2.4.1.602 International Environmental Data Sharing Initiative (OES Environmental Project)

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Project Overview

**Project Summary**
This project examines the environmental effects of marine energy development to facilitate siting and permitting. PNNL leads the OES-Environmental initiative (IEA Ocean Energy Systems task) that aims at gathering, synthesizing, and disseminating current research efforts on the environmental effects of marine energy. This information is used to reduce the scientific uncertainty that has slowed the development of marine energy projects. OES-Environmental represents the most comprehensive effort to gather data and bring together the marine energy community on potential environmental effects of marine energy development worldwide.

**Intended Outcomes**
This project builds on available knowledge on environmental effects from the international marine energy community and engages practitioners from all aspects of the marine energy industry to overcome barriers associated with marine energy development. The outcomes of this project support the advancement of reliable and cost competitive marine energy technologies by providing access to the data and information needed to reduce critical permitting barriers.

**Project Information**

<table>
<thead>
<tr>
<th>Principal Investigator(s)</th>
<th>Andrea Copping, PhD (PNNL)</th>
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</table>

**Project Partners/Subs**

- **Partners:**
  - 15 OES-Environmental nations

- **Subcontractors:**
  - Aquatera Limited (United Kingdom)
  - Graphic designer (Robyn Ricks)

**Project Status**
Ongoing

**Project Duration**
- **10/01/2010**
- **09/30/2024**

**Total Costed (FY19–FY21)**
$3,375,087
Project Objectives: Relevance

Data access, analytics, and workforce development

- Facilitates the exchange of information and data on the environmental effects of marine energy
- Used by developers to inform design and operational parameters to reduce potential environmental effects and facilitate permitting

Reducing barriers to testing

Collaboration with U.S. stakeholders and OES-Environmental analysts:
- To curate and disseminate relevant information on environmental effects of marine energy
- To inform permitting processes

Work with other OES-Environmental nations to identify and fill knowledge gaps on environmental effects of marine energy

Interactions with marine energy developers, advisors, regulators, and researchers to inform and facilitate permitting and licensing processes through data synthesis, workshops, webinars, and outreach

Development of STEM resources to increase understanding of marine energy and associated environmental effects and support the future workforce
Project Objectives: Approach

Continuous international collaboration with OES-Environmental analysts to support international effort and leverage international knowledge expertise

Data collection and curation

Dissemination of knowledge and information

International engagement with stakeholders, developers, advisors, and regulators

Advancing the development of marine energy in the US by learning from international studies and projects

Understand and resolve the environmental risks of marine energy development and operation to the marine environment to accelerate the deployment of devices in a responsible manner
Project Objectives: Approach

Available data & information

Regulator surveys & webinars

Regulators’ needs

Risk retirement
  - Evidence bases
  - Data transferability

Marine energy community feedback

Regulators’ input & feedback

Guidance documents
  - MRE Brochure

Marine Renewable Energy: An Introduction to Environmental Effects

2020 State of the Science Report

Regulators’ needs
Project Objectives: Risk Retirement

For certain interactions, potential risks need not be fully investigated for every project (1-4 devices)

Rely on what is already known: permitted projects, research, or analogous industries

A “retired risk” can be reexamined in the future as more information becomes available

Regulators’ & ME community input:
- Workshops
- Webinars Q&A
- Surveys
- Draft reviews

Provide mechanisms to:
- Transfer existing ME data and knowledge to new projects
- Understand (un)certainties to guide research & retire risks

Risk retirement does not replace or contradict any regulatory processes

https://tethys.pnnl.gov/risk-retirement
Project Objectives: Expected Outputs and Intended Outcomes

**Expected Outputs**
- 2020 State of the Science (SoS) Report
- Public webinars, workshops, publications, social media, podcasts
- Risk retirement pathway
- + Derivatives

**Intended Outcomes**
- Easy access to all available information on environmental effects of marine energy via Tethys
- Increased awareness about environmental effects of marine energy
- Valuable source of information and available materials from other countries
- Accelerate permitting processes of marine energy projects
## Project Timeline

<table>
<thead>
<tr>
<th>FY</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY19</td>
<td>Data transferability matrix &amp; case studies</td>
<td>2020 SoS literature review &amp; annotated outline</td>
<td>US regulators workshop on risk retirement</td>
<td>Data transferability effectiveness report</td>
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### Go/No-Go: Approval of the annotated outline of the 2020 State of the Science Report (Q2)

### Go/No-Go: Effectiveness of risk retirement process (Q2) & Phase 4 of OES-Environmental (Q3)

### Go/No-Go: NA

Constant activities: analyst coordination, technical workshops, public webinars, conference presentations
### Project Budget

**Total Project Budget – Award Information**

<table>
<thead>
<tr>
<th></th>
<th>DOE</th>
<th>Cost-share</th>
<th>Total</th>
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<tbody>
<tr>
<td></td>
<td>$3,375,087</td>
<td>*90K€ ($95K)</td>
<td>$3,470,087</td>
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<table>
<thead>
<tr>
<th></th>
<th>FY19</th>
<th>FY20</th>
<th>FY21</th>
<th>Total Actual Costs FY19–FY21</th>
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<tbody>
<tr>
<td>Costed</td>
<td>$997,907</td>
<td>$1,351,660</td>
<td>$1,025,520</td>
<td>$3,375,087</td>
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* From Ocean Energy Systems. In addition, 15 other collaborating nations provide in-kind support for country analysts.

There have been no project modifications, costs overruns, or missed milestones FY19-FY21.
End-User Engagement and Dissemination

<table>
<thead>
<tr>
<th>OES-Environmental Analysts</th>
<th>Regulators</th>
<th>Researchers</th>
<th>Developers &amp; Consultants</th>
<th>Public</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Quarterly meetings</td>
<td>• Surveys</td>
<td>• Provide up to date science through <em>Tethys</em></td>
<td>• U.S. Marine Energy Council (MEC)</td>
<td>• Create materials for broader audiences</td>
</tr>
<tr>
<td>• Technical contributions (<em>Tethys</em>, 2020 State of the Science, OES white papers, peer-reviewed publications)</td>
<td>• Outreach programs and continued engagement</td>
<td>• Workshops and webinars to advance knowledge and share outcomes</td>
<td>• Information on <em>Tethys</em></td>
<td>• Engage STEM students and teachers (Educational Resources page, coloring pages)</td>
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<td></td>
<td>• Webinars and online workshops</td>
<td>• Project metadata</td>
<td>• Engage at workshops for developer perspective</td>
<td>• Produce content for general public (podcasts)</td>
</tr>
<tr>
<td></td>
<td>• <em>Tethys</em> Blasts</td>
<td>• <em>Tethys</em> Blasts</td>
<td>• Project metadata</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Targeted material (MRE brochure, guidance documents)</td>
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Performance: Accomplishments and Progress

Risk Retirement
- 4 stressors retired for small numbers of devices
- 4 guidance documents
- 4 evidence bases
- Discoverability matrix
- Data transferability

Outreach & Engagement
- 13 webinars
- 10 conference presentations
- 9 workshops
- 6 journal publications
- 4 conference papers
- 3 conference tracks
Performance: Accomplishments and Progress (cont.)

**Tethys Accomplishments**

<table>
<thead>
<tr>
<th>Year</th>
<th>Increase in Tethys Visits</th>
<th>New Tethys Blast Subscribers</th>
<th>New MRE Documents</th>
<th>New Social Media Followers</th>
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<tbody>
<tr>
<td>FY19</td>
<td>49.8% ↑</td>
<td>240</td>
<td>281</td>
<td>247</td>
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<tr>
<td>FY20</td>
<td>16.9% ↑</td>
<td>340</td>
<td>737</td>
<td>329</td>
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<td>FY21</td>
<td>44.3% ↑</td>
<td>~300</td>
<td>537</td>
<td>270</td>
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As of FY22, Tethys is now under PRIMRE

Overall increases year over year

Large increases in FY20 & FY21 associated with SoS
Future Work

Ongoing activities FY22

Knowledge Collection and Curation
- OES-Environmental metadata forms
- Management measures tool
- Tropical/subtropical

Risk Retirement
- Evidence bases for entanglement and collision risk
- Guidance documents for entanglement and collision risk
- Country specific guidance documents

New Research Topics
- Scaling up to arrays
- Ecosystem effects
- Cumulative effects
- Displacement

Outreach & Engagement
- Existing audiences
- STEM (coloring pages)
- Public audiences (YouTube videos, podcasts)
- Webinars, workshops
Future Work

**FY23**
- Risk retirement
- Initiate 2024 SoS
  - Literature review
  - Report outline
  - Draft chapters
- Continue new topics
- Strong focus on collision risk
- General outreach

**FY24**
- Proposal Phase 5 OES-Environmental
- Complete 2024 SoS
  - Expert reviews
  - Chapter revisions
  - Draft release
  - Final release
- Outreach 2024 SoS
Q&A