Data Transferability for Marine Renewable Energy: Monitoring Datasets Discoverability Matrix

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Today’s workshop

• Introductions
  ▪ Purpose for the workshop
  ▪ Introduction to the topics

• Data transferability process

• Monitoring Dataset
  Discoverability Matrix

• Next Steps
• International initiative under Ocean Energy Systems (OES)
• 15 countries currently participating:
  ▪ Australia, Canada, China, Denmark, France, India, Ireland, Japan, Norway, Portugal, South Africa, Spain, Sweden, United Kingdom, United States
• Environmental effects of marine renewable energy (MRE)
• Major themes: data transferability and risk retirement
Environmental Effects of MRE

- **Stressors:**
  - Collision Risk
  - Underwater Noise
  - EMF
  - Habitat Changes
  - Physical Systems
  - Displacement

- **Receptors:**
  - Marine animals
  - Habitats
  - Oceanographic conditions
Barriers to Consenting/Permitting

• MRE industry perceptions:
  ▪ Long time to get projects in the water
  ▪ Complex, extensive consenting requirements (baseline and post-installation)

• We perceive that the regulatory community:
  ▪ Faces many challenges
    ✓ Novel technologies
    ✓ Uncertainty of environmental effects
  ▪ Mandate to protect environment and uphold regulations
  ▪ Key for getting devices deployed

OES-Environmental is working to bridge these gaps
Data Transferability

• Data Transferability
  ▪ Using data from an already consented MRE project or analogous industry to be “transferred” to inform potential environmental effects and consenting for a future MRE project
  ▪ Data that might be “transferred” need to be collected consistently for comparison

• By “data”, we mean
  ▪ Data and information
    - Could be raw or quality controlled data
    - More likely analyzed data and information, synthesized data to reach some conclusion, reports, etc.
Data Transferability

- Framework – classifies stressor/receptor relationships
- Data Collection Consistency Table – outlines parameters for comparison of data between projects
- Monitoring Datasets Discoverability Matrix – catalogues relevant datasets
- Best Management Practices – suggest four practices for implementation
Framework

- Guides the process for data transfer
- Develops common understanding of data types and parameters
- Brings together datasets from already consented projects in an organized fashion
- Uses four variables to define an interaction
- Compares the applicability of each dataset for transfer
# Data Collection Consistency

<table>
<thead>
<tr>
<th>Stressor</th>
<th>Process or Measurement Tool</th>
<th>Reporting Unit</th>
<th>Analysis or Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collision Risk</td>
<td>Sensors include: acoustic only, acoustic + video, Other</td>
<td>Number of visible targets in field of view, number of collisions</td>
<td>Number of collisions and/or close interactions of animals with turbines used to validate collision risk models.</td>
</tr>
</tbody>
</table>
| Underwater Noise        | Fixed or floating hydrophones                                           | • Amplitude dB re 1 μPa at 1 m  
• Frequency: broadband or specific frequencies | Sound outputs from MRE devices compared against regulatory action levels. Generally reported as broadband noise unless guidance exists for specific frequency ranges. |
| EMF                     | Source: Cable, other, shielded or unshielded                           | AC or DC, voltage, amplitude                                                     | Measured EMF levels used to validate existing EMF models around cables and other energized sources. 🎶                                                |
| Habitat Change          | • Underwater mapping with: sonar, video  
• Habitual characterization from: mapping, existing maps                | Area of habitat altered, specific for each habitat type                           | Compare potential changes in habitat to maps of rare and important habitats to determine if they are likely to be harmed.                             |
| Changes in Physical Systems | Numerical modeling, with or without field data validation                | No units. Indication of data sets used for validation, if any                     | Data collected around arrays should be used to validate models.                                                                                   |
| Displacement Barrier Effect | Population estimates by: human observers, passive or active acoustic monitoring, video | Population estimates for species under special protection                           | Validation of population models, estimates of jeopardy, loss of species for vulnerable populations.                                                   |

[https://triton.pnnl.gov/](https://triton.pnnl.gov/)
<table>
<thead>
<tr>
<th>BMP 1</th>
<th>Meet the necessary minimum requirements to be considered for data transfer.</th>
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<tbody>
<tr>
<td>BMP 2</td>
<td>Determine likely datasets that meet data consistency needs and quality assurance requirements.</td>
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<tr>
<td>BMP 3</td>
<td>Use models in conjunction with and/or in place of datasets.</td>
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<td>BMP 4</td>
<td>Provide context and perspective for datasets to be transferred.</td>
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Monitoring Datasets Discoverability Matrix

• The *Monitoring Datasets Discoverability Matrix* (Matrix) is an interactive tool to guide data transfer
  ▪ Makes datasets from existing projects accessible for regulators, developers and MRE community to transfer data to future projects

• Categorized by the six stressors

- Collision Risk
- Underwater Noise
- EMF
- Habitat Changes
- Physical Systems
- Displacement
How it Works

• Classifies existing monitoring datasets by defined characteristics:

<table>
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<tr>
<th>Stressor</th>
<th>Receptor</th>
<th>Site Conditions</th>
<th>Technology Type</th>
<th>Project Size</th>
</tr>
</thead>
</table>

• Datasets come from OES-Environmental metadata for MRE project sites and research studies
• The Matrix filters this information and allows users to sort through the stressors and characteristics to retrieve relevant datasets for future projects
Using the Matrix: Underwater Noise

- Example: tidal turbine in a noisy environment; interested in the potential impacts of underwater noise on marine mammals
Accessing the Matrix

Link:

https://tethys.pnnl.gov/monitoring-datasets-discoverability-matrix
Discussion and Feedback

• What are your thoughts on “data transferability”?

• Does the Matrix make sense?

• Could you make use of the Matrix for transferring data and consenting MRE projects?

• General feedback on the Matrix?
Next Steps

Please provide any additional feedback on the Matrix by **March 17**th to mikaela.freeman@pnnl.gov

**OES-Environmental**

- Matrix public webinar
- Guidance documents
  - To provide guidance on risk retirement in an accessible format for the entire evidence base that regulators can use
  - Developed for each stressor
  - Focus on risk retirement for single devices
Thank you!

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