Pacific Northwest
NATIONAL LABORATORY

umerc + METS 2024

Electricity Generation from Tidal Currents at Oyster Farms

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U.S. DEPARTMENT OF ENERGY BATTELLE

PNNL is operated by Battelle for the U.S. Department of Energy

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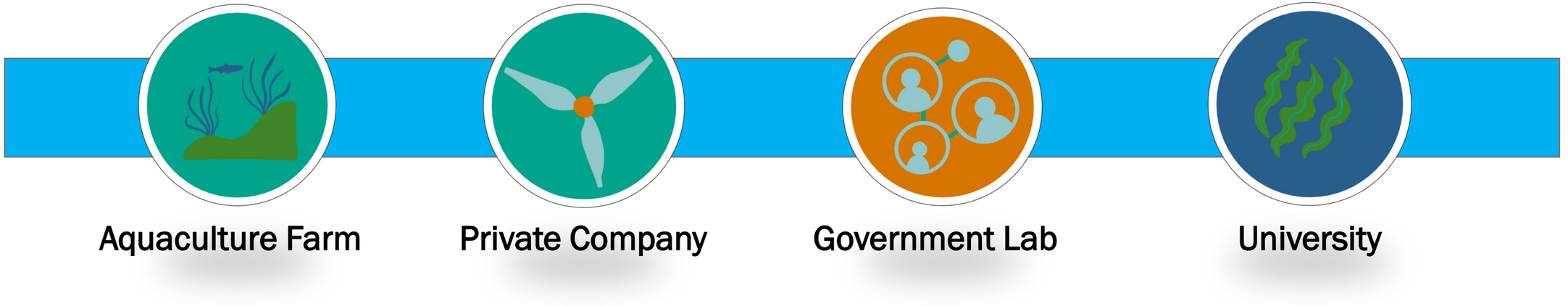
The Vision

Demonstrate low current velocity devices can power equipment at aquaculture farms by

- *assessing the power needs and current velocities at 3 aquaculture farms*
- *field testing a low current speed electricity generation device*



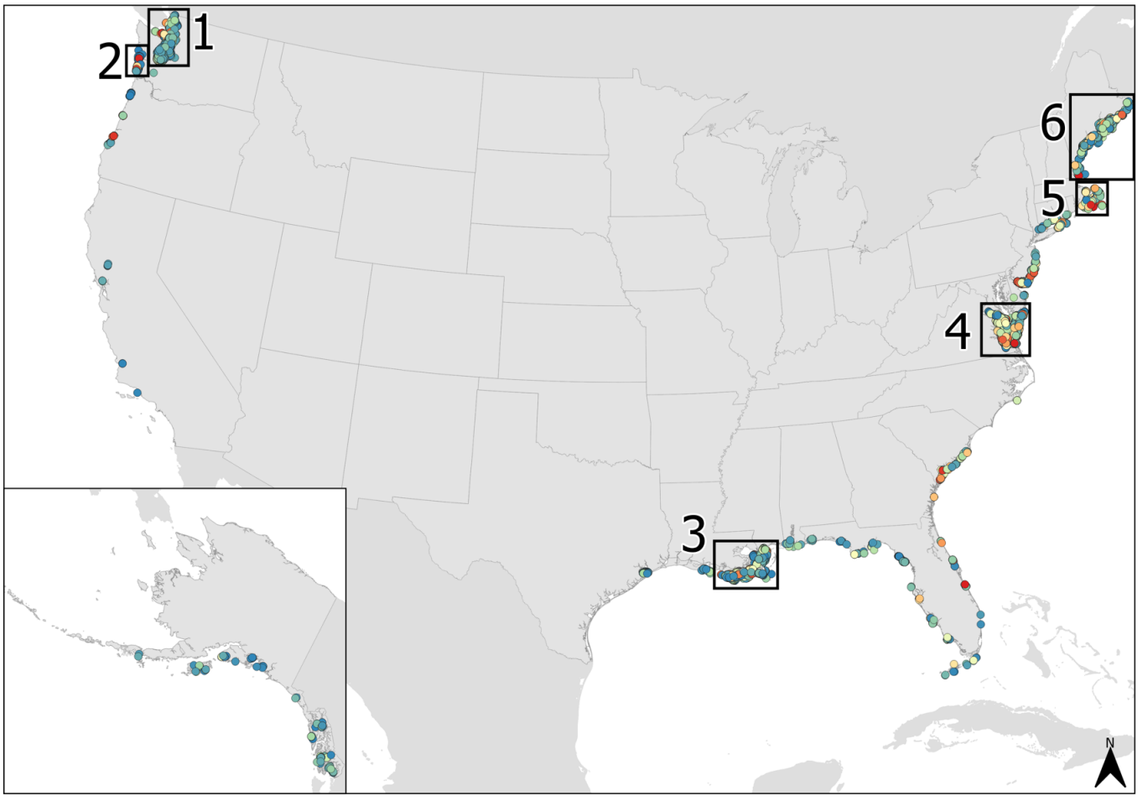
The Vision

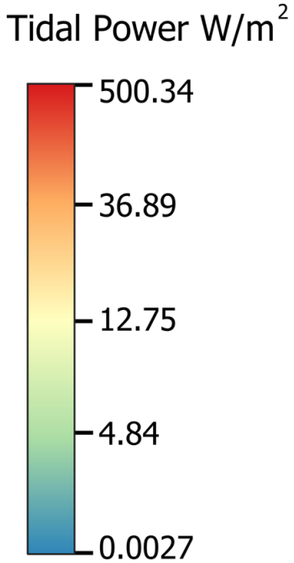
Industry + University + National Lab

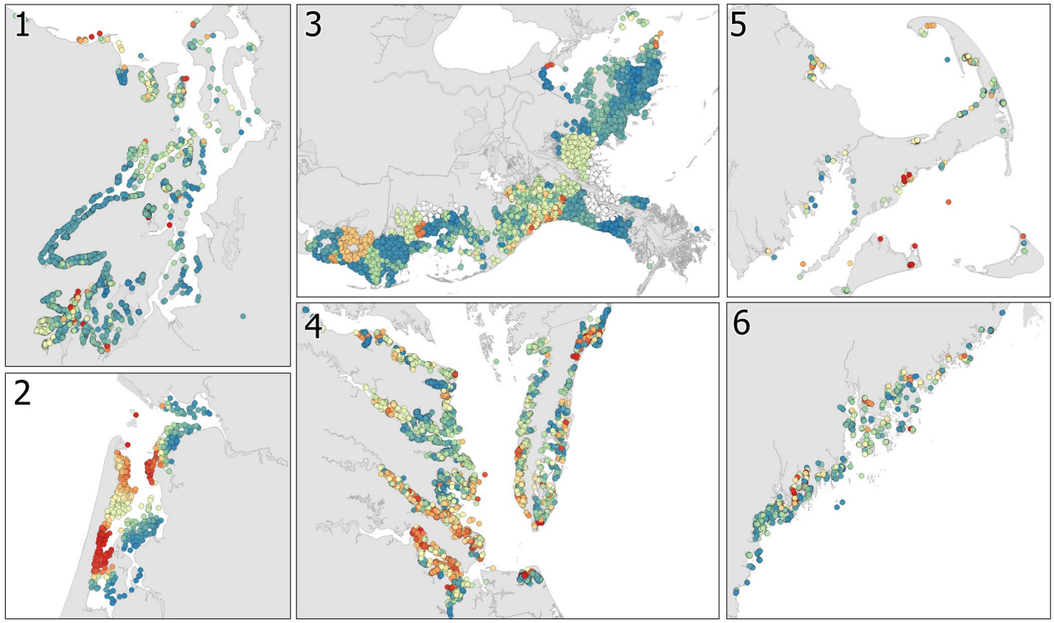
Unique Roles of Each Institution

Current Speed Study	Intellectual Property	Field Testing	Tank Testing
Power Needs	Project Management	Engineers	Professor, Interns, Grad Students, Postdocs (>180)

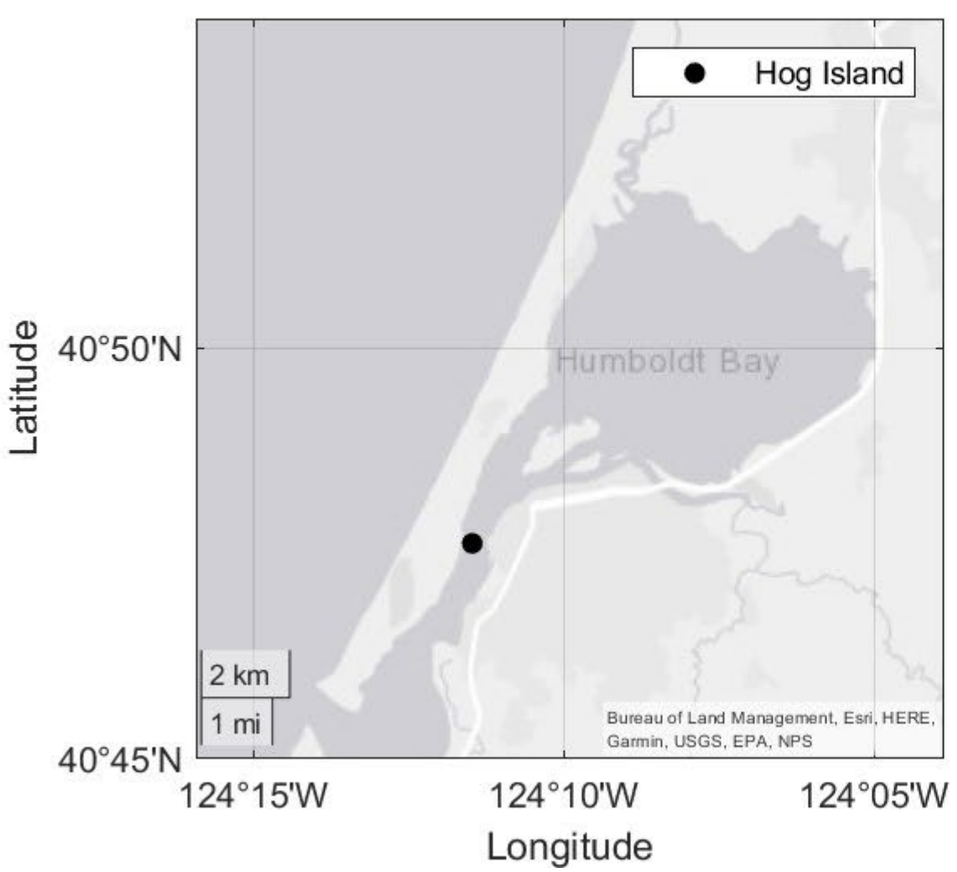
Tidal Power at shellfish farms in the U.S.

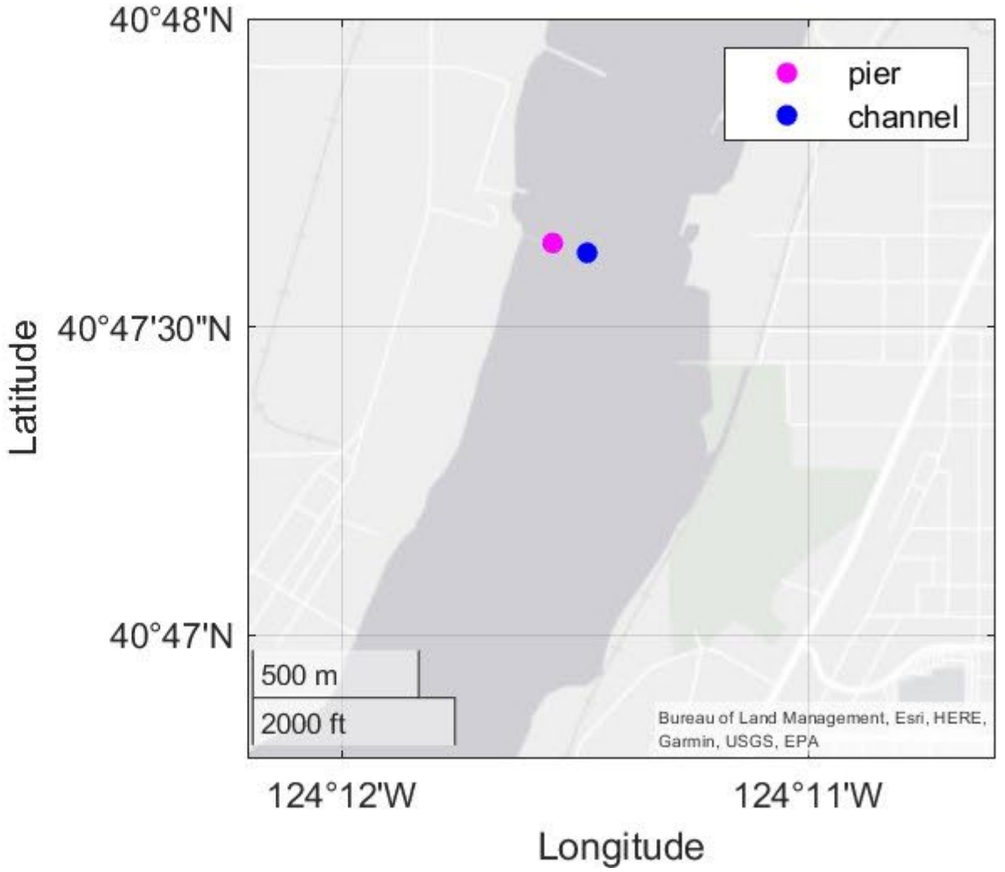






Micro-siting at Hog Island

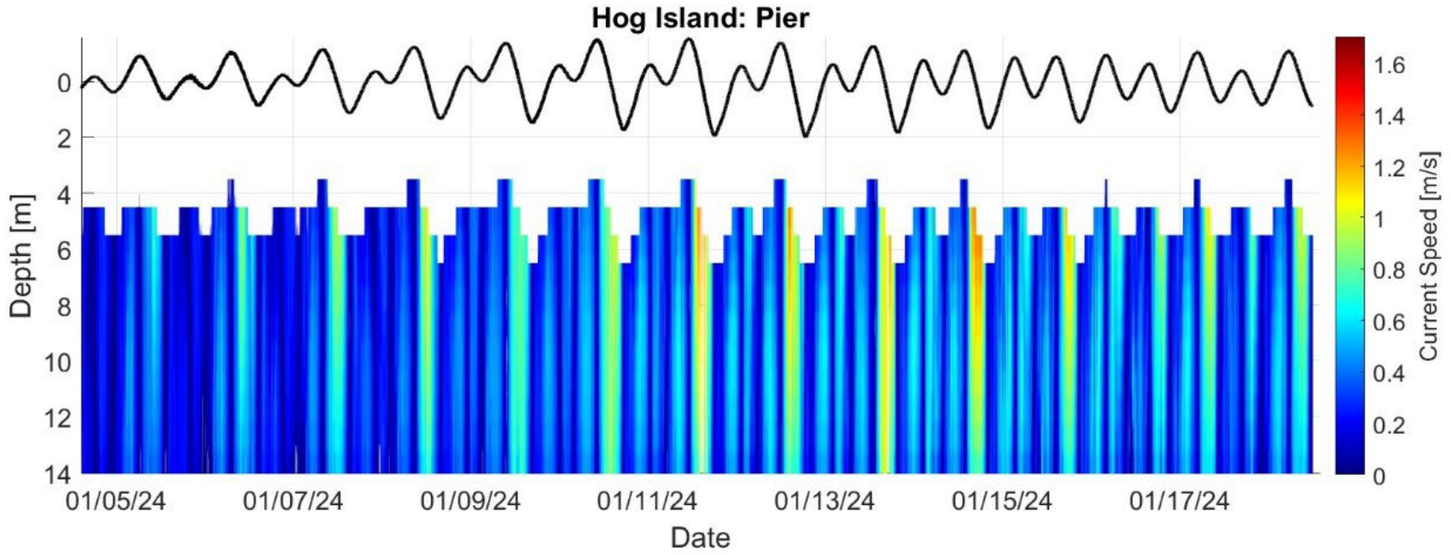




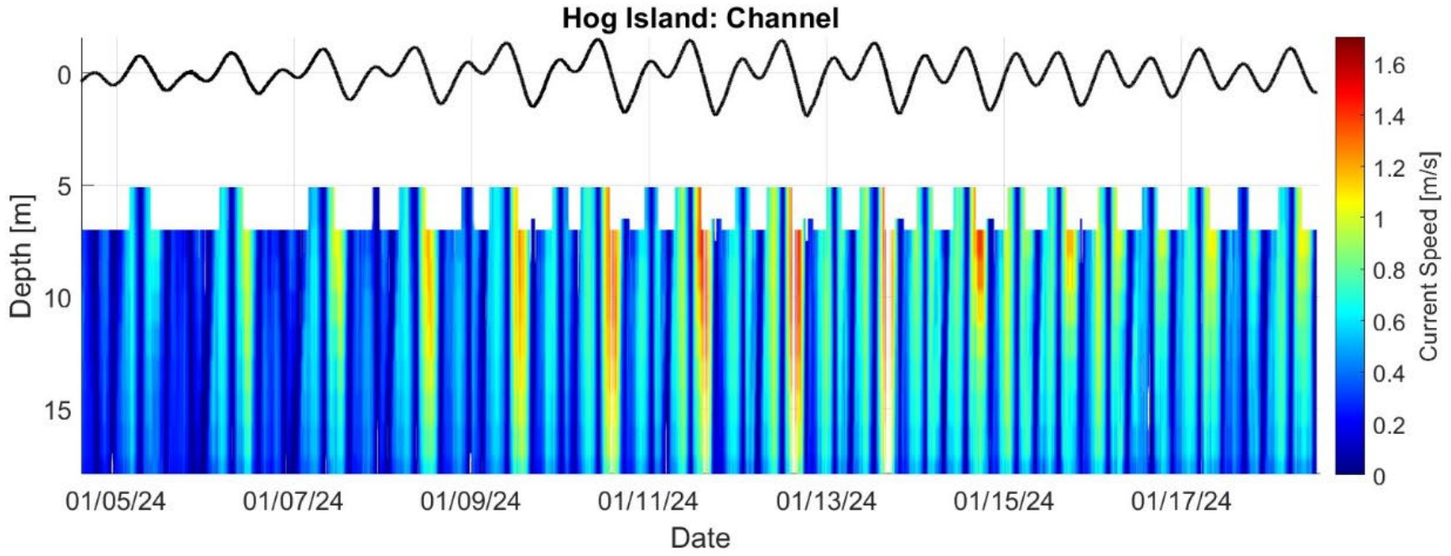
Micro-siting at Hog Island

Micro-siting at Hog Island

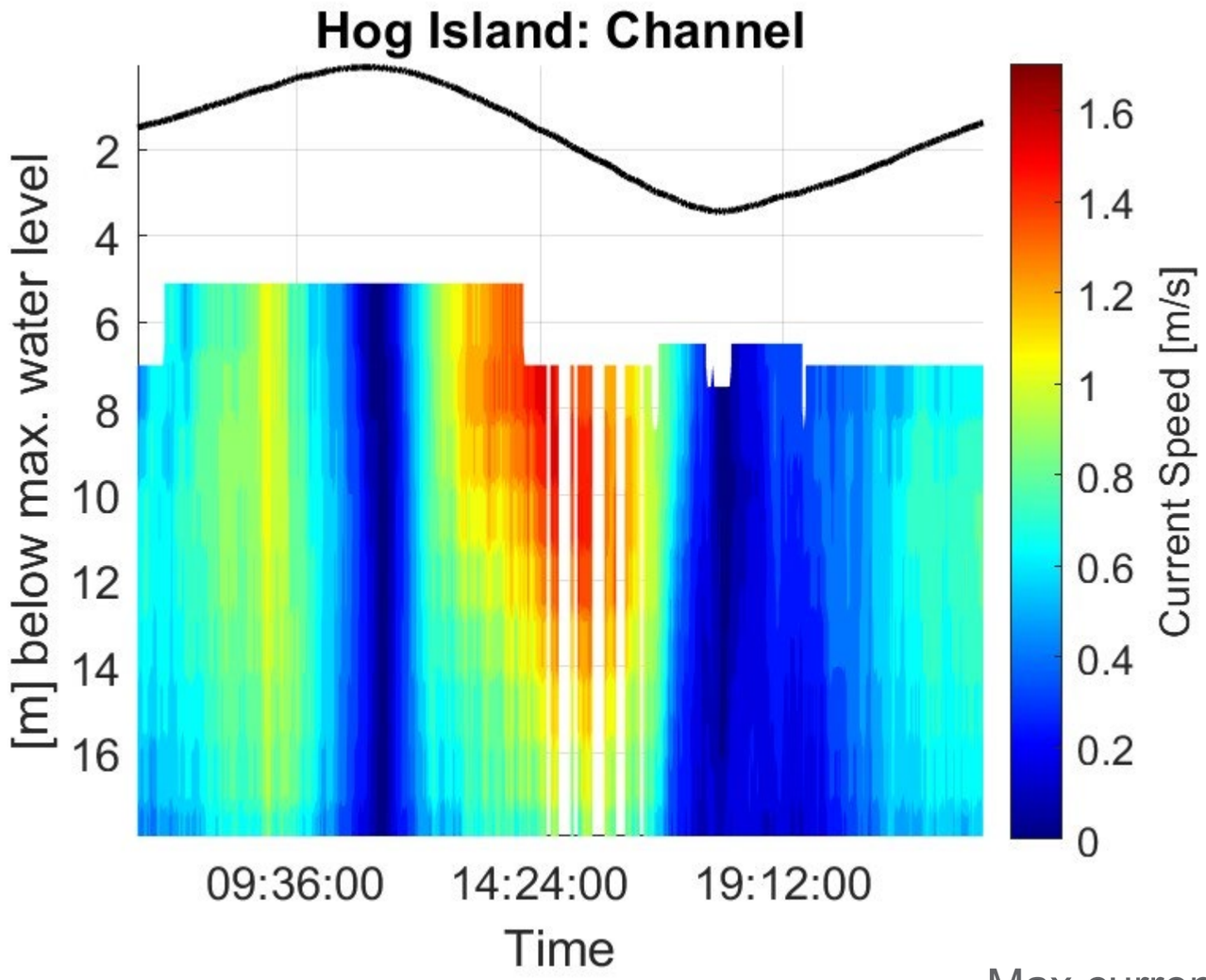
Max speed:
1.42 m/s



Max speed:
1.68 m/s

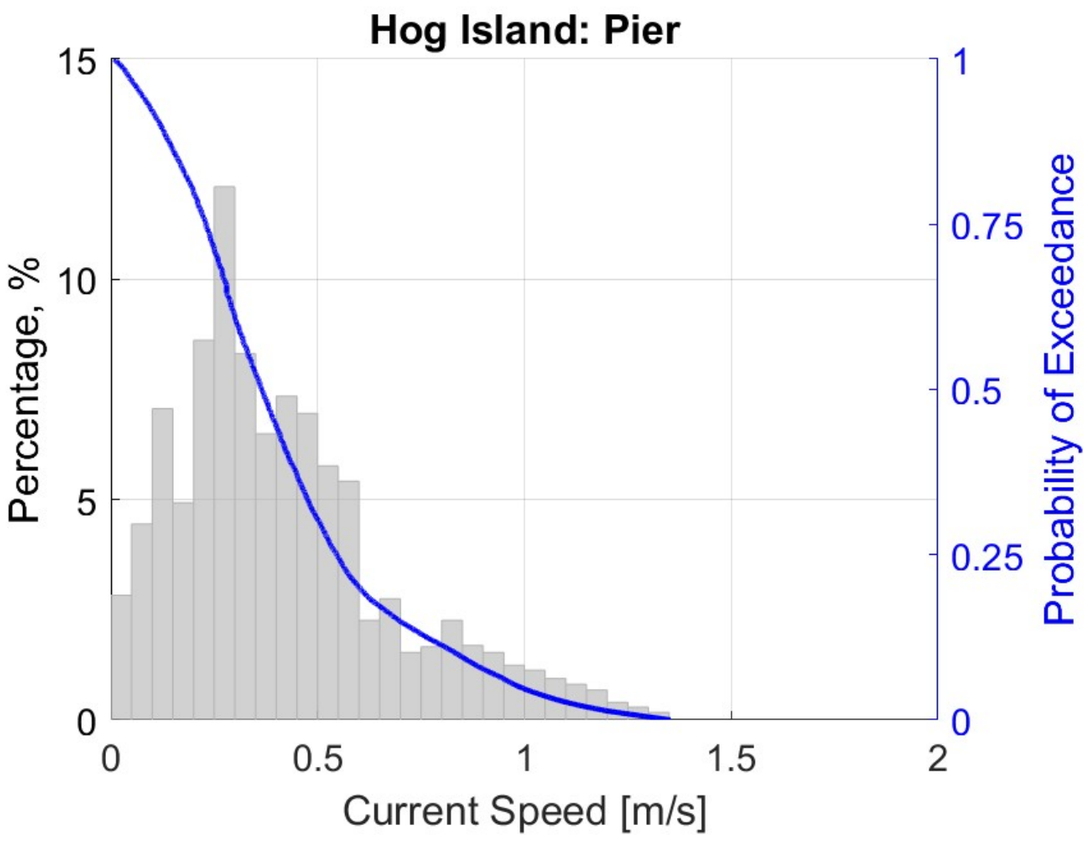


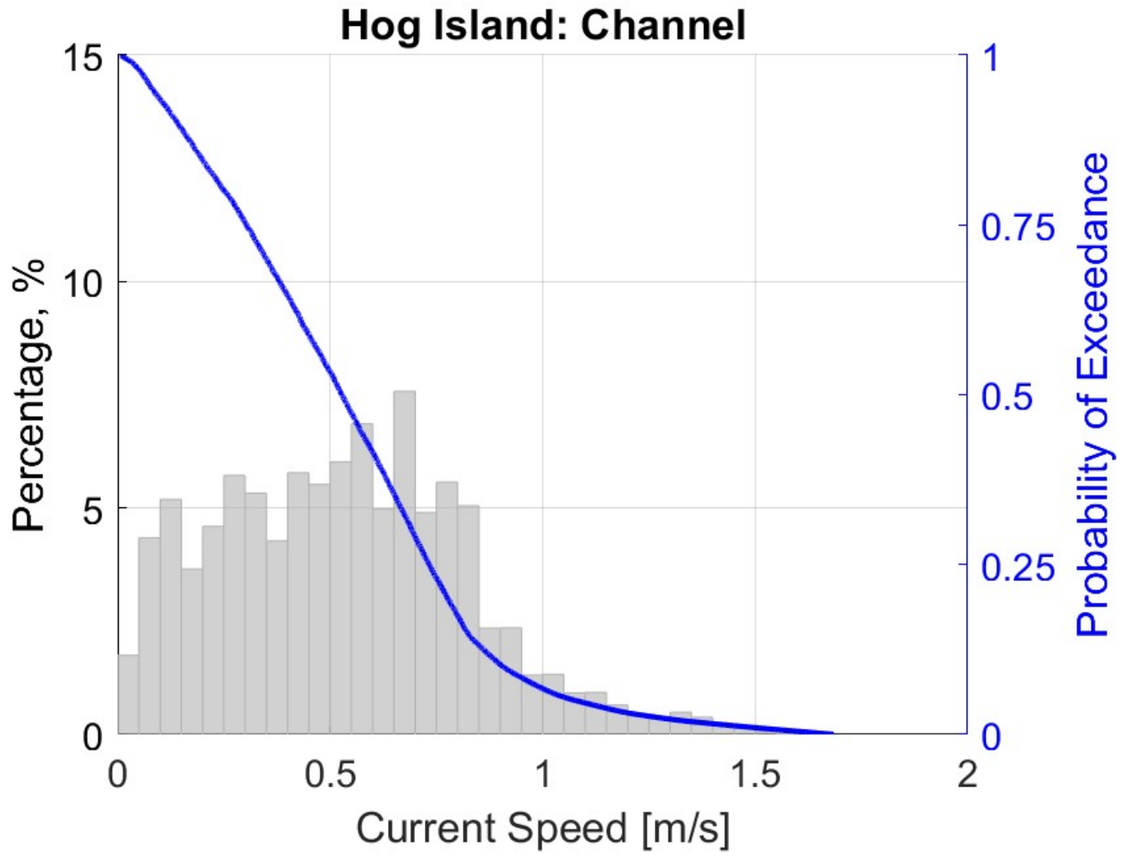
ADCP problems at max speed



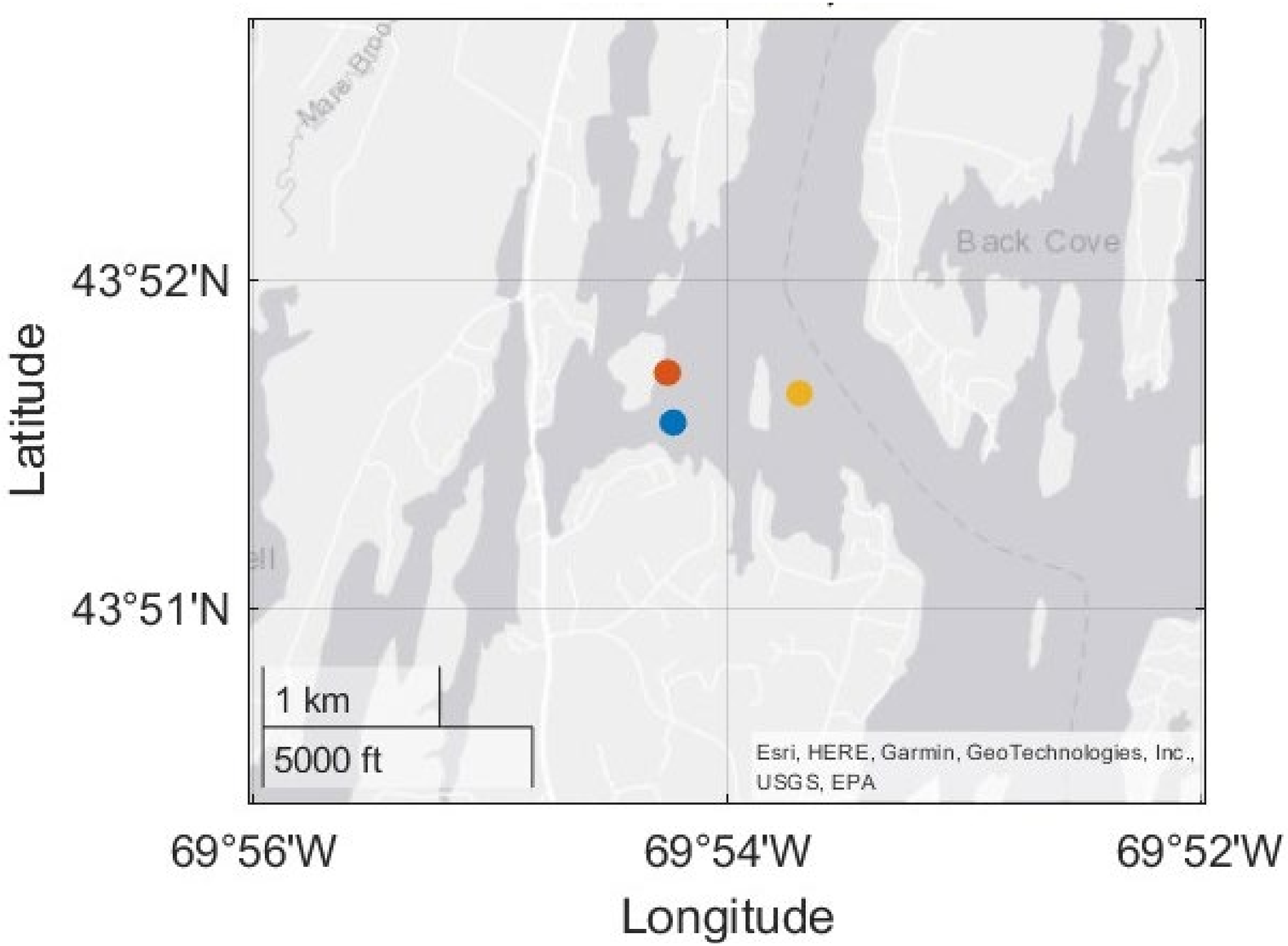
Max current speed was actually higher than 1.68 m/s

Micro-siting at Hog Island





Micro-siting at Ferda Farms



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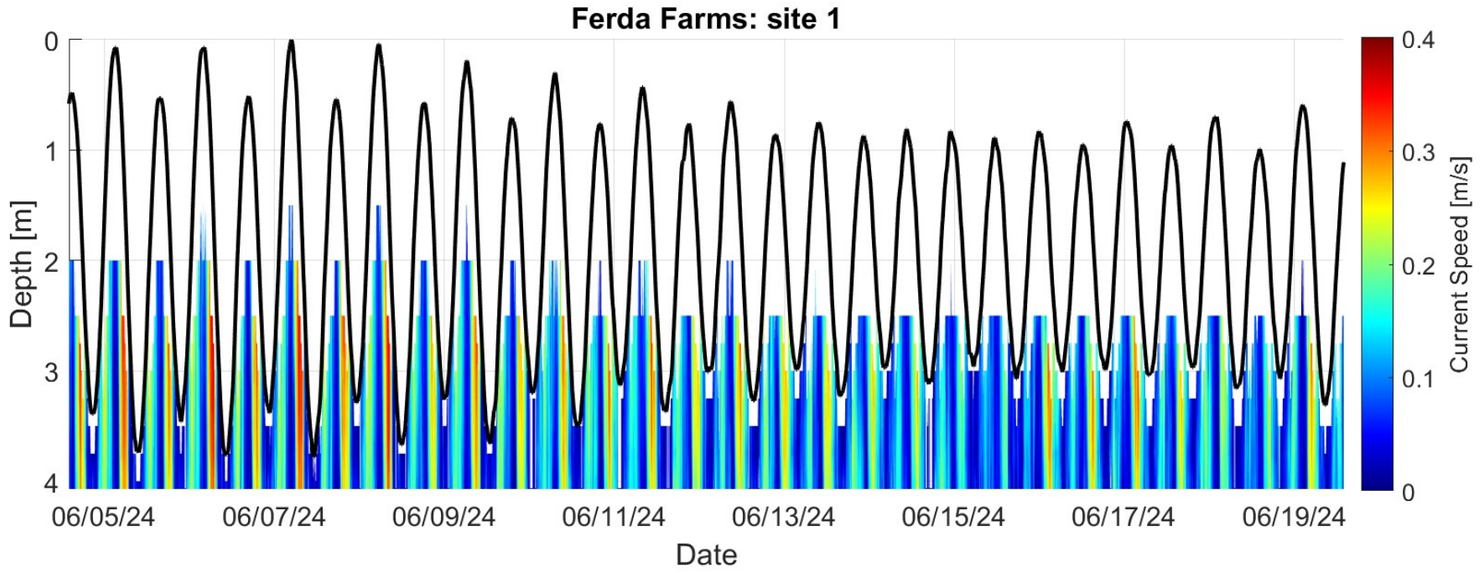
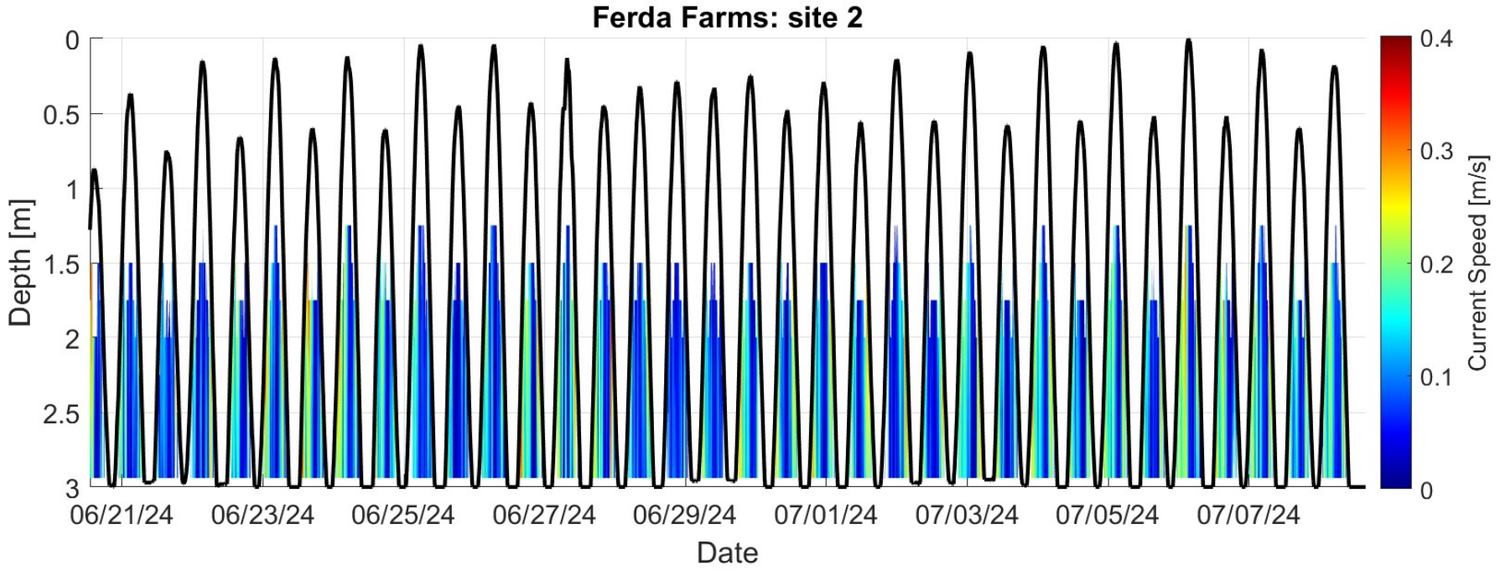
Micro-siting at Ferda Farms

Micro-siting at Ferda Farms

Max speed:
0.40 m/s



Max speed:
0.39 m/s



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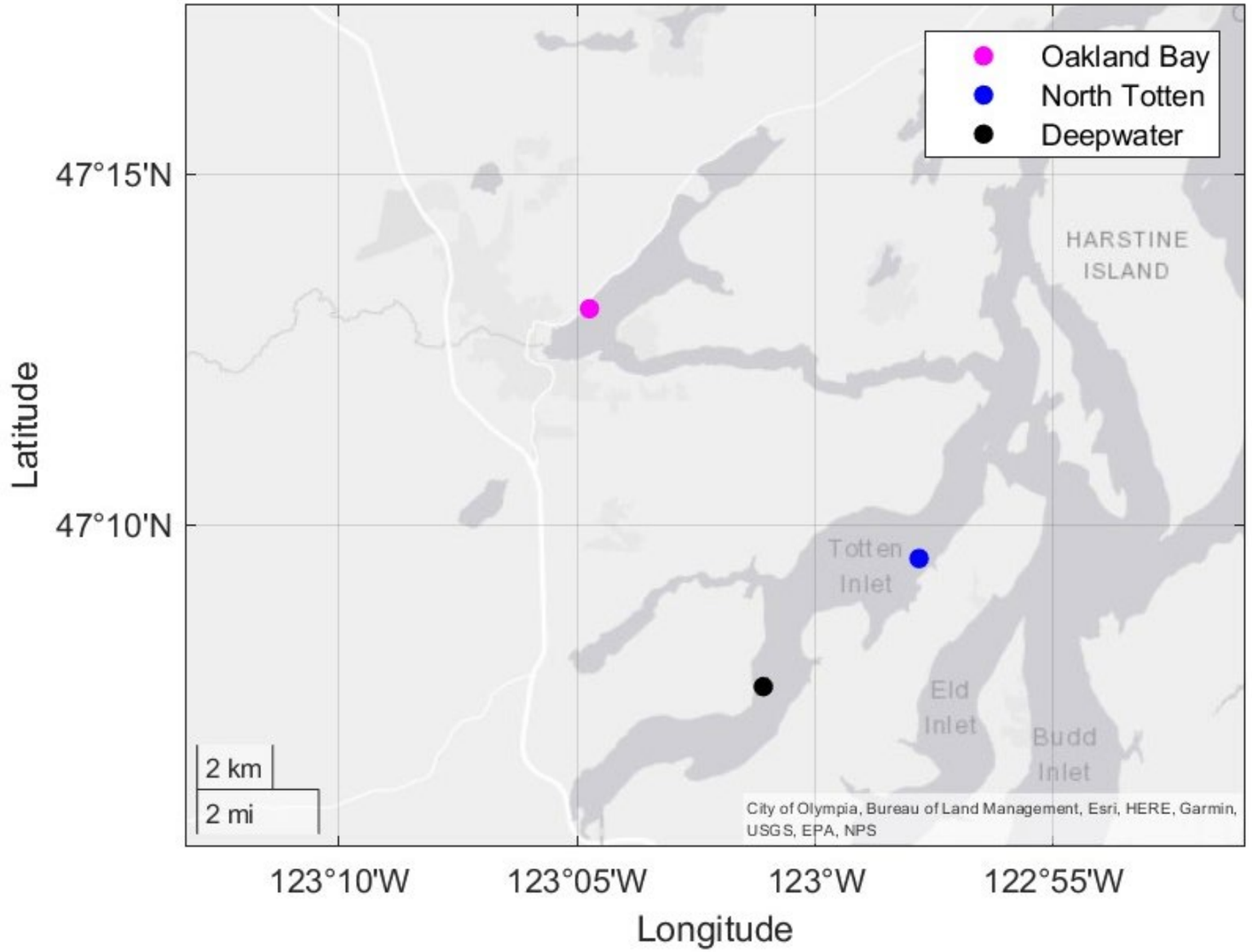
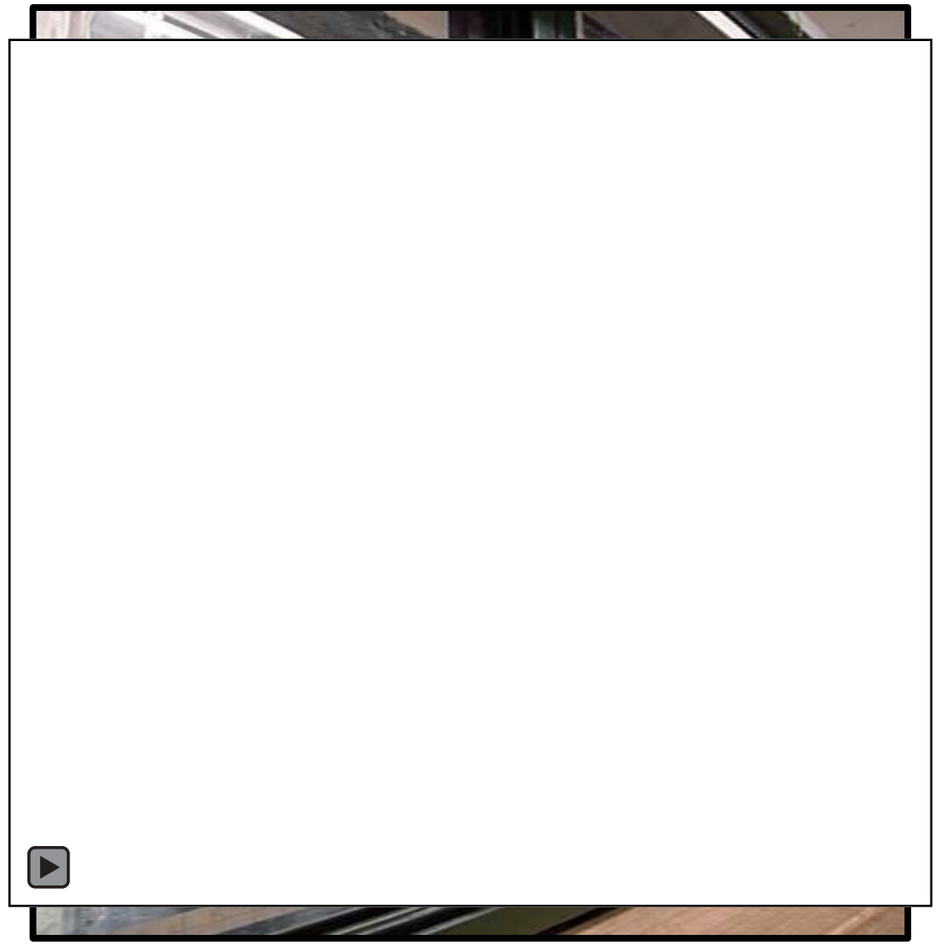
Micro-siting at Taylor Shellfish



Vortex Hydro: VIVACE



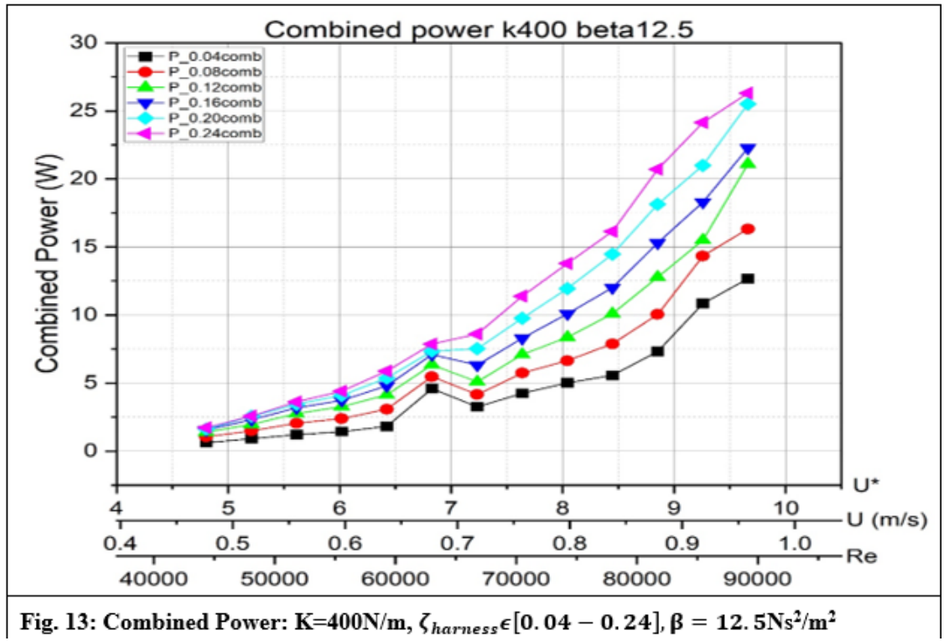


Fig. 13: Combined Power: K=400N/m, $\zeta_{harness} \epsilon [0.04 - 0.24]$, $\beta = 12.5 Ns^2/m^2$

Field Test at PNNL-Sequim

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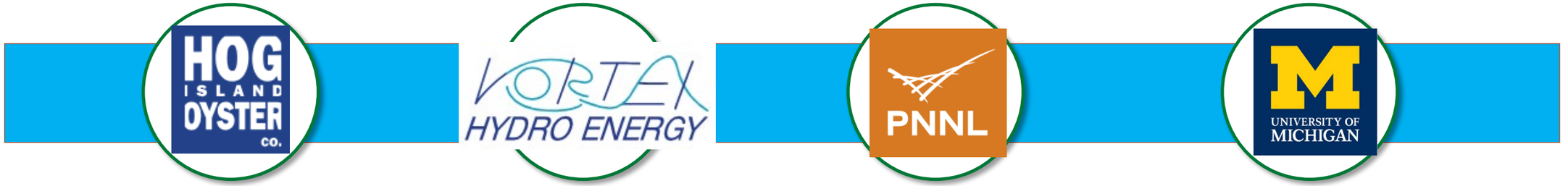
The Vision

Industry + University + National Lab

How much current? | Power production | Field Testing | Tank Testing



How much power?

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Thank you

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