of State Agencies to OAH</b>	

## Working Group Focus

*Senate Bill Enrolled 1039 Section 3 legislative text*

SB 1039		Council Recommendations			
		WG1	WG2	WG3	WG4
Sec 3. (1) (b) (A)	<i>Developing optimal strategies for mitigation</i>				
Sec 3. (1) (b) (B)	<i>Strengthening existing scientific monitoring, research and analysis</i>				
Sec 3. (1) (b) (C)	<i>Identifying habitats vulnerable to corrosive sea water</i>				
Sec 3. (1) (b) (D)	<i>Identifying the socioeconomic and ecosystem impacts</i>				
Sec 3. (1) (b) (E)	<i>Steps to increase public awareness of the science</i>				
Sec 3. (1) (b) (F)	<i>Developing long-term coordination strategy</i>				
Sec 3. (1) (b) (G)	<i>Leveraging opportunities for research partnerships</i>				

**Working Group 1: Scientific Understanding and Data Gaps**

**Working Group 2: Reduce Causes of OAH**

**Working Group 3: Building Adaptation and Resilience**

**Working Group 4: Expand Public Awareness**



## Oregon Coordinating Council on Ocean Acidification and Hypoxia

### DRAFT Work Flow Process

#### PROBLEM STATEMENT:

Oregonians care about and rely on the ocean for social and economic well-being. Living ocean resources are at risk from Ocean Acidification and Hypoxia (OAH) and other atmospheric-carbon related changing ocean conditions.

#### SOLUTIONS:

To stabilize and sustain our social and economic well-being, we choose to take action to understand, adapt to and mitigate OAH.

