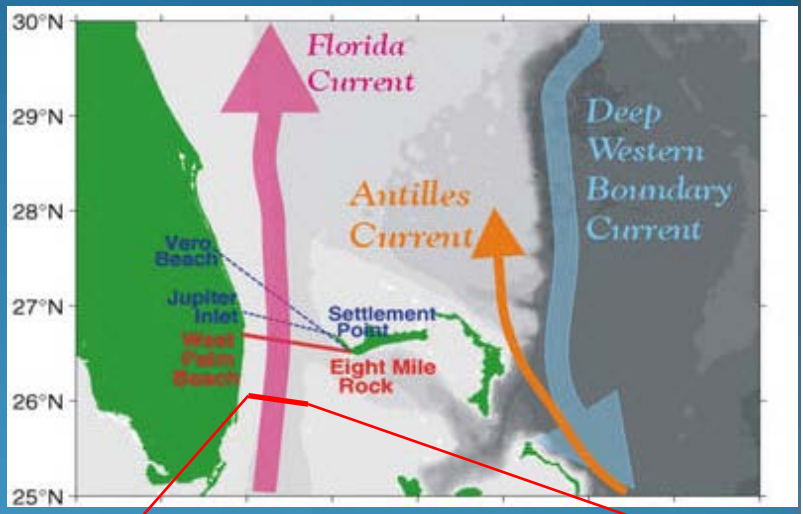
Environmental Challenges
of MHK Energy Generation
from the Florida Current

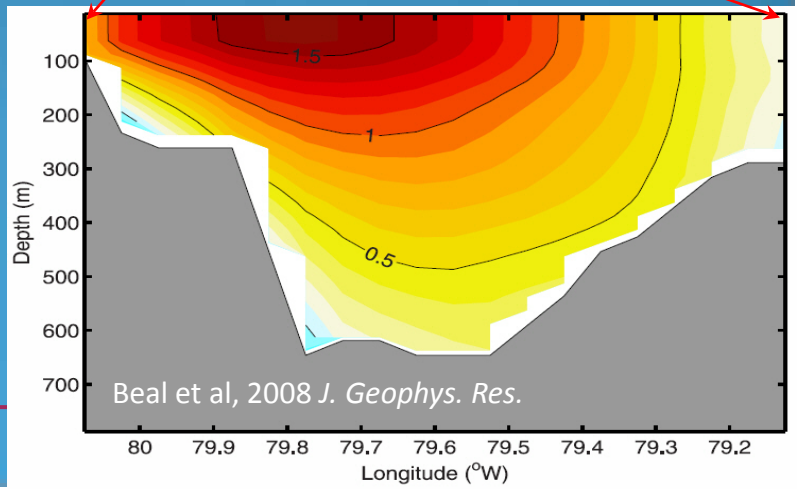
Some are unique; some are generic;
All require the perspective of stewardship

Howard Hanson
Scientific Director
hphanson@fau.edu

Florida's MHK Resource

The Florida Current offers power densities of nearly tropical-storm strength winds within ~15 miles of the seventh largest metropolitan area in the U.S.





Beal et al, 2008 *J. Geophys. Res.*

The Challenge

Two fundamental questions arise

- ***Will commercial scale implementation affect the dynamics of the current in a significant way?***
- ***How can implementation embrace environmental stewardship?***

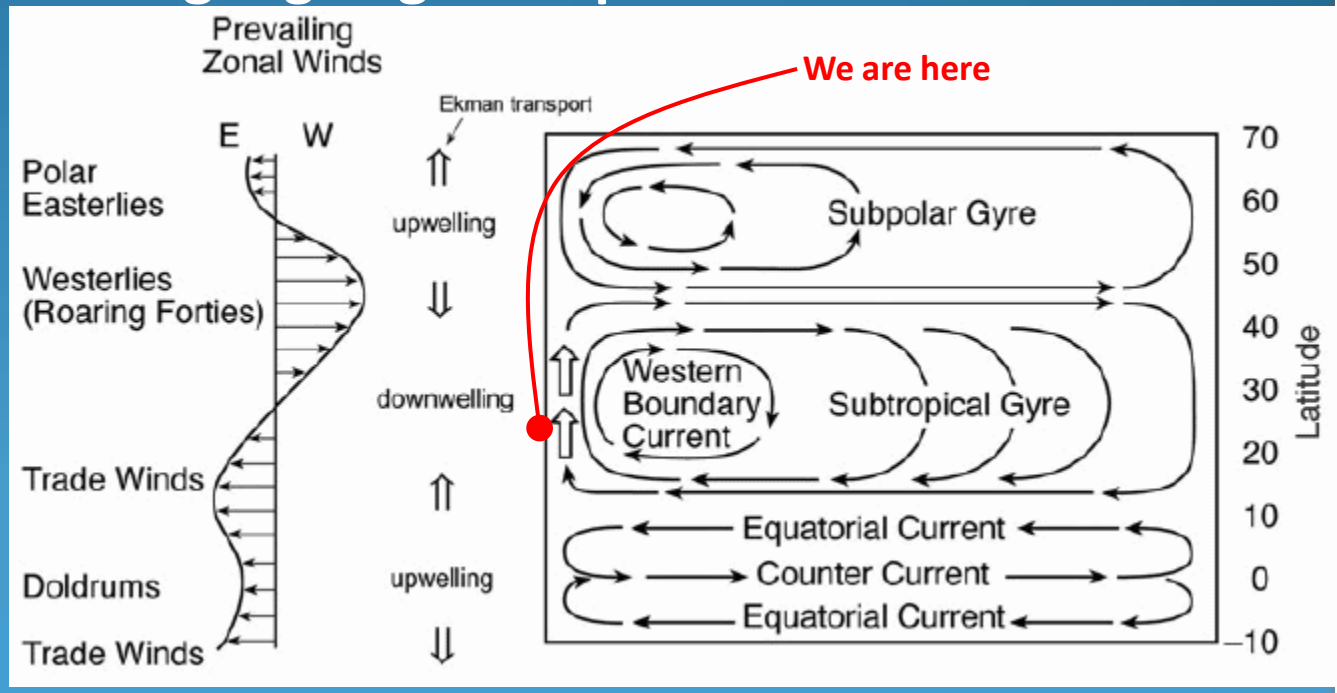
In addressing both the physical and the biological environment, these questions apply to other MHK deployments as well.

Dam Up the Stream?

Not likely.

The Gulf Stream is the northward return flow associated with the (southward) Sverdrup Drift of the Atlantic Ocean's wind-driven circulation. Nothing is going to stop it.

But the local currents *will* very likely be changed.



Wakes

Turbines are different from propellers, but they still produce wakes.

In the ocean, it's likely that the turbulence will less dramatic (it is a lower Reynolds Number flow), and the depth of the water column will protect the bottom from disturbance.

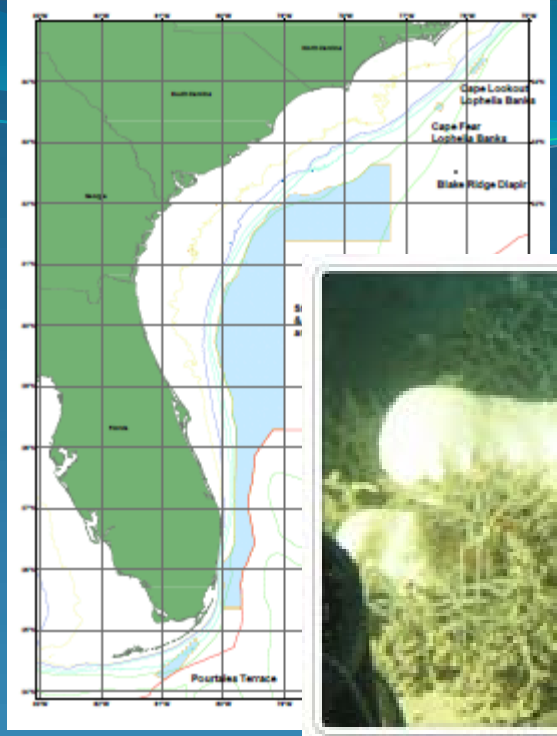
Still, the effect of the wakes on the pelagic ecosystem need to be understood.

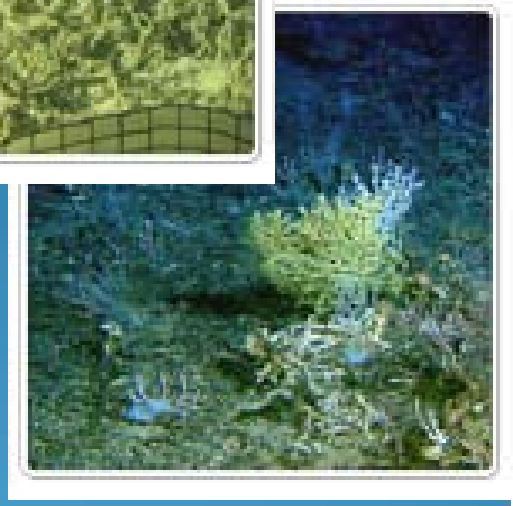
Ecosystem Issues

- Alteration of bottom substrates by moorings; sediment transport and deposition; changes in benthic habitats;
- Noise & electromagnetic fields;
- Chemical toxicity;
- Strikes and entanglement;
- Inadvertent FADs issues;
- Interference with animal movements and migrations

Two examples in Florida...

Lophelia





The existence of these cold/deep-water corals will provide challenges for ocean-bottom activities. The patchy nature of their distribution throughout the region of interest will require great care with emplacements of anchors and underwater cables.

Chelonioidea

All species are endangered.

Like tourists, they *love* our beaches (but for different reasons).

Little is known about their at-sea behavior, and how they might react to energy-system deployments is a complete mystery.

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