

# Ocean Acidification & Hypoxia (OAH) Communication Plan



Oregon Coordinating  
Council on Ocean  
Acidification & Hypoxia



OREGON OCEAN  
SCIENCE TRUST



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Photo by Oregon Department of Fish & Wildlife

## Introduction

In 2022, the Oregon Ocean Science Trust (OOST), in consultation with the Oregon Coordinating Council on Ocean Acidification and Hypoxia (OAH Council), requested proposals for strategic research, monitoring, and communications to address ocean acidification and/or hypoxia. Subsequent to the passage of funding bill HB 3114 by the Oregon Legislature, the State of Oregon made strategic investments to address the risks and vulnerabilities caused by OAH that threaten Oregon’s economy and ecosystems. Pathways Collaborative was hired to work with the OAH Council and its Education and Outreach Working Group to develop a communications plan and strategy for outreach and education on ocean acidification and hypoxia impacts, science, and solutions.



**PATHWAYS  
COLLABORATIVE**

## Background

**The Oregon Council on Ocean Acidification and Hypoxia (OAH Council)**, initially convened in 2017 by Senate Bill 1039, is charged with producing legislative reports on ocean acidification and hypoxia for the governor every two years. The OAH Council is made up of thirteen members from multiple agencies and organizations that represent a variety of interests. Since 2017, the OAH Council has been implementing the legislature’s vision to provide science-based recommendations to the State on how to understand, mitigate, adapt to, communicate, and strengthen Oregon’s response to changing ocean conditions and their negative impacts. The Council recommends strategic actions in an iterative process, including repeated public input, scientific inquiry, and action planning. In even years, the Council produces a biennial report to the legislature that provides an update on Oregon’s implementation of the Oregon OAH Action Plan, adopted in 2019. These reports share the status, stories, and progress on adaptation, mitigation, and ocean change resilience efforts.

**The Oregon Ocean Acidification and Hypoxia (OAH) Action Plan** for 2019-2025, outlines actions that Oregon is taking to adapt to and mitigate OAH impacts. Through this Action Plan, Oregon joins British Columbia, Washington, California, and other global partners in our commitment to building solutions for OAH impacts to better prepare for the future. Every action requires state leadership and resources to implement projects that lead to better understanding of OAH and to adaptation and mitigation steps. Broad partnerships with all Oregonians are essential to the success of this Action Plan.

This Communication Plan addresses Action Priority #4 - Communicate Ocean Acidification and Hypoxia (OAH) science, impacts, and solutions to raise awareness and support decision-making and support decision-making. The vision proposed in this Action Plan states:

*Policy-makers, agencies, and the public have information on Ocean Acidification and Hypoxia (OAH) science, impacts, and solutions. This information supports decision-making across the state and leads to publicly-supported approaches to OAH adaptation and mitigation.*

## Purpose

**The OAH Communication Plan** is a two-part resource designed to aid in the development of publicly supported approaches to OAH adaptation and mitigation planning and policy creation. Part 1 contains a **Communication Toolkit** and Part 2 presents an **Implementation Plan** for operationalizing the Communication Toolkit.

Part 1, the **Communication Toolkit**, presents compelling and effective messages that advance understanding of ocean change and generates policy support for OAH adaptation, mitigation and resilience. The audience-specific, positive messages are designed to inspire behavior change in identified audiences for each prioritized action.

The purpose of Part 2, the **Implementation Plan**, is to present a phased approach for implementing the Communication Toolkit, including a strategy for assessing future success. The Implementation Plan suggests what entities are responsible for implementing each step, a timeline for implementation, and a series of metrics that can be used to evaluate the effectiveness of implementation.



# Goals and Objectives

As stated in the project RFP:

***To inspire action, communities and individuals need to know what they can do and be inspired to do so.***

While there are many individual actions that could be recommended for people to do, the personal choices that most Oregonians make on a daily level are limited in actual impact or restricted to those with higher socio-economic status. Taking legislative action, however, is an equal-opportunity action with potential for significant impact. Inspiring people to be civically engaged requires a mindset of **civic readiness**, such that they are primed to speak up about, vote for, and - if possible - financially support measures that mitigate ocean acidification and hypoxia along the Oregon Coast. Creating a sense of civic readiness goes beyond specific actions that may change over time.

Working off of the stated vision, the overarching goal of this **OAH Communication Plan** is to increase the civic readiness of key audiences. By *civic readiness*, we mean *possessing the skills and fierce desire to respond to calls for action in the form of legislation or funding on the local, community, state and/or regional level*. Other public definitions of civic readiness include:

Civic readiness is the ability to make a positive difference in the public life of our communities through the combination of civic knowledge, skills and actions, mindsets, and experiences. (New York State Education Dept.).

“Civic Ready” individuals use civic knowledge, skills and mindsets to make decisions and take actions for themselves, their communities, and public good as members of a culturally diverse, democratic society. (New York State Education Dept.)

By any definition, individuals with *civic readiness* are primed for action through messages that speak to their values and articulate specific ways they can participate in legislative initiatives.

Under this umbrella goal, the objectives of the Communication Plan are for target audiences to demonstrate their *civic readiness* through measurable objectives. The following objectives taken from the **Oregon OAH Action Plan** are considered a priority in Oregon and have been adopted by the governor as key action items:

- Increase community understanding and conversations about OAH
- Reduce the causes of OAH by minimizing carbon footprints in your environment
- Increase scientific understanding and trust by attending meetings, webinars, seminars, networking, etc.
- Become involved in gathering data for the scientific community
- Focus on economic indicators to track the impact of OAH on Oregon specific businesses

*These objectives represent higher-level actions that the Council supports; additional individual actions may be beneficial as part of building an OAH reduction mindset among community members.*



Photo by Trav Williams of Broken Banjo Photography

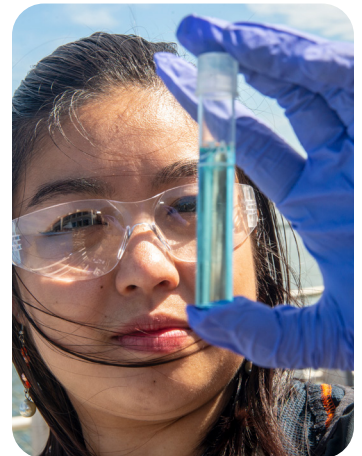
## PART 1: Communication Toolkit

This process mirrors the highly successful National Network for Ocean and Climate Change Interpreters (NNOCCI) communication training, which has been utilized across the US since 2009. Over 400 informal science educators have been trained in the use of these messages and methods.

# Prioritization of Audiences

## Why Prioritize Audiences

Effective communication requires an understanding of the specific audience receiving the message. A particular message may resonate well with one group but not another. “Oregonians” is too broad an audience. Familiarity with the varied demographics around the state, as well as their baseline understanding of the topic, helps to tailor messaging for distinct populations.



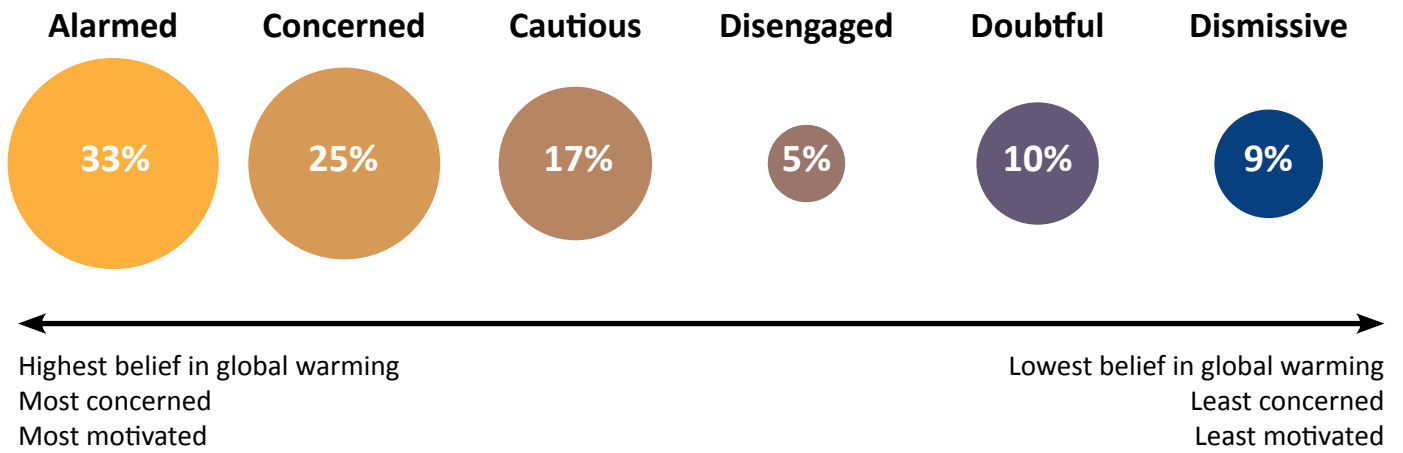
<sup>1</sup> <https://climatecommunication.yale.edu/>

<sup>2</sup> <https://climatecommunication.yale.edu/about/projects/global-warmings-six-americas/>

Photo by Lynn Ketchum

## Audience Demographics in Oregon

To understand the demographics of audiences in Oregon, we turned to the Yale Project on Climate Change Communications.<sup>1</sup> While that project addresses climate change at large, it is a useful reference for those concerned with ocean acidification and hypoxia which are directly related to many of the same issues that feed into the climate crisis. Both ocean acidification and hypoxia are ocean-based effects of climate change, caused by changes in ocean chemistry driven by the increase of carbon dioxide in the atmosphere. Therefore, understanding how the general populace thinks and feels about climate change is a reasonable starting point for determining their beliefs and attitudes related to OAH. As part of their annual reporting, Yale and George Mason Universities conduct The Six Americas Study which has been tracking American attitudes towards climate change since 2009.<sup>2</sup> On a scale of highest to least concerned about climate change, The Six Americas represent a spectrum of beliefs and motivations among the American public with regard to climate change:

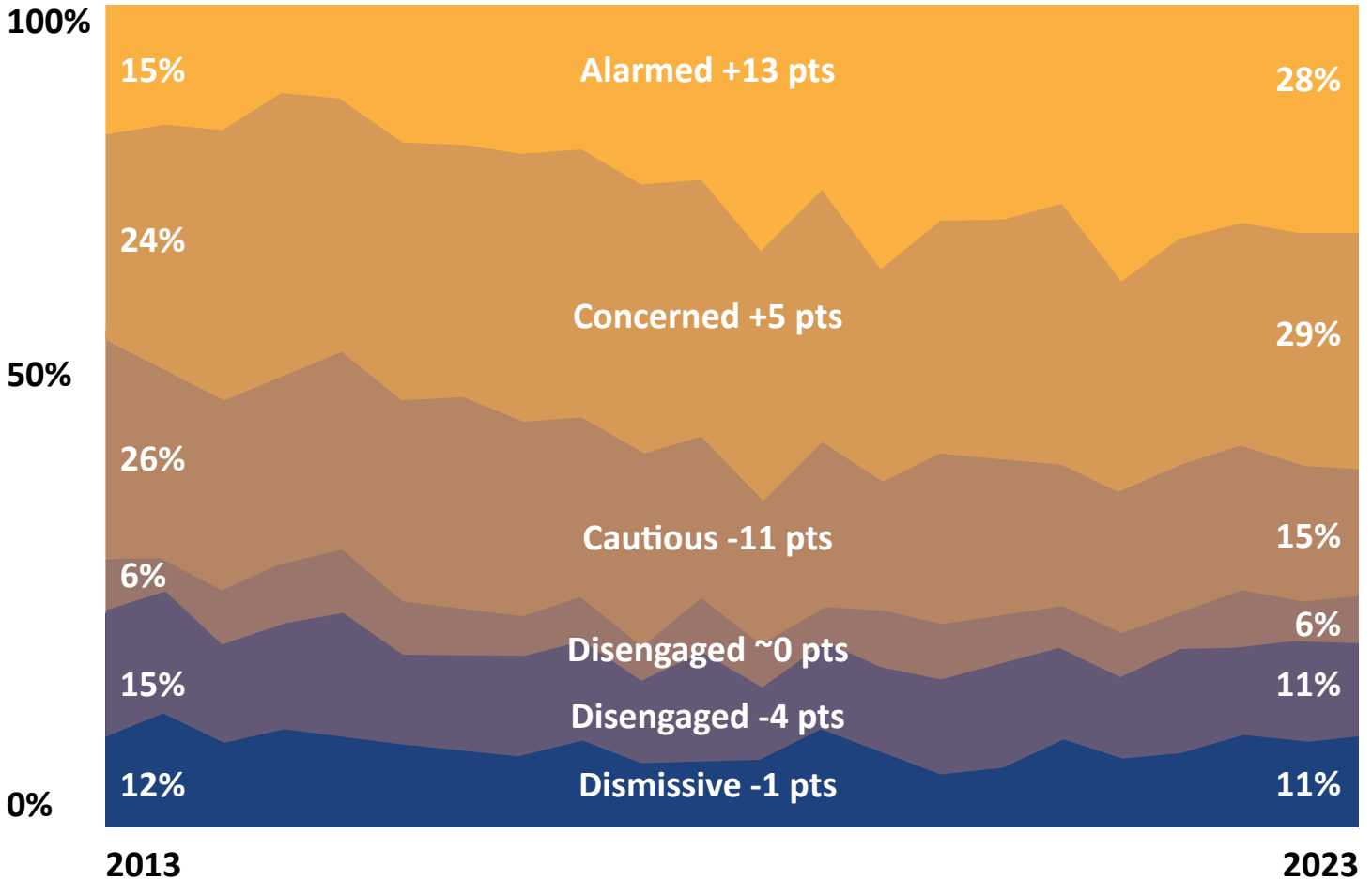


Descriptions of each of The Six Americas are provided in the table below:

Level	Description
The Alarmed	They are convinced global warming is happening, human-caused, an urgent threat, and they strongly support climate policies. Most, however, do not know what they or others can do to solve the problem.
The Concerned	They think human-caused global warming is happening, is a serious threat, and support climate policies. However, they tend to believe that climate impacts are still distant in time and space, thus climate change remains a lower priority issue.
The Cautious	They haven't not yet made up their minds: Is global warming happening? Is it human-caused? Is it serious? The Disengaged know little about global warming. They rarely or never hear about it in the media.
The Disengaged	They know little about global warming. They rarely or never hear about it in the media.
The Doubtful	They do not think global warming is happening or they believe it is just a natural cycle. They do not think much about the issue or consider it a serious risk.
The Dismissive	Believe global warming is not happening, human-caused, or a threat, and most endorse conspiracy theories (e.g., "global warming is a hoax").

The most recent data shows a significant change in the distribution of The Six Americas between 2013 to 2023. The Alarmed segment grew by 15% (from 18% to 33% of the U.S. adult population), while the Dismissive segment trended downward (from 11% to 9%). Overall, Americans are becoming more worried about global warming, more engaged with the issue, and more supportive of climate solutions.

## Global Warming's Six Americas Over the Last Decade



Base: 25,368 U.S. adults. Data include 22 waves of national surveys spanning april 2013—October 2023

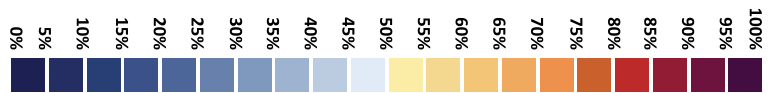
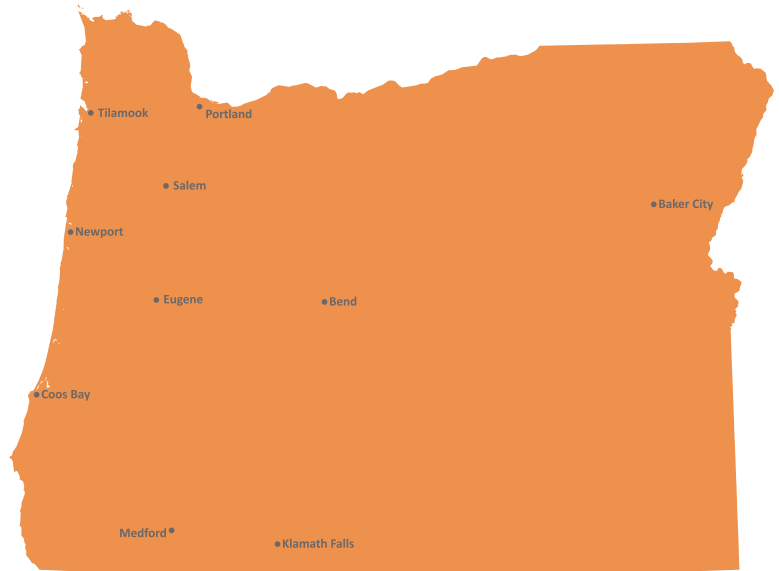
Source: Yale Program on Climate Change Communication; George Mason University Center for Climate Change Communication

# Estimated % of adults who think global warming is happening (nat'l avg. 72%), 2021

## Oregon Specific Data

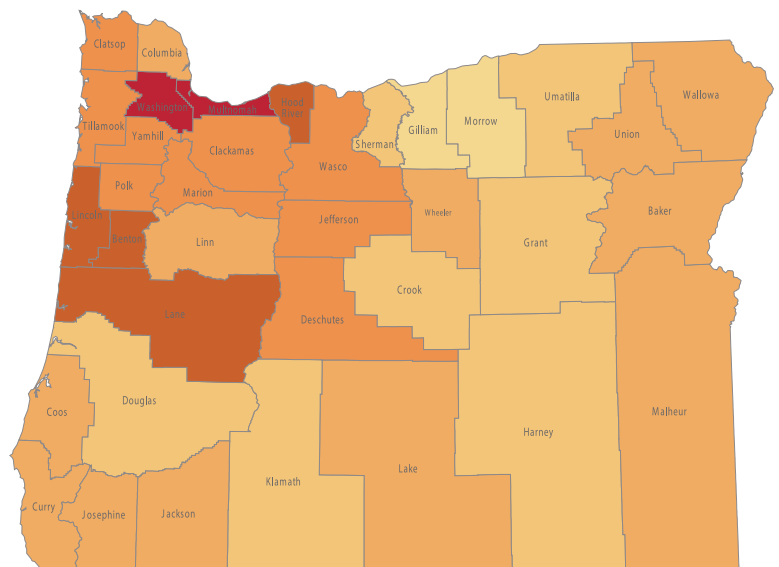
The Six Americas Project also publishes data on a searchable website, allowing interested parties to run queries on a number of factors across national, state, counties and metro area levels.<sup>3</sup> Their database shows important trends for Oregonians as they relate to communications about climate science.

The estimated percent of adults across the entire state of Oregon who think global warming is happening is 75%, compared to the national average of 72%.



## Individual counties

Looking at individual counties within Oregon, however, there is significant geographic variation in this belief. Residents in Multnomah and Washington Counties are much more likely (80% or higher) than residents in Gilliam and Morrow Counties (55%) to believe global warming is happening. Notably, the coastal counties of Lincoln and Lane are at 75%.

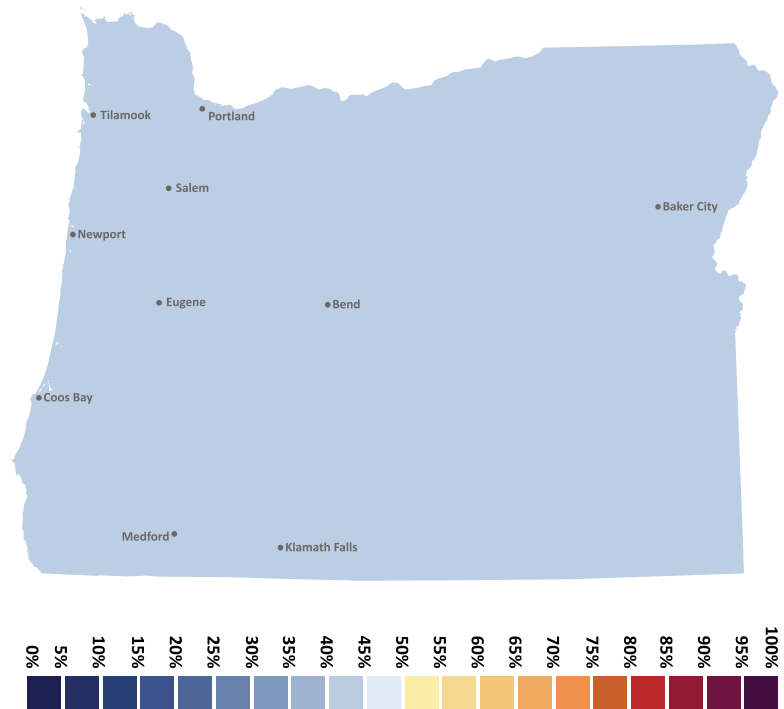


<sup>3</sup> <https://climatecommunication.yale.edu/visualizations-data/ycom-us/>

# Estimated % of adults who discuss global warming at least occasionally (nat'l avg, 35%), 2021

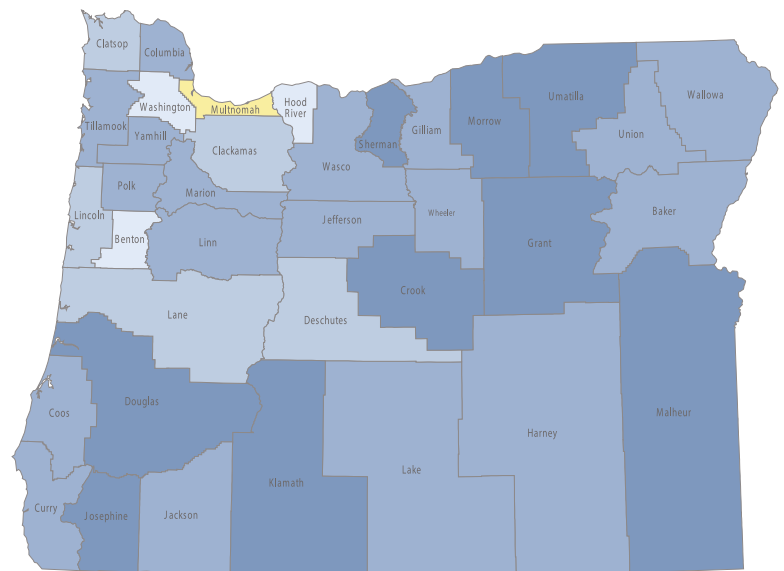
## Oregon Specific Data

Based on the 2021 data, 41% of Oregonians discuss global warming at least occasionally (6 points higher than the national average).



## Individual counties

On a county-level, again the data show variations in different geographic areas of the state, with the highest percentage of residents who discuss global warming at least occasionally (52%) located in Multnomah County.



Again, while The Six Americas construct applies to climate change broadly, it is a useful approximation for understanding Oregonian's beliefs about and tendencies to discuss related concepts like OAH. Much of Oregon's economy is directly impacted by climate change issues, from ocean acidification impacting the seafood industry to forestry and agriculture impacted by drought and increased temperatures.

These data are important in light of the understanding that effective messages can make the information accessible and generate more public discussion of the topic. The selection of specific messages for specific audiences is necessary in order to increase receptiveness to climate-related issues like ocean acidification and hypoxia and subsequently shift understanding of the threats these issues have towards Oregonian's environment and livelihoods...and ultimately spur them towards actions around solutions.

## Selection of Target Audiences

In order to narrow down the possible audiences to target with direct communication, we followed a systematic process. Beginning with a list generated by the OAH Council of many possible audience segments, we developed a matrix to assess the viability and impact of each audience group, looking at multiple demographic and psychographic factors for each group. These factors included: geographic distribution across the state; relative size of each audience in Oregon; ease of reaching each audience; weight they carry as influencers; and where they fall on the 6 Americas scale of concern about climate change. This exercise revealed certain audience segments as being stronger candidates for an effective OAH communication campaign. From the original list of over 45 possible audiences (see Table 1), and with input from the OAH Council, we winnowed the options to eight groups that aligned most closely with the OAH Council’s interests and showed the most promise for having an impact.

**Table 1. Original list of possible audiences considered as targets for this project.**

Category	Possible Audiences for Consideration
<b>Academic</b>	Academics
	College students - esp. marine science majors
	High school students
<b>Age</b>	Seniors
<b>Agriculture</b>	Agriculture industry
	Farmers / Ranchers
<b>Business</b>	Businesses that have a lot to lose by aligning with one side or the other
	Most stores (grocery, etc.)
<b>Commercial fishing</b>	Aquaculture organizations
	Commercial fisheries & aquaculture
	Fishing industry
	Oyster/bivalve, related mariculture folks
	Salmon fishermen
<b>Commercial industry (non-fishing)</b>	Construction industry
	Forest industry
	Timber industry
	Transportation industry
	Trucking industry

<b>Geographic</b>	Central Oregon (high desert) communities
	Coastal communities
	Eastern Oregon
	Southwest Oregon communities
<b>Government</b>	City planners
	County commissioners
	Department of Transportation
	Natural resources managers / stewards
	Port Commissioners
	Regulating agencies
<b>NGO</b>	Environmental organizations
<b>Personal experience</b>	People contending with personal / family, health, housing, finance crises
	People who have experienced fires and drought
	People who have seen their favorite places changing
	Urban parents just trying to make it through the day
<b>Personal views</b>	Climate change skeptics
	People who don't trust scientific organizations
	People who identify as not liking politics; avoid conflict
<b>Political</b>	Local government (e.g., coastal commissions)
	Metro centers (liberals)
<b>Recreation</b>	Outdoor recreationalists
<b>Recreational fishing</b>	Crab fishermen
	People who harvest fish and shellfish
<b>Religious</b>	Devoutly religious
<b>Socioeconomic</b>	Low income households
	Marginalized communities
	People just fighting to make it daily
<b>Tourism</b>	Regional coastal tourism partners
	Tourism industry

From this original list, the combined team selected eight audiences: High School/College Students, Seniors, Tourism and Hospitality Industry, Commercial Fisheries/Harvest Industries, Local Govt (port and county commissioners), City Planners, Outdoor Recreation Enthusiasts and Seafood Suppliers/Restaurants. To bring these eight population segments to life, we crafted audience profiles in the form of short narratives describing fictional characters who represented their group (see Appendix A). The **OAH Council** provided feedback on those audience profiles to ensure that they sufficiently encapsulated the spirit of the intended audience. We then used the profiles in a survey to systemically weigh various items relative to that audience. This approach helped the group to avoid bias in selecting the final list of target audiences. Each audience was rated on the following items:

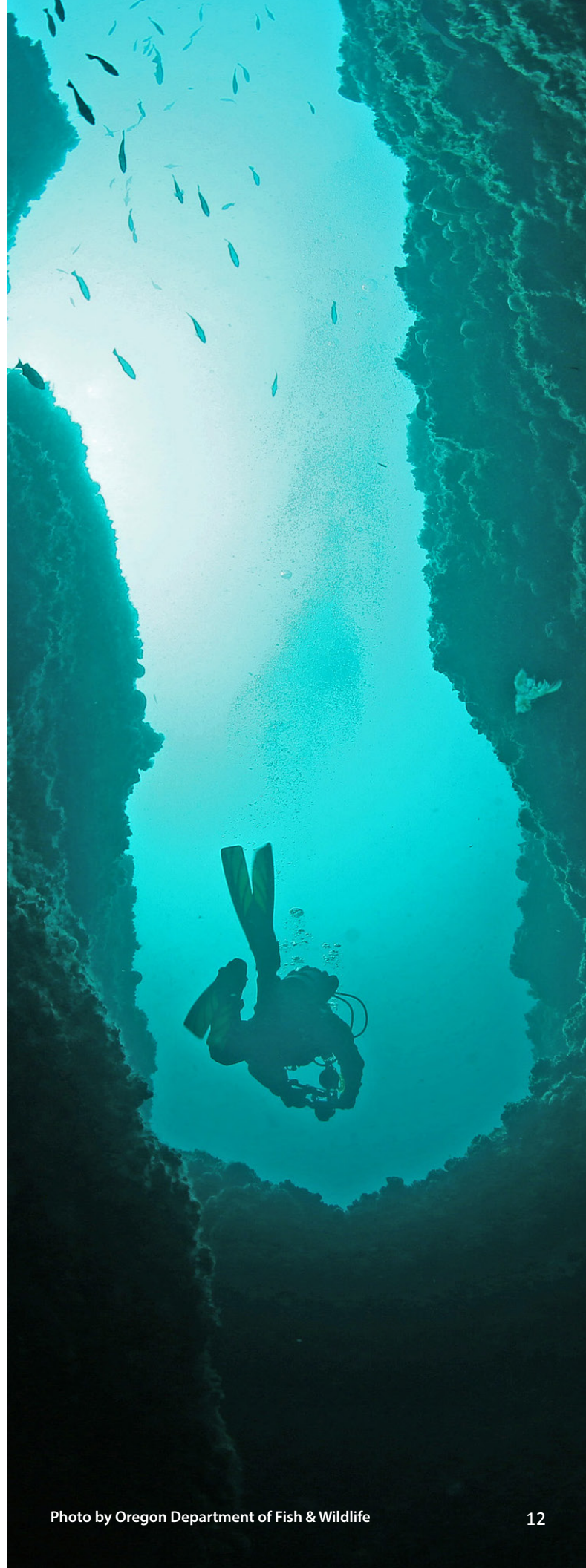
- Ability to amplify message
- Number of barriers to connecting with them
- Likelihood that they can effectively communicate with legislators
- Value of increasing their civic readiness
- Personal enthusiasm about connecting with them

Survey respondents were also asked to rank their top three choices for audiences that they felt would have a high degree of impact.

The combined qualitative ratings and quantitative rankings from the **OAH Council**, the **Education & Outreach Working Group**, and **OPAC** were used to calculate which of the eight audiences were most likely to be effective targets for communication about OAH in Oregon. The most highly rated audiences overall were:

- Local government: Port and County Commissioners
- Seafood suppliers and restaurants
- Commercial fisheries/harvest industry
- Tourism/hospitality industry

With this final list of target audiences, the focus shifted toward developing messages that would demonstrate successful science communication about OAH with each of these groups.



# Messages

The creation of messages about OAH that resonate with the target audiences and lead to action requires careful selection of language to clearly explain the complex scientific phenomena, as well as framing to ensure that the science content is, in fact, received. Knowledge alone is an insufficient catalyst towards action. People do not change their behavior unless they feel some personal or emotional connection to the effort. Nor do they continue taking action if they feel the effort is futile.

An effective OAH message is emotionally driven, rooted in science, and spurs hope for the future. One of the best ways to highlight hope with this topic is to share solutions that feel tangible and rely on community-level action. This allows people to connect with other members of their community around climate change issues in a meaningful, active way that inspires others to act instead of feeling despair for the future.

Here we present an approach to messaging about OAH that begins with a value shared by the audience, presents the science of ocean acidification and hypoxia, and ends on a hopeful note that incorporates a community-level solution.

## Leading with an audience-specific value

Before launching into an explanation of OAH, science communication best practice suggests leading with a shared value to capture the attention of the intended audience. Evidence-based values that test well across all Americans, include the concepts of protection and responsible management. Language to describe these values tested by the Frameworks Institute includes:


### Protection



**We have a duty to safeguard the wellbeing of people and places**

- We must protect and preserve the habitats and ecosystems we depend on
- Showing concern for the others is the right thing to do
- Stepping in to ensure people's safety and well being
- Let's take measures to eliminate or reduce risks
- Let's be vigilant in shielding people and places from harm

### Responsible Management



**Taking common-sense steps today is in the interests of future generations**

- Let's be responsible when it comes to the environment
- Let's look ahead to handle problems before they get worse
- Responsible managers keep an open mind, look to evidence, and take a level-headed, step-by-step approach
- Future generations depend on the decisions we make today

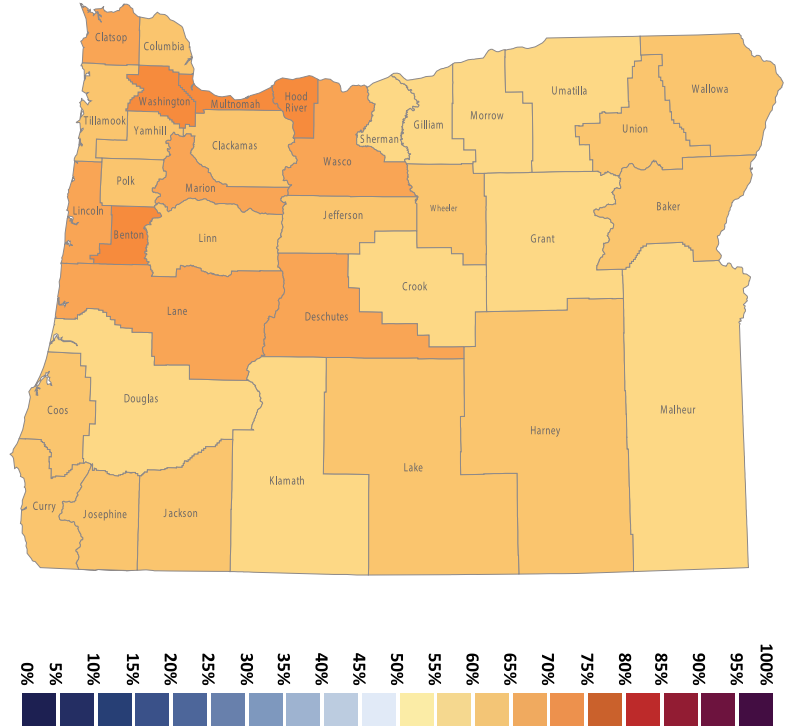
Both of these values are reflected in visualizations of The Six America's data.

<sup>4</sup> Local government was the general term applied to this audience once Port and County Commissioners were selected by the OAH Council and OPAC as important targets

<sup>5</sup> Simon, Adam, et. al., (2014) *The Value of Explanation: Using Values and Causal Explanations to Reframe Climate and Ocean Change*. A Frameworks Research Report.

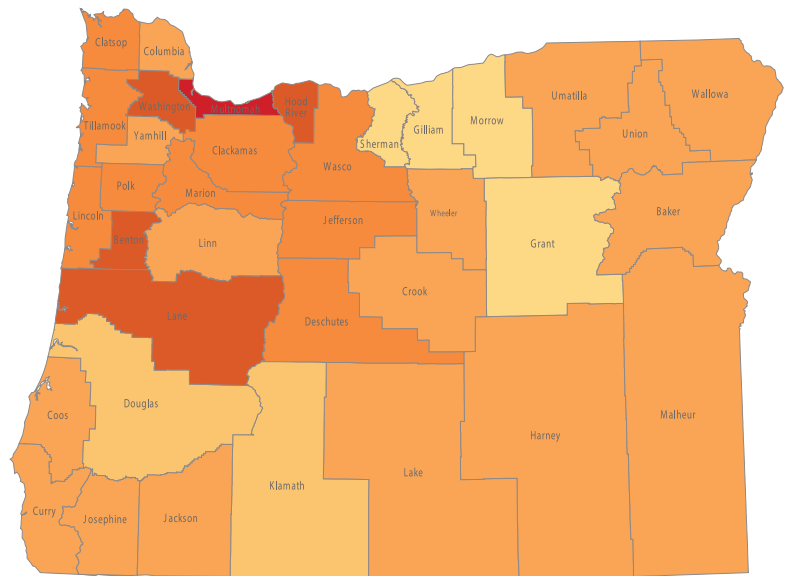
## Estimated % of adults who think citizens should do more to address global warming (nat'l avg. 65%), 2021

The value of Protection, for example, is represented in the percent of adults who believe citizens should do more to address global warming (up to 70% in some parts of Oregon, compared to 65% nationally).



## Estimated percent of adults who think global warming will harm future generations (nat'l avg 71%)

The value of *Responsible Management* is encompassed in the percent of adults who think *global warming will harm future generations*. Here, residents of Multnomah county reach up to 80% while the majority of the state is between 65-70% (compared to the national average of 71%).



By grounding our understanding of the demographics around geographic differences, we can begin to see the need for targeting our selected audiences with messages specifically tailored to their values and life experiences.

## Explaining the scientific phenomena

While there are numerous scientific and technical documents that describe OAH, this **Communication Plan** seeks to use messaging that has been co-created with members of the public to ensure the messages resonate with them. In April 2023, visitors to the Oregon Coast Aquarium participated in message testing to help craft a clear and concise explanation of the scientific phenomena of ocean acidification and hypoxia. As aquarium visitors entered the jellies gallery, an evaluator approached them using continuous random sampling and invited them to participate in a table-top activity where they were presented with 29 accurate statements about ocean acidification and hypoxia (see Appendix B). These statements were pulled from existing scientifically sound sources, including Oregon's OAH Action Plan, NOAA's website, and the National Network for Ocean and Climate Change Interpretation (NNOCCI). After hearing a brief explanation of the terms ocean acidification and hypoxia, participants were instructed to use the statement cards to assemble their own explanation of ocean acidification and hypoxia, preferably in a way that a group of fourth grade students with short attention spans could comprehend. (For reference, most informal science learning centers write signage with a 4th to 9th grade reading level).

A total of thirty OAH summaries were developed through this activity, some by individual visitors and some through family/group effort. Data collected from this exercise showed every phrase was utilized at least twice. The average number of statements required to complete the exercise was 7.5; the fewest number of phrases used was 4 and the greatest number of phrases used was 16. The most common phrase (used by 57% of respondents) was: *The term "hypoxia" refers to low or depleted oxygen in a body of water.* The least common phrase (used by only 7% of respondents) was: *Salmon, halibut, Dungeness crab, razor clams, oysters, pink shrimp, lamprey, and rockfish have helped generations or Oregonians earn a living.*

Notably, over one third of participants selected the same nine statements (see Table 2). Together, the nine most popular statements comprise an explanation of ocean acidification and hypoxia that can be delivered in less than one minute and is easily comprehended by the majority of public audiences.

### Developing the OAH "Elevator Speech"

In April 2023 at the Oregon Coast Aquarium, members of the visiting public were invited to participate in a table-top activity designed to develop a simple explanation of ocean acidification and hypoxia that would be understandable by the layman. Participants heard a brief description of the terms ocean acidification and hypoxia, and were then shown cards containing factual statements about OAH (see Appendix B). Their task was to select the statements they felt best conveyed the concepts and put them in an order suitable for teaching upper-elementary students about OAH.

#### **Activity Set-up:**

"When we burn fossil fuels like coal and gas, we release carbon dioxide into the air. The ocean absorbs a lot of this carbon dioxide, which is changing the ocean's chemistry—a process called ocean acidification. As you might imagine, messing with the acidity of ocean water spells trouble for many species.

Another challenge that ocean creatures face is the issue of hypoxia. This word simply means there are low oxygen levels in the water. Cold ocean water can absorb more oxygen than warm water can. Hypoxia can be caused by climate change increasing the temperature of the ocean.

Imagine you have been invited to give a talk to a 4th grade classroom in Oregon about ocean acidification and hypoxia. Your job is to explain how the ocean is changing and why it matters. These 4th graders don't have the longest attention span, but are probably capable of understanding more than we give them credit for.

Using the cards on the table, create the best explanation you can for your students. You may use as many or as few of the cards as you like. Move them around until you have a version you like best."

When participants finished, the evaluators asked them to read their script out loud in its entirety to confirm they liked their presentation; changes were permitted if desired. Once a final version was completed, the statement cards were photographed for later data entry.

Statement about OAH	Percent of participants who utilized it
The term "hypoxia" refers to low or depleted oxygen in a body of water.	<b>57%</b>
Because most organisms need oxygen to live, few organisms can survive in hypoxic conditions.	<b>43%</b>
Local actions will lead to a brighter future, for the oceans, its species, and the communities that depend on them.	<b>43%</b>
Oregon's ocean is changing, and many species have already shown signs of distress.	<b>43%</b>
As a result of the changing chemistry, we are seeing sea creatures' skeletons and shells becoming thinner or more brittle.	<b>40%</b>
Climate change is the cause of hypoxia, as warmer waters hold less oxygen.	<b>40%</b>
This is called ocean acidification.	<b>37%</b>
Just as humans need calcium to build their bones, sea creatures need calcium carbonate to build strong skeletons and shells.	<b>33%</b>
As the Pacific Ocean warms, its ability to hold a lot of oxygen declines.	<b>33%</b>

Table 2. The most popular statements used to explain OAH. Each of these statements were used by at least one third of activity respondents.

## Core Message

We offer here the core message that emerged from data-driven analysis. The selected statements do not necessarily reflect a comprehensive understanding by participants of how ocean acidification and hypoxia occur on a deep scientific level. From research on communication about complex science issues, however, we know that the public does not require deep knowledge of an issue in order to move them towards action. Rather, they can be motivated by emotions and values to become engaged and make behavior changes. The language presented here combines the nine most popular phrases, for direct use by those responsible for communicating effectively about these topics with the general public. While the core message can be presented verbatim, communicators may also sew the phrases together in a slightly different configuration, or weave additional information into the script, in order to tailor it for a particular audience or purpose. Best practice suggests re-testing a reconfigured message with the target audience and with every change made in the messaging. It cannot be assumed that even a slightly different message will remain as effective.

*Oregon's ocean is changing, and many species have already shown signs of distress. Just as humans need calcium to build their bones, sea creatures need calcium carbonate to build strong skeletons and shells. The ocean absorbs a lot of carbon dioxide, which is changing the ocean's chemistry and prevents the development of calcium carbonate. This is called ocean acidification. As a result of the changing chemistry, we are seeing sea creatures' skeletons and shells becoming thinner or more brittle.*

*Climate change is also the cause of hypoxia, as warmer waters hold less oxygen. As the Pacific Ocean warms, its ability to hold a lot of oxygen declines. The term "hypoxia" refers to low or depleted oxygen in a body of water. Because most organisms need oxygen to live, few organisms can survive in hypoxic conditions. Local actions will lead to a brighter future, for the oceans, its species, and the communities that depend on them.*

## Ending with a Community-level Solution

After delivering the core message, it is important to end with a solutions-oriented action - either something the audience can themselves engage in or something occurring within the community that the audience can support.

Reviewing data visualizations for Oregon from 6 America's Study reveals a bifurcation of opinions of "who" should take on more responsibility to address climate change and related issues. Urban centers and coastal residents are more likely to expect more involvement of citizens and local government, while more rural west-state populations do not expect local government, the Governor or other citizens to address this issue. Oregon presents an interesting geographic layout, with coastal counties generally classified as rural (due to low population compared with other US states) while also being considered more likely to care about climate issues. The Six Americas study supports this incongruity, showing that coastal areas align more closely with inland metro areas. It should be noted that not all of Oregon's counties along the coast follow this pattern; notably Coos County, where fishing and timber industries are primary economic drivers, generally scores lower on items within the Six Americas study.

Regardless of how populations are oriented, utilizing the approach of linking Values to Community Level Solutions, puts the direction of the conversations and solutions back in the hands of the citizens themselves. This can resonate with the "less government- rugged individualism" that many Oregonians identify with.

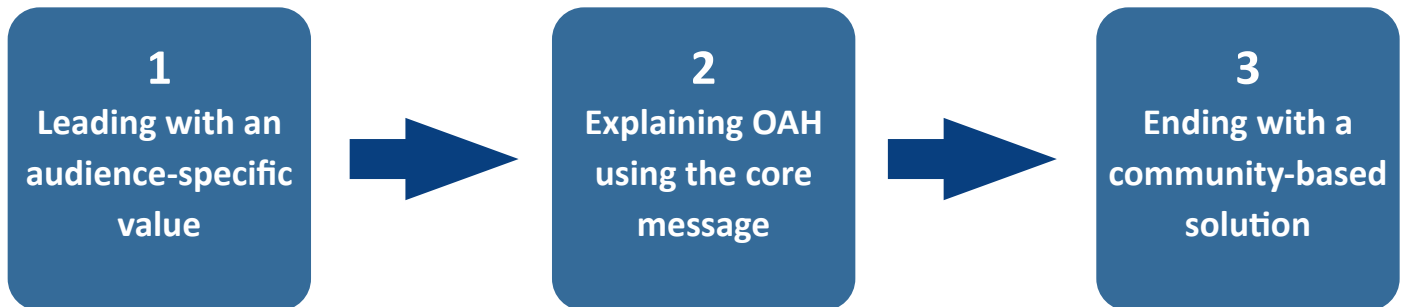


Photo by Trav Williams of Broken Banjo Photography

# Audience-Specific Messages

The three-part format for messaging can be applied to any of the target audiences, and tailored to match their particular values and relevant actions. Here we present first a generic template, suitable for communicating with the general public. Next we offer a version unique to each of the target audiences, incorporating audience-specific values and solutions.

Each message follows the same three-part format:



If you have limited time or space for messaging, focus on using the text in bold.

---

## MESSAGING FOR THE GENERAL PUBLIC

[1] **We must protect the Oregon Coast from being harmed by the issues facing our environment.**

[2] Core message

[3] **Let's be vigilant in safeguarding our coastal habitats and the Oregonians whose livelihoods depend on them.**  
**What are some ways you can help safeguard our coasts?**

---

## MESSAGING FOR LOCAL GOVERNMENT OFFICIALS: PORT & COUNTY COMMISSIONERS

[1] **Taking practical, common sense steps to address ocean acidification and hypoxia is in the best interest for future generations.**

[2] Core message

[3] **Practical, feasible, step-by-step approaches allow us to make real progress on longstanding challenges with ocean acidification and hypoxia.** Here in [Name of Port/County], we are making real progress by [insert your solution!]... We can all make a difference by handling problems before they get worse.

---

## MESSAGING FOR SEAFOOD SUPPLIERS & RESTAURANTS

[1] **We must protect Oregon's beloved seafood restaurants from being harmed by ocean acidification and hypoxia.**

[2] Core message

[3] **Showing concern for the welfare of seafood suppliers is the right thing to do.** Here at [Name of Restaurant], we are doing the right thing by [insert your solution!]... We hope you'll join us in protecting and preserving the Oregon Coast and the fish populations that we all depend on.

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## MESSAGING FOR COMMERCIAL FISHERIES & HARVEST INDUSTRY

[1] **We must protect Oregon’s fishermen and shellfish harvesters from being harmed by the effects of ocean acidification and hypoxia.**

[2] Core message

[3] **Protecting our harvest industry means actively eliminating or reducing the risks of ocean acidification and hypoxia.**

Here at [name of fishery], we are actively eliminating or reducing risks of ocean acidification and/or hypoxia by [insert your solution!]... Let’s all be vigilant in shielding and safeguarding habitats and people from ocean acidification and hypoxia.

---

## MESSAGING FOR TOURISM & HOSPITALITY INDUSTRY

[1] **We all want to enjoy Oregon’s beautiful coast, today and for many tomorrows to come! Taking practical, common sense steps to address ocean acidification and hypoxia is in the best interest for future generations.**

[2] Core message

[3] **Future generations depend on the decisions and plans we make today.** Here at [name of hotel/Other tourist site], we are committing to future generations by [insert your solution!]... We appreciate your shared commitment to being responsible with our natural resources to ensure future generations can enjoy visits to the Oregon Coast.



# Civic Actions to Address OAH

Messaging alone is not enough to address OAH. After reaching an audience with a clear, compelling message, it is also necessary to engage them in related and meaningful actions.

Addressing the human causes of OAH requires many people taking action at many levels. There is no single action that everyone can and will engage in; rather, different audiences have varying capacities to make a difference.

Moving people towards action can occur once the OAH message has been conveyed. Examples of actions that are tied to the messages and can be encouraged for each target audience include the following:

Audience	Value	Message	Action
General Public	Protection	We must protect the Oregon Coast from being harmed by the issues facing our environment.	Become involved in gathering data for the scientific community - your data can help cutting edge research in Oregon. <sup>A</sup>
Local Government Officials (Port & County Commissioners)	Responsible Management	Taking practical, common sense steps to address ocean acidification and hypoxia is in the best interest for future generations.	Increase community conversations (and understanding) of OAH through public meetings, trade association meetings, community group training workshops, media appearances, etc.
Seafood Suppliers and Restaurants	Protection	We must protect Oregon's beloved seafood restaurants from being harmed by ocean acidification and hypoxia.	Reduce the carbon footprint in your environment. <sup>B</sup>
Commercial Fisheries/ Harvest Industry	Protection	We must protect Oregon's fishermen and shellfish harvesters from being harmed by the effects of ocean acidification and hypoxia.	Become an active citizen by following any and all legislative discussions/ environmental reviews/ coastal permitting, etc. <sup>C</sup>
Tourism and Hospitality Industry	Responsible Management	We all want to enjoy Oregon's beautiful coast, today and for many tomorrows to come! Taking practical, common sense steps to address ocean acidification and hypoxia is in the best interest for future generations.	Focus on economic indicators to track the impact of OAH on Oregon specific businesses

<sup>A</sup> Some relevant examples of citizen science projects include:

- Oregon Season Tracker - <https://extension.oregonstate.edu/ost>
- pHPro - <https://www.citizenscience.gov/catalog/181/#>
- Global Ocean Acidification Observing Network (GOA-ON) - <http://www.goa-on.org/home.php>

<sup>B</sup> Carbon footprint reduction can also occur at home, in schools, and in neighborhoods and should be accessible to anyone in the industry including wage workers and immigrants. EPA's carbon footprint calculator is available at: <https://cleanet.org/resources/41910.html>

<sup>C</sup> Specific legislative activities may include:

- Advocating together to reduce your community's carbon footprint
- Commenting to legislators as appropriate

## Training to take the Message to your Community

Individuals from each target audience can be trained to serve as messengers about the ways OAH affects their community. Trained messengers are best able to relay essential ideas and serve as trusted resources within their networks. The following workshop outline suggests fundamental topics to include in a presentation meant for target audiences:

### OAH Messaging Workshop Outline

1. Why are we talking to you?
  - a. How is your professional role impacted by OAH, and how can you play a role within your professional community?
  - b. How can you use your voice to reach legislators that can impact actions on this issue?
2. Help activate "civic readiness" (get your professional colleagues primed for action)
3. What are the basics of OAH?
4. How do these issues impact your field/livelihood?
5. Who is working on these issues?
6. What actions/research/legislation has been done so far?
7. How do we talk about OAH? What are the tested messages that resonate with the public?
8. Become an Influencer and a Messenger

# Media/ Resources

The intended users of this Communication Toolkit are likely well-versed in the science behind ocean acidification and hypoxia (OAH); indeed, some will be among the foremost experts on these topics. It is not necessary, therefore, to provide here an exhaustive list of articles and information to explain OAH. Rather, this section highlights a few, well-crafted resources accessible to anyone. In developing the Communication Plan, the following resources were reviewed and deemed relevant to the OAH project. The following resources are a sampling of materials that can be used as a refresher for those wishing to communicate effectively or shared with audiences who are still learning. Additional resources are available as an Appendix.

Keywords to search for current articles and resources:

- Ocean acidification
- Oregon Coast fisheries impacts of climate change
- Hypoxia Pacific Northwest
- Marine life + pH
- Oregon ocean chemistry

## Science of Ocean Acidification & Hypoxia (OAH)

[Ocean Acidification](#) - This NOAA-produced collection of educational materials includes multimedia products, data resources, background information, and related stories.

The [OA Alliance Action Plan Toolkit](#) presents an informational graphic about OA as well as a guide to help develop OA action plans that contain both regulatory and non-regulatory actions.

[Dungeness Crab toolkit \(NOAA\)](#):- This communication toolkit is designed for educators and communicators to use to teach others about the impact of ocean acidification on Dungeness crab. The toolkit includes: fact sheet; infographic; PowerPoint slideshow with script; reference list; resource list; public domain video B-roll; and public domain images. Impacts of Ocean Acidification & Hypoxia

[The Ocean is Shattering Heat Records. Here's What That Means For Fisheries](#) - (Graham, Max, 11 August 2023, Grist.) This story is part of Record High, a Grist series examining extreme heat and its impact on how — and where — we live.

[Oregon's Intertidal Ecosystem Is Approaching a Tipping Point](#) - (Dzombak, Rebecca, 18 April 2022, Hakai Magazine.) Examples of warning signs by ocean ecologists.

[Oregon shellfish farmers: Perceptions of stressors, adaptive strategies, and policy linkages](#) (Green, K.M., et. al., 1 March 2023, *Ocean and Coastal Management*. vol. 234. ) The article is based on research with commercial Oregon shellfish growers and their insights on the stressors that affect their shellfish operation. They highlight ocean stressors but also focus on other stressors that are priorities to growers. Importantly, based on interviews with these growers, they document specific adaptive strategies that can be employed in response to stressors and related policy linkages.

[Fighting Ocean Acidification, One Oyster at a Time](#) (Holtz, Jackson, University of Washington). Article describing how UW is partnering with shellfish growers and others to help fight ocean acidification, which threatens both shellfish and the industry built around them.



Photo by Chris Peterson of Action Works Photography

# Effective Communication Strategies

## [National Network for Ocean and Climate Change](#)

[Interpretation \(NNOCCI\)](#) NNOCCI's website offers a curated set of resources including publications, training kits, webinars, and videos to support discussion around the complex topic of climate change. Membership is required to access certain resources but is free and open to anyone.

## [How to effectively communicate about climate change](#)

(Matthews, Ben, Empower Agency.) Describes five key aspects for climate science information to be fully absorbed by audiences, according to Columbia University's Center for Research on Environmental Decisions.

## [Efforts to Advance Awareness, Understanding and Action](#)

[around Ocean Acidification](#) (Meyer, D., et. al, 2012. The Ocean Project.) Summary of findings from survey and in-depth interviews with representatives from zoos, aquariums, museums and other conservation organizations to investigate whether and, if so, how these institutions are addressing the issue of ocean acidification.

## [Transforming the stories we tell about climate change: from](#)

['issue' to 'action.'](#) (De Meyer, K., et al 2021. Environ. Res. Lett. 16 015002). Highlights a potentially important shift in how climate change is communicated. 98% of environmental news stories are negative in nature. Can we shift this approach and would it lead to better engagement, action and hope?

# Social Science for Understanding Climate Communication

## [Public emotions and cognitions in response to ocean](#)

[acidification](#) (Insinga, M. L., et. al, 15 April 2022. *Ocean and Coastal Management*. Vol 221.) This article examines cognitions and emotions regarding ocean acidification (OA).

## [Who Is Talking About Climate Change?](#)

(Letter from Anthony Leiserowitz, Ph.D. Director, Yale Program on Climate Change Communication, 2023.) The Yale Program for Climate Change Communication recently put out new research looking at the demographics of who is talking about climate change. The latest data identifies the types of people most likely to talk with family and friends about global warming and some characteristics that may help to explain why they do.

[Climate Opinion Fact Sheets for States, Counties, or Congressional Districts](#) - Factsheets tool, based on the [Yale Climate Opinion Maps](#), that provides information about Americans' beliefs, risk perceptions, and policy preferences

about climate change for all 50 states, 435 congressional districts, and 3,142 counties across the U.S. The tool allows you to customize which survey questions are shown on your Factsheet.

## [Information about the human causes of global warming influences causal attribution, concern, and policy support related to global warming](#)

(Bergquist, P., et. al., 11 July 2022, *Thinking and Reasoning*) Research article suggesting that, when informed about climate change causes, impacts and solutions, most Americans can update their own climate change beliefs, risk perceptions, and policy support.

## [Survey findings name barriers to civic engagement for Oregon families and ways to reduce them](#)

(Oregon Values and Beliefs Center, September 30, 2021) Survey results describing top barriers to civic engagement and strategies for reducing those barriers.

# Communicating Climate Solutions

## [Expanding Our Repertoire: Why and How to Get Collective Climate Solutions in the Frame](#)

(Frameworks Institute, 2017.) Three-pager explaining how solutions (promising initiatives, effective programs, or recommended decisions) can be used as a communication element to gain public support and engagement in the issue of climate change.

## [Combating Misinformation: How to Talk About Science](#)

(Frameworks Institute, 31 May 2023.) One-pager that presents research looking at the science of misinformation. When trust is low, we are more susceptible to misinformation, but what is behind the lack of trust? Suggests how better framing can help us activate productive mindsets and more effectively counter misinformation.

## [Capacity Building to Address Ocean Change: Organizing Across Communities of Place, Practice and Governance to Achieve Ocean Acidification and Hypoxia Resilience in Oregon](#)

(Regula Whitefield, C., et. al., 2021. *Coastal Management*. 49:5, 532-545.) Research paper focusing on identifiable actions that human communities are taking in reaction to ocean change to mitigate these increasingly apparent impacts.



Photo by Amanda Gladics

## Part 2: Implementation Plan

**This toolkit consists of Part 1:** Communication Plan and **Part 2:** Implementation Plan. The primary designated user for these plans is the Oregon Ocean Acidification and Hypoxia Council (OAH Council). The OAH Council expects to use this Implementation Plan to pilot test and use the contents of the Communications Plan. Other interested groups may utilize the Implementation Plan to chart their own localized and targeted messaging program.

In **Part 1**, the accompanying Communication Plan outlines the steps taken to determine specific audiences, messages, actions and metrics based on the work done in partnership with the OAH Council. We encourage other like-minded groups to further tailor their approaches based on their specific targeted outcomes.

In **Part 2**, we offer strategies for how the four identified audiences can best be used as “influencers” to reach policymakers.

# Implementation Checklist

A five step process is suggested for the implementation of the Communication Plan. Full recommendations for the OAH Council follow this checklist.

## Step 1: Assembling Messengers

- Recruit key personnel (messengers) who are well connected to the target audience(s)
- Review Communication Plan thoroughly with the team of messengers
- Agree upon messenger responsibilities (including participation in training) and timeline

## Step 2: Identifying Metrics

- Determine metrics specific to each audience based on intended outcomes
- Define success for each metric

## Step 3: Training Messengers

- Conduct training for messengers on effective science communication
- Provide opportunities to practice message delivery in various formats

## Step 4: Disseminating Messages

- Initiate coordinated message dissemination
- Maintain consistent, ongoing messaging using existing communication channels

## Step 5: Evaluating Outcomes

- Assess specific metrics for each target audience
- Survey policymakers on the extent to which they support actions that reduce OAH

# Recommendations for OAH Council

For the purpose of the OAH Council's initiative around OAH communication, each step is detailed here:

## Step 1: Assembling Messengers

### 1A: Recruit key personnel (messengers) who are well connected to the target audiences.

Begin by listing characteristics of great messengers for your target audiences. Favorable traits may include:

- recognized community leaders
- people with education experience
- people whose vocations overlap with multiple target audiences
- strong advocates within local organizations

Some key community members from the target audiences are already involved in the planning process and would be well situated to engage as messengers for the four target audiences shown on the diagram. They have already demonstrated commitment to OAH issues as members of various councils, working groups and associations. Individuals who have agreed to assist with the Implementation Plan are:

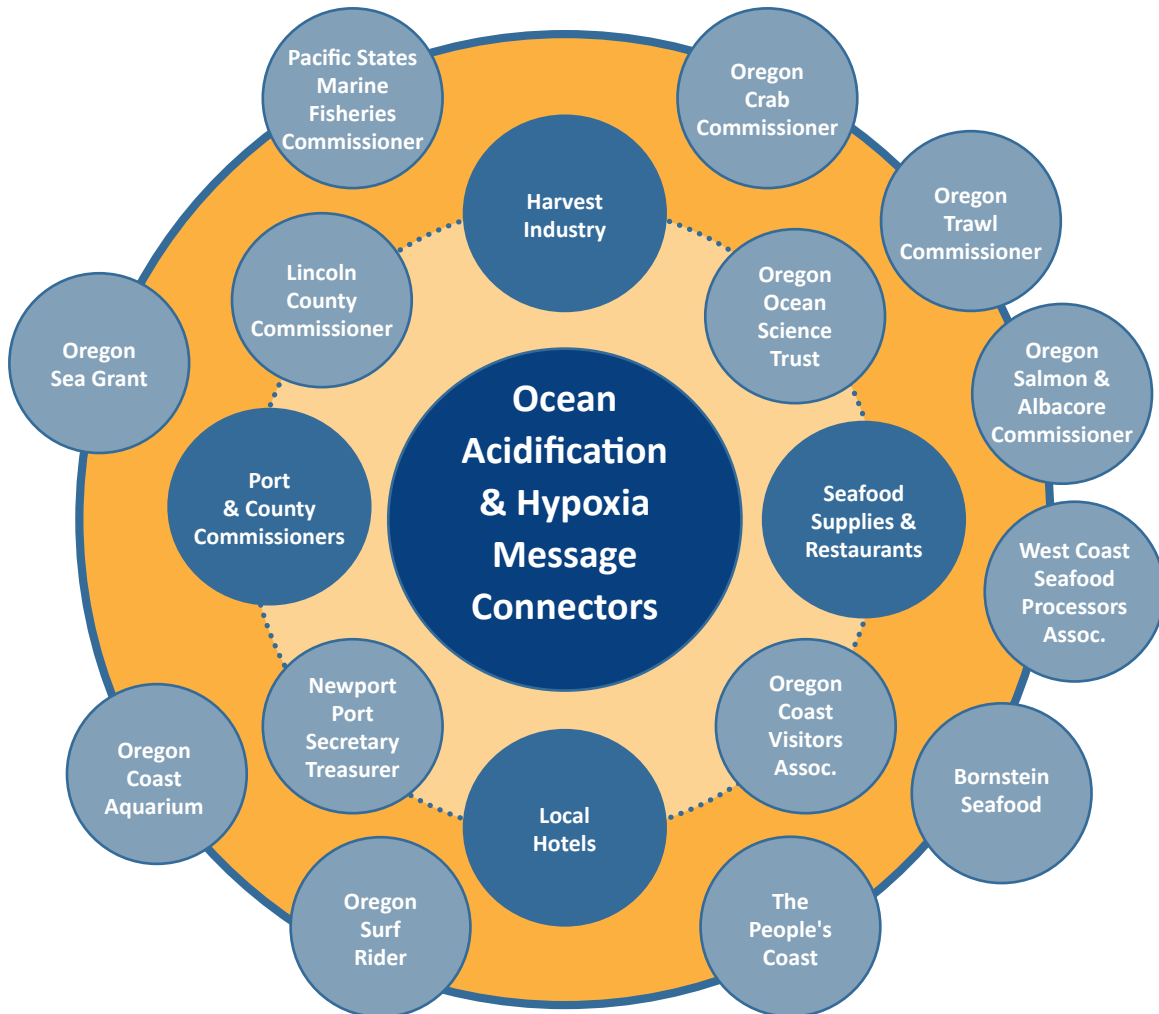
- Laura Anderson, Co-owner of Local Ocean Seafood & OOST Board Member
- Kerry Carlin-Morgan, Director of Education & Volunteer Services at Oregon Coast Aquarium; OAH Council Education and Outreach Working Group member
- Andy Lanier, Coastal Natural Resource Specialist at Oregon Coastal Management Program; OAH Council member
- Karina Nielsen, Director of Oregon Sea Grant at OSU; served as Oregon Sea Grant Representative on OOST
- Fran Recht, Pacific States Marine Fisheries Commission & NGO Representative to OAH Council
- Arica Sears, Deputy Director of Oregon Coast Visitors Association (OCVA)

In order to roll out these messages in an effective and impactful manner, a larger cadre of messengers will need to be recruited. Suggested sources could come from various subject matter experts who have been involved in the Communication Plan development process. In addition, there may need to be staff/intern/fellow support internally through ODFW.



During and after the April 2023 OAH Symposium, Pathways Collaborative met with individuals representing each audience segment. These conversations revealed a network of individuals within each audience segment who are known and respected messengers in their communities and can serve as end users of the Communication Plan in order to reach and influence policy makers. (See the Acknowledgments section for specific names.)

Identifying strong partner organizations can also improve the success of targeted communication, particularly if the partner organization is already focused on that audience.



## 1B: Review Communication Plan thoroughly with the team of messengers

The entire team of recruited messengers must be well versed with the Communication Plan before beginning any work. A thorough reading and group discussion about each section will permit everyone to (re)familiarize themselves with the purpose and content of the plan, clarify any questions or misunderstandings, and build cohesiveness among team members as to their goals for implementing the plan.

Particular emphasis should be placed on audience selection, core message, values, and community-centered solutions. Ensure that all key personnel are familiar with the audiences that were identified through a systemic and inclusive process. Review the values of protection and responsible management in order to understand how and why these values resonate with the target audiences. The team should also review the process taken to create the core message and audience-specific actions.

Once the Communication Plan is clear, the messaging team should discuss possible pitfalls and barriers to success implementation. By conducting a “pre-mortem,” it is possible to identify what could go wrong at each stage and pre-emptively guard against these potential missteps.

## 1C: Agree upon messenger responsibilities (including participation in training) and timeline

The group of messengers should develop a set of job descriptions and responsibilities for all team members. By outlining required commitments and assigning specific tasks to individuals, the implementation process is more likely to be completed in a timely and thorough manner.

Different roles may emerge based on individuals' areas of expertise, position within the community, and ability to interact with the target audiences. In addition to the messenger roles, some team members may identify as influencers. Messengers are professionals who can be trained to be effective communicators with one or more of the target audiences, and may be called upon to train others in the future. Influencers are key community members who have the ability to draw attention to issues and promote additional audiences. Influencers may even reach beyond the target audiences by sharing messages through broader means (social media, public events, public institutions, etc.)

Potential commitments for each role could look like this:

Aspect of Communications Work	Messengers	Influencers
Time commitment	moderate to heavy	light
Toolkit training required	yes	yes (mini)
Toolkit training others	yes	no
Public presentations	yes	no
Community gatherings	yes	yes
Legislative briefings	possibly	no
Social media posts	some	yes
Rapid response to newsworthy issues	yes	yes

All participants will need some level of training and communications resources. Dedicating sufficient time to training in effective science communication is critical to ensuring that the messaging effort is worthwhile.

Messengers should commit to completing their specific tasks within a given timeline. Assuming funding is available, a reasonable timeline might look like this:

Steps	Tasks	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9+
<b>Assembling Messengers</b>	Recruit key personnel (messengers) who are well connected to the target audience(s)	█								
	Review Communication Plan thoroughly with the team of messengers		█							
	Agree upon messenger responsibilities (including participation in training) and timeline		█							
<b>Identifying Metrics</b>	Determine metrics specific to each audience based on intended outcomes			█						
	Define success for each metric			█						
<b>Training Messengers</b>	Conduct training for messengers on effective science communication				█	█				
	Provide opportunities to practice message delivery in various formats					█				
<b>Disseminating Messages</b>	Initiate coordinated message dissemination						█			
	Maintain consistent, ongoing messaging using existing communication channels						█	█	█	
<b>Evaluating Outcomes</b>	Assess specific metrics for each target audience								█	█
	Survey policymakers on the extent to which they support actions that reduce OAH									█

## Step 2: Identifying Metrics

### 2A: Determine metrics specific to each audience based on intended outcomes

Consider what is expected in terms of outcomes for each audience and identify corresponding metrics.

For example, some *sample metrics* for the target audiences could be:

#### Audience 1: Local Govt – Port and County Commissioners

- Quarterly citizen/commissioners information sharing sessions in 23 Port Districts
- Introduction of local level legislation to address causes of OA
- Special tax incentives for less-impactful businesses
- Adoption of Carbon-Reduction practices Policies or practices for agencies
- Stretch Goal: target of ZERO carbon emissions for Port District (auto, boat, land based machinery)

#### Audience 2: Seafood Suppliers and Restaurants

- OAH information cards at local seafood restaurants (similar to Seafood Watch Cards) (along with training workshops/materials for restaurant staff)
- 70% participation of regional staff in Informational Workshops on issues and communications
- Highlighting vulnerable local species on menus (e.g., “We don’t have \_\_\_ due to OA issues”)
- Support for low emissions vehicles for seafood supplies and restaurants. All vehicles marked “helping to reduce carbon output.....”)
- Stretch Goal: Sell and serve only “zero carbon” fish and shellfish. (zero carbon rating determined by Fisheries research and policies)

#### Audience 3: Commercial Fisheries/Harvest Industry

- Citizen involvement in monitoring OAH metrics that they can input into interactive and searchable website for general public
- “Net to Plate” PSA highlighting the challenges and responsible management practices
- State grants to reduce emissions output from fishing vessel
- Stretch Goal: Harvest only “zero carbon” fish and shellfish. (zero carbon rating determined by Fisheries research and policies)

#### Audience 4: Tourism and Hospitality

- Development and adoption of Tourism Green Practices along coastal locations (to reduce emissions and impact on wild lands)
- Certification of tourism locations—include mentions of OAH reduction as part of certification
- Creation of “citizen science” weekend packages to encourage city dwellers to become personally involved in water quality monitoring and green practices
- Stretch Goal: Require all Oregon Hotels to be “zero carbon” (energy sources, fleet and limos, food preparation, laundry, etc.)

## 2B: Define success for each metric

Once the particular metrics for each audience have been chosen, it is important to articulate what it means to achieve success. The team should consider what is reasonable within the expected timeframe, given available resources.

A measure of success might be based on quantitative data (e.g., 50% of the Port Districts offer citizen/commissioners information sharing session at least twice a year) or qualitative data (e.g., After 3 months of running a “Net to Plate” PSA highlighting responsible management practices, there is a measurable increase in residents who can correctly use the term ocean acidification in a sentence.)

Success should be defined around measurable data used to determine the achievements of your communication efforts.

## Step 3: Training Messengers

### 3A: Conduct training for messengers on effective science communication

Use the training materials provided on the **Oregon Ocean Science Trust (OOST) website**: <https://www.oregonoceanscience.com/>

### 3B: Provide opportunities to practice message delivery in various formats

After everyone has received the basic training on effective science communication, allow participants space and time to rehearse their messages. It takes practice, out loud and with a friendly audience, to become fluent with the phrasing that will connect with an audience’s values and engage them in productive discourse about ocean acidification and hypoxia. Messengers must experience their own learning curve to build confidence in communicating this information. It is ok - and expected - to make mistakes during this period of practice. Repetition is necessary in order to develop fluency in delivering the messages effectively.

The group may choose to schedule periodic meetings, in person or on Zoom, to discuss attempts to deliver messages and get feedback from their peers. Talking through successes and failures helps to reinforce good technique and provide motivation to continue the effort.



## Step 4: Delivering Messages

### 4A: Initiate coordinated message delivery

Although the messengers for the four target audiences will each have their own approach and style to deliver their messages, the effort itself can be unified. By coordinating message roll-outs and dissemination across the audience groups, important information will be conveyed more powerfully, especially as it reaches the legislative level.

The group may wish to develop general guidelines for creating resources, while allowing each messenger the flexibility to adapt it for their target audience. Whenever an OAH message is prepared, it should at a minimum include the following points:

- A value-based proposition
- An explanation of OAH (the “core message”)
- A solutions-focused example

### 4B: Maintain consistent, ongoing messaging using existing communication channels

For each target audience, repeat messages across a variety of formats. Do not expect that if a message is delivered once, it has been heard. Messages must be delivered repeatedly, early and often.

Communicating with each audience through platforms they already use will be the most direct method to reach them. The table below lists the channels of communication that were identified as useful to each of the audiences targeted by the OAH Council. Linking into existing platforms is the easiest way to begin. Other suggestions would need to be developed but were recommended by members of that audience.

Target Audience	Communication Channels: Existing	Communication Channels: Suggested
<b>Local government officials: port &amp; county commissioners</b>	<ul style="list-style-type: none"> <li>• Informal conversations with constituents that highlight what the region is doing to solve climate problems.</li> <li>• Frequent but time-limited contact with federal legislators; message needs to fit into two minutes or less.</li> </ul>	<ul style="list-style-type: none"> <li>• QR codes with recorded messages installed on the informational panels along the seafront</li> <li>• Brief (2-3 min) videos to share with government agencies</li> <li>• One-pagers on how OAH affects people’s lives</li> </ul>
<b>Seafood suppliers &amp; restaurants</b>	<ul style="list-style-type: none"> <li>• Biannual “Seafood 101” training for Local Ocean staff</li> </ul>	
<b>Commercial fisheries &amp; harvest industry</b>	<ul style="list-style-type: none"> <li>• Annual paper newsletters of approximately 2-4 pages with infographics for each group of fishers</li> </ul> <p><i>Note: Emails are not an effective method of communication with this audience</i></p>	<ul style="list-style-type: none"> <li>• 30-second video featuring a fisherman using first-person narrative and disseminated through the SeaGrant system</li> <li>• Memes presenting “mind-blowing” OAH facts</li> </ul>
<b>Tourism &amp; hospitality industry</b>	<ul style="list-style-type: none"> <li>• People’s Coast Summit annual conference (hosted by OCVA)</li> <li>• Ocean Cluster Initiative: Making local seafood easier to find and buy (coordinated by OCVA)</li> </ul>	<ul style="list-style-type: none"> <li>• Social media posts that can be copied and pasted are helpful</li> <li>• 30-second video featuring a fisherman using first-person narrative and disseminated through all the hotel TVs</li> </ul>

## Step 5: Evaluating Outcomes

### 5A: Assess specific metrics for each target audience

Metrics should be used to evaluate the effectiveness of the Implementation Plan with the target audiences. Refer back to the metrics identified in Step 2 to prepare an evaluation approach. Assessment of each metric requires the collection of data specific to the expected outcome. An evaluation consultant can assist with selecting appropriate methodology, preparing protocols, and analyzing results.

### 5B: Survey policymakers on the extent to which they support actions that reduce OAH

During and after the April 2023 OAH Symposium, Pathways Collaborative met with individuals representing each audience segment to discuss possible metrics of success and related actions. Input from these interviews confirmed that *civic readiness* is a key outcome of any prioritized actions. Given that the terminal audience for all of the OAH communications is legislators, it is necessary to survey those policymakers to determine progress towards the ultimate outcome.

The following actions were suggested by the OAH Council as possible areas where legislative actions could make a difference:

- Decreasing carbon emissions: electric vehicles, renewable energy
- Programs that reduce plastics - bag ban, reusable water bottles
- Advocating for corporate responsibility
- Keeping seafood local
- Oyster Lease Permit guidelines
- Sponsoring beach clean-ups
- Kelp forest & wetland restoration efforts
- Gear modifications for fishermen
- Solar energy
- Zoning and building restrictions
- Establishing Marine Protected Areas

Increases in each of these action items would demonstrate progress towards civic readiness and OAH reduction.



# Evaluation Tools for Measuring Success

While specific evaluation methods and protocols cannot be developed until the particular metrics are agreed upon, the following approaches are offered here as ideas on types of instruments to use at each stage of the implementation:

## Short Term

- Pulse surveys of target audiences to assess whether the communication is hitting the mark
- Self-assessment by messengers to gauge how often they are able to disseminate the message

## Medium Term

- Pre/Post questionnaires with target audiences
- Tool that measure people's intention to make a change (e.g., pledges)

## Long Term

- Focus groups with target audiences
- Review of 6 Americas data, looking at trends around whether Oregonians are talking about climate change and other variables

**Resource:** [Are We There Yet - communications evaluation guide](#)

For longitudinal assessment, an annual evaluation is recommended. To ensure this occurs, a Legislative Fellow should be hired to help the OAH Council stay focused on the long-term implementation of the communication plan. The OAH Council alone does not currently have the bandwidth to implement the plan and ongoing evaluation without personnel support.

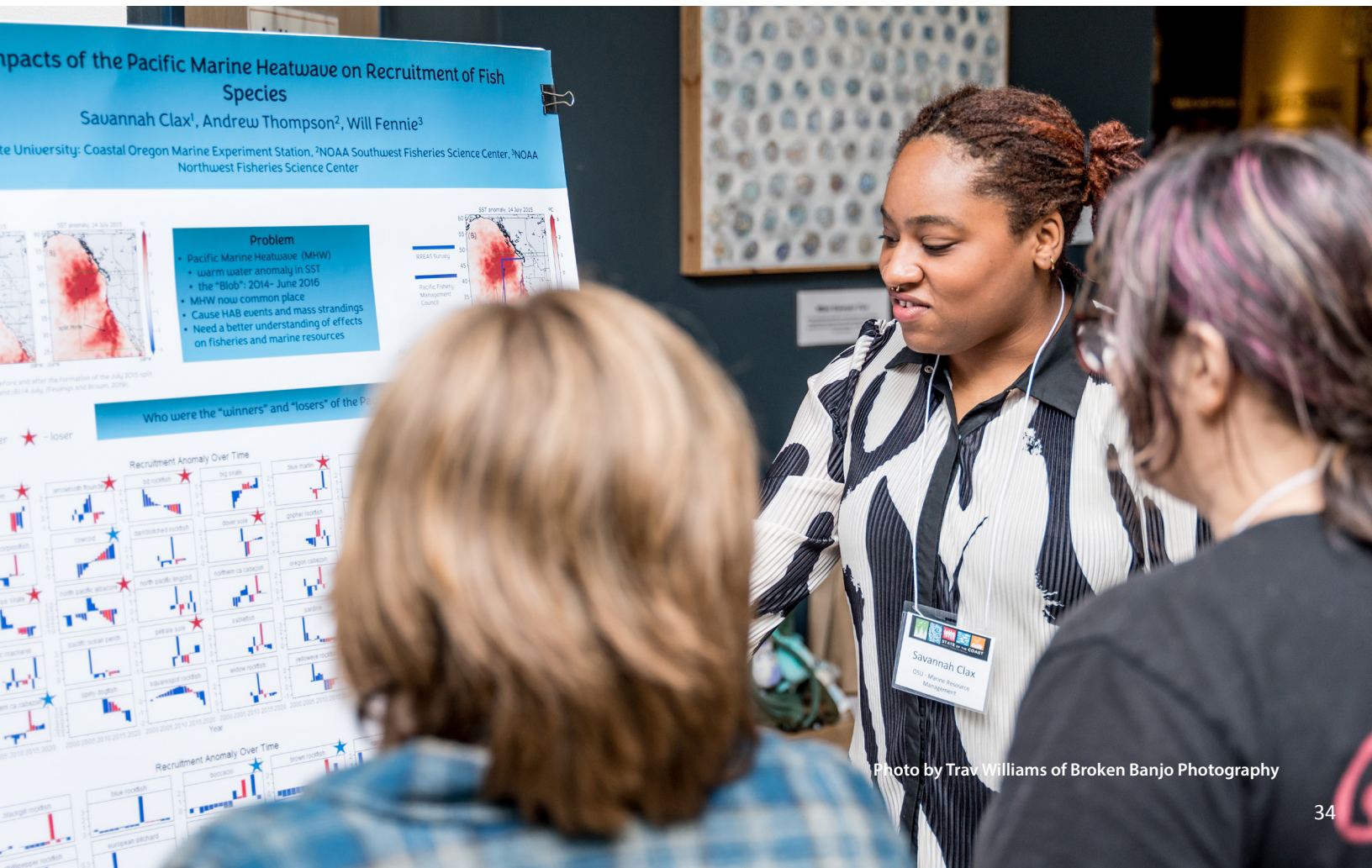


Photo by Trav Williams of Broken Banjo Photography

# Acknowledgments

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## OOST Board of Directors (at time of development)

- Laura Anderson
- Lisa DeBruyckere
- David Gomberg
- Steve Marx
- Christine Moffitt
- Karina Nielsen

## OAH Council (at time of development)

- Jack Barth
- Caren Braby
- Rian Hooff
- Laurie Juranek
- Robert Kemp
- Andy Lanier
- Jessica Miller
- Christine Moffitt
- Karina Nielsen
- Kristen Penner
- Fran Recht
- Jack Schaefer

## OAH Council's Education & Outreach Working Group

- Jack Barth
- Caren Braby
- Kerry Carlin-Morgan
- Susan Chambers
- Francis Chan
- Tracy Crews
- David Hansen
- Charlie Plybon
- Fran Recht

In addition to members of the OAH Council and Education & Outreach Working Group, the following individuals participated in workshops contributing to the development of the Communication Plan:

- Meghan Dugan
- Charlotte Regula-Whitefield
- Amanda Solla

In addition to members of the OAH Council and Education & Outreach Working Group, the following individuals provided valuable insights through interviews:

- Laura Anderson
- Ben Ashby
- Andrew Bornstein
- Walter Chuck
- Rick Goche
- Kaety Jacobson
- Sean Maguire
- Alex Manderson
- Yelena Nowak
- Arica Sears
- Ted Slabik
- Jessica Watson



photo by Gustavo Garcia

## Appendices

- A. Audience profiles
- B. Audience prioritization questionnaire results
- C. OAH card sort activity statements
- D. Targeted Interview Questions
- C. Additional Resources

# Appendix A: Audience Profiles

## Audience 1: City Planners

City Planners, like Kristen, have the challenge of creating a sustainable future for large and small urban and suburban areas of the state. Kristen recently joined the Resilient Cities Network to strengthen her skills as she tries to create a new culture among the Planners in Oregon. She's taken colleagues to Seattle and Vancouver to talk with their Planners. Her hope is that the cities and towns along the Pacific Northwest will all work together to reduce their environmental impact while creating great public spaces for the future. Aspects of waste management, flooding and runoff all have a direct impact on water quality. Kristen is always on the lookout for scientifically based and timely information to help bolster her work.

## Audience 2: Commercial Fisheries/ Harvest Industry

Captain Scott is a second-generation fisherman out of Coos Bay. His family has been harvesting Dungeness crabs for over 40 years. Captain Scott works hard to comply with harvest fisheries regulations because he wants to ensure the crab population is strong for the future. It's backbreaking work, but he can't picture doing any other type of work. He knows that there are a variety of opinions about effects of climate change but he has seen the impact of hypoxia and ocean acidification on his crab harvests. He's just not sure what he and others can do locally to curb a global issue. Captain Scott has a colleague who sits on a scientific advisory council to listen in on what their research is showing. In reality, the scientific community needs him and others in the harvest industry to be their "eyes and ears" on the water.

## Audience 3: High School/ College Students

David attends High School in Salem and is concerned about the future of the planet. Like many Gen Z aged youth, he is not afraid to speak his mind and express his opinion on injustices. He is globally connected with like-minded youth through social media, hearing about concerns in their areas of the world. David considers himself informed and active on social justice and environmental issues. He sometimes worries that prior generations have done irreparable damage to the planet, yet he is impressed when he sees all ages at rallies. David is tech savvy and gets most of his information via social media.

## Audience 4: Local Government - Port & County Commissioners

Marilyn and Albert are both elected officials in their coastal community of Cascade Locks. There are a myriad of issues facing their region. Funding requests come in to the Port Commission and the County Commission for infrastructure improvements, seismic analysis, building permits and commercial usages, and local land management contracts. In addition to Cascade Locks issues, their elected positions cover all of Hood River County. Their constituents are concerned with population growth and over-development of the land surrounding the rivers. It's a tough balancing act to promote economic growth and conserving wild spaces. As commissioners, Marilyn and Albert can review and enact local policies that affect property values, waste management systems, and new construction.

## Audience 5: Outdoor Recreationalists (who have observed changes over time)

Since moving to Portland in the mid '80s, Carl has been visiting various parts of the Tualatin Valley to hike, cycle, kayak and fish. He loves that this region is so close to the city, but so far from the urban bustle of everyday life. Over the years, Carl and his family have made friends with other families—they've even started planning vacations together. More and more, they are finding their planning needs to account for issues with drought, fires and unseasonably hot days. One of Carl's sons has asthma so they need to pay attention to any factor that may trigger an attack in a remote location. After the kids have gone to bed, Carl and the other parents sit around the campfire and talk about changes in the local environment that they have seen over the past 25 years. A couple of parents think it is just seasonal variation and natural patterns, but Carl and the others think it's evidence of climate change. Summer days seem hotter and more frequent, rivers and lakes are either high from recent heavy rains, or low due to spells of no rain. It feels as if the "normal" (predictable range) is harder to find in areas they have visited for decades. They have looked for other natural areas to visit, but this Valley holds a special place in their hearts.

## Audience 6: Seniors

Mary has retired and moved from her home in Portland to a retirement community in Lake Oswego. She is driving distance from her grown children and grandkids. Mary likes the community she lives in—they have lots of activities, field trips and speakers. She tries to take advantage of all the opportunities she can (hey! She paid for them!). When her kids were growing up, she and her husband loved taking them camping and exploring local parks. Lately, she has noticed that the parks and natural areas have changed and look a bit “sick”. Mary wants to get her grandkids to these spots to share her memories of those trips, while creating new memories with these kids. Maybe there is something her retirement community can do—bring in a speaker or get involved in local efforts. They have strong voices and they have time.

## Audience 7: Tourism & Hospitality Industry

Stephanie works at a charming B & B in Bend that attracts adventurous travelers who want to whitewater kayak, fish and hike the nearby natural areas. She was attracted to the job because she loves adventure traveling herself! Folks come from all over the western states to experience this area—and 50% of those are from the state of Oregon. Word has gotten out that Bend is a great place to visit, which keeps all the businesses thriving. After really busy weekends, Stephanie sees the impact of all those visitors in the trash they generate, in the traffic, and on the trails. She really wants to model the best way to enjoy this natural beauty. She works hard to tell guests at the B & B how to enjoy the area without causing harm.

## Audience 8: Seafood Suppliers & Restaurants

Susan is a fishmonger in downtown Portland. Among her regular clients are chefs for some of the best restaurants around. Chef Will is eager for his restaurant to have the best local seafood every day, so he counts on Susan for her knowledge and advice. Susan buys her fish and crustaceans straight from the docks, then transports the days’ catch to her fish market location. The relationship between fish seller and chef is an important link in the sea-to-table chain. Susan pays attention to the harvesters and their concerns, while Will focuses on delighting his diners with innovative dishes. Susan has noted changes in the types and catch amounts of favorite fish—she’s asked her regular suppliers what they are experiencing out on the water. She passes this information on to Chef Will so he can take note and be prepared for changes—can he swap out certain fish for others? Chef Will understands that he needs to keep his dining room staff informed every single day. Both Susan and Will rely on good information to make smart buying decisions that support local fisheries without harming futures harvests.



# Appendix B: Audience Prioritization Questionnaire & Results

**Goal: Identify which target audiences should be priorities for the OAH Council to reach:**

Rate this audience on the following factors:

- Ability to amplify message (i.e., how much bang for the buck): **low to high**
- Number of barriers to connecting with them: **few to many**
- Likelihood that they can effectively communicate with legislators: **low to high**
- Value of increasing their civic readiness (i.e., what it’s worth to have them primed for legislative action): **low to high**
- Your personal enthusiasm about connecting with them: **low to high**

Rank the top 3 audiences you feel OOST should target with our Ocean Acidification and Hypoxia Messaging Campaign.

- City Planners
- Commercial Fisheries/Harvest Industry
- High School/College Students
- Local Govt- Port and County Commissioners:
- Outdoor Recreationalists (who have observed changes over time)
- Seniors
- Tourism and Hospitality Industry
- Seafood Suppliers & Restaurants

Score for # of Priority Votes	Audience	Score for Ranking on Scales
16	Local Government - Port and County Commissioners	209
11	Commercial Fisheries/Harvest Industry	202
11	Tourism and Hospitality Industry	202
11	High School/College Students	196
7	Seafood Suppliers & Restaurants	189
5	Outdoor Recreationalists	181
4	Seniors	179
1	City Planners	174

Please share why you selected your top-ranked choice.

## Local Government

### - Port and County Commissioners

- They have a platform to raise awareness amongst their residents/constituents, and also have the ear of state legislators.
- By their very nature, local government is connected to state and federal legislators as well as they interact about issues important to their municipalities. That being said, they are also very busy and have immediate needs that will likely take precedence over OAH. They also have a fair amount of turnover with the two year voting cycle. The fishing industry are going to be directly impacted and have connections to legislative folks as well, so may have a stronger drive to act. But our youth will be voters very soon and are much more tech savvy so may provide more bang for the buck as well.
- Lots of funds now for natural infrastructure that they may be able to be encouraged to use

## Commercial Fisheries/Harvest Industry

- The fishing community is well organized and is quite aware of this, so an easy first step.
- They are most likely to be impacted directly, and before other the stakeholders

## Tourism and Hospitality Industry

- Potential to engage with audiences that would care, local community businesses, depend on a healthy environment, often include some basic natural history in their tours, could brand the concept of supporting a healthy environment. Might be a win-win.
- Industry sees a wide cross section of society, who may be quite influential in their own professional or private lives. These people may be more receptive to messaging when on vacation etc. since they will be relaxed and enjoying the environment they are in. More likely to want to protect what they are enjoying in other words. People that are out enjoying the beach or a river, and paid money to be there and chose to use their free time to be there, will be more receptive and maybe passionate about protecting it.

## High School/College Students

- They are most likely to see some results and are young and more likely interested in years ahead.

## Seafood Suppliers & Restaurants

- Seafood is a massive industry in Oregon. This industry will see massive change as the oceans change, and having them primed for change will be essential. People also love through their stomachs- if the seafood suppliers express an emergency, those that eat the seafood may start to listen. Food connects people.
- Largest consumer audience with direct connection



# Appendix C: OAH Card Sort Activity Statements

The following 29 statements were included as options for participants to select as part of the exercise to create a short presentation explaining OAH.

1. As a result of the changing chemistry, we are seeing sea creatures' skeletons and shells becoming thinner or more brittle.
2. As the Pacific Ocean warms, its ability to hold a lot of oxygen declines.
3. Because most organisms need oxygen to live, few organisms can survive in hypoxic conditions.
4. Carbon dioxide emissions are being absorbed by the ocean and altering the chemical balance of seawater.
5. Climate change is the cause of hypoxia, as warmer waters hold less oxygen.
6. In some parts of the ocean, like along the Oregon coast, hypoxia may be a greater threat than acidification.
7. Just as humans need calcium to build their bones, sea creatures need calcium carbonate to build strong skeletons and shells.
8. Local actions will lead to a brighter future, for the oceans, its species, and the communities that depend on them.
9. Ocean acidification and hypoxia are increasing, and are both related to climate change.
10. Ocean acidification prevents animals at the bottom of the food chain from building and maintaining the protective shells they need to survive.
11. Ocean acidification changes the chemistry of the ocean.
12. Ocean acidification disrupts the food chain, and changes the ocean's ecosystems.
13. One result of this change in chemistry is that carbonate - something shellfish use to build their shells - becomes scarce.
14. Oregon's ocean is changing, and many species have already shown signs of distress.
15. Salmon, halibut, Dungeness crab, razor clams, oysters, pink shrimp, lamprey, and rockfish have helped generations or Oregonians earn a living.
16. The addition of carbon dioxide to the ocean from burning fossil fuels is making seawater more acidified.
17. The change in chemistry is reducing the amount of calcium carbonate in the ocean.
18. The ocean absorbs a lot of carbon dioxide, which is changing the ocean's chemistry.
19. The ocean absorbs the extra carbon dioxide that gets emitted into the atmosphere when we burn fossil fuels, and that changes the chemistry of the ocean.
20. The term "hypoxia" refers to low or depleted oxygen in a body of water.
21. There are many efforts currently underway to slow or reverse various drivers of climate and ocean change.
22. This is called hypoxia.
23. This is called ocean acidification.
24. To ensure that we have marine resources in the future, we must act now to stabilize the ocean's health.
25. Warm water can hold less oxygen than cold water.
26. We need to rethink our use of fossil fuels.
27. When carbon dioxide is added to seawater, it makes the ocean more acidic.
28. When there are fewer shellfish in the food chain for other creatures to eat, it affects the whole ecosystem.
29. When we burn fossil fuels like coal and gas, we release carbon dioxide into the air.

# Appendix D. Targeted Interviews

## Audience Interviews

Prior to the OAH Symposium in April 2023 and in the two weeks following this event, Pathways Collaborative conducted interviews with 11 individuals who represent the perspectives of the four target audience groups:

### Tourism Industry

- Arica Sears, Deputy Director of Oregon Coast Visitors Association (OCVA)

### Seafood Suppliers/Restaurants

- Andrew Bornstein, Bornstein Seafoods
- Laura Anderson, Co-owner of Local Ocean Restaurant & OOST Board Member

### Commercial Fisheries/Harvest Industry

- Jessica Watson, ODFW
- Bob Kemp - commercial fishing boat captain
- Rick Goche - commercial fishing boat captain (and Port Commissioner)
- Ben Ashby -commercial fishing observer
- Ted Slabik, Englund Marine (supplier of marine instruments and equipment)

### Port & County Commissioners

- Kaety Jacobson, Lincoln County Commissioner
- Sean Maguire, Policy Analyst who works for Xan Augerot, County Commissioner for AOC Regional District 5 (Benton, Lane, Linn counties)
- Walter Chuck, Secretary/Treasurer of Newport Port Commission
- Rick Goche, Commissioner for Port of Bandon (and commercial fishing boat captain)

### Key Learnings

While none of the draft metrics we started with ended up being particularly on-point with the audiences we explored those concepts with, the conversations with folks in each group were exceedingly helpful in providing ideas for approaches that could be highly effective in communicating about OAH within their networks.

### Tourism Industry (specific focus on local non-chain hotels)

In addition to having direct contact with the hotel and restaurant communities, OCVA reaches a lot of seafood processors. This organization allows us to reach multiple of our target audience.

The OCVA Deputy Director felt that a Communications Toolkit would be helpful if it gave examples of how to talk about OAH in a way the general public can understand along with offering solutions for specific audience groups.

- 50 page doc won't be utilized
- Social media posts that can be copied and pasted are helpful
- May prefer to avoid the term "climate change"

Arica Sears noted: Education is not enough! Need to make the right action the best/easiest option. Needs to be the default. Community members don't need to understand all of the details of OAH to be part of the solution.

OCVA consults with a climate scientist. We should find out who this is and give them the Communications Toolkit.

OCVA has an annual conference - People's Coast Summit. We may be able too use this as an opportunity to disseminate the Communications Toolkit.

OCVA coordinates the Ocean Cluster Initiative: Making local seafood easier to find and buy.

<https://www.oregoncoastfoodvision.org/cluster> -

- Laura Anderson (OOST) is also part of OCI project
- Think about how we can tie into this?

### Seafood Suppliers/Restaurants

A primary concern for this audience is communicating effectively about truly locally harvested and processed seafood. (Seafood can still be labeled "locally caught" even if it gets shipped to China for processing.)

We should connect with Jana Hennig, Executive Director at [Positively Groundfish](#), which crafts marketing campaigns and messaging about sustainable seafood.

- Check out the [video vignettes](#) where she interviews stakeholders like fishermen, chefs, director of Monterey Bay Fisheries Trust, etc.

The Seafood Watch program is not beloved with this audience.

Local Ocean offers training for its staff twice a year: Seafood 101. Possibility of incorporating communication toolkit here.

## Commercial Fisheries/Harvest Industry

Only a small fraction of this audience will probably engage in these issues (the ones who attended OAH symposium); there are maybe five per fishery who are engaged and they can become a conduit to the others. There is a close relationship between the fishermen and the processors. Should target younger fishermen (age 40 and under); but older guys who buy in can also be strong influencers!

There are some people in the industry who are more apt to engage, and it takes a long time to build their trust, but then they can be really great influencers. Should allow the fishermen to be viewed as the experts. Helps them buy into the data when they see themselves in it. This is a sensitive space. Need to acknowledge the hard work they do and truly value it. Avoid any messages that seem demeaning.

Attention span of this audience limited - needs to be flashy and catchy and short. Emails are not an effective method of communication. Paper newsletters of approx. 2-4 pages with infographics are put out annually for each group of fishers: crabbers, etc.

Unlikely that this group would agree to write letters to congress or be involved in any sort of bureaucracy.

There is survey fatigue among the fishermen who get asked repeatedly to participate. With a little bit of preparation, some would be willing to talk to the media.

Suggestion: 2-3 minute video that features someone like Rick (a fishermen) using language that we provide, it could be easily disseminated (through SeaGrant system) - get one person from each of the audiences to make these videos.

- 10-15 second video would be even better
- Create a TikTok video that gets picked up and repeated - through influencers
- Make it modular - something short that fits into something longer
- Put the video on all the hotel TVs, on the OCVA website
- Create a meme with a mind-blowing fact
- Avoid talking about environmentalism
- Message should be constructive (not necessarily hopeful)

Hard part is explaining that OAH is already affecting us...or making people care that it will affect the next generation. Normalizing behaviors is key.

Look into fishermen's associations like the Pacific Northwest Waterways Association (PNWA) as a channel through which to disseminate the Communications Toolkit.

Newport/Coos/maybe Astoria: Fishermen's Wives groups - good nexus

## Port & County Commissioners

Commissioners have very little authority or direct control; no jurisdiction over their municipalities. Each community is unique. (E.g., (Coos Bay and Newport and super different even though they are only 50 miles apart.) Port Commissioners promote what works for ports, including climate change issues.

This audience indicated an interest in communicating with a constituency that may not care about the science of OAH. Need to find common interests, like food and fisheries.

- "Your seafood is being threatened" - this is a message people respond to, regardless of their politics.
  - Clams, mussels, Dungeness crabs - all critical species that people along the coast know about
  - Kelp as nurseries for many fish species
- Avoid the term "climate change" (even many Commissioners are climate deniers)
- Avoid suggesting changes in ocean are man-made
- Ok to say, "The pH of the ocean is changing."
- Ok to say, "The plankton in the ocean absorbs more carbon than trees on land."
- Provide examples of adaptations for fisheries that highlight the up-side of climate change. ( Ex: There didn't use to be a squid fishery in Oregon; now that California waters are too warm, the squid have moved north.)
- Include info difference between hypoxia and upwelling
- Avoid the term "dead zones" (bad for tourism)

Did not feel that partnering directly with a scientist would be beneficial; however, if scientists help create the message, then commissioners can help deliver it. Conversations are often informal. Commissioners do a lot of networking/educating. Comfortable being used to funnel information and to highlight what the region is doing to solve climate problems (community-based solutions).

Suggested they would benefit from messages that grab people's attention but don't focus on doom and gloom. Message should highlight that it is a serious issue but you can do something about it. Should talk about community resilience and the need to be planning for climate change things in the future. This resonates with both the business and the government sectors, and leads to civic readiness.

Have frequent contact with federal legislators, but time is very limited. Message needs to fit into two minutes or less. Should provide basic information and then let the questions emerge.

Infographic that presents what you need to know and what you need to do would be beneficial. Make it relatable, with details specific to each county.

Suggestion: Add QR codes with recorded messages to the SeaGrant panels along the seafront. Info about how the issues are affecting the fisheries. Addressing how your seafood is impacted. "Food education." How OAH affects the food supply.

Would like one-pagers on how OAH affects people's lives - including people living in trailer parks.

Would like brief (2-3 min) videos to share with government agencies



## Appendix E: Additional Resources

Video Title/Link	Source	Target Audience	Run Time (min:sec)
<a href="#"><u>Ocean Acidification – Changing Waters on the Oregon Coast</u></a>	Oregon State University (2016)	General Public Commercial Fisheries & Harvest Industry Local Government: Port & County Commissioners	12:11
<a href="#"><u>Ocean Acidification – Part 2, Solutions</u></a>	Oregon State University (2018)	General Public Commercial Fisheries & Harvest Industry Local Government: Port & County Commissioners	10:38
<a href="#"><u>Understanding Hypoxia: Dead Zones on the Oregon Coast</u></a>	Oregon State University (2022)	Commercial Fisheries & Harvest Industry Local Government: Port & County Commissioners Seafood Suppliers & Restaurants	14:17
<a href="#"><u>The Ocean: Earth’s CO2 Sponge</u></a>	NOAA Pacific Marine Environmental Laboratory (2023)	General Public Local Government: Port & County Commissioners	4:22
<a href="#"><u>Science on a Sphere, Acidifying Oceans: Oceans and Climate Change</u></a>	NOAA (2023)	General Public	3:13
<a href="#"><u>Demystifying ocean acidification and biodiversity impacts</u></a>	California Academy of Sciences (2014)	General Public Tourism and Hospitality Industry	12:12

Podcast Title/Link	Source	Target Audience	Run Time (min:sec)
<p><a href="#">Dealing with Dead Zones: Hypoxia in the Ocean</a></p> <ul style="list-style-type: none"> <li>NOAA scientist Alan Lewitus explores why dead zones form, how the problem of hypoxia is growing worse, and what we're doing about it</li> </ul>	NOAA (2022)	Commercial Fisheries & Harvest Industry Local Government: Port & County Commissioners Seafood Suppliers & Restaurants	18:40

Visual Title/Link	Source	Target Audience
<a href="#">Species Spotlight: Dungeness Crab</a>	OAH Council (2019)	General Public Local Government: Port & County Commissioners Seafood Suppliers & Restaurants Tourism and Hospitality Industry
<a href="#">Species Spotlight: Oyster</a>	OAH Council (2019)	General Public Local Government: Port & County Commissioners Seafood Suppliers & Restaurants Tourism and Hospitality Industry
<a href="#">Species Spotlight: Salmon</a>	OAH Council (2019)	General Public Commercial Fisheries & Harvest Industry Seafood Suppliers & Restaurants Tourism and Hospitality Industry
<a href="#">What can you do to help mitigate and address climate-ocean change?</a>	OA Alliance	Commercial Fisheries & Harvest Industry Local Government: Port & County Commissioners Tourism and Hospitality Industry
<a href="#">What can local governments do to address coastal and ocean acidification?</a>	OA Alliance	Commercial Fisheries & Harvest Industry Local Government: Port & County Commissioners Tourism and Hospitality Industry

Interactive Learning Platform Title/Link	Source	Target Audience
<a href="#">Virtual Urchin</a>	University of Washington (2021)	General Public
<a href="#">Surface Ocean pH Levels</a>	The King's Centre for Visualization in Science	General Public
<a href="#">Diving into an Acidifying Ocean</a>	OAH Council (2019)	General Public Commercial Fisheries & Harvest Industry Seafood Suppliers & Restaurants Tourism and Hospitality Industry
<a href="#">Exploring our Changing Ocean</a>	OA Alliance (2023)	General Public Tourism and Hospitality Industry
<a href="#">Storytelling Ocean Acidification</a>	Plybon, Charlie - Oregon Surfrider (2017)	General Public Tourism and Hospitality Industry
<a href="#">OA Alliance Story Maps</a>	OA Alliance (2024)	General Public Tourism and Hospitality Industry

