Environmental Data Integration and Analysis Tool

Supporting PacWave's Adaptive Management Plan

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Marine Energy Technology Symposium
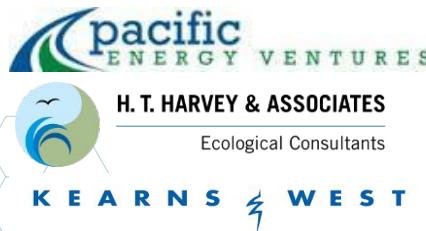
Project Goal

› Support PacWave's mission of environmental stewardship and implementation of their Adaptive Management Plan.
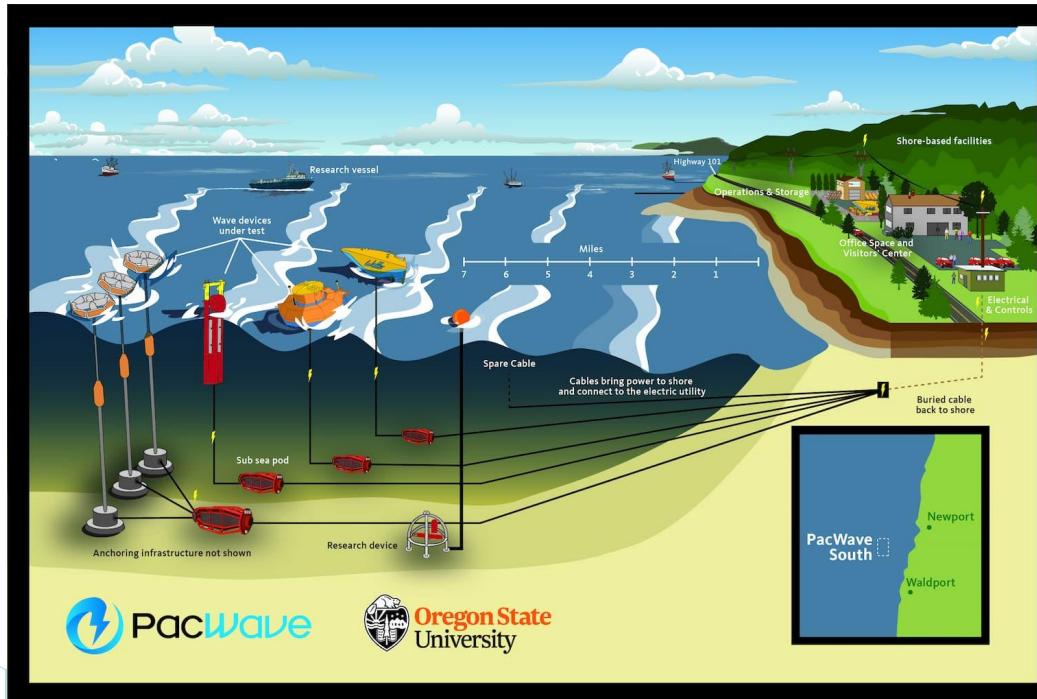
What Is Adaptive Management?

❯ Acknowledge that we do not know all ways our actions will interact with the environment.

❯ Development of a robust monitoring plan and data collection.

❯ Evaluate data as its collected and communicate findings.

❯ Make modifications to monitoring and operations to reduce impacts, collect additional data, or address concerns.

Adaptive Management at PacWave

Adaptive Management Committee

1. Electromagnetic Fields
2. Benthic
3. Entanglement
4. Interaction
5. Environmental Acoustics

6. Vessel acoustics
7. Device Acoustics
8. Pinniped Haulout

9. Birds and Bats

Study Plans and Protection, Mitigation, and Enhancement Measures

10. Operations & Maintenance
11. Cable and Construction
12. Water Resources
13. Vessel Traffic
14. Geologic & Soil Resources
15. Aquatic Resources. & Endangered Species
16. Terrestrial Resources
17. Rec, Ocean, Land Use
18. Cultural Resources
19. Five Year Reviews
20. Fish and Wildlife Emergency

Environmental Data Integration and Analysis Tool

› Summarize monitoring data

› Contextualize data

› Consistent reporting methods

› Integrate new data streams

› Act as a repository

Integrated Data Dashboard

Stressor and Receptor Metrics

Monitoring Design

Assessment and Adaptation

Data Integration and Synthesis (EDIA Tool)

Environmental Data Sources
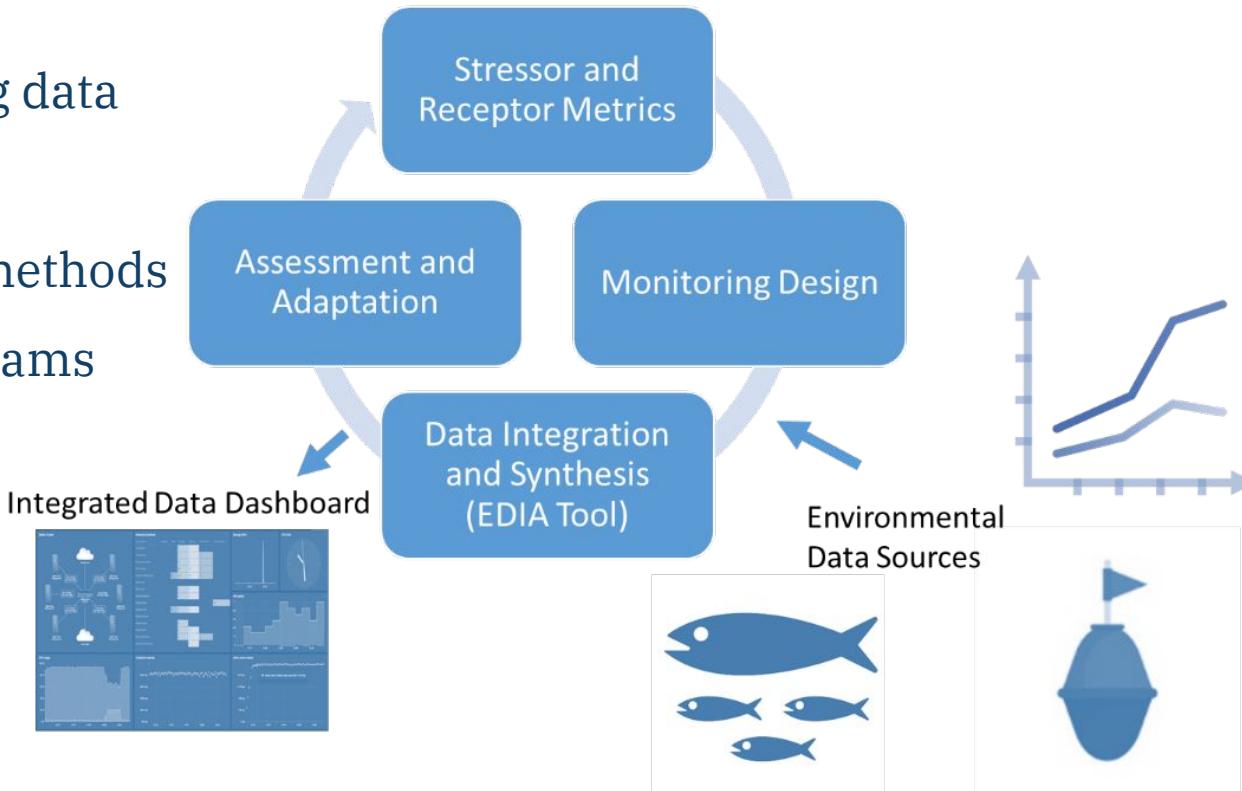
What Data is Collected?

PM&E	Frequency	Types
EMF	Varying	Spatial model results
Benthic	Yearly	Spatial surveys
Entanglement	Varying	Observations
Interaction	Varying	Observations
Acoustics	Daily	Deployed Instrument
Metocean	Hourly	Deployed Instruments

Wave Sensor
sofarocean.com

Acoustic Sensor

Benthic Data

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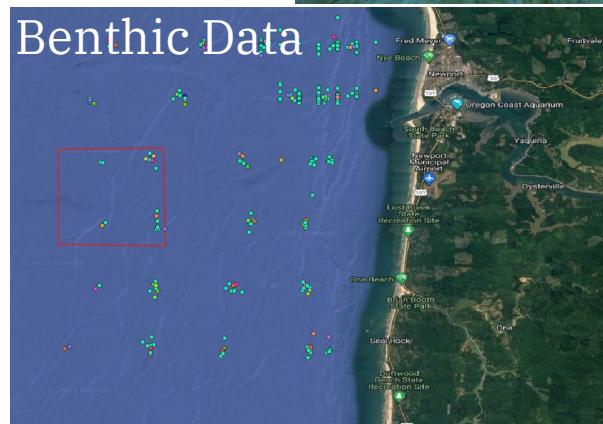
Data Pathways

EDIA Dashboard

EDIA Server
BLOB
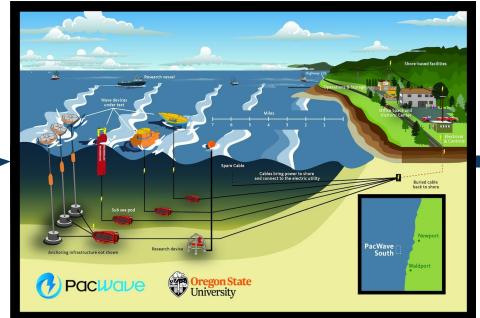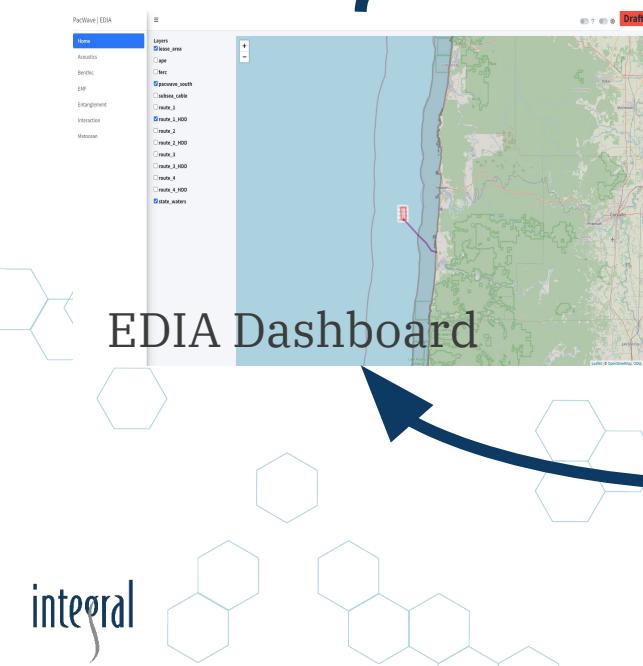
EDIA Dashboard

› Spatial and Temporal Data Displays

› Sections for Each PM&E

› Will update when new data is available

› Displays can be output to be included in reporting
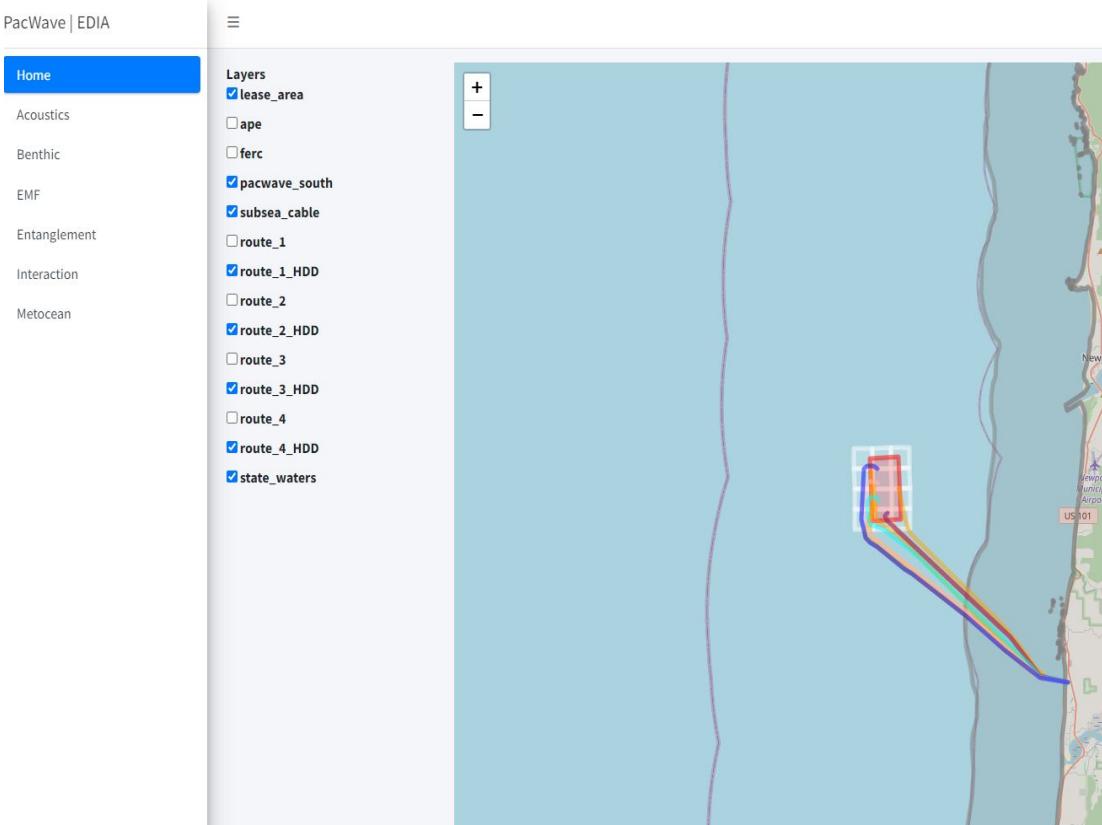
Metocean Data

› Spotter Buoys

› CDIP Buoy

› Nexans Buoy

› ADCP- Currents

› Key to contextualizing site conditions

Acoustics

Management Plan sets a sound pressure level threshold of 120 dB.
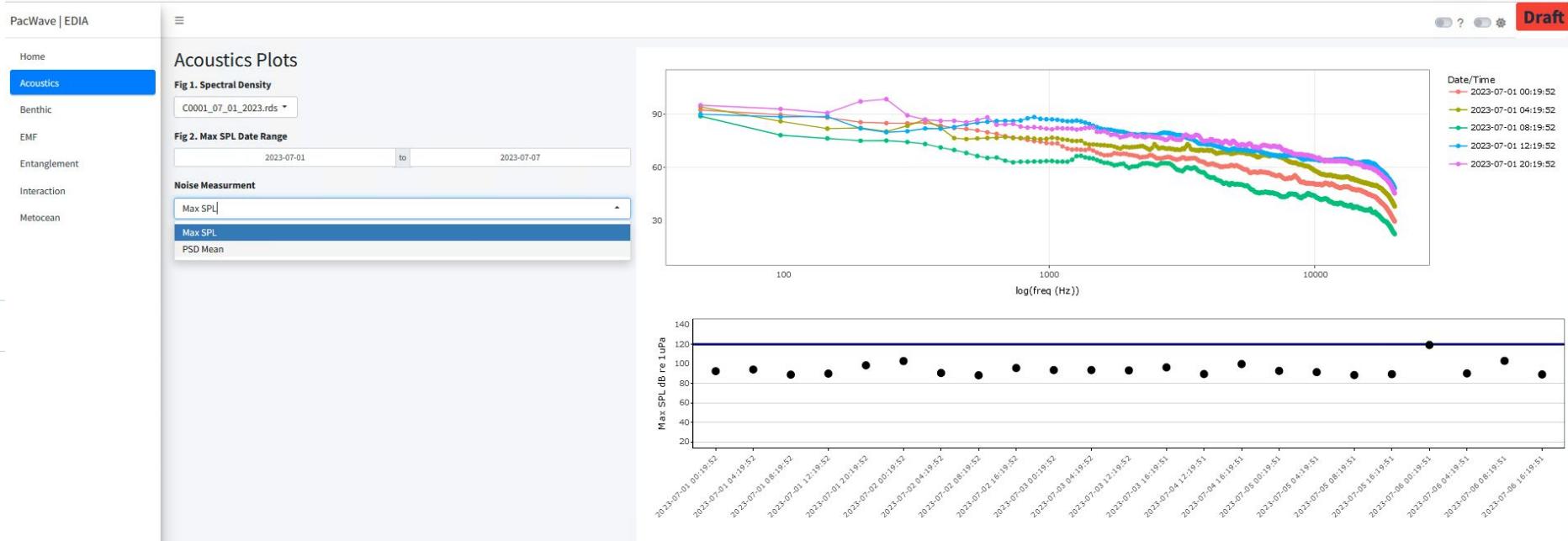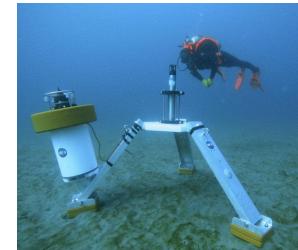
Entanglement and Interactions

› Entanglement of derelict fishing gear poses a threat to devices and stakeholders.

› Observations from the vessels as well as ROV surveys will help inform frequency, location, and manner of interactions.

› Interactions with aquatic animals is possible and must be documented.

› Standardized forms will help PacWave collect and communicate data.
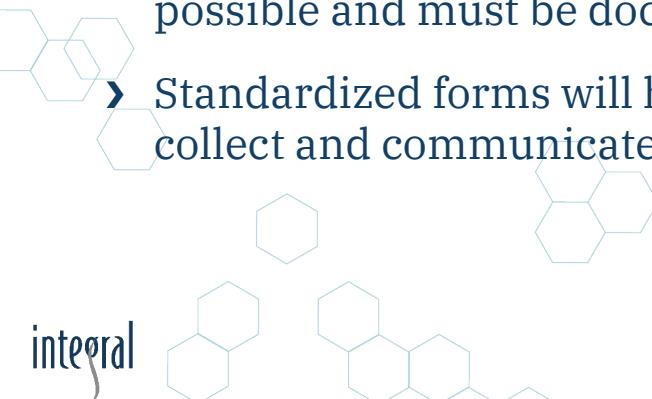
PM&E 3(2): OSU research surveys/opportunistic surface observations (at least once/quarter)
A. Date:
B. Time:
C. GPS vessel track:
D. Survey Type:
1. Vessel Based Surface Entanglement Survey? (Y/N)
1a. Opportunistic? (Y/N)
1b. Specific Survey? (Y/N)
2. ROV Subsurface Survey? (Y/N)
E. Opportunistic Observations:
1. Position of entangled gear/organism:
2. Description of entangled material (indicate if no material observed):
3. Species of organism entangled (if any):
4. Ability to remove/need to remove:
5. Reporting
PM&E 3(3): OSU spring surveys/ surface surveys of active WEC berths during the spring season (mid-March through mid-June)
A. Date:
B. Time:
C. GPS vessel track:

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EMF and Benthic Data

› EMF data evaluation is still in development.

› Models will be developed and field measurements taken of EMF fields.

› OSU will continue to collect benthic data to characterize variability and any changes due to PacWave operations.
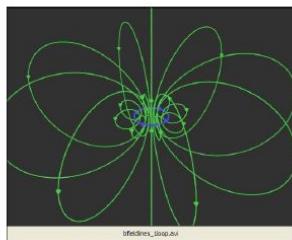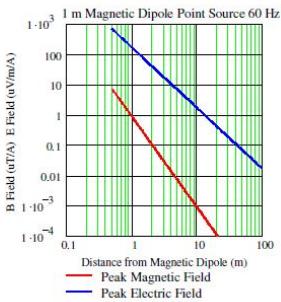
M. Slater, et. al, 2010- OWET
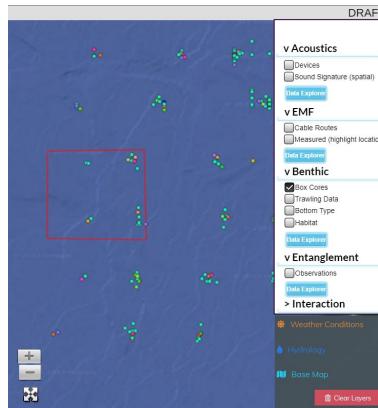
Wider Benefits of this Project

› Developed Educational Materials on marine energy

- Targeted to sigh schoolers to get them interested in Marine Energy.

- Covers basics of waves, technology, and environmental concepts .

- Call to Action: If you know of secondary education groups interested in learning more about marine energy please reach out.

› Apply tool to other sites in development.

Wind generation

Wind–Sea interaction under the influence of gravity

Wave propagation

Fetch

Seabed

Kinetic energy

Potential energy

Khan, Khan, Aziz
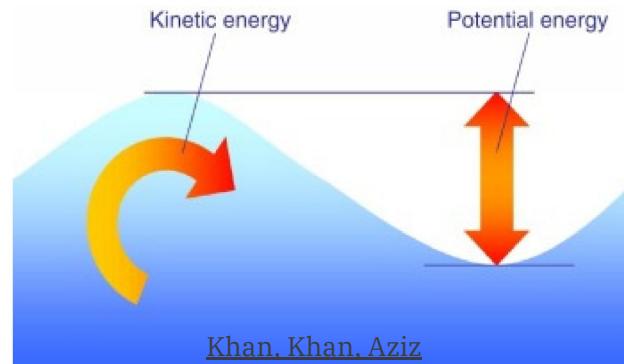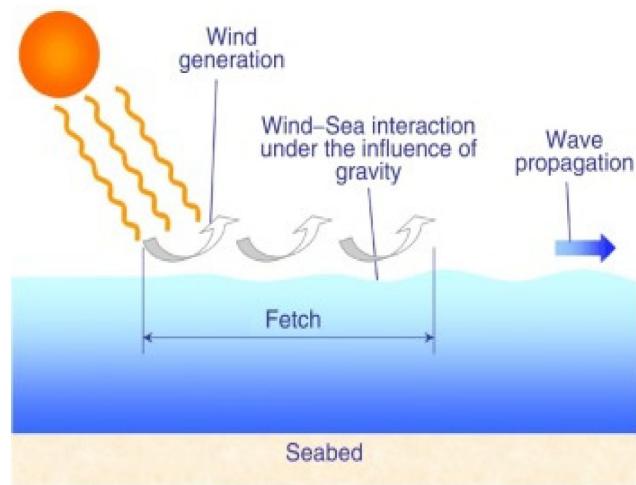
Next Steps

› Work with PacWave, PNNL, and partners to finalize tool functionality

› Iterate on new data sets to integrate into Tool

› Deploy prior to operations starting in Spring 2025

Thank you to the DOE, PacWave, and National Laboratories for their support of this project!

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