



**NOAA**  
**FISHERIES**

# Adaptive Management in Marine Renewable Energy

Kim Hatfield\*  
January 27, 2016

\*Ocean Associates Inc. Contractor to NMFS, West Coast Region

# Adaptive Management in Marine Renewable Energy

- Background on NMFS regulatory role
  - Mission
  - Authorities
- Adaptive Management
  - Overview
  - Applications in Marine Energy
  - Project Examples

# National Marine Fisheries Service Mission

Stewardship of living marine resources through science-based conservation and management, and the protection and restoration of healthy ecosystems.



# NMFS Regulatory Authorities

- Endangered Species Act
- Magnuson Stevens Fishery Conservation and Management Act
- Marine Mammal Protection Act
- National Environmental Policy Act
- Fish and Wildlife Coordination Act
- Federal Power Act



# Adaptive Management in Natural Resources

## General Principles

- is useful when there is substantial **uncertainty regarding** the most appropriate strategy of **managing natural resources**
- is not a trial and error process but rather **links management objectives** with learning about the systems, and **adjusts management based on the learning**
- **incorporates testable models** that can range from simple qualitative and conceptual, to quantitative and highly detailed
- **incorporates monitoring**, which is fundamental for testing models and for **measuring progress** toward management objectives
- requires institutional leadership and stakeholder **agreement, commitment, and support** for monitoring and assessment for the project's duration

From: *Adaptive Management: The US Department of the Interior Technical Guide* (Williams et al. 2007).

# Oregon Wave Energy

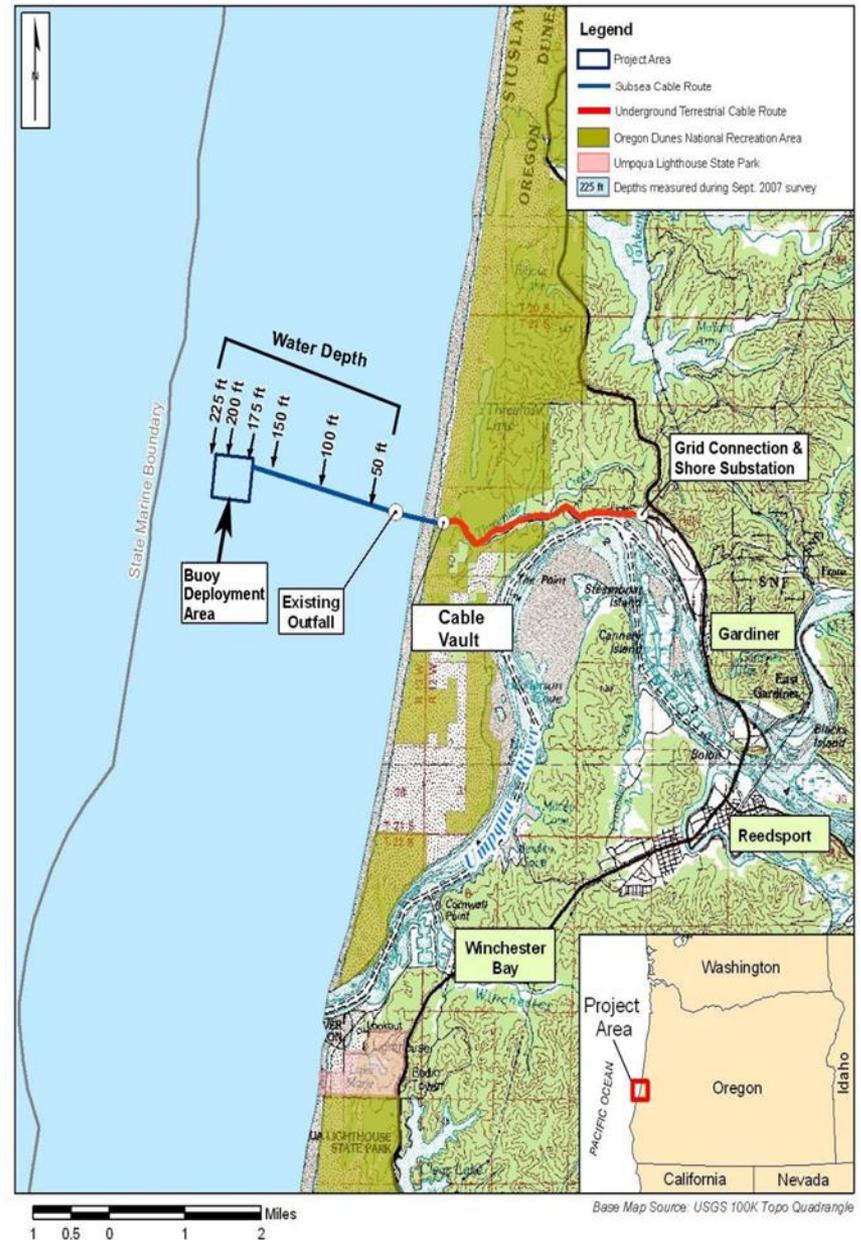
**2007:** Ocean Power

Technologies: Reedsport Wave Park

Three phases

- Single Buoy (Corps Permit - LOC)
- 10-buoy (License – BiOp)
- 100-buoy (withdrawn)

**2012:** FERC commercial license issued

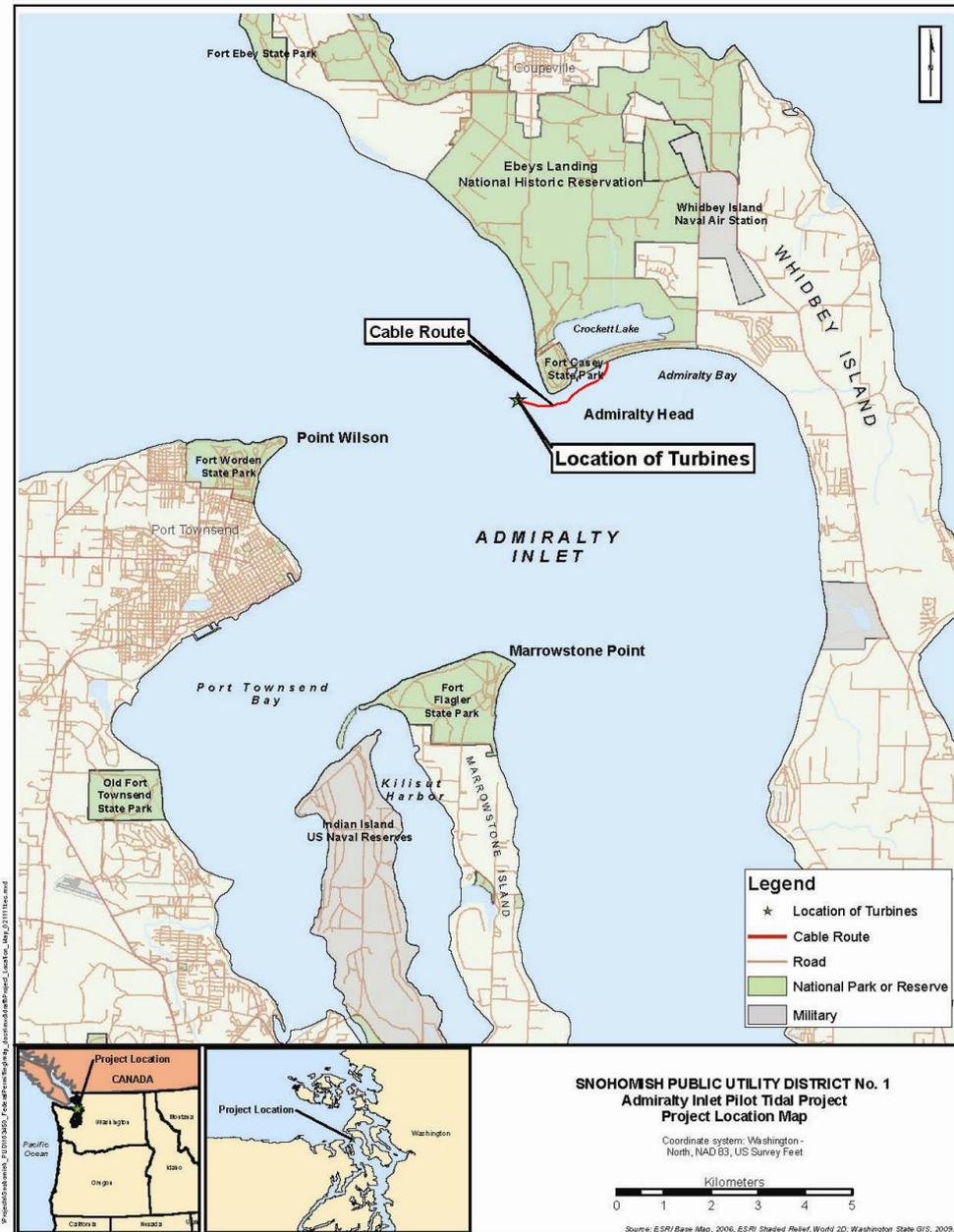
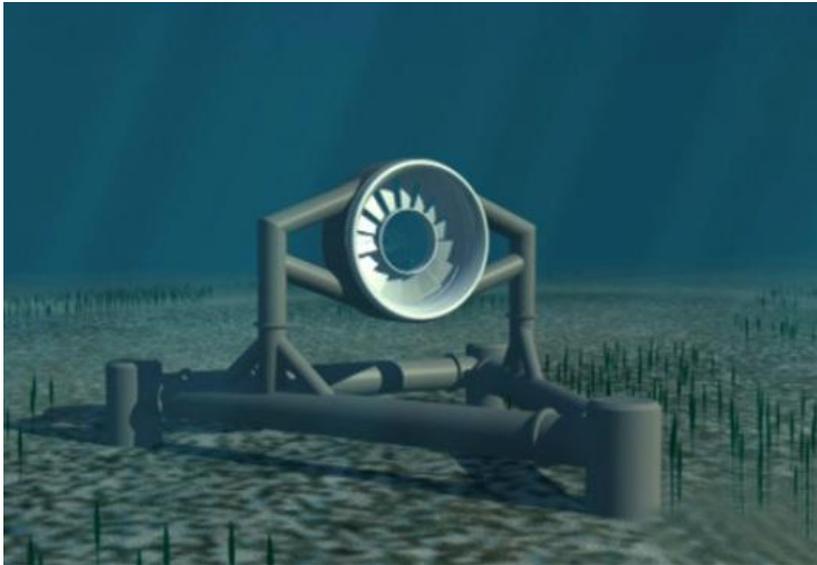


# Washington Tidal Energy

Snohomish PUD: Admiralty Inlet

2- Open Hydro Tidal Turbines

- Pilot License issued by FERC in March 2014



# Adaptive Management in Marine Energy

- Takes time to develop as plans must be project and site specific
- Provides opportunities for project deployment despite uncertainty
- Builds and improves knowledge base for future project consideration
- Requires long term commitment from all parties
- Relies on and requires strong relationships and clear communication



# Adaptive Management in Marine Energy

- How is Adaptive Management Changing?
- What is Adaptive Management doing for the industry?

# Questions?

Kim Hatfield  
Kim.Hatfield@noaa.gov  
(Ocean Associates Inc. Contractor)