



Pacific Northwest
NATIONAL LABORATORY

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Annex IV Meeting of Country Analysts

online meetings

October 30, 2017



ANNEX IV



Today...

- ▶ *Tethys*
 - Statistics and uses

- ▶ Regulator Survey

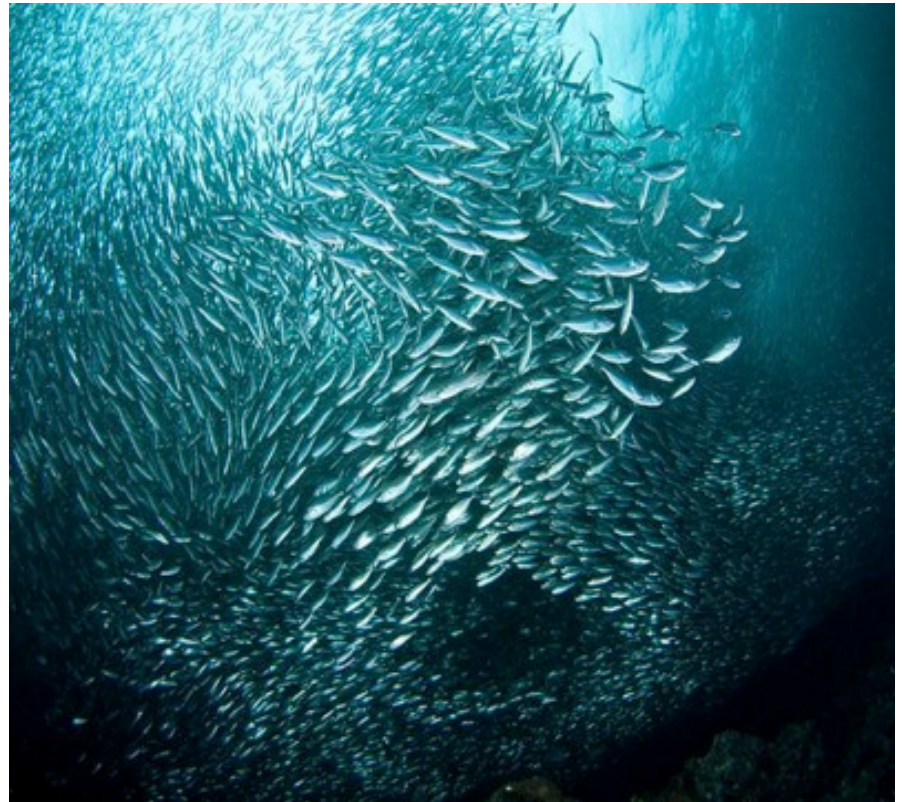
- ▶ Data transferability

- ▶ OES paper

- ▶ EWTEC:
 - Workshop
 - Conference

- ▶ Upcoming events

- ▶ Roundtable



- ▶ 11.6% increase in visits from FY16
 - Decrease in total page views and average pages per visit
- ▶ 400+ documents added to *Tethys* (over 3,600 total)
- ▶ 174 external websites linked to *Tethys*
- ▶ Increase of 1,100+ links (over 4,700 total)
- ▶ Improved loading speeds – specifically Knowledge Base and Map Viewer
- ▶ New summary pages created for Short Science Summaries
- ▶ And coming soon:
 - Data portal – tracks post-installation monitoring data
 - Management Measures Tool

1. June 19th *Fisheries Interactions with MRE*
 - Kieran Reilly, MaREI – University College Cork, Ireland.
 - Michael Bell, Heriot-Watt University, UK.

2. September 21st – *Information Collection and Consenting Processes for Wave and Tidal Deployments – Lessons from the Field*
 - Shelley MacDougall, Acadia University, Canada.
 - Jan Sundberg, Uppsala University, Sweden.

- ▶ November 2nd – *Environmental Effects of Permitting MRE Development*
 - 1st US regulators' webinar held March 29th and followed by survey

- ▶ Late December (possible) – *Demonstration of Management Measures Tool*



- ▶ 150 metadata forms
 - 94 project sites
 - 46 research studies
- ▶ More automated metadata management system created in FY16 to keep forms updated annually
- ▶ FY17 push to updated outdated forms, with specific emphasis on those collected in 2012
- ▶ Please update or provide new projects for Annex IV metadata forms
- ▶ Please look at and update regulatory information for your countries MRE development
 - Email to Mikaela Freeman (mikaela.freeman@pnnl.gov)



Call for Annex IV country input

Management Measures Tool

- ▶ Will be made publicly available on *Tethys* shortly
- ▶ If you'd like to review: <https://tethys.pnnl.gov/management-measures>
- ▶ May hold a webinar to demonstrate tool

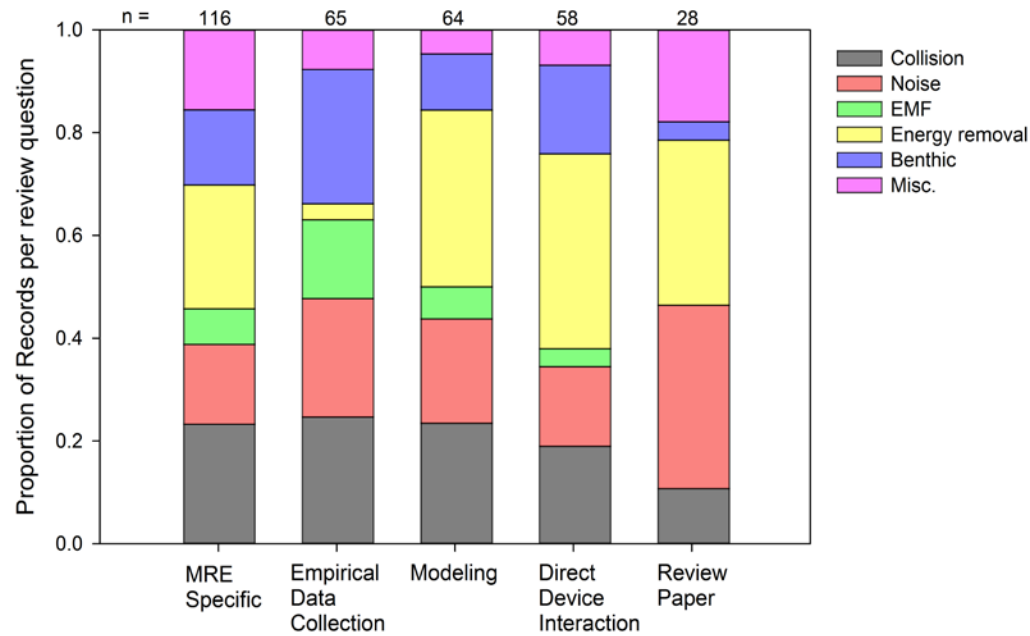
The tool can be explored using the following steps:

Filter by Technology Type
Filter by Management Measure Category
Filter by Project Phase
Filter by Stressor
Filter by Receptor

Technology Type	Management Measure Category	Phase of Project	Stressor	Receptor	Specific Receptor	Interaction	Specific Management Measures	Implications of Measure
Tidal	Mitigation	Operation & Maintenance	Collision risk	Marine Mammals	Marine Mammals	Potential for collision with turbine blades.	Environmental monitoring to better understand near-field behaviour and avoidance.	This will help reduce scientific uncertainty, however monitoring can be costly.
Wave	None identified	Operation & Maintenance	Barrier to movement	Marine Mammals	Cetaceans	Potential barrier to movement due to the physical presence of devices and associated moorings / support structures, cables and electrical equipment.	None identified.	n/a
Tidal	None identified	Operation & Maintenance	Barrier to movement	Marine Mammals	Cetaceans	Potential barrier to movement due to the physical presence of devices and associated moorings / support structures, cables and electrical equipment.	None identified.	n/a

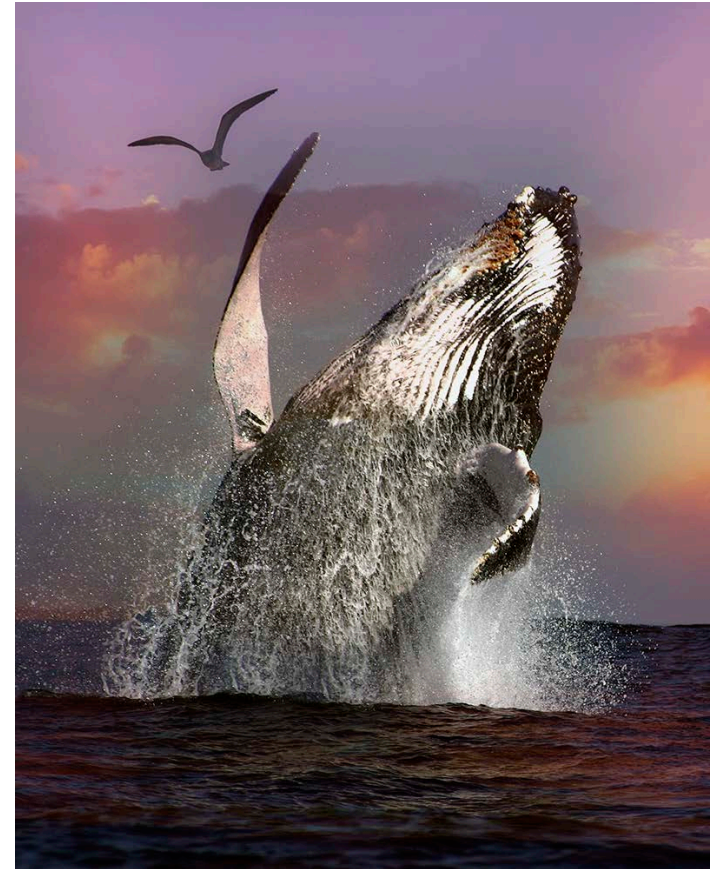
Literature Review

- ▶ Search for new documents since 2016 State of the Science
 - Collected 300+ documents from *Tethys* Knowledge Base and Web of Science
 - Ensured papers are in *Tethys*
- ▶ Established a method to systematically and efficiently review literature
 - Abstract review with 5 criteria for relevance
 - Reviewed 151 documents relevant to environmental effects
 - 6 focus areas: Collision Risk, Noise, EMF, Benthic Changes, Physical Systems, Other



- ▶ Key findings
 - Since 2016 SoS, number of new papers
 - Confirmed *Tethys* as a robust tool for MRE environmental documents

- ▶ Recommendations
 - Insufficient new information to make changes to Short Science Summaries
 - Conduct similar review annually, preferred to have “SoS light” every year (?)
 - New SSS prepared: entanglement
 - Possible new SSS: monitoring in high-energy environments



- ▶ New summary pages for each on *Tethys*
 - <https://tethys.pnnl.gov/short-science-summary-collision-risk>
 - <https://tethys.pnnl.gov/short-science-summary-underwater-noise>
 - <https://tethys.pnnl.gov/short-science-summary-electromagnetic-fields>

POTENTIAL FOR ANIMALS TO BE ENTAILED IN MOORING LINES

Entanglement with Marine Renewable Energy Mooring Lines

POTENTIAL CONCERNS
Large marine animals, especially great whales such as grays or humpbacks, may potentially become entangled in mooring lines and power cables, resulting in drowning, or the lines may abrade the whale's skin, allowing debilitating infections to result in injury or death. Many wave devices and floating tidal turbines are attached to the seabed with mooring lines. In addition, marine renewable energy (MRE) devices must send energy to shore through large export cables, usually placed on the seabed; cables that collect power from individual devices may be strung in the water column before joining a single cable heading to the sea floor.

STATUS OF KNOWLEDGE
There is a large body of scientific literature on entanglement of marine mammals and other marine animals with fishing gear, including nets, cables, and traps. Typically these entanglements occur because there is a loose end to a line, allowing the whale or other marine animal to become wedged in the gear. Alternatively, lines may have sufficient slack to allow a loop of cable or line to encircle parts of the animal. Entangled loose fishing gear has been shown to affect the swimming and hunting ability of whales and other marine animals, potentially leading to death from starvation or drowning; there are some data on the force that will cause injury if a marine animal were to encounter a cable, but the force with which an adult whale or calf, or other marine animals, might collide with an MRE cable has not been calculated. Balen whales have typically been the focus of papers on entanglement around offshore energy, but smaller

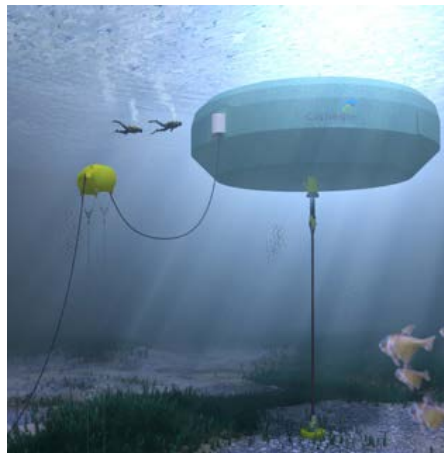


- ▶ New Entanglement SSS up on *Tethys*
- ▶ SSS for FY18 – thoughts?



Call for Annex IV country input

- ▶ **Goal: understand US regulators information needs and key uncertainties associated with permitting MRE developments**
- ▶ Emailed 200, received 35 complete responses
 - 43% federal regulators, 57% state regulators
- ▶ Majority of participants have directly participated in the environmental permitting of an MRE device
 - 60% federal, 65% state

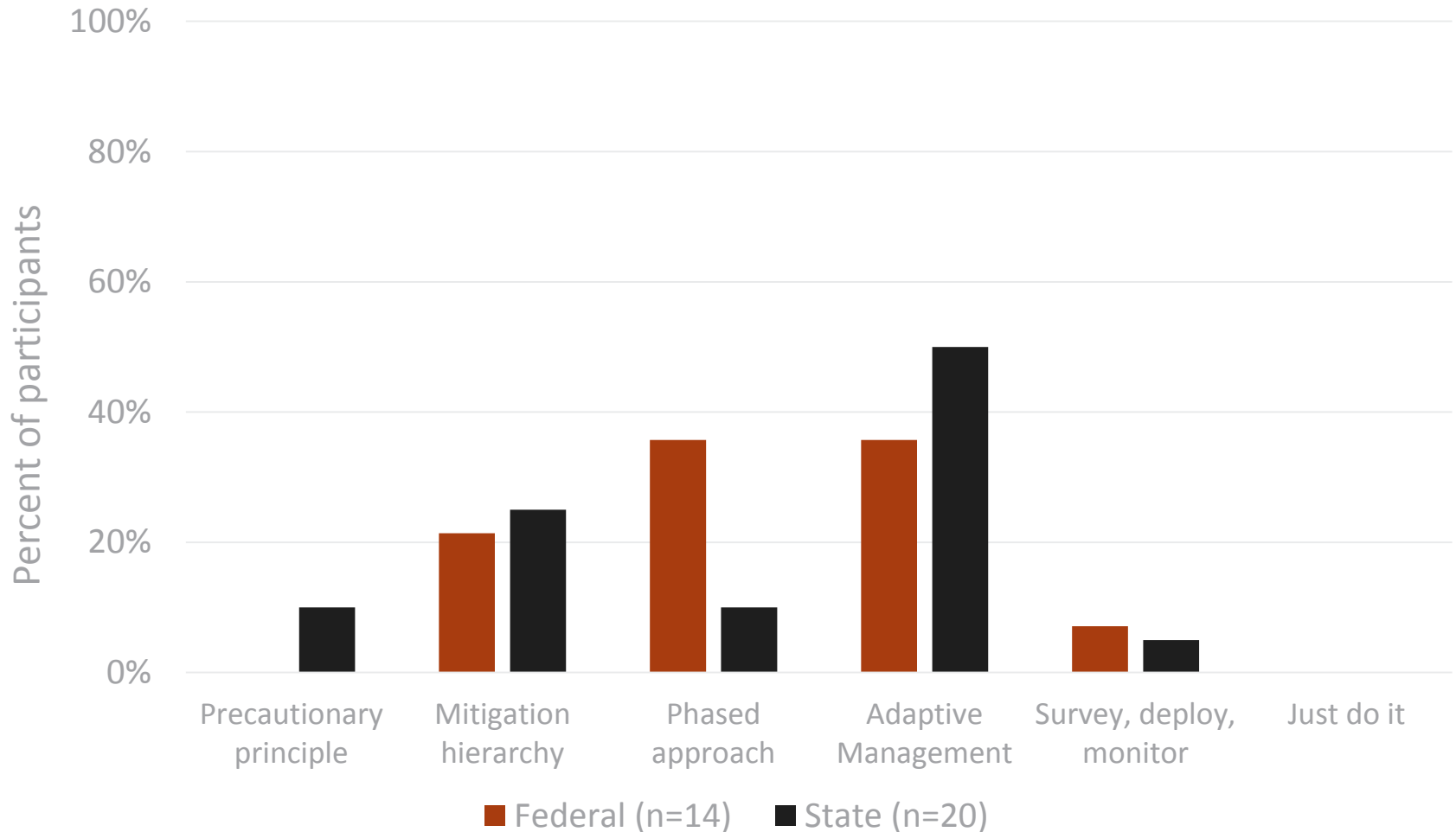


- ▶ Familiarity with specific technologies was low
 - Most familiar was offshore wind technologies
 - In general, federal regulators were more familiar with technologies than state regulators

- ▶ Top challenges vary by federal or state agency, and by number of devices (single device or array)
- ▶ Single device
 - Federal: “Effects of underwater sound emissions from devices on animals”
 - State: “Benthic/habitat destruction”
- ▶ Array
 - Both: “Avoidance, attraction, and/or displacement of animals”

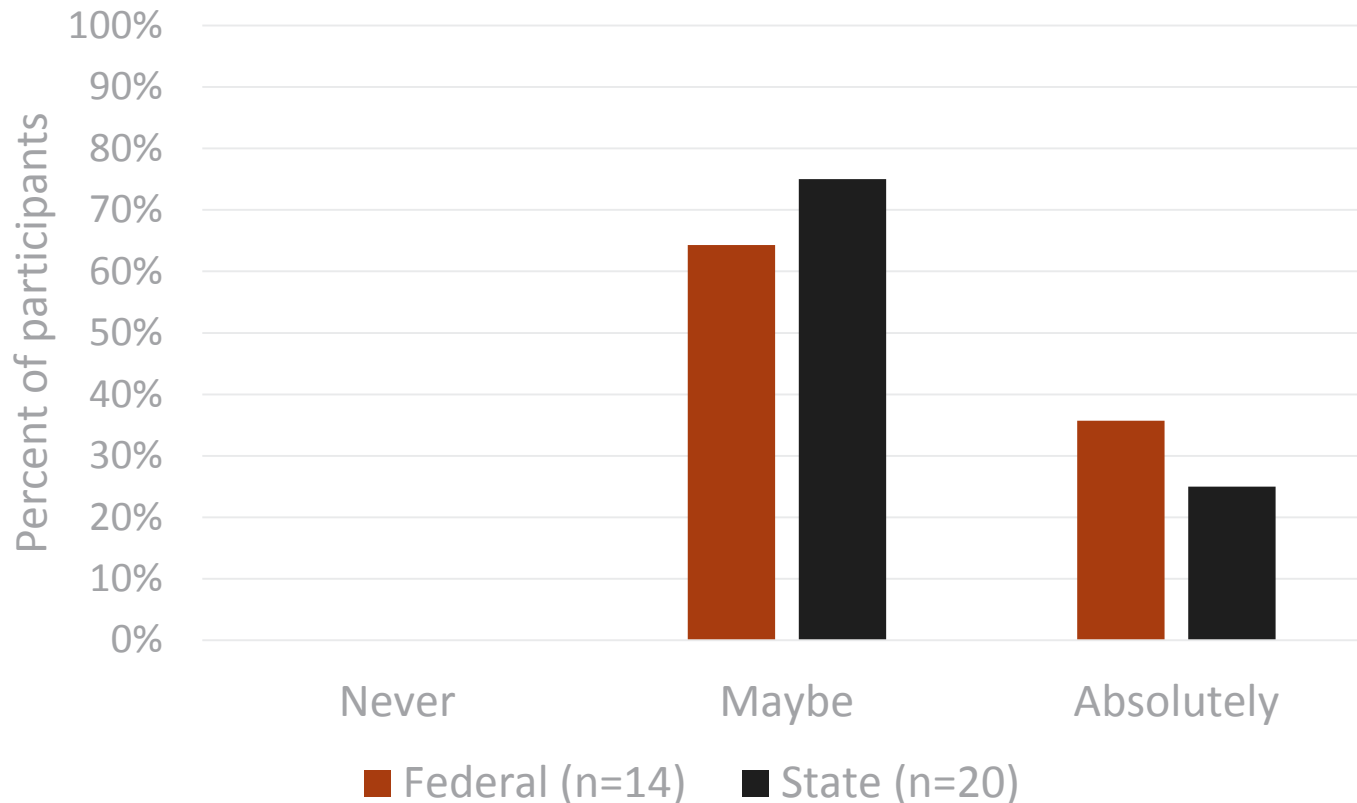
Best Approach to MRE Development

- ▶ Which approach best describes your vision of how the MRE industry should develop?



Application of Data from Other Locations

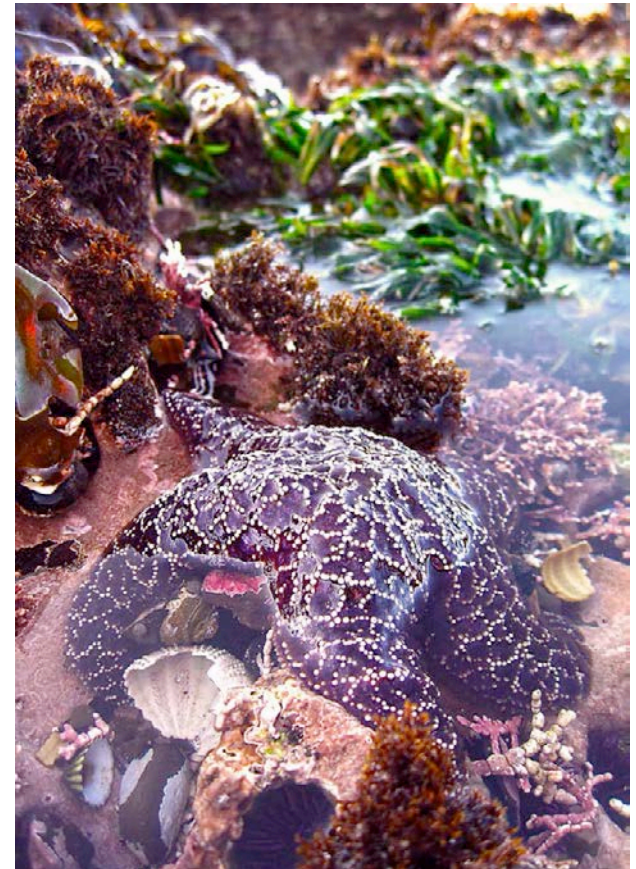
- ▶ Can data collected from other locations be applied towards environmental permitting within your jurisdiction?



- ▶ Overall:
 - perceived difference in impacts between single device and array
 - perceived risk increases with scale, but more data needed

- ▶ Data transferability should be further explored
 - No one answered “never”
 - 25% state regulators and 36% federal answered “absolutely”

- ▶ Some limitations to the survey



- ▶ Response to US regulators survey: follow up falls into three bins:
 - Need for increased sharing of known information – webinars, etc.
 - Data transferability and collection consistency
 - New research

- ▶ Outcomes:
 - Administer survey in other Annex IV nations...??
 - Pursue data transferability and collection consistency
 - Collect new research ideas for funding agencies



- ▶ Literature review of data transferability in other industries:
 - What does it take to consider data transferable?
 - Are there criteria, limits to transferability?
 - White paper and plan for next steps end of December.

- ▶ Data transferability papers that provide clues, esp. for transportation, land use/habitat projects
 - Appears we can get insight for aerial (geographic) based receptors
 - Not so sure of useful papers for other receptors
 - May think of MRE/environment interactions as:
 - Aerial-based (e.g., benthic habitat, changes in physical systems -?)
 - Individual animal effects (e.g., collision risk, EMF effects)
 - Effects on species (e.g., acoustic effects causes animals to avoid a habitat)



Call for Annex IV country input

- ▶ OES position paper:
 - Describes challenges, including regulatory requirements
 - Environmental Risks – single devices and arrays, interactions and risks
 - Recommendations to advance the industry
 - Additional background information with citations

- ▶ Submitted to OES for approval at fall OES meeting (November in India)

- ▶ We will add a link once available



- ▶ 6 environmental sessions
 - One session largely modeling related
 - Other 5 sessions more biological interactions, as well as physical interactions
- ▶ 3 socio-econ related sessions
- ▶ Annex IV and ORJIP sponsored workshop on social and economic risks and benefits of marine renewable energy development

Social and Economic Workshop at EWTEC

- ▶ Sent registered participants list of data types needed for consenting/permitting
- ▶ 36 people registered, about 50 participated in workshop

- ▶ Plenary speakers:
 - Shelley McDougal, Acadia Univ CA – economic data needs
 - Sandy Kerr, Heriot-Watt Univ., Orkney – social data needs
 - Gareth Davies, Aquatera, Orkney – case studies of S&E needs

- ▶ Two breakout sessions: Social, Economic
- ▶ Outcome
 - Really never talked about the data needs, but rather what we do not do right in understanding S/E needs
- ▶ Next steps:
 - Fill out list of data needs, add notes from sessions for short report
 - Use information gathered for 2018 socio-econ workshops

- ▶ Regulator webinar – November 2nd 2017, online

- ▶ EIMR Conference – April 24-27, 2018 in Kirkwall, Scotland
 - **Abstract submission December 20th 2017**
 - ORJIP/Annex IV workshop – socio-economic

- ▶ ICOE Conference – June 12-14, in Normandy, France
 - ICOE is now run by OES
 - **Abstract submission November 30th 2017**
 - Annex IV workshop – data transferability and collection consistency

Future Meetings

- ▶ January 18th 2018
- ▶ February 15th 2018
- ▶ March 15th 2018

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