Strategy 3 - Education and Outreach
Activity 3.3
Host an OA Communication and Education Conference focusing on Best Practices and develop a summary report describing model programs for teaching and interpreting OA
Effective Practices for Communicating Ocean Acidification Workshop Participants

- California Academy of Sciences
- Center for Ocean Solutions
- University of California Santa Cruz
- Long Beach Aquarium of the Pacific
- California Coastal Commission
- National Marine Sanctuaries
- Hatfield Marine Science Center
- Monterey Dive Boat Operator
- CINMS Advisory Council
- University of California Santa Barbara
- Aquarium of the Bay
- Word Craft
- Passionfish
- Institute for Systems Biology
- South Slough and Elkhorn Slough National Estuarine Research Reserve
- Scripps Institution of Oceanography
- Monterey Bay Sanctuary Foundation
- Spector Dance
- Ocean Conservancy
- Monterey Bay Aquarium Research Institute
- University of Gothenburg
- NOAA Coastal Services Center
- Plymouth Marine Lab
- CeNCOOS
- Hopkins Marine Station
- National Marine Sanctuary Foundation
- Alisal High School
- Monterey Bay Aquarium
- New England Aquarium
- Ocean Conservancy
- Seattle Aquarium
- Stevenson School
- San Francisco State University
- Environmental Defense Center
- NOAA OA Program, Coral Reef Cons, Fisheries, Education, PMEL
- COSEE West/USC Sea Grant
- Kennesaw
- Edge Research
- Cal State University Monterey Bay
- Sanctuary Exploration Center
- CYSO
- Oceana
- Millenium Art
- Rosenstiel School of Marine Sci.
- Hopkins Marine Station
- Upwell
- 360 Degree Films, Australia
- California Sea Grant
- National Parks Western Region
- Woods Hole Oceanographic Institution
- Climate Interpreter
- Moss Landing Marine Lab
- Consortium for Ocean Leadership
- Long Marine Lab
- Hog Island Oyster Company
- The Ocean Project
- Pacific Science Center Seattle
What is YOUR PRIMARY ROLE in communicating ocean acidification?
### Perceptions of Threats to Ocean Health (2011)

**Q: How serious is each of these threats to ocean health?**

<table>
<thead>
<tr>
<th>Threat</th>
<th>% among most + very serious</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dumping of sewage, chemicals and other pollutants</td>
<td>84%</td>
</tr>
<tr>
<td>Plastic, trash and debris that ends up in the ocean</td>
<td>78%</td>
</tr>
<tr>
<td>Offshore oil and gas drilling and related oil spills</td>
<td>71%</td>
</tr>
<tr>
<td>Run-off of agricultural pollution into the ocean</td>
<td>67%</td>
</tr>
<tr>
<td>Loss of marine mammals like whales</td>
<td>67%</td>
</tr>
<tr>
<td>Destruction and decline of coral reefs</td>
<td>67%</td>
</tr>
<tr>
<td>Damage to and loss of ocean and coastal habitats</td>
<td>65%</td>
</tr>
<tr>
<td>Overfishing and depletion of fish populations</td>
<td>63%</td>
</tr>
<tr>
<td>Global warming</td>
<td>51%</td>
</tr>
<tr>
<td>Ocean acidification</td>
<td>50%</td>
</tr>
<tr>
<td>Bottom trawling/fishing that damages the ocean bottom</td>
<td>48%</td>
</tr>
<tr>
<td>Growth and development in coastal areas</td>
<td>43%</td>
</tr>
<tr>
<td>Development of aquaculture/ fish farms in ocean waters</td>
<td>25%</td>
</tr>
<tr>
<td>Development of off-shore wind farms</td>
<td>17%</td>
</tr>
</tbody>
</table>

Ocean Conservancy®

Start a Sea Change

EDGE RESEARCH
I’d rate the impact to Puget Sound 9, community 8, personally 4. I just don’t see myself being very dependent on the seafood or sea life or ocean. I think our economy depends on the fact that we live on the water. But we don’t really eat seafood that much. It’s not something like my business or anything. It doesn’t affect me in any way.
I am worried about...

Scalar Variable (level of agreement)

<table>
<thead>
<tr>
<th></th>
<th>US Composite</th>
<th>Recent ZAM (12mths)</th>
<th>&quot;Concerned&quot; about CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unprompted - Ocean Acidification</td>
<td>17</td>
<td>26</td>
<td>52</td>
</tr>
<tr>
<td>Global Warming</td>
<td>55</td>
<td>60</td>
<td>81</td>
</tr>
<tr>
<td>Prompted - Ocean Acidification</td>
<td>54</td>
<td>58</td>
<td>74</td>
</tr>
</tbody>
</table>

ZAM = Zoo, Aquarium, Museum visitors
CC = Climate Change
Partners Research

ZAM-Partners Communicating OA (98)

- Already doing so: 34%
- Planning to do so: 21%
- Thinking about it: 31%
- Not interested: 14%

The Ocean Project
stories

• about innovative problem solvers
• so people can recognize their help is needed to address disruptive changes in the world
• many scales-individual, community, state, nation
• reduce CO₂ emissions
Crisis approach does not work!
**Effective Messages**

*Percent of respondents who indicated this message was effective or extremely effective*

<table>
<thead>
<tr>
<th>Message</th>
<th>Pre-Workshop</th>
<th>Post Workshop</th>
</tr>
</thead>
<tbody>
<tr>
<td>As CO$_2$ increases in the atmosphere, it dissolves in the ocean and it is changing the pH of the sea making it more acidic.</td>
<td>68</td>
<td>70</td>
</tr>
<tr>
<td>Ocean acidification is the other CO$_2$ problem</td>
<td>28</td>
<td>37.5</td>
</tr>
<tr>
<td>The more CO$_2$ we emit, the more acidic the ocean water becomes: a phenomenon known as ocean acidification.</td>
<td>67</td>
<td>60</td>
</tr>
</tbody>
</table>
Effective Messages

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</tr>
</thead>
<tbody>
<tr>
<td>Biodiversity of the global ocean is changing due to ocean acidification</td>
<td>51</td>
<td>65</td>
</tr>
<tr>
<td>Marine organisms with calcium carbonate skeletons or shells (e.g., oysters, clams and mussels) can be affected by small changes in acidity</td>
<td>69</td>
<td>86</td>
</tr>
</tbody>
</table>
Effective Messages

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<tbody>
<tr>
<td>This rate of change is unprecedented in the last 55 million years. The rate of ocean acidification will continue to accelerate in the coming decades.</td>
<td>35</td>
<td>80</td>
</tr>
<tr>
<td>Ocean acidification has the potential to fundamentally change the ocean, its habitats, food webs and marine life</td>
<td>66</td>
<td>91</td>
</tr>
</tbody>
</table>
**Case Study Preference**

**Pre-Workshop**
- CCLME: 4%
- Natural CO2 Vents: 2%
- Urchin larval development: 7%
- Clownfish olfactory cues: 8%
- Pteropods/Salmon: 8%
- Coral reef impacts: 15%
- Pacific NW oysters: 56%

**Post-Workshop**
- CCLME: 8%
- Natural CO2 Vents: 5%
- Urchin larval development: 0%
- Clownfish olfactory cues: 36%
- Pteropods/Salmon: 0%
- Coral reef impacts: 1%
- Pacific NW oysters: 50%

CCLME = California Current Large Marine Ecosystem
MESSAGE PLATFORM

1. Remind the audience of the role and function of the ocean

2. Do not open the door to debate; OA is real and measurable

3. A living ocean matters; OA is a real danger to the basis of the food chain, clean water, our economy

4. This is not a problem for tomorrow; it is happening today.

5. Coastal states need to be especially concerned

6. People have a role to play. Support for science, local initiatives and personal action are all needed.
Conservation Actions
Take Home

• Separate OA from Climate Change
• Changing Ocean not Acid Ocean
• Health Analogies
• Don’t use winners and losers
• Economics and Seafood
• Make it locally relevant
• We CAN make a difference if we reduce our CO2 consumption – Hope
• Get Ready for Change!
Next Steps

• Workshop summary

• Action Plan

• Ongoing Communication

• Refine messages and case studies

• 85% plan to use what they learned
What does this mean for West Coast Region Educators?

- Participate
- Enhance Outreach Kits
- Stay Connected
- Future Workshops
acidocean.org to yourchangingocean.org?

Understanding Ocean Acidification

Our carbon emissions are making the ocean more acidic, which threatens life in our seas. Use these resources to educate yourself and others and take action.

Workshops
Presentations from the Understanding Ocean Acidification workshops in coastal California.

Hands-On Activities
Find lesson plans and projects that show CO₂’s effect on ocean acid levels and sea life.

Useful Links
Continue learning from additional websites, FAQs, videos and reports available online.

Watch the PSA and Take the Pledge
Commit to change. Explore what you can do to reduce CO₂ emissions and make your ocean pledge.
What does this mean for Gulf of the Farallones NMS?

- Trainings for Partner Agency Docents & Volunteers
- Develop New AYS program
- Teacher Workshops
- Adapt 4th Grade VC Field Trip
- Planktronika & Public Programs
- Adapt Rocky Shore Partnership
Acknowledgements:
West Coast National Marine Sanctuary Education Team
Sara Hutto
Monterey Bay Aquarium Research Institute
Ocean Conservancy
Upwell
Edge Research
The Ocean Project
California Academy of Science
Monterey Bay Aquarium
New England Aquarium
NOAA Ocean Acidification Program
NOAA Coral Reef Conservation Program
NOAA Fisheries
Education Share-a-thon