A full-page background image of a surfer riding a large, curling blue wave. The surfer is positioned on the left side of the frame, wearing a dark wetsuit and a helmet, riding a surfboard. The wave is a deep blue color with white foam at the crest. The text is overlaid on the right side of the image.

Recreation impacts of wave energy projects

Who's concerned about what?

**Daniel Shelby, Bo Shelby, and Doug Whittaker
Confluence Research and Consulting**

Hydrokinetic energy projects

Generate electricity from waves or currents

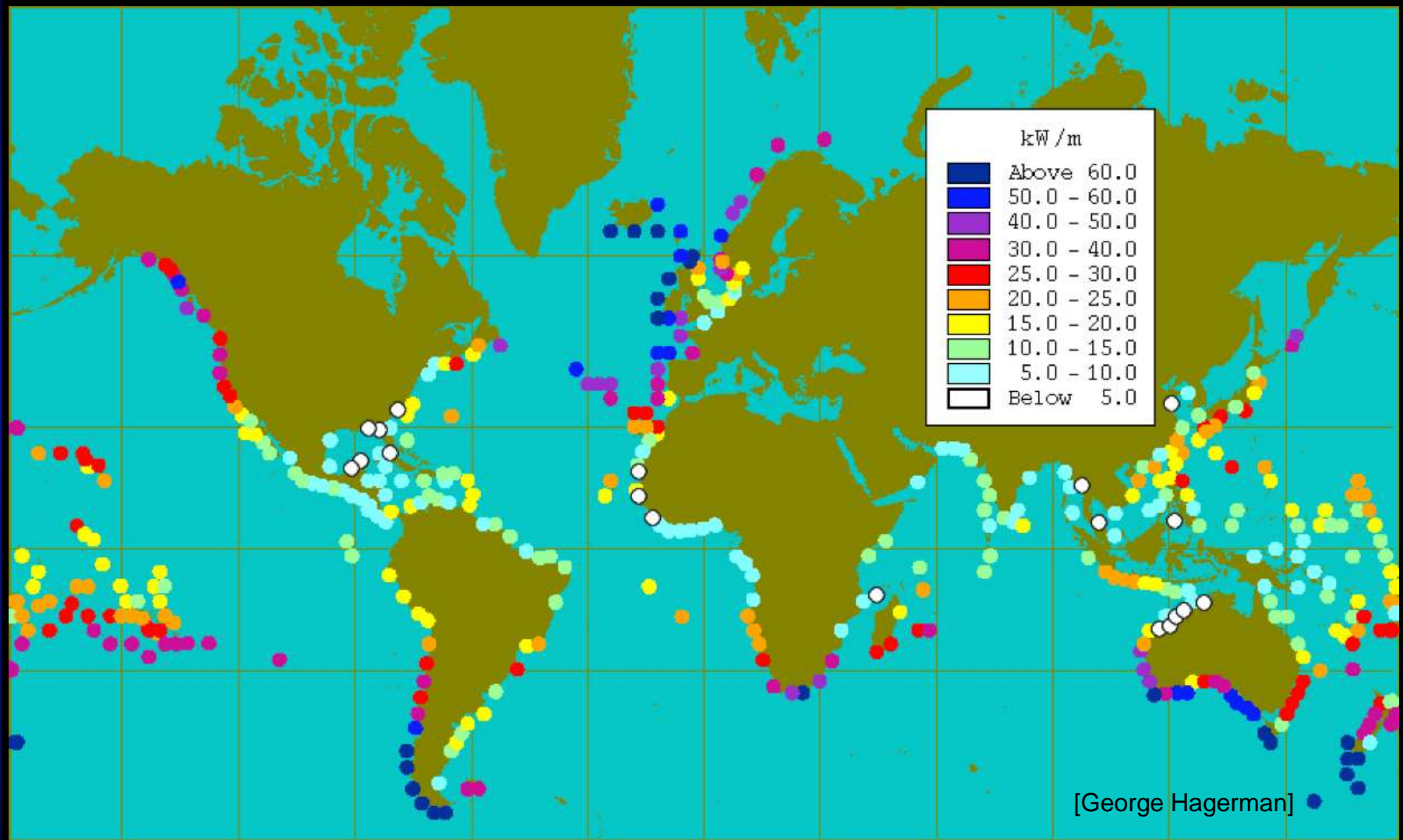
- Ocean waves
- Ocean currents
- Tidal currents
- Rivers

New technologies

- Great promise
- But unknown impacts



Power from ocean waves

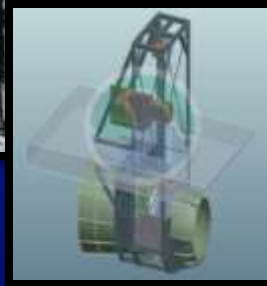


Example current energy projects

Shrouded turbines
Hastings, Upper Mississippi, MN



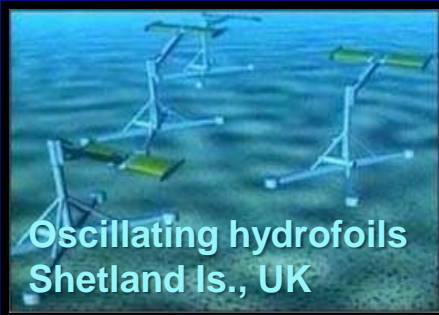
<http://www.hgenenergy.com/hastingsphotos.html>



Shrouded turbines
Admiralty Island, WA



Oscillating hydrofoils
Shetland Is., UK



Open turbines
Attached to pilings



Open turbines
Roosevelt Island, NY



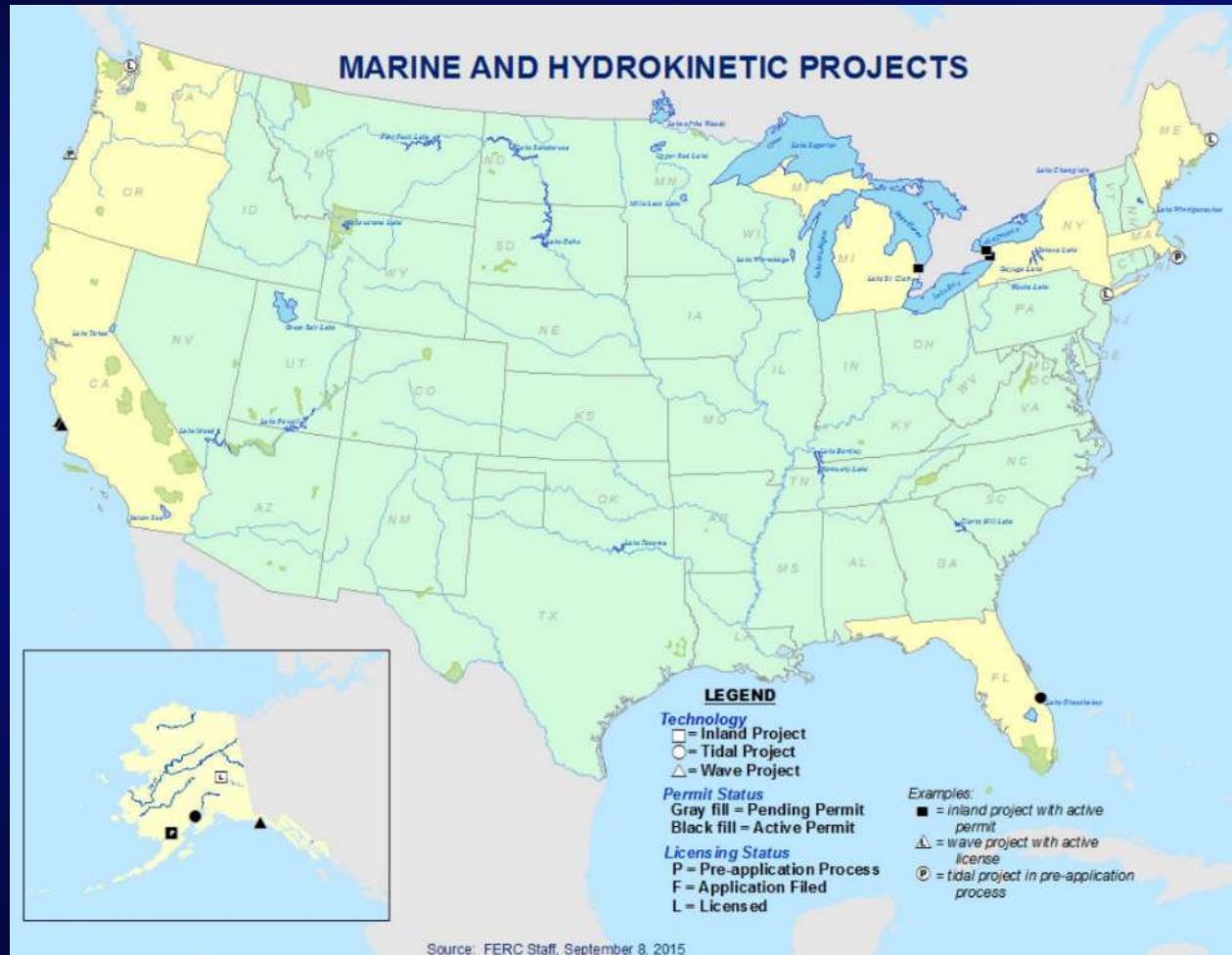
Example wave energy projects



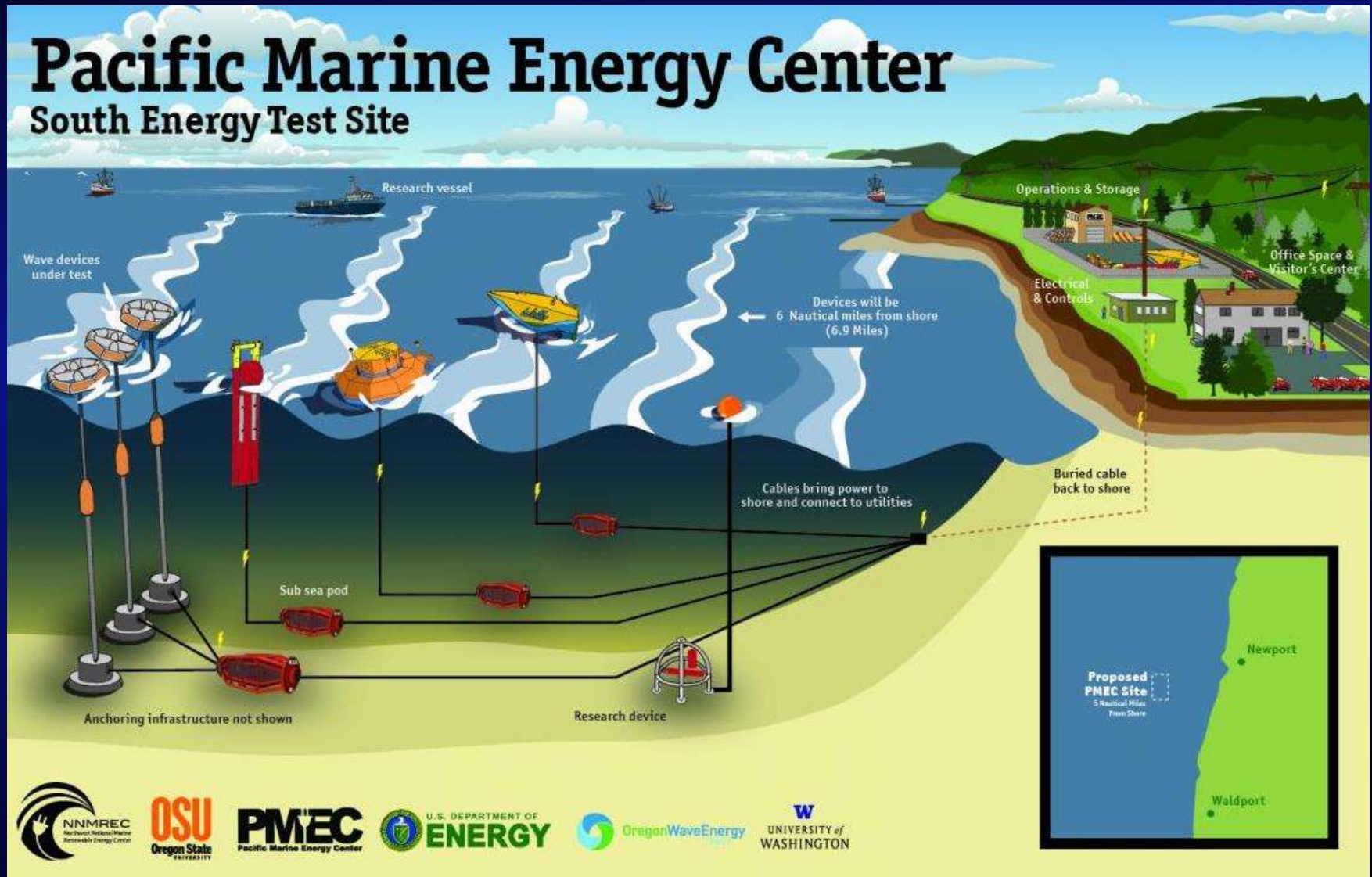
Getting power to the grid



Number and types of projects




Cooperative Development



Potentially affected marine recreation



A full-page background image showing a surfer in a dark wetsuit riding a massive, curling blue wave. The wave is breaking over the surfer, creating a large tunnel of water. The surfer is positioned on the left side of the frame, facing the wave. The water is a deep blue color, and the wave's crest is white with foam. The overall scene is dynamic and powerful.

Potential recreation impacts

Access restrictions and safety

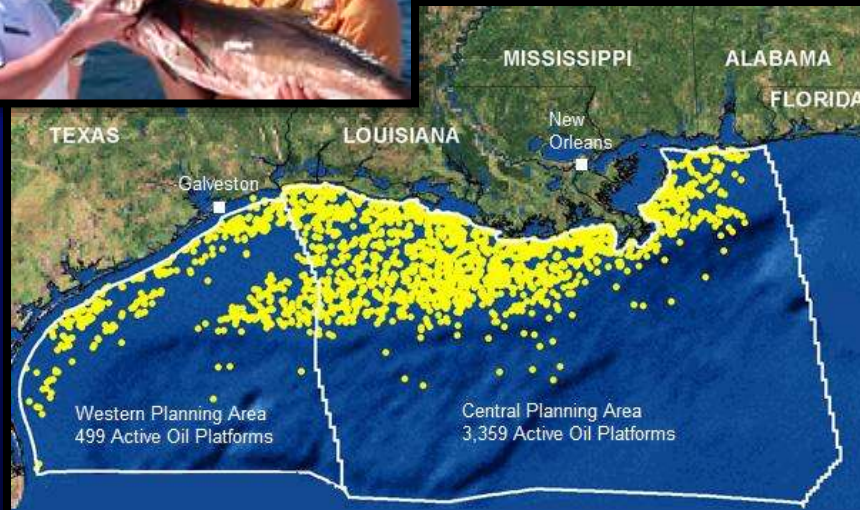


Impact depends on

- Type & size of restriction (exclusion vs. restriction)
- Importance of recreation
- Available substitutes

Access restrictions

Boating impacts



Access restrictions Land-based development

**JETTY CLOSED
NO TRESPASSING**



**NO BEACH
DRIVING
BEYOND THIS
POINT**

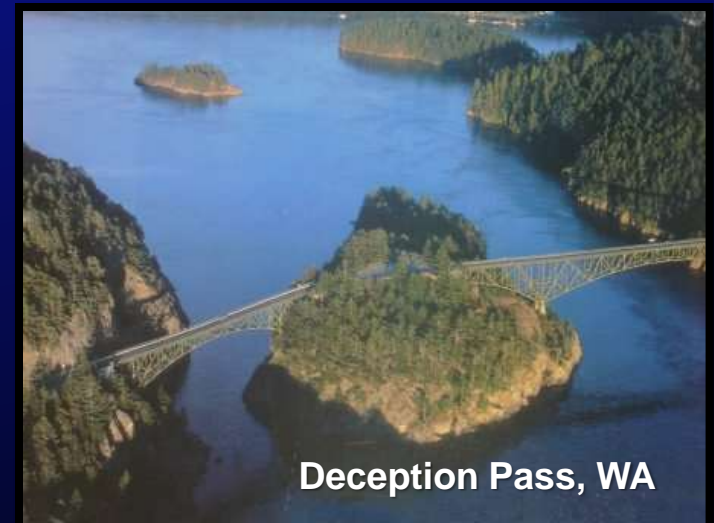
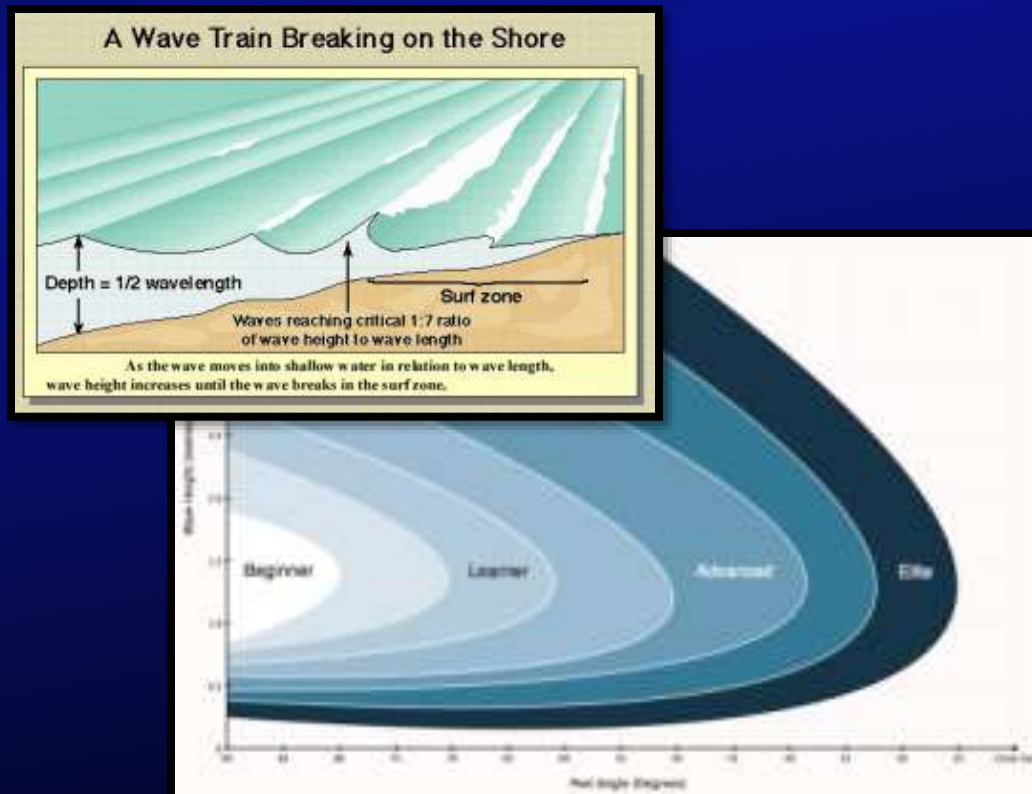


Wave and hydraulic characteristics



Wave & hydraulic characteristics

Evolving science

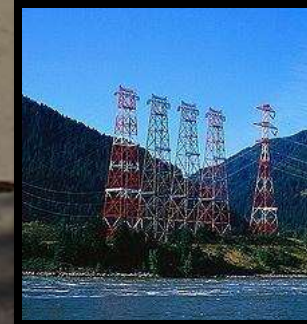


Aesthetics and noise



Impact depends on

- Size and shape of development
- Including construction and maintenance



Aesthetics and noise

Setting and activity matter

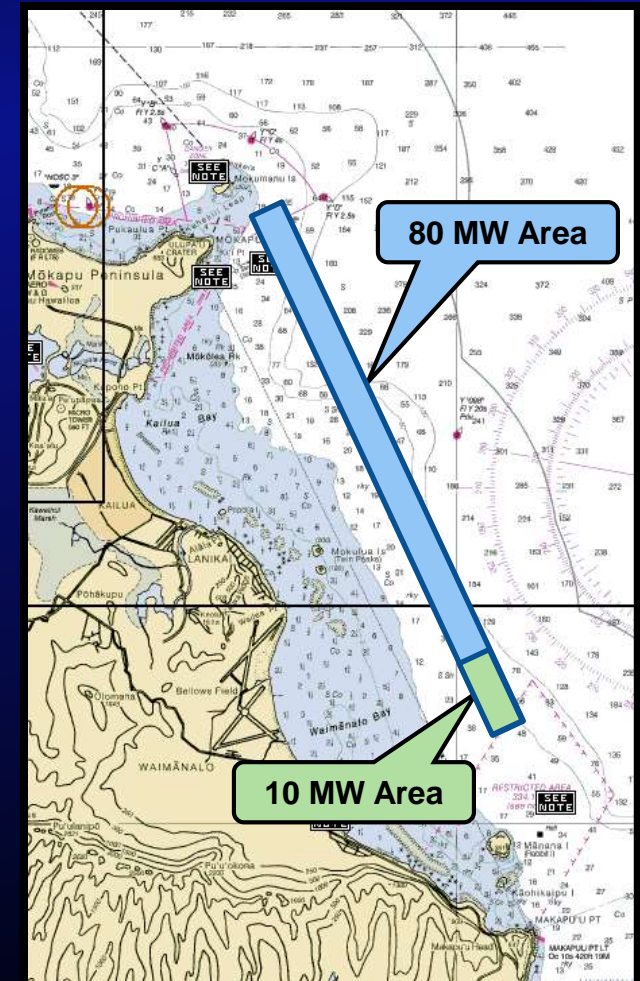
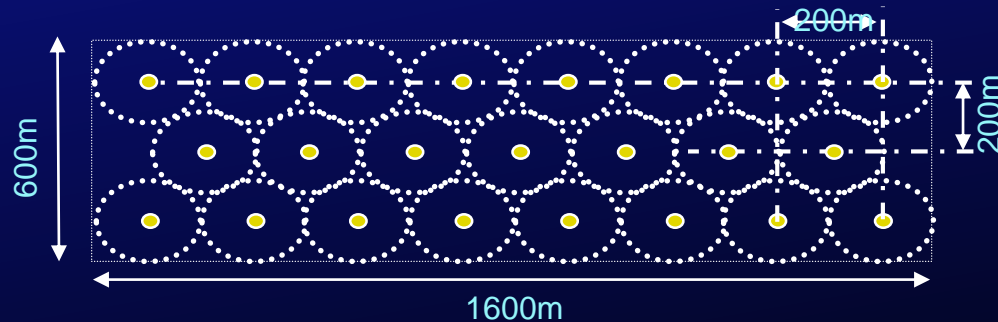


Cumulative impacts

Scale is a major issue

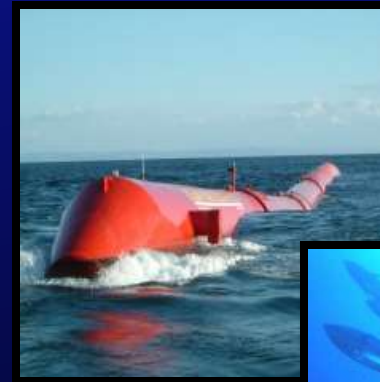
Arrays & multiple projects likely

Challenges of project-by-project review



Fish / wildlife impacts

- Biologists study fishery / wildlife
- Potential recreation implications
- Positive or negative possible...






Potential study methods

- User surveys
 - Use / user observations
 - Photo-based evaluations
- Computer & physical modeling
 - Pilot projects with modeling

Other methods: Evaluations from public, recreation users



A full-page background image of a surfer riding a massive, curling blue wave. The surfer is positioned on the left side of the frame, wearing a dark wetsuit and a helmet, riding a surfboard. The wave is a deep, vibrant blue with white foam at the crest and base. The text "What does the public think?" is overlaid in white on the right side of the image.

**What does
the public
think?**

Media sources



Statewide paper (The Oregonian)

63 articles

773 comments

The News Register Guard (Lincoln City)

14 articles

The Umpqua Post (Reedsport)

15 articles

Content analysis

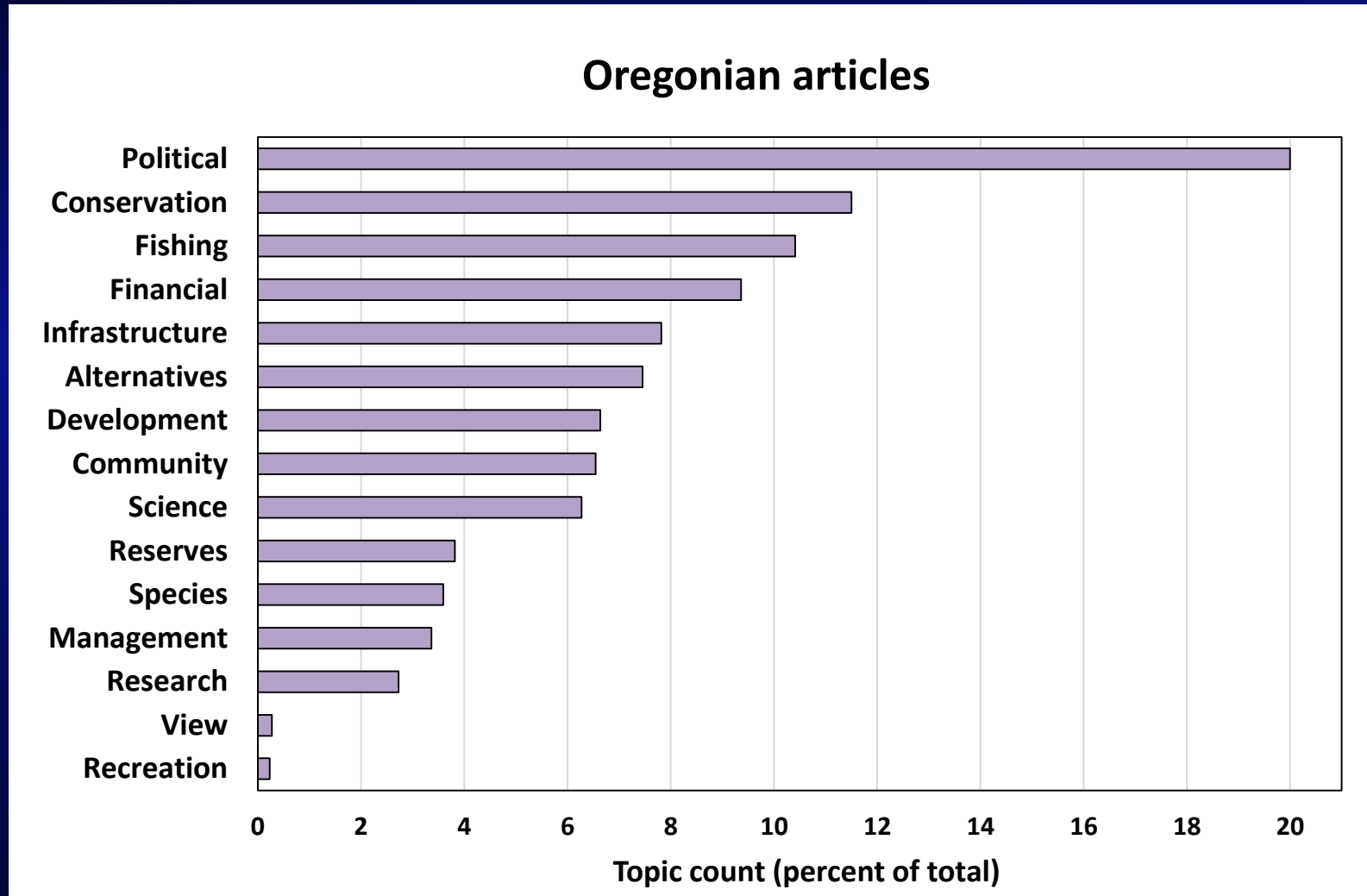


Counted topics in articles / public comments

Relative amount of discussion on each topic

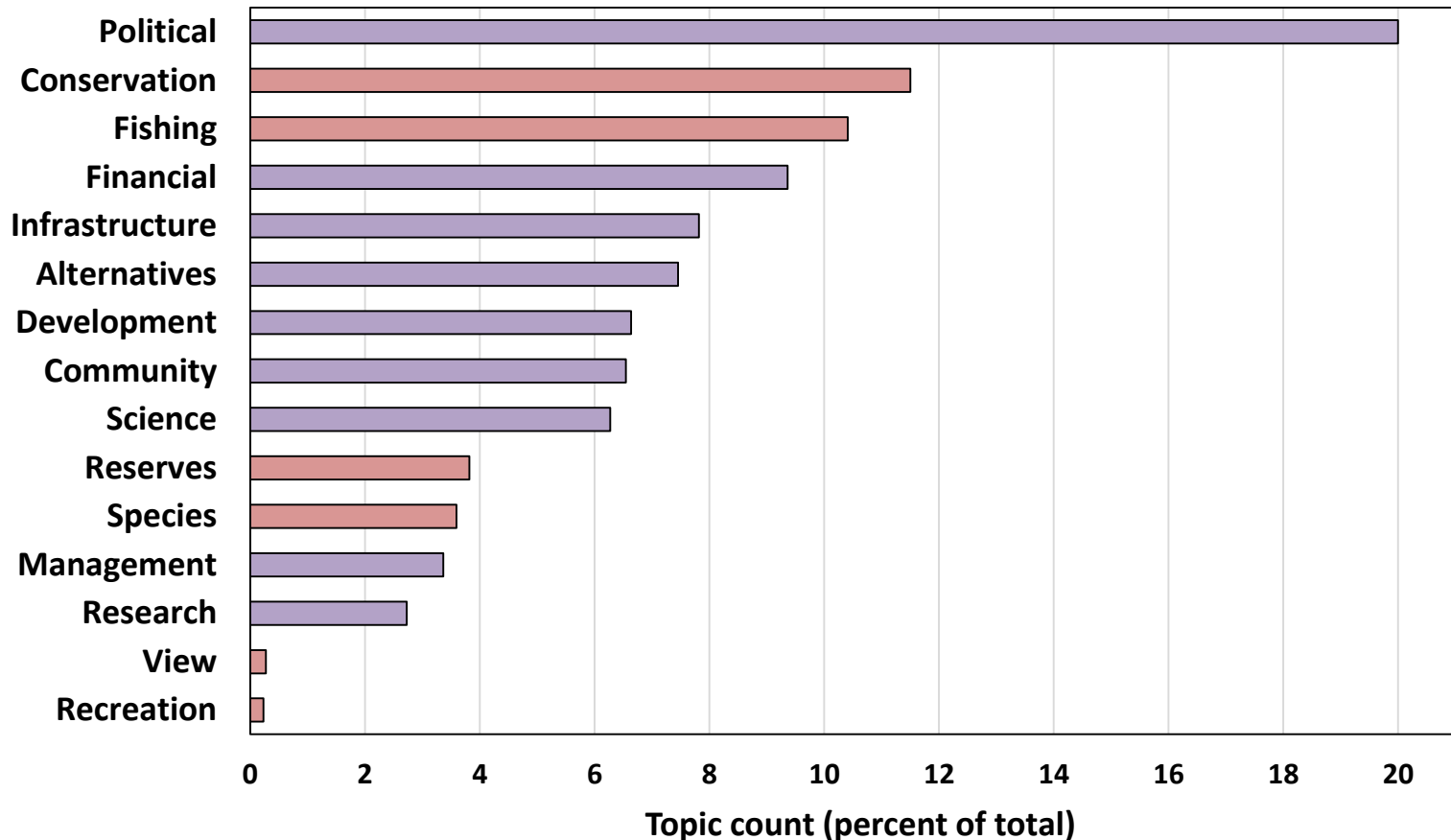
No evaluation of facts or quality of content

Most-discussed topics



Resource-impact topics

Oregonian articles



Politics

Most-discussed topic

“Government continues to stand in the way of progress! Wow, what a surprise.”



Technology

How they work
and will they work?

“What happens when one sinks -- which is bound to happen, they insist -- given the rage of winter storms?”



Conservation

NIMBY – Not in my bay
General concern
Marine Protected Area

“Buoys stuck out in the open seas for electrical energy sounds sick to me. I really do not see the difference between this and plastic garbage bags and nylon nets floating in the ocean.”

Fishing

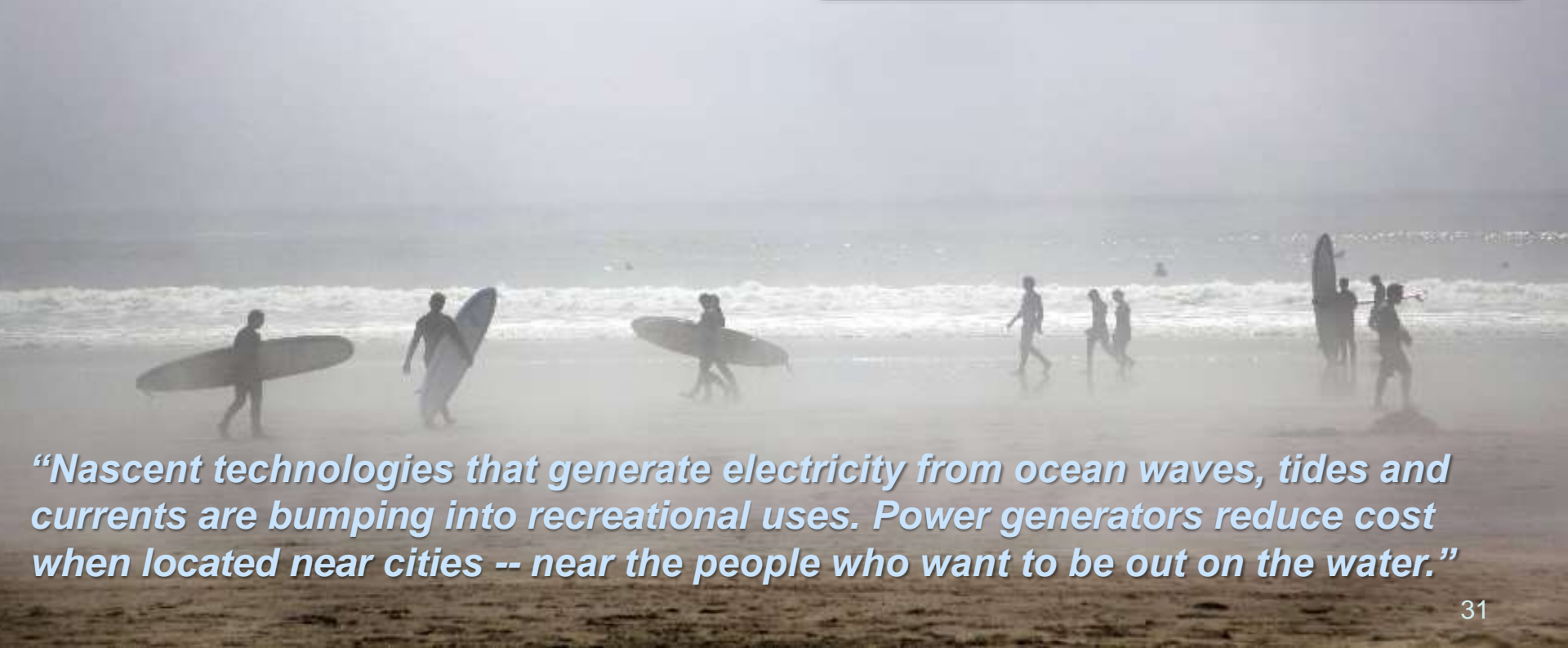
Highest specific impact concern



"Critics, including some crabbers and fishermen, worry that the project, with 12 miles of mooring line, could interfere with fishing and potentially harm ocean life."

Aesthetics and recreation

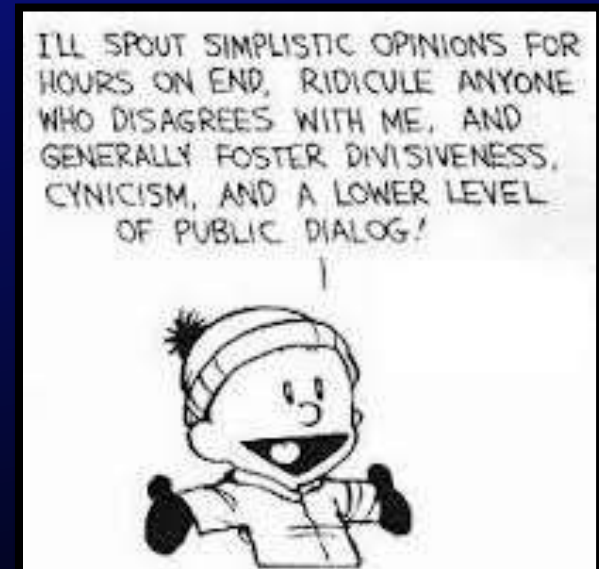
Rarely discussed – broad concerns



“Nascent technologies that generate electricity from ocean waves, tides and currents are bumping into recreational uses. Power generators reduce cost when located near cities -- near the people who want to be out on the water.”

Internet comments vs. articles

Newspaper invites on-line comments

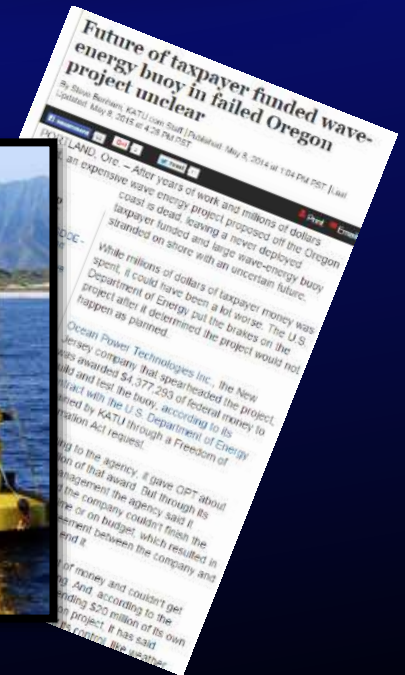


“Green widget scam”

Concern about fraud / tax payer investment
Connected to wind power concerns
Links to climate change and oil/gas issues?



**WIND
POWER
FRAUD**
WHY WIND WON'T WORK
CHARLES S. OPALEK, PE



Fishing vs. environment



Fishing and commerce topics
more than general conservation

Aesthetics and recreation



Local vs. statewide

Politics – still most-discussed

Community / process discussed more

Fishing dropped slightly; aesthetics and recreation still low



Conclusions

Early stages of public interest – focused on basics

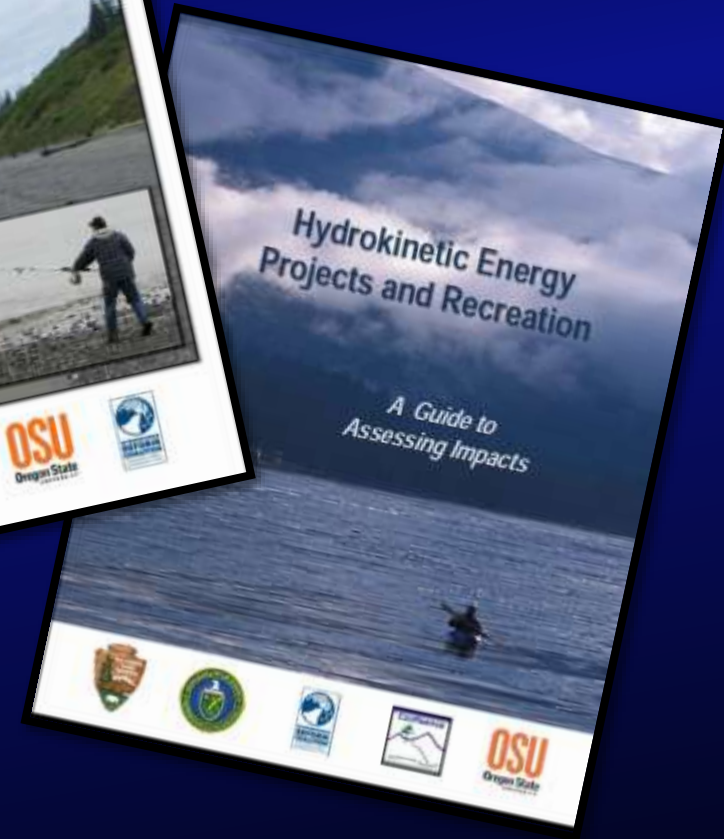
Many impacts are broadly described

Public critiques are broad and likely uninformed

Considerable room for media improvement

Research can help categorize and direct public conversation

Questions or comments?



Guide to assessing recreation impacts:

<http://www.hydroreform.org/hydroguide/hydrokinetic-recreation>

East Forelands recreation impacts report:

http://www.hydroreform.org/sites/default/files/East_Forelands_Tidal_Energy_Project-Recreation_Impacts_Assessment_Final.pdf