

Harnessing Aquamarine Energy

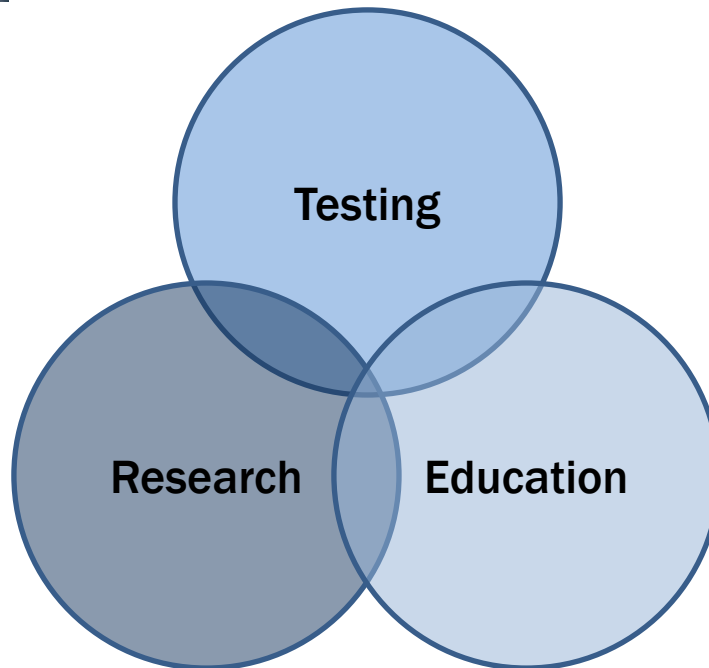
Program Overview
Florida Energy Systems Consortium
Oversight Board Meeting

November 26, 2013

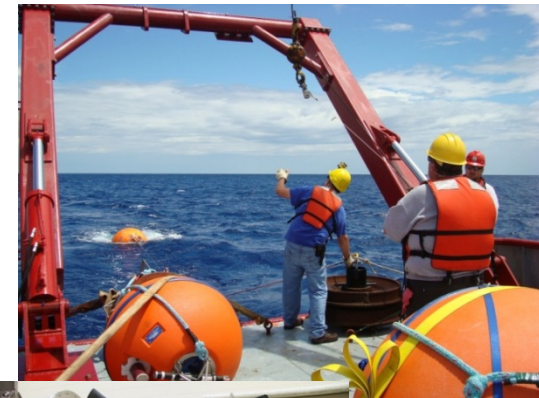
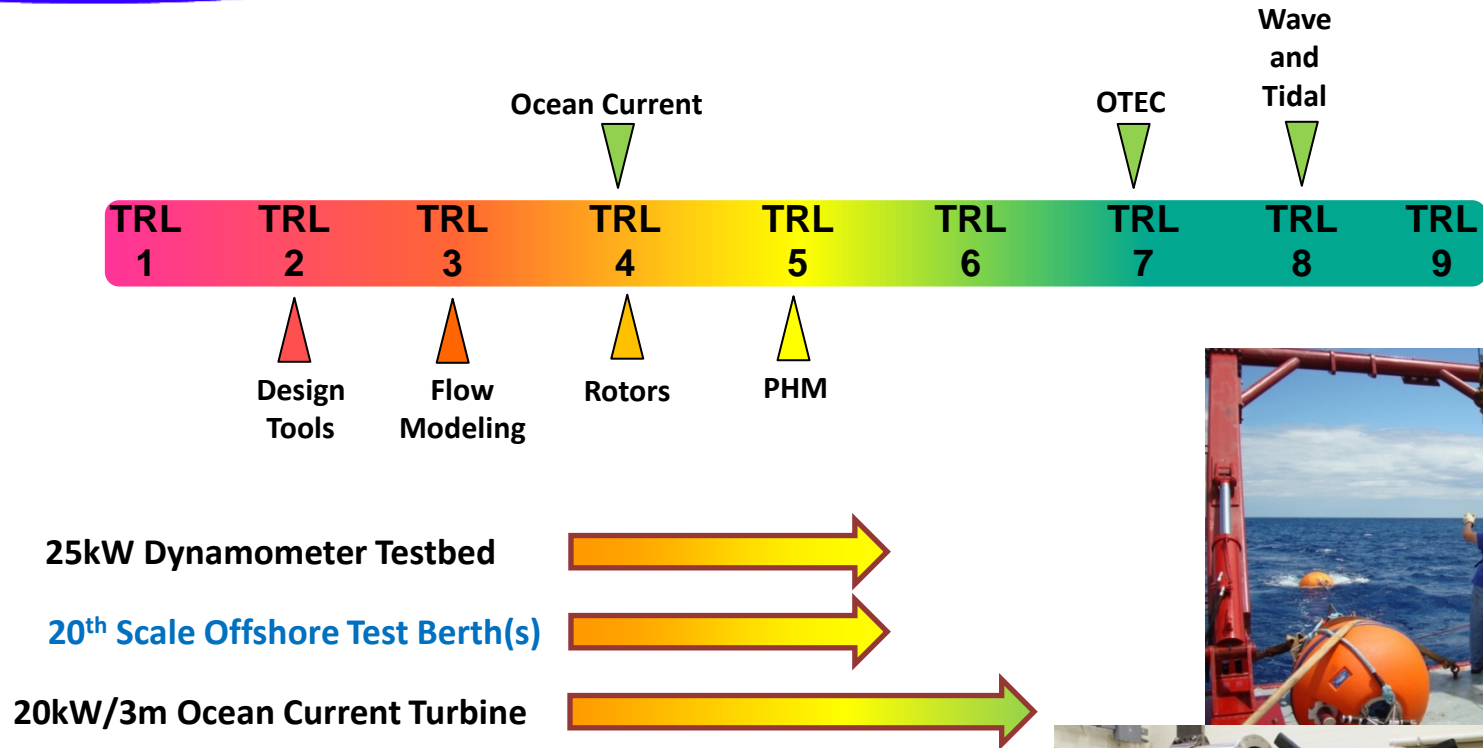
Camille Coley, Associate Director

SNMREC Purpose

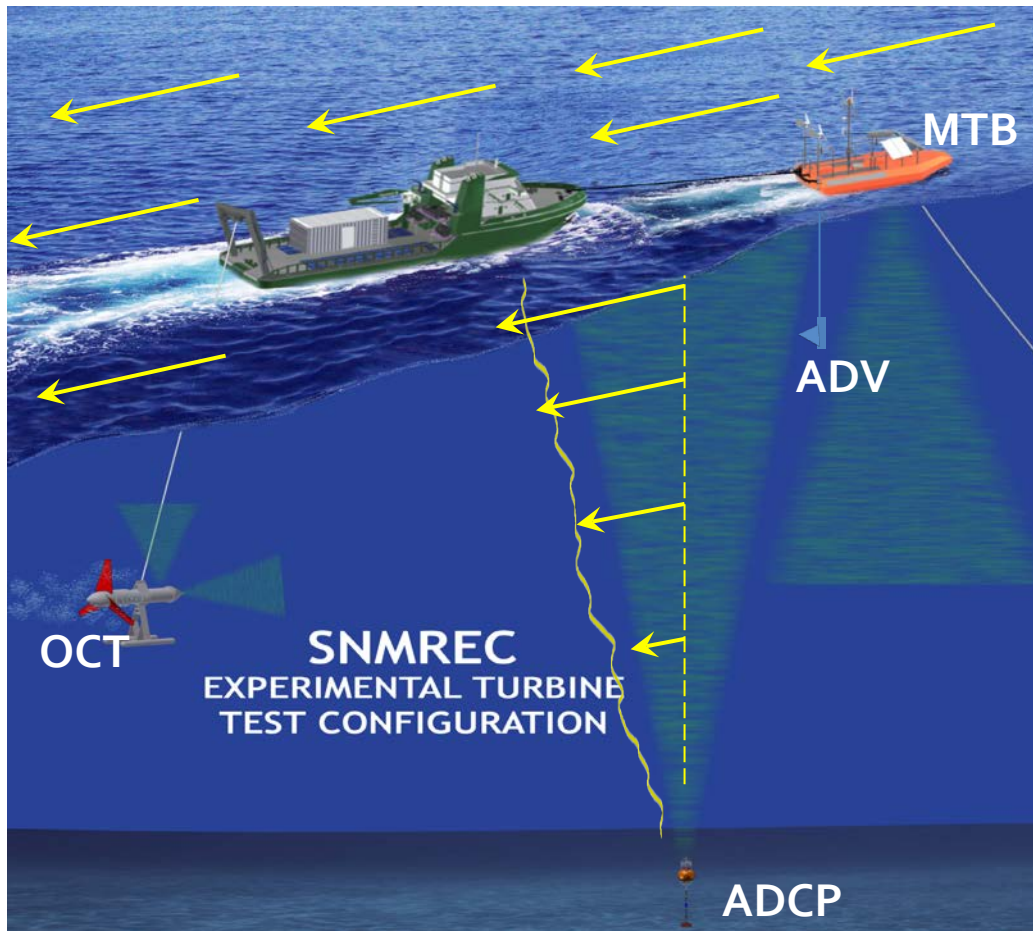
Enable a utility-scale
commercially-viable
MHK industry



Servicing the MHK Industry



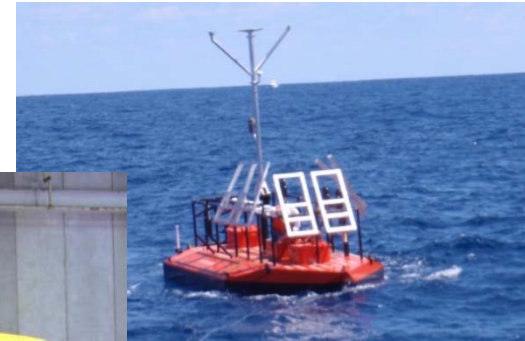
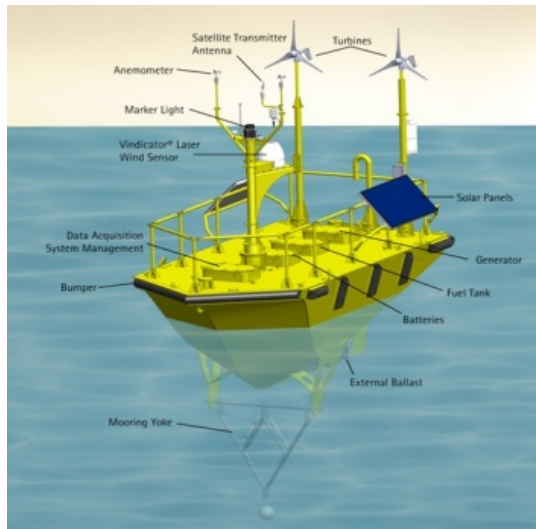
Small-scale Offshore Testing



Surface-deployed
without power
transmission to
shore

Capable of testing
1/10 – 1/4 scale
systems up to
100kW or **7m**
diameter
demonstration
turbines

Mooring & Telemetry Buoy



Ocean Current Research Turbine

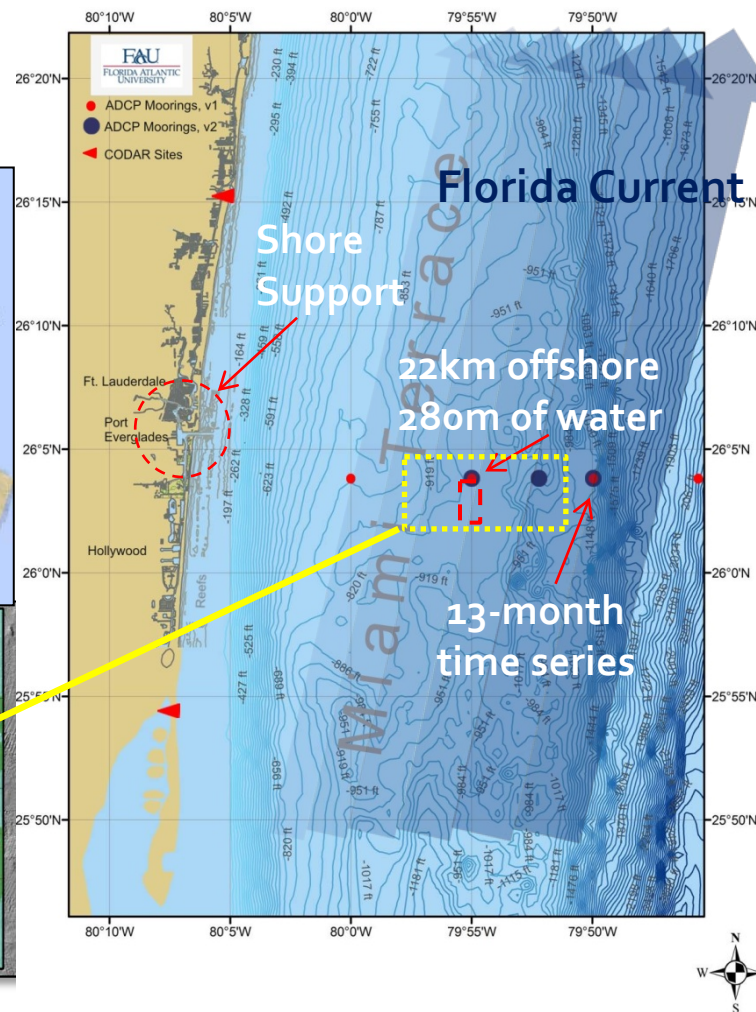
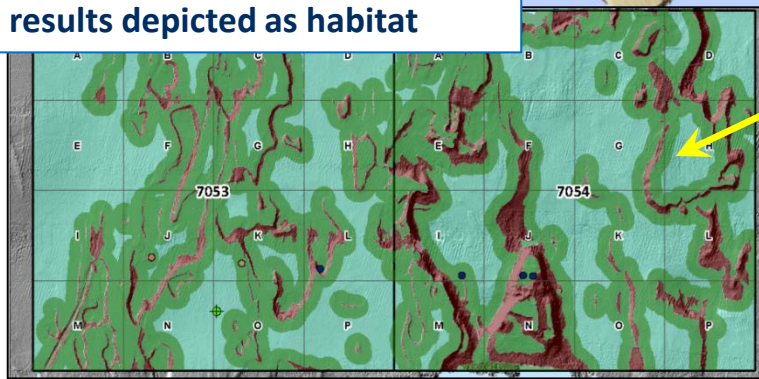
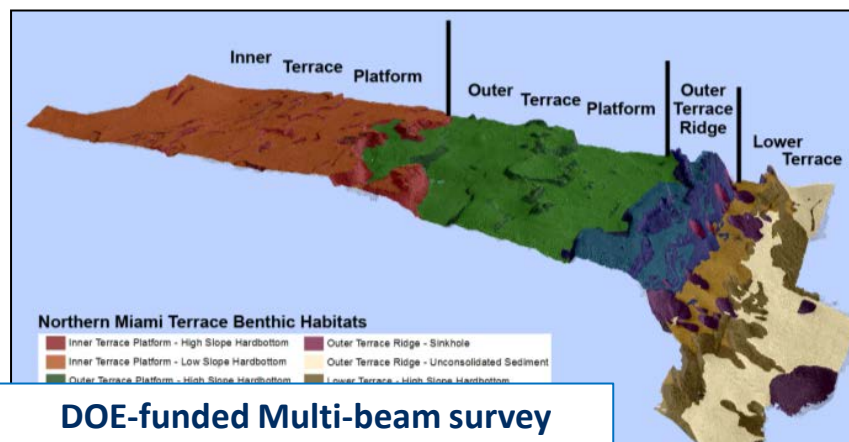
25kW axial-flow
configuration
with **3 meter**
diameter rotor



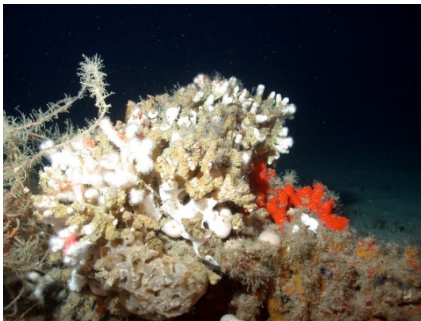
Small-scale Offshore Testing

TRL
4-5

Location



Environmental Effects

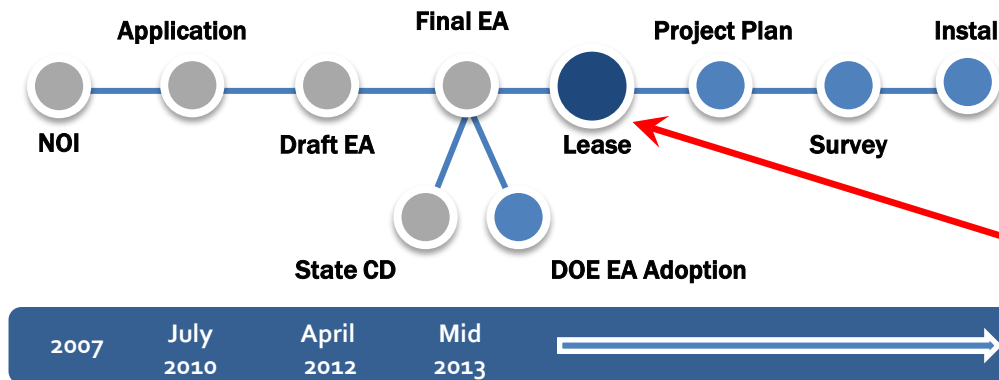


Is large-scale implementation of MHK compatible...

- with the physical environment?
- with the biological environment?
- with the social environment?

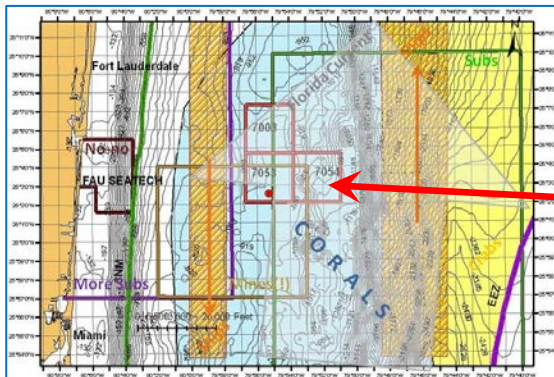
Small-scale Offshore Testing

BOEM Lease



FIRST Lease on the
OCS:

Establishing the
framework for future
applicants



SNMREC Lease
Blocks:

FUTURE

Development Plan

Near Term

Test and validate commercial **demonstration-scale** turbines



Mid-Term

Plan and establish large scale turbine **prototype-scale** testing capability



Long Term

Reduce MHK Cost Of Energy

Prototype Scale Testing Challenges

**All of these challenges
drive future research
needs:**



- **Transport** to site and **deployment** of devices
- **Communications** and **control**
- Lift (dynamic) vs. buoyancy (static) **attitude control systems**
- **High drag forces** on large rotors and devices
- Complex and Unique **mooring** methods
- **Power transmission** from device to seafloor and shore
- **Multiple turbine integration** and connection
- **Water depth** and relatively small zone of operation (near surface)
- **Maintenance and repair** procedures
- **Regulatory needs** and economic analyses



**And now the fun
part....**