Presentation to:

Federal Renewable Ocean Energy Working Group

Oregon Military Department (OMD)

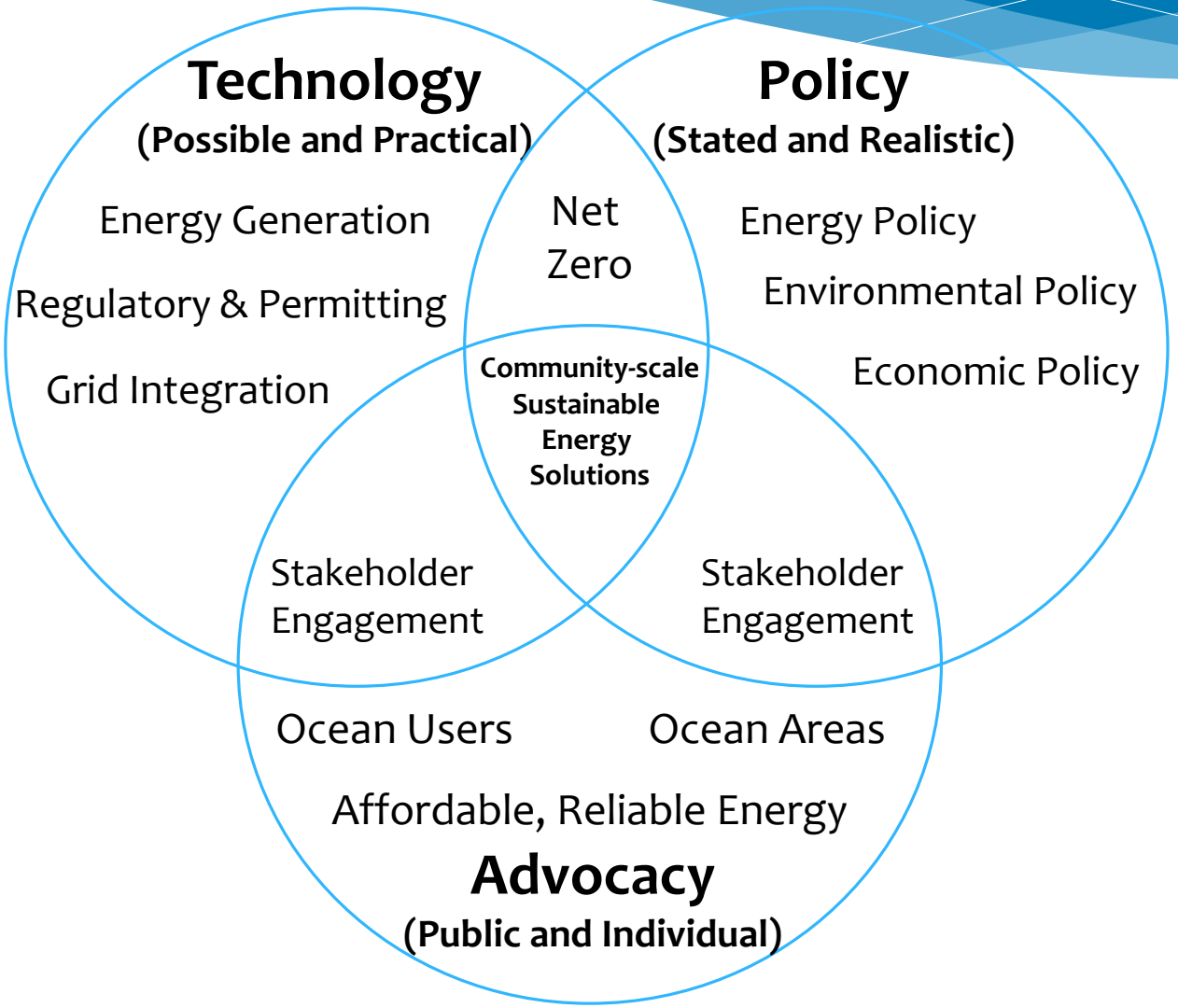
Marine Renewable Energy

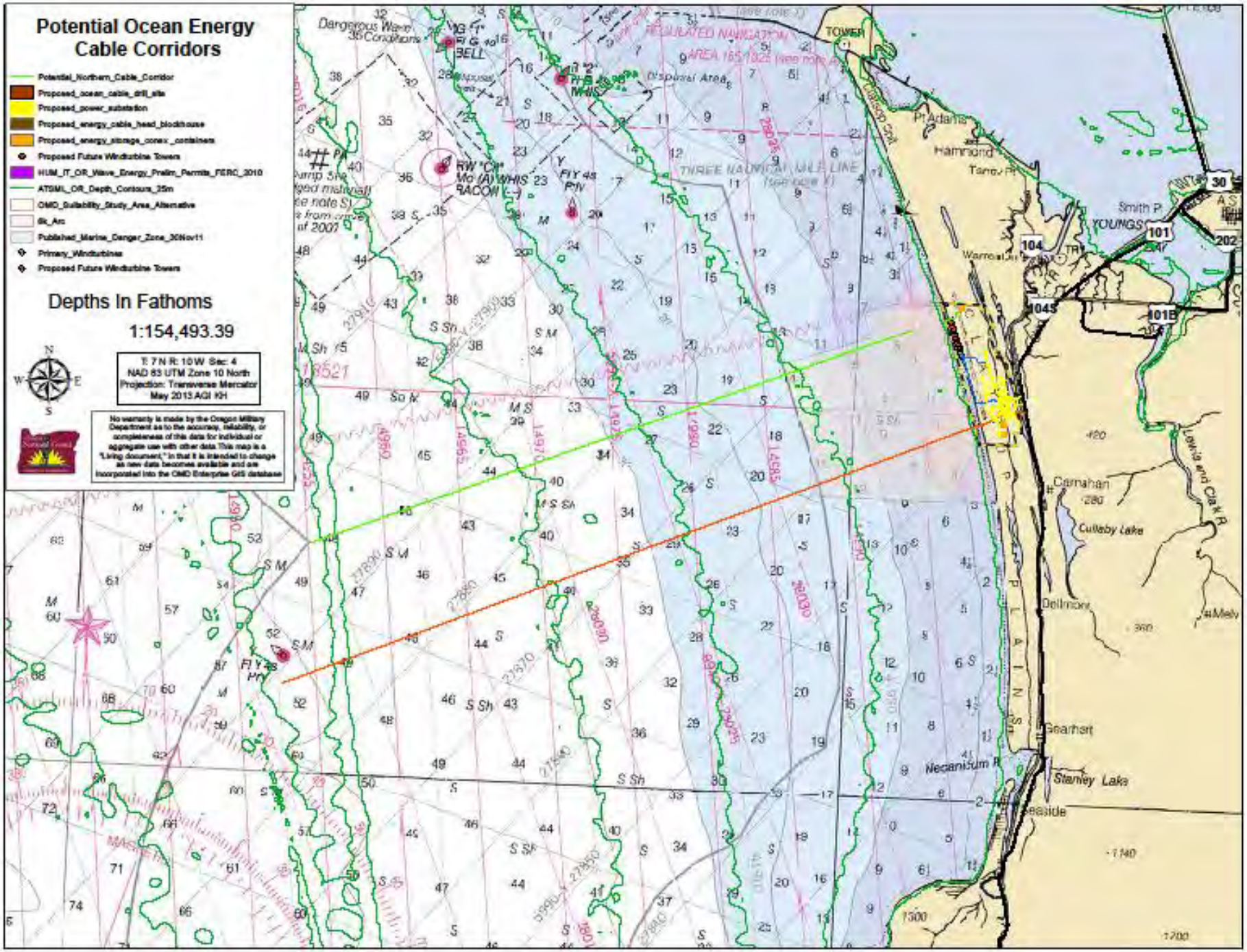
- Energy Independence
- Energy Security
- Disaster Resilience

Camp Rilea Energy

The Model

What does it take for a technology to become a solution?




Potential Ocean Energy Cable Corridors
Potential_Northern_Cable_Corridor
Proposed_ocean_cable_drill_site
Proposed_power_substation
Proposed_energy_cable_head_blockhouse
Proposed_energy_storage_cones/_containers
Proposed Future Windturbine Towers
HUM_IT_OR_Wave_Energy_Prelim_Permits_FERC_2010
ATSML_OR_Depth_Contours_25m
OMD_Suitability_Study_Area_Alternative
tlk_Arc
Published_Marine_Danger_Zone_30Nov11
Primary_Windturbines
Proposed Future Windturbine Towers
Depths In Fathoms
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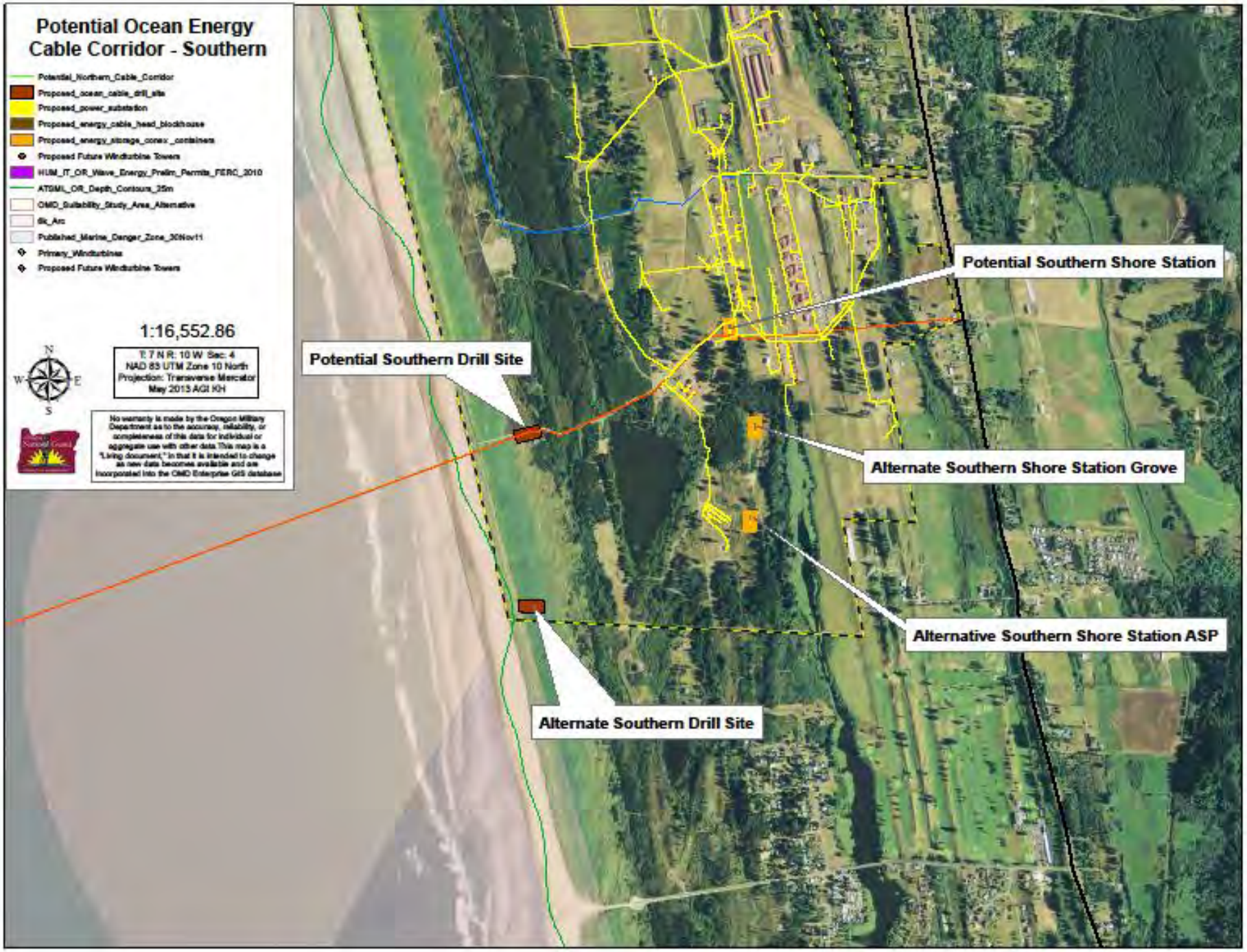
T. 7 N R. 10 W Sec. 4
NAD 83 UTM Zone 10 North
Projection: Transverse Mercator
May 2013 AGI KH
No warranty is made by the Oregon Military Department as to the accuracy, reliability, or completeness of this data for individual or aggregate use with other data. This map is a "living document," in that it is intended to change as new data becomes available and are incorporated into the OMD Enterprise GIS database.
Dangerous Wreck 35 Conditions
REGULATED NAVIGATION AREA
THREE NAUTICAL MILE LINE
TOWER
Pt Adams
Hammond
Tansy Pt
Warrenton
Smith P.
YOUNGS
Camahan
Cullaby Lake
Delmoor
Gearhart
Neacanicum R
Stanley Lake
Seaside
30
101
202
104
1045
101B


Potential Ocean Energy Cable Corridor - Southern
Potential_Northern_Cable_Corridor
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Proposed_power_substation
Proposed_energy_cable_head_blockhouse
Proposed_energy_storage_conex_containers
Proposed Future Windturbine Towers
HUM_IT_OR_Wave_Energy_Prelim_Permits_FERC_2010
ATSML_OR_Depth_Contours_35m
OMD_Suitability_Study_Area_Alternative
6k_Arc
Published_Marine_Danger_Zone_30Nov11
Primary_Windturbines
Proposed Future Windturbine Towers
1:16,552.86
T. 7 N R. 10 W Sec. 4
NAD 83 UTM Zone 10 North
Projection: Transverse Mercator
May 2013 AGI KH
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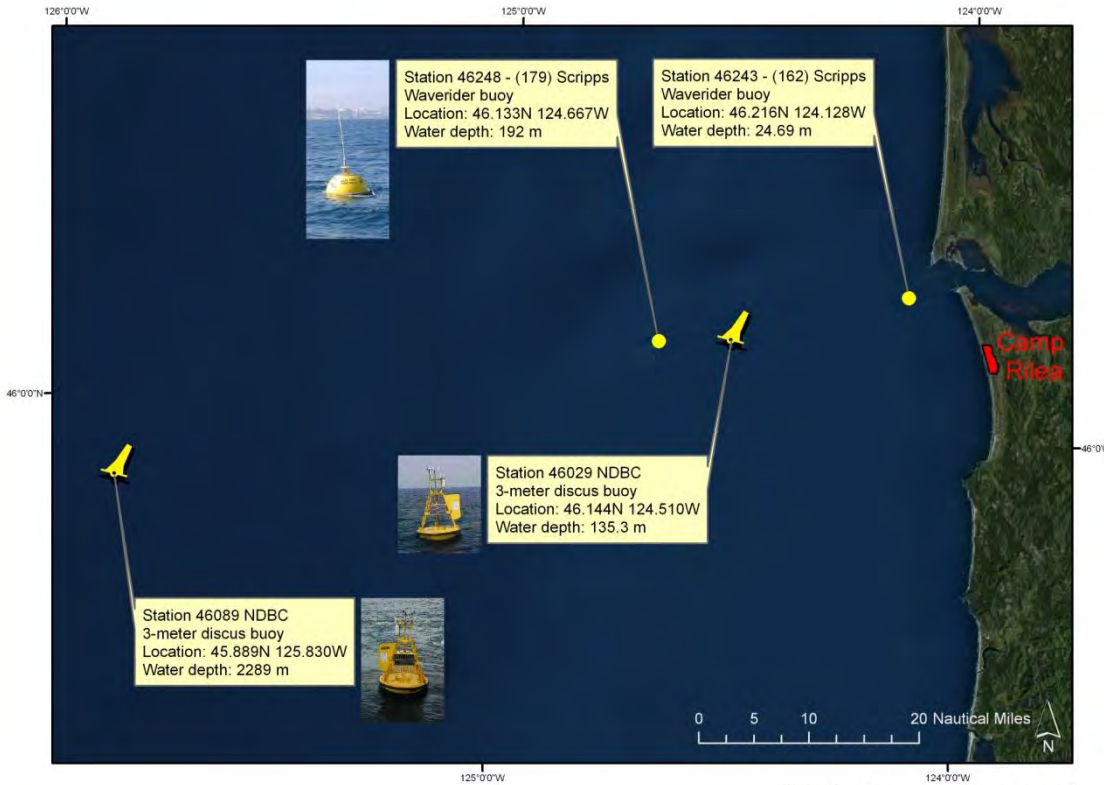
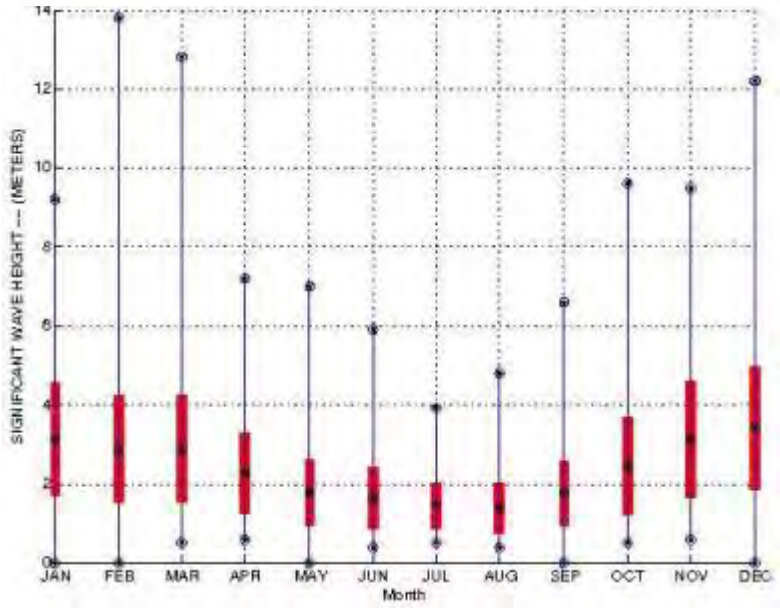
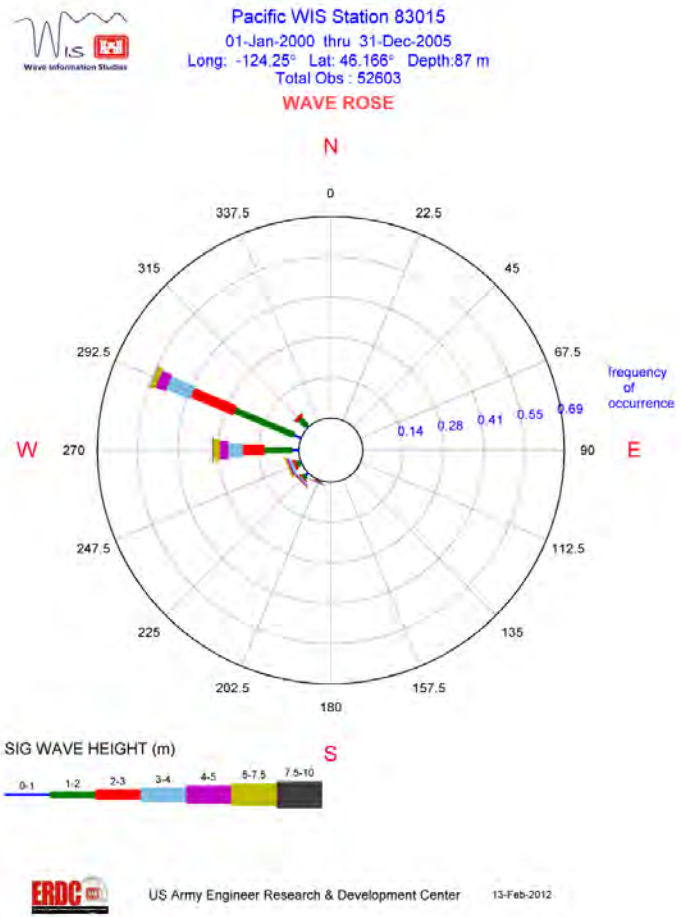
Potential Southern Shore Station
Potential Southern Drill Site
Alternate Southern Shore Station Grove
Alternative Southern Shore Station ASP
Alternate Southern Drill Site

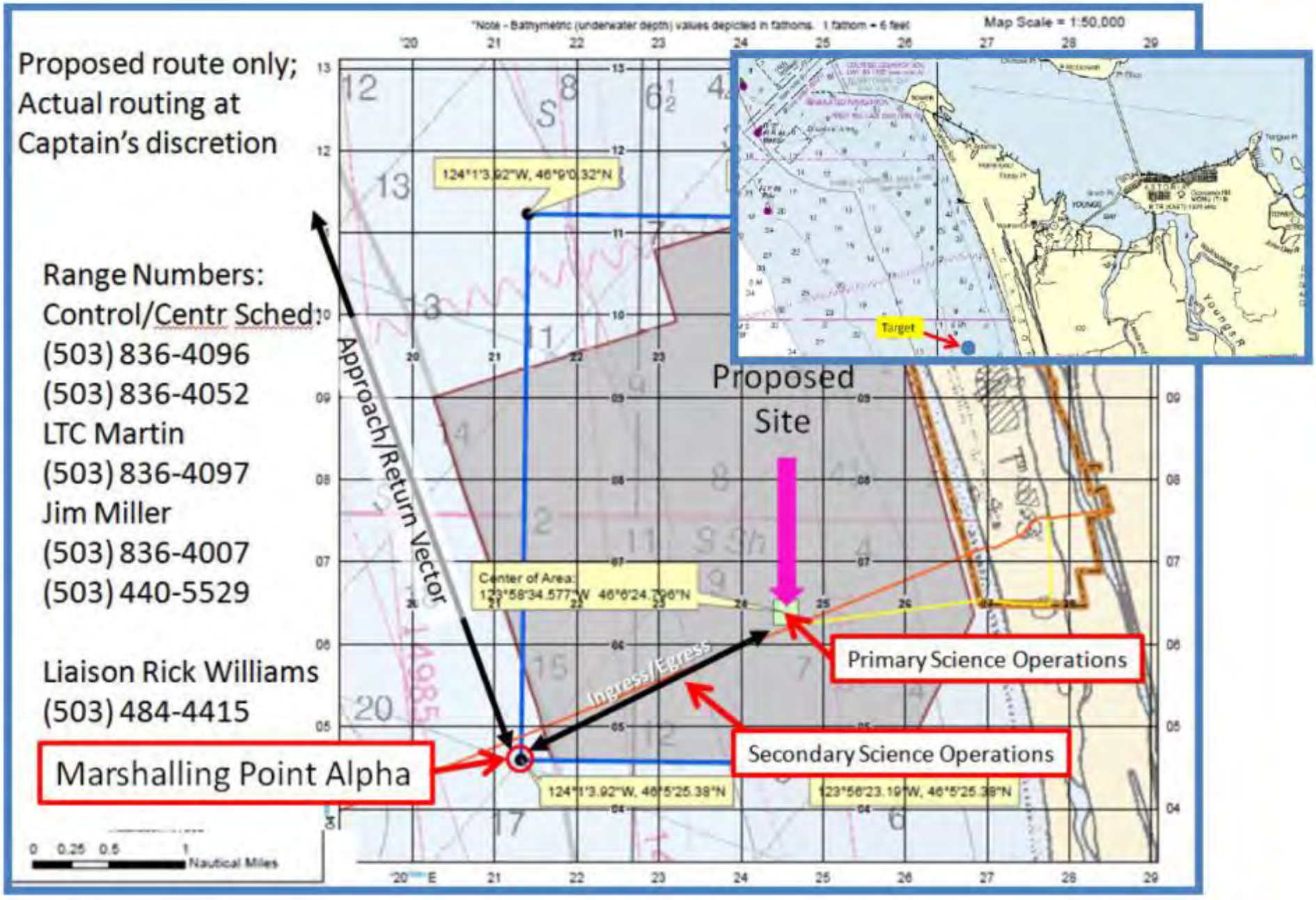
Wave Resource Camp Rilea, Oregon



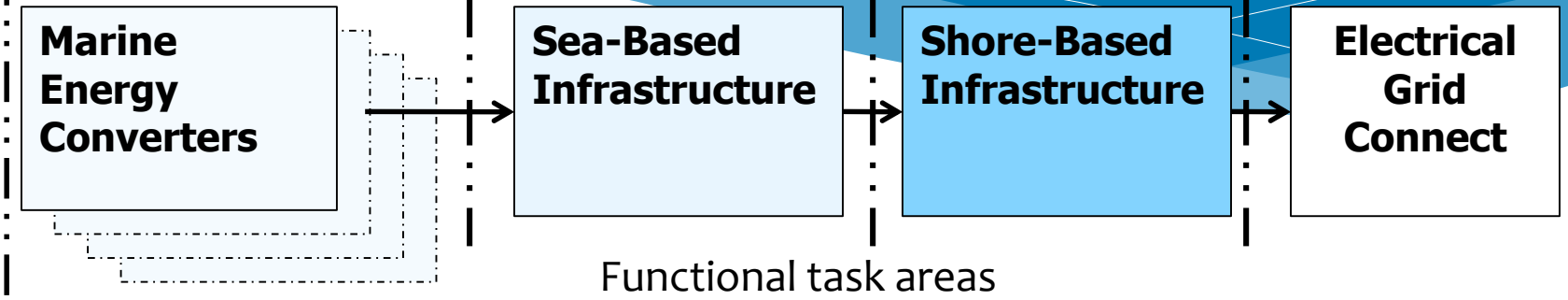
Data Source: www.ndbc.noaa.gov/






Proposed route only;
Actual routing at
Captain's discretion
Range Numbers:
Control/Centr Sched:
(503) 836-4096
(503) 836-4052
LTC Martin
(503) 836-4097
Jim Miller
(503) 836-4007
(503) 440-5529
Liaison Rick Williams
(503) 484-4415
Marshalling Point Alpha
Approach/Return Vector
Ingress/Egress
Proposed Site
Primary Science Operations
Secondary Science Operations
Target
Map Scale = 1:50,000
0 0.25 0.5 1 Nautical Miles

System Block Diagram



Functional task areas

Design & Planning	Resource adaptation, conceptual design, preliminary design, prototyping, detailed design, implementation planning
Regulatory & Permitting	Site evaluation and selection, environmental analysis, outreach, and agency interaction
Implementation, Operations and Maintenance	Procurement, fabrication, logistics, installation, commissioning, project operations, maintenance, monitoring, adaptive management, and decommissioning
Financial & Business Management	Business planning, finance, project management, cost accounting and control
Marine Energy Converters (MECs)	MEC technology development, installation planning, device operation and maintenance.

The Path Ahead:

Oregon Military Department (OMD)

Marine Renewable Energy

- Energy Independence
- Energy Security
- Disaster Resilience

Concept Summary

Three major thrusts:

- Temporary Testing/Demonstrations:
  - Test single WECs, independent or surface lay cable to beach.
  - Test small arrays, independent or surface lay cable to beach.

- Pilot-scale:
  - Test and select WECs for small arrays
  - Focus on southern cable route
  - 1 to 2 MWX average annual output for Camp Rilea and disaster resilience

- Phased Development:
  - Mid-term & long-term development based on experience and lessons learned
  - Evolve to community scale power source

Contact:

Oregon Military Department (OMD): LTC Ken Safe

kenneth.safe.mil@mail.mil

503-584-3503

Marine Renewable Energy: Rick Williams

richard.b.williams@leidos.com

503-484-4415

BACKUP SLIDES

Existing Electrical Distribution

- Camp Rilea is a national security site and the disaster response site for the North Coast, needs multiple power sources
- Camp Rilea has policy of co-use and co-location to avoid encroachment on live fire training mission
  - Electrical distribution system close to shore
  - Connects to local utility grid at Hwy 101
  - Willing to consider test site
  - Willing to consider cable landings
  - Professional staff
  - Culture of environmental compliance

Mission-Driven Design

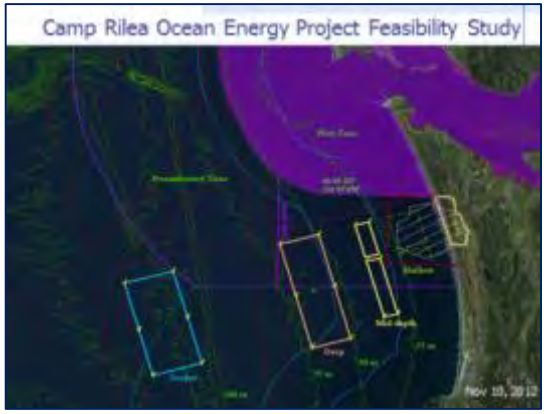
- Camp Rilea's mission is training and needs dependable power from multiple sources.
  - Camp Rilea requires energy security and energy independence
  - North coast communities will benefit from power generation and jobs and enhanced ability to support emergency service response
  - Research hardening for disaster resilience

Feasibility Study

National Guard Bureau funded:

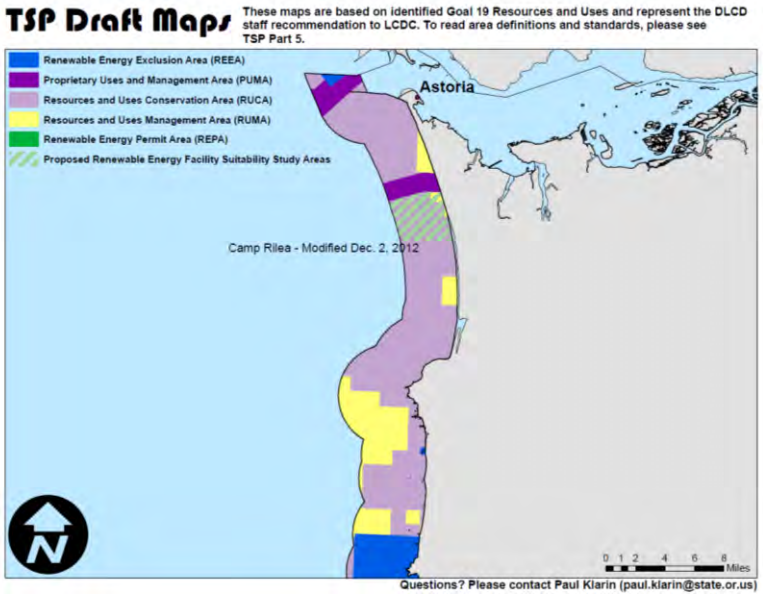
Camp Rilea Ocean Energy Feasibility Study in 2011-12:

- Wave resource excellent for Wave Energy Converter (WEC) deployment.
- Camp Rilea base load 500KW, with 900KW peak load.
- Wave energy is a compatible use of the Camp Rilea Small Arms Ranges Surface Danger Zone (SDZ).
- All power on the Oregon Coast depends on transmission lines across the Coast Mountain Range.
- Wave energy makes sense in Oregon; and,
- Wave energy will make sense first at Camp Rilea given DOD Net Zero Energy Policy and OMD Mission requirements:
  - energy security,
  - energy independence,
  - disaster resilience,



Outreach & Advocacy

After a four-year effort
to develop the Oregon Territorial Sea Plan Part 5,
the Oregon Land Conservation and Development Commission
authorized the waters off Camp Rilea as a Renewable Energy
Facility Suitability Study Area in 2013.



Outreach & Advocacy

Camp Rilea hosted Wave Energy Developers Summit in 2014.

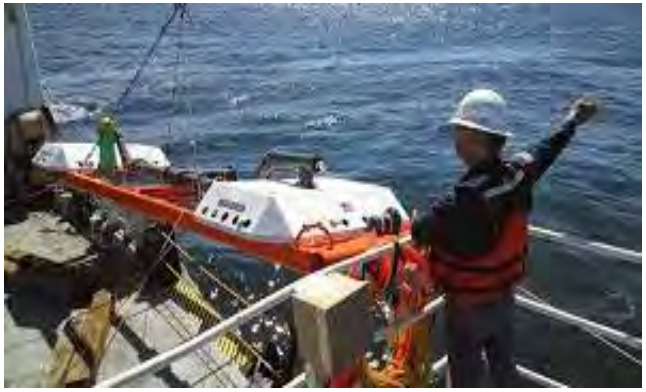
Local community outreach, permitting, and successful deployment by M3 Wave Energy accomplished with support of Job Corps Seamanship Program students, staff, and Training Vessel Ironwood in 2014.

OMD and M3 Wave Energy presented at Ocean Renewable Energy Conference in 2014.

Demonstration Support

Jointly-funded project by OMD/OWET:

Provided systems engineering and program management support for the concept and the first use of the new Oregon Territorial Sea Plan Wave Energy section by the M3 Wave Energy Pilot Project in 2013-14.

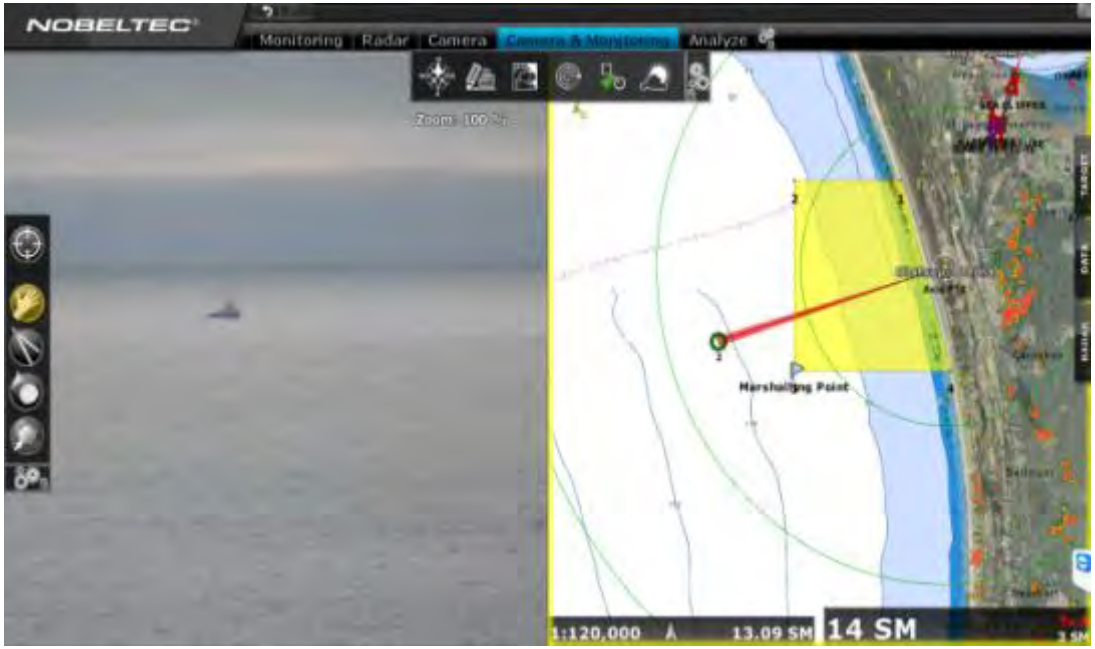


Cooperative Demonstration

Working with related industries:

Successful cooperative demonstration of a prototype Coastal Monitoring System at Camp Rilea by OMD, Nobeltec Systems, and Furuno Radar accomplished in 2015.

Evaluation continues.



Outreach & Advocacy

The Oregon Legislature adapted the Net Metering Law to support wave energy projects with undersea power cables landing at Camp Rilea. The Law went into effect in 2015.

OMD executed a Memorandum of Understanding to cooperate on wave energy development and test center procedures with Oregon State University and the DOE-funded Northwest National Marine Renewable Energy Center and Pacific Marine Energy Test Center (PMEC) in 2015. Camp Rilea provides shallow and mid-depth test sites that complement the PMEC deep test site.

Process (and Persistence)

Obtain funding
and continue the iterative design process for the Camp Rilea Shallow Water and Mid-Depth Test Sites to evaluate WECs for OMD use:

- Conceptual Design
- Preliminary Design
- Permitting
- Detailed Design
- Construction
- Installation
- Commissioning
- Operations
- Evaluation.

Big Picture (and Persistence)

Obtain funding.

Wave energy successes at Camp Rilea demonstrate a compatible use with renewable energy projects and have applicability to Army and Navy coastal facilities around the globe.

Joint-funding by OMD/OWET is providing systems engineering and program management support for the at-sea demonstration of the Resolute Marine Energy WEC planned in 2016.

OWET-funded community outreach activities continue, as well as coordination with related DOE-funded projects at Sandia National Lab and University of Washington Applied Physics Lab.

Summary

Camp Rilea

Renewable Energy Opportunities:

- “A site that cooperates with wave energy testing”
- Significant renewable energy resource potential
- Supports Clatsop County emergency operations
- “Community-Scale Energy Project” will mitigate the BPA electrical transmission grid limitation to the Oregon Coast
- Supports R&D for wave energy research for Department of the Army, DOD, Oregon, OSU, OWET, industry
- Help develop solutions for Oregon and other places around the globe with higher energy prices
- Help reduce carbon pollution