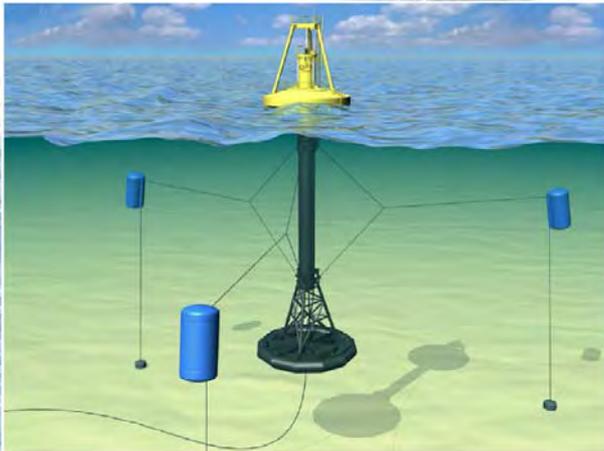


Alternative Energy Development on the West Coast: How We Approach Permitting and How We (Try to) Think About the Environment

NOAA West Coast Managers Meeting
San Francisco, January 28, 2009



Gregory McMurray

Principal Marine Scientist

Oregon Coastal Management
Program

Department of Land Conservation
and Development



Deception Pass Tidal Energy Project
Agate Passage Tidal Energy Project
Willapa Bay Tidal Power Project

Netarts Development
OSU Wave Energy Small-Scale Test Berth Site

Coos Bay OPT Wave Park Project
Coos County Offshore Wave Energy Power Proj

Humboldt WaveConnect Project
Centerville OPT Wave Energy Park
Mendocino WaveConnect Project

San Francisco Offshore Wind
Golden Gate Energy Tidal Project

Ventura Offshore Wind

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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Image © 2009 DigitalGlobe
elev 490 ft

Google

39°24'35.47" N 122°32'40.00" W

Eve alt 1276.34 mi

An aerial photograph of a tropical island. The island is small and roughly circular, with a prominent white sandy beach on the left side. The interior of the island is covered in dense green vegetation. The surrounding water is a clear, vibrant turquoise color, with gentle waves lapping at the shore. The sky is a pale, hazy blue, suggesting a bright, sunny day.

**Part I – How We Approach
Permitting (from the states'
perspective)**

Flashback:

Ocean Wave Energy Facility Regulation: Integrated Management or Permitting Nightmare?

California and the World Ocean

Long Beach, California, September 19, 2006

Greg McMurray

Oregon Coastal Management
Program

Justin Klure

Oregon Department of
Energy

Authority	Territorial Sea			EEZ
	CA	OR	WA	Federal
Energy Facility Siting	FERC Preemption	FERC Preemption	FERC Preemption	FERC/MMS (9-mile overlap)
Seabed Ownership (Leasing)	State Lands Commission	State Lands	Natural Resources	Minerals Management Service
Clean Water Act (Section 401)	Water Resources Control Board	Environmental Quality	Ecology	Environmental Protection Agency
Coastal Zone Mgmt. (Consistency)	California Coastal Comm	Land Conservation Development	Ecology	Not applicable
Environmental Process	CEPA (Lead Agency)	Land Conservation Development Goal 19 TSP	SEPA (Ecology)	NMFA (Lead Agencies)
Fish/Fisheries	Fish & Game /PMFC	Fish & Wildlife /PMFC	Fish & Wildlife /PMFC	NMFS/PMFC
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vessel Safety	Coast Guard	Coast Guard	Coast Guard	Coast Guard
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Key Table Points

- **Key mandatory Territorial Sea authorities for states are:**
 - Seabed ownership and leasing
 - Clean Water Act Section 401 Certification
 - Coastal Zone Management Act Consistency
- **Territorial Sea is really co-managed**
- **The patchwork of other authorities needs to be effectively and efficiently included in any process (a challenge)**
- **Question: Can the WCGA help with a regional approach?**

Oregon's Approach

- Expedite application development through Governor-initiated *Oregon Solutions* stakeholder process
- Use Ocean Policy Advisory Council to develop long-term state approach
- Modify existing hydroelectric model to coordinate state input
- Use Effects Evaluation in the state's Territorial Sea Plan in lieu of SEPA

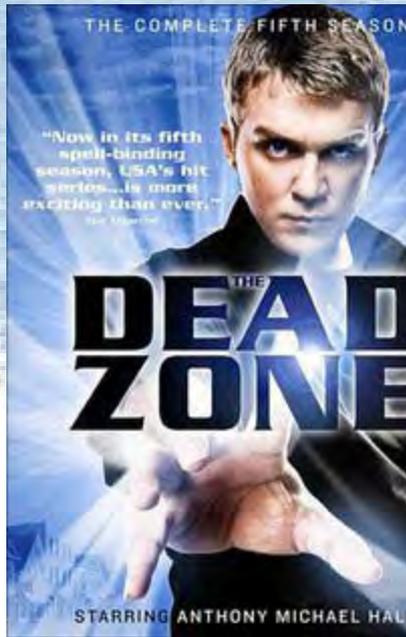
Key Mandatory Federal Environmental Authorities

- **National Environmental Policy Act**
- **Consultations**
 - **Endangered Species Act**
 - **Marine Mammal Protection Act**
 - **F&W Coordination Act**
 - **Magnuson-Stevens Fishery Conservation and Management Act (EFH and HAPCs)**
 - **(The BA/BiOp outweighs the EIS)**

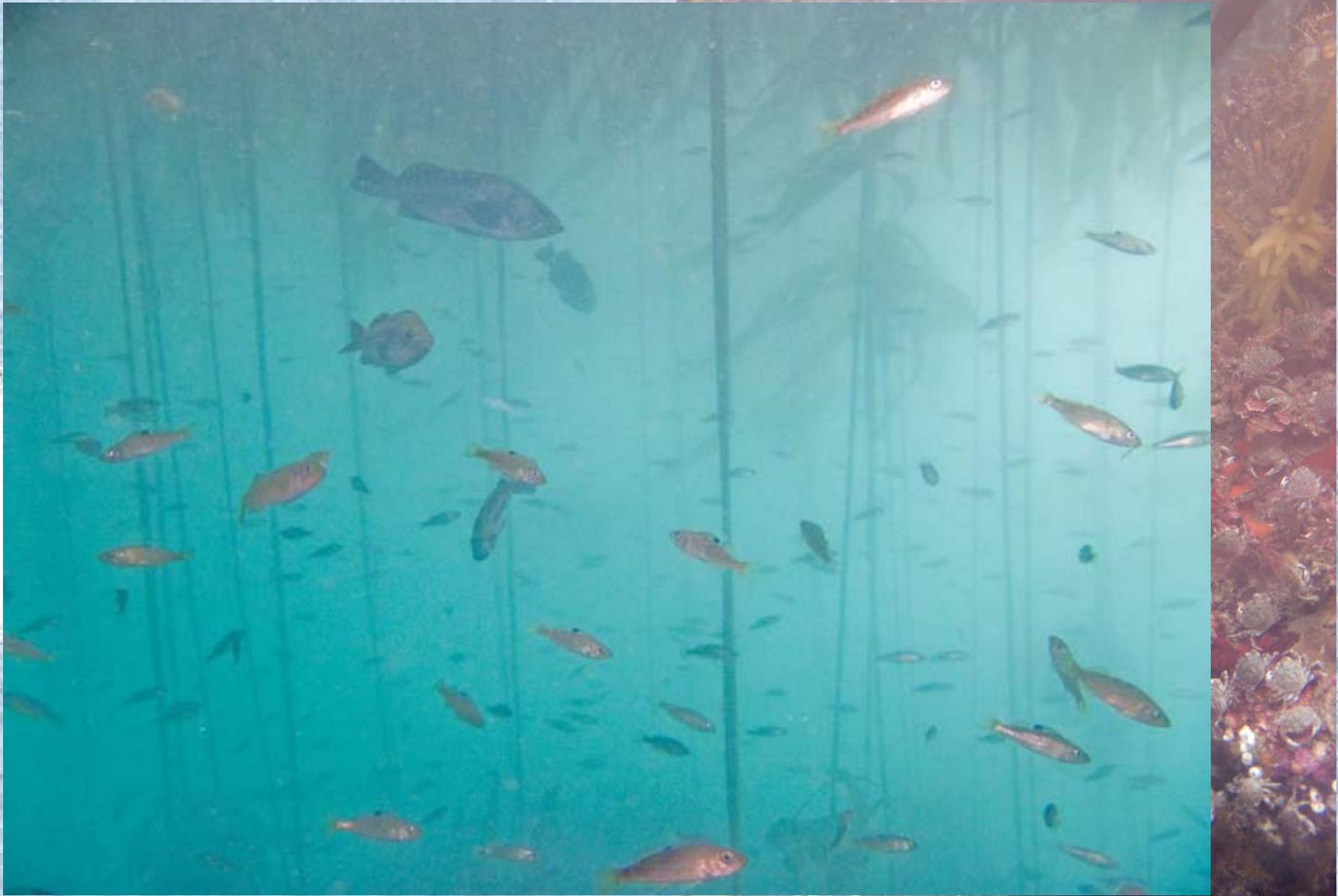
An aerial photograph of a large, conical island in the middle of a blue ocean. The island is covered in dense green vegetation. A thick, white plume of smoke or steam rises from the top of the island, spreading out over the water. The text "Part II – How We Think About Environmental Effects" is overlaid in the center of the image.

**Part II – How We Think
About Environmental Effects**

A Sea of Change.....2004



A Sea of Change.....2008



Basis for Prospective Assessments

- MMS released *Worldwide Synthesis* and a programmatic EIS in 2007
- Best information presently available on wave energy is the Scottish Executive's 2007 *Strategic Environmental Analysis*
- NOAA has published a wave energy ecological effects workshop proceedings targeted to the Pacific Northwest
- New assessment from the California Energy Commission recently released
- New assessment for Congress
- Baseline and monitoring studies for the Reedsport Wave Energy Project Settlement will soon to be submitted to FERC

Major Issues – by Stressor

- **Wave and current modification**
- **New hard structures – water column and benthic**
- **Chemical toxicity**
- **Acoustics**
- **Electromagnetic fields**

Also cumulative effects

And use/user conflicts

Array Effects

- Depending on signatures and additive or multiplicative effects, arrays may create an ecological barrier
- Depending on process, could also result in a “volume swept clear” (i.e., like a net)
- Array will also have a set of characteristic permeabilities
- Key receptors for array effects:
 - Animals with crossing migration patterns
 - Predators or prey utilizing new structure
 - Animals with susceptible life histories

Adaptive Management: Key Characteristics

- **We are information-limited**
- **Cannot meet mandates to assess impacts without more information**
- **Studies are designed to obtain baseline; monitoring for effects**
- **Management decisions are left to future adaptive management teams**
- **Agencies always retain authorities**



Examples of Mitigation

- **For collisions:**
 - Color
 - Spacing
 - Acoustic avoidance devices
 - No surface or subsurface traps
- **For electromagnetic fields:**
 - Cable trenching and shielding
 - Alternating current above $\sim 7\text{-}8$ Hz
 - Faraday cage

Faraday Cage 1



Faraday Cage 2



**OREGON
CRAB BAIT**

Oh Shuck!
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CHARLESTON Oyster Food

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Oyster Food at Marina Plaza
111 N. 1st Street, Astoria
Astoria Oyster Festival Association

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Over 10,000 Big Game Bucks, Mountain Goat and Porcupine Hunts



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- 1 Porcupine Hunt
- 100 Big Game Bucks
- 1000 Big Game Bucks
- 10000 Big Game Bucks

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Fax: 325-1111
www.marina-plaza.com

**PLEASE
NO WAVE ENERGY
NO MARINE RESERVES**



Faraday Cage 3

Cumulative Effects

- Effects across all receptors – systems view
- Effects of multiple deployments (arrays)
- Effects of size of individual arrays
- Effects of multiple arrays
- Effects of wave energy plus other existing and new uses
- Measuring effects in a changing ocean
- Initial study funded by Oregon Wave Energy Trust will take place during 2009
- Greg's two key questions:
 - How big an array is too big?
 - How many such arrays is too many in a region?
- **Question: Is there a helpful regional approach?**

System Survivability: Update on Finavera Test Buoy

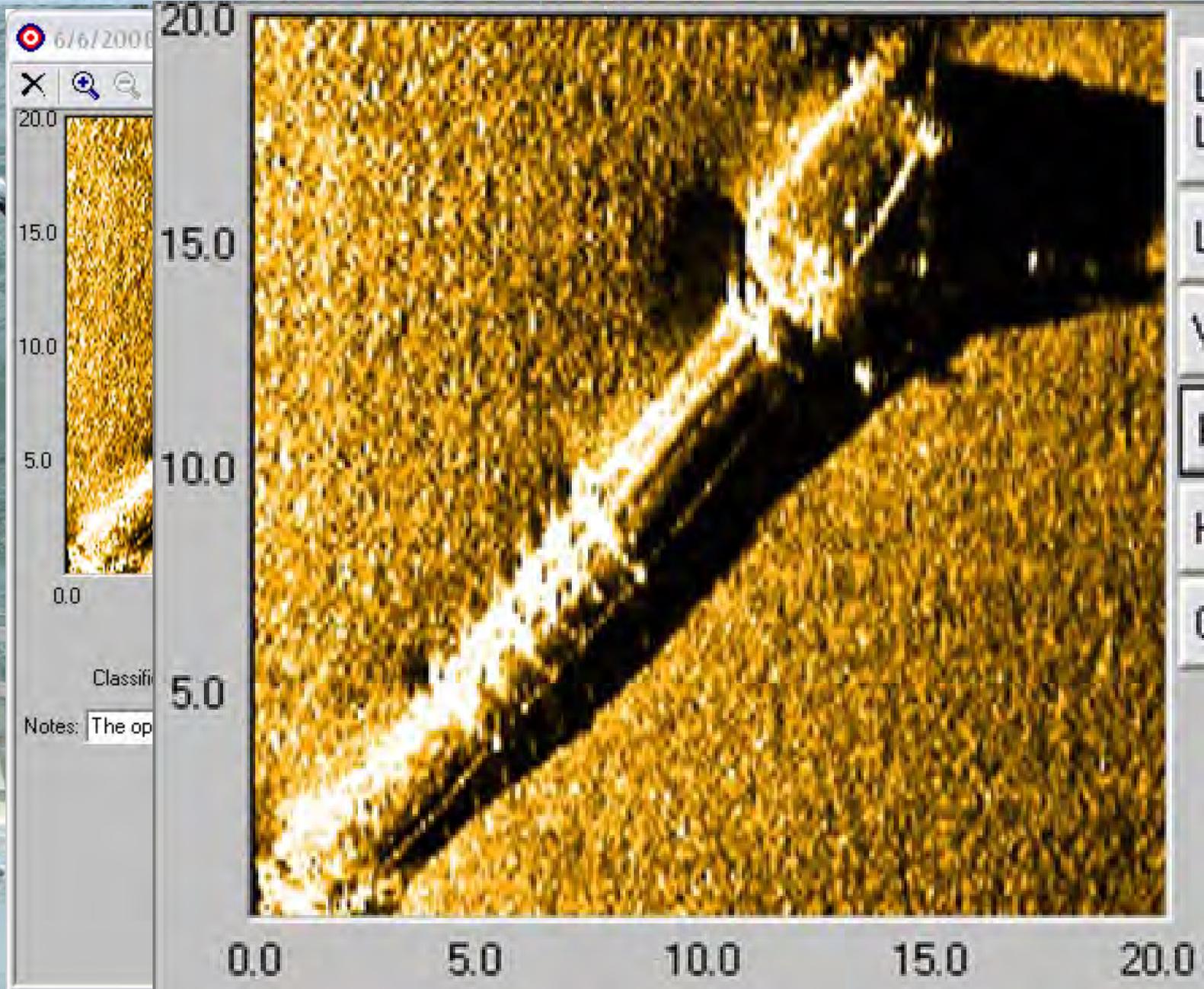


Blub, blub, blub!

**(buoy sinks during
November 2007
recovery attempt)**



Fast Forward to June 2008







Thanks. Questions?

gregory.mcmurray@state.or.us