

**Oregon Marine Renewable Energy Environmental Science Conference**  
**Breakout Group Session 1: Baseline Studies**  
29 November 2012

The principal objective of this group is to refine the identification of data gaps in the area of baseline studies prior to the deployment of wave and wind marine renewable energy projects off Oregon -- and to place priority levels on the remaining needed research. This group considers the information needs for programmatic level decisions across a wide geographic area, before site-specific information is known. Keeping in mind the types of decisions BOEM needs to make and the scale and intensity of potential impacts from various types of projects, this group would look at the quality of the baseline data in all the disciplines, how many years of baseline we have, what resolution the information is in, and determine where there are gaps. This group will also provide recommendations for using data from other geographic locales and identify extrapolation constraints. By looking at the question across disciplines, this group may identify opportunities for cooperative data collection. For example, a wildlife biologist could perform surveys while seafloor mapping activities were underway. Finally, the group will examine how variability in time series data requirements or length of time series.

Suggested Schedule: Baseline studies breakout group

0900	Introductions and objectives
0910	Determine existing gaps, being as specific as possible; determine priorities. (1)
1000	Break
1020	Evaluate how baseline information is used/extrapolation recommendations. (2)
1050	Evaluate opportunities for collaboration (3)
1125	Discuss variability and how to capture it (4)
1150	Wrap-up: discuss major points for summary
1200	Adjourn to Lunch

1. Review previously identified gaps and identify research or proxy data that exist to inform gaps.
  - a. What existing datasets (current or previous surveys/studies) can be used as baseline for marine renewable energy environmental effects studies? Where have baseline surveys specific for MRE been undertaken?
  - b. What information do you have to add from ongoing or completed research that addresses a gap? Are there other gaps missed that need to be added?
  - c. Rank the gaps in order of importance to a decision or in order of progression. [A data gap, even a large one, which does not affect the ability to make a decision at the programmatic level for wind or wave energy projects offshore Oregon, should be ranked low in priority]
  - d. If possible, specifically identify the research questions needed for each gap identified.

2. What is the best way to use current or previous surveys/studies as baseline for marine renewable energy environmental effects studies?
  - a. Where baseline surveys specific for MRE have been undertaken:
    - i. How many months/years have these been underway?
    - ii. How applicable is 'baseline' data from one site to another location?
    - iii. How long does it take to assess 'natural variation' of the system to establish baseline variability?
  - b. How will climate change/SLR affect 'baselines' and comparing subsequent data?
3. Are there opportunities for shared data collection? Are there synergies/collaborations possible to fill these gaps? Is this realistic given variable funding sources/timing needs for surveys?
4. How much variability is there and how much data/time series do you need to capture it?

### Baseline Breakout Group: Instructions

Identifying gaps: needed baseline studies (may include those currently underway) and relative priorities

Using the tables from the gap analysis as background, identify remaining important baseline study/research question gaps required for each of the topical areas ("affected environmental components") noted on the left in the spreadsheets below for wave and offshore wind. Not all cells will necessarily have an entry. Once the baseline studies addressing gaps are identified, the first cut at assigning priorities ("need") will be done as a second pass through the tables, using the color scheme identified below.

#### Identifying the priorities for different projects

**VERY IMPORTANT** color indicates level of **need** supporting decision-making, where yellow and pink indicate greater need than green.


Moderate Need

Higher Need

Highest Need

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	Wave Energy	Offshore Wind Energy
Affected Environmental Component	Baseline  <i>Baseline Studies Supporting Decision-Making for Marine Renewable Energy Projects</i>	Baseline  <i>Baseline Studies Supporting Decision-Making for Marine Renewable Energy Projects</i>
Geology (Sediments)		
Meteorology and Air Quality		
Physical Oceanography		
Water Quality		
Acoustic Environment		
Hazardous Materials and Waste Management		
Electromagnetic Fields		

Marine Mammals		
Threatened and Endangered		
Nonendangered Species		
Marine and Coastal Birds		
Threatened and Endangered		
Nonendangered Species		
Use of Pacific Coast Habitats by Migratory Birds		
Terrestrial Biota (Including bats and butterflies)		
Fishes and Essential Fish Habitat		
Threatened and Endangered		
Fishery Management Plans		
Other Fish Species		
Essential Fish Habitat		
Sea Turtles		
Coastal Habitats		
Seafloor Habitats		
Topographic Features		
Other Benthic Resources		
Areas of Special Concern		
National Parks		
National Marine Sanctuaries		
National Wildlife Refuges		
National Estuarine Research Reserves		
National Estuary Program		

**Oregon Marine Renewable Energy Environmental Science Conference**  
**Breakout Group Session 2: Impact/Short Scale Studies**  
29 November 2012

The principal objective of this group is to refine the identification of gaps in the area of potential impacts from deployment of wave and wind marine renewable energy projects off Oregon -- and to place priority levels on the remaining needed research. Using the two tables from the gap analysis provided prior to the workshop dealing with post-deployment operations and maintenance, this group will review the gap analysis tables and discuss specific impacting agents in a stressor-receptor context using their knowledge of what research is completed or underway globally and regionally for each impacting agent. The group would build upon previous syntheses and update the information with expert knowledge, newly or nearly completed studies from both the scientific and grey literature. Information from the synthesis and experience papers presented the first day of the Conference will also help. This will be followed by placing priorities on the studies in terms of the urgency of getting the needed results. Finally, the group will address questions related to extrapolating data collected elsewhere for regional use, and opportunities for collaboration.

Suggested Schedule: Impact/short scale studies breakout group

0900	Introductions and objectives
0910	Determine existing gaps, being as specific as possible; determine priorities. (1)
1000	Break
1020	Evaluate parameters for use of global and proxy data in regional projects. (2)
1050	Evaluate opportunities for collaboration (3)
1125	Approaches to initiate impact studies (4)
1150	Wrap-up: discuss major points for summary
1200	Adjourn to Lunch

1. Review previously identified gaps and identify research or proxy data that exist to inform gaps.
  - a. Review operations, maintenance and decommissioning tables and update impact table as appropriate. What information do you have to add from ongoing or completed research that addresses a gap?
  - b. Rank the gaps in order of importance to a decision or in order of progression.
  - c. If possible, specifically identify the research question needed for each gap identified.
2. What is the most effective means of applying the results of impact studies done elsewhere (e.g., Europe, UK) to the physical and biological systems off the coast of Oregon? What kind of follow-up studies off the Oregon coast would be necessary to

confirm the applicability of results? What recommendations does the group have for evaluating proxy data and determining its applicability?

3. What synergies can be applied in research programs maximizing efficiency in meeting multiple objectives (e.g., addressing multiple gaps)? Consider collaborative research, resource sharing, and cross-agency approaches.
4. In the absence of operational marine renewable energy devices, what approaches can be taken to initiate key impact studies to collect data that will address the most important gaps? Will results need to be confirmed when devices are installed?

### Impacts Breakout Group: Instructions

Identifying gaps for needed impacts and short-term studies (may include those currently underway) and relative priorities  
Using the tables from the gap analysis as background, identify remaining important impact study gaps or research question needs for each of the topical areas ("affected environmental component") noted on the left in the spreadsheets below for wave and offshore wind. Not all cells will necessarily have an entry. Once the impact studies addressing gaps are identified, the first cut at assigning priorities ("need") will be done as a second pass through the tables, using the color scheme identified below.

#### Identifying the priorities for different projects

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	Moderate Need	
<b>Affected Environmental Component</b>	Higher Need	
	Highest Need	
Geology (Sediments)	Not relevant to this MRE type	
Meteorology and Air Quality		
Physical Oceanography		
Water Quality		
Acoustic Environment		
Hazardous Materials and Waste Management		
Electromagnetic Fields		
Marine Mammals		
Threatened and Endangered	Wave Energy	Offshore Wind Energy
Nonendangered Species	Impact/Short-term	Impact/Short-term

Marine and Coastal Birds	<i>Impact/Short-term Studies Supporting Decision-Making for Marine Renewable Energy Projects</i>	<i>Impact/Short-term Studies Supporting Decision-Making for Marine Renewable Energy Projects</i>
Threatened and Endangered		
Nonendangered Species		
Use of Pacific Coast Habitats by Migratory Birds		
Terrestrial Biota (Including bats and butterflies)		
Fishes and Essential Fish Habitat		
Threatened and Endangered		
Fishery Management Plans		
Other Fish Species		
Essential Fish Habitat		
Sea Turtles		
Coastal Habitats		
Seafloor Habitats		
Topographic Features		
Other Benthic Resources		
Areas of Special Concern		
National Parks		
National Marine Sanctuaries		
National Wildlife Refuges		
National Estuarine Research Reserves		
National Estuary Program		



**Oregon Marine Renewable Energy Environmental Science Conference**  
**Breakout Group Session 3: Monitoring/Cumulative/Long-Term Studies**  
29 November 2012

The principal objective of this group is to identify the long-term monitoring studies needed for deployments of wave and offshore wind marine renewable energy projects off Oregon -- and to place priority levels on the remaining needed research. This group would evaluate information needs that span larger spatial and temporal scales than those considered by breakout group #2, and provide feedback on three aspects: (1) surveillance monitoring that would supplement or validate impact assessments and inform future analyses; (2) condition monitoring that would assist in determining long-term natural and anthropogenic changes, including shifting baselines; and (3) cumulative impacts.

Suggested Schedule: Monitoring/Cumulative/Long-Term studies breakout group:

0900	Introductions and objectives
0910	Determine existing gaps, being as specific as possible; determine priorities. (1)
1000	Break
1020	Evaluate parameters to use monitoring data to inform models and assessments. (2)
1050	Evaluate opportunities for collaboration (3)
1125	Discuss discerning development impacts against shifting baselines. (4)
1150	Wrap-up: discuss major points for summary
1200	Adjourn to Lunch

1. Review previously identified gaps and identify research or proxy data that exist to inform gaps.
  - a. What should we monitor and what information do we need to determine how it should be done? For example, we know windmills have the potential to impact birds, so in an offshore environment, how to we monitor for them? Put nets below? Cameras? What data gaps exist that limit our design?
  - b. If possible, specifically identify the research question needed for each gap identified.
2. What is the best way to include existing monitoring programs or datasets to answer wave and wind monitoring questions? What types of new monitoring might apply to a suite of devices or take advantage of larger datasets?
  - a. Are there monitoring programs in place which will provide information for wind and wave energy projects? What are they? What questions do they answer of interest to offshore re energy?
  - b. Rank the gaps in order of importance to a decision.
  - c. What types of compliance monitoring might be needed to validate our assessments?

- d. What types of monitoring might inform our models for better assessments? What types of condition monitoring may be needed to evaluate long-term/cumulative affects?
- 3. What synergies can be applied in monitoring programs to maximize efficiency in meeting multiple objectives (e.g., addressing multiple questions)? Consider collaborative research, resource sharing, and cross-agency approaches.
- 4. How do we detect the effect of development against a shifting baseline affected by climate change and other parameters? Example: measuring nearshore wave characteristics – if wave energy devices are numerous, they should negatively affect wave height/intensity. If climate is equally increasing wave height/intensity, there would be no effect measured.
  - a. What recommendations does this group have for design considerations to account for shifting baseline?

### Monitoring Breakout Group: Instructions

Identifying gaps for needed monitoring studies (may include those currently underway) and relative priorities  
Using the tables from the gap analysis as background, identify remaining important monitoring study research question gaps for each of the topical areas ("affected environmental components") noted on the left in the spreadsheets below for wave and offshore wind. Not all cells will necessarily have an entry. Once the monitoring studies addressing gaps are identified, the first cut at assigning priorities ("need") will be done as a second pass through the tables, using the color scheme identified below.

#### Identifying the priorities for different projects

**VERY IMPORTANT** color indicates level of **need** supporting decision-making, where yellow and pink indicate greater need than green.


Moderate Need

Higher Need

Highest Need

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	Wave Energy	Offshore Wind Energy
	Monitoring	Monitoring
Affected Environmental Component	Monitoring Studies Supporting Decision-Making for Marine Renewable Energy Projects	Monitoring Studies Supporting Decision-Making for Marine Renewable Energy Projects
Geology (Sediments)		
Meteorology and Air Quality		
Physical Oceanography		
Water Quality		
Acoustic Environment		
Hazardous Materials and Waste Management		
Electromagnetic Fields		

Marine Mammals		
Threatened and Endangered		
Nonendangered Species		
Marine and Coastal Birds		
Threatened and Endangered		
Nonendangered Species		
Use of Pacific Coast Habitats by Migratory Birds		
Terrestrial Biota (Including bats and butterflies)		
Fishes and Essential Fish Habitat		
Threatened and Endangered		
Fishery Management Plans		
Other Fish Species		
Essential Fish Habitat		
Sea Turtles		
Coastal Habitats		
Seafloor Habitats		
Topographic Features		
Other Benthic Resources		
Areas of Special Concern		
National Parks		
National Marine Sanctuaries		
National Wildlife Refuges		
National Estuarine Research Reserves		
National Estuary Program		