



**NOAA  
FISHERIES**

# Ocean Homesteading? Science and technology needs for smart industry planning and management



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# Can we use science and technology to improve the odds?



Choices made by the homesteader

Where to homestead

What to grow

How to market

Make a go of it and in 5 years the land is yours

**But lots of people did not make a go of it!**

Marine aquaculture is like that – the onus is on the applicant.

Make a go of it and in 5 years you can reapply for a permit

**But lots of people will not make a go of it!**



# a triple bottom line...

- Environmental performance
- Economic performance
- To be socially acceptable

Why? Because having all three will make the development, technology transfer and replication easier.

But two out of three ain't bad.

## Best Practices For Increasing the Impact of Research Investments



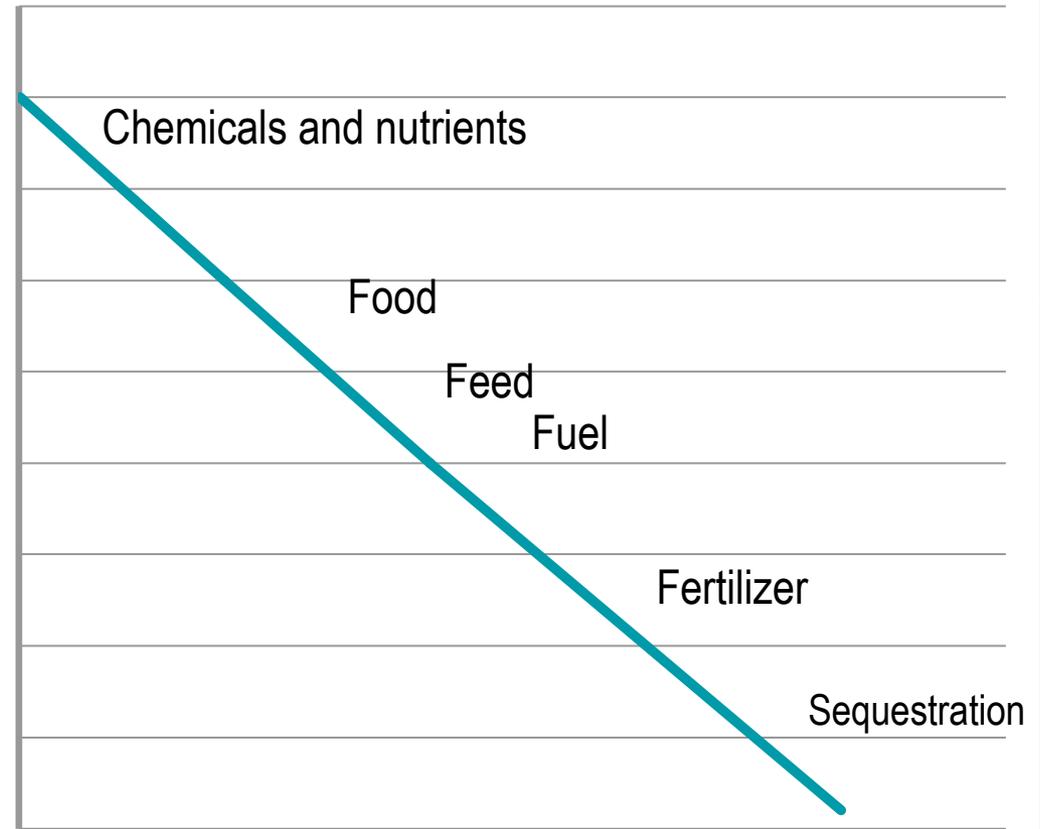
A Report by the  
Research to Applications  
Task Force of the Ocean  
Research and Resources  
Advisory Panel

July 17, 2007

# What are you going to do with it?

- Best and highest use
- Unit value and market size are inversely related
- “Appropriate Technology” changes with market and production

Unit Value

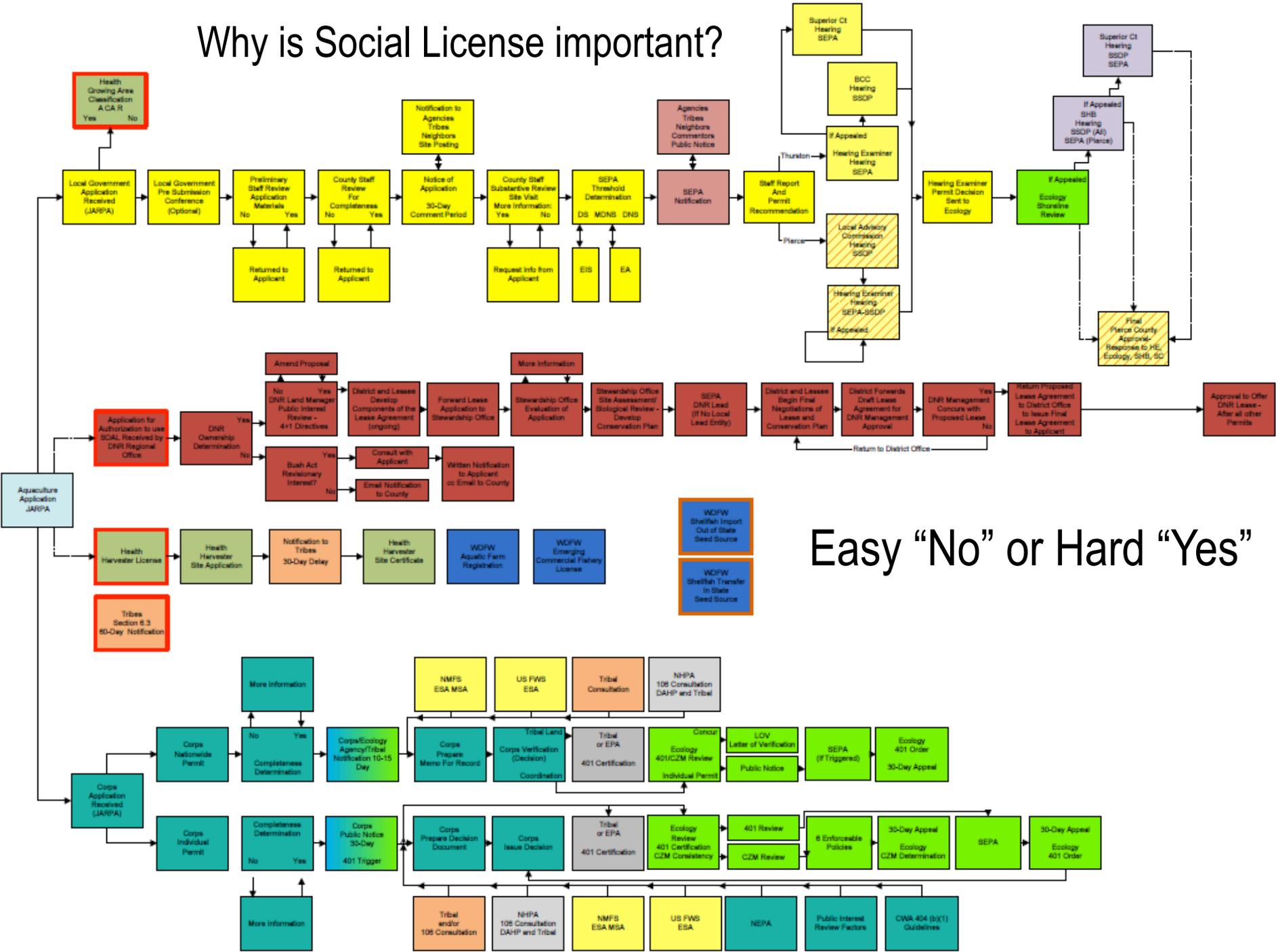


Market Size

# Mr. Takahiko Yamada



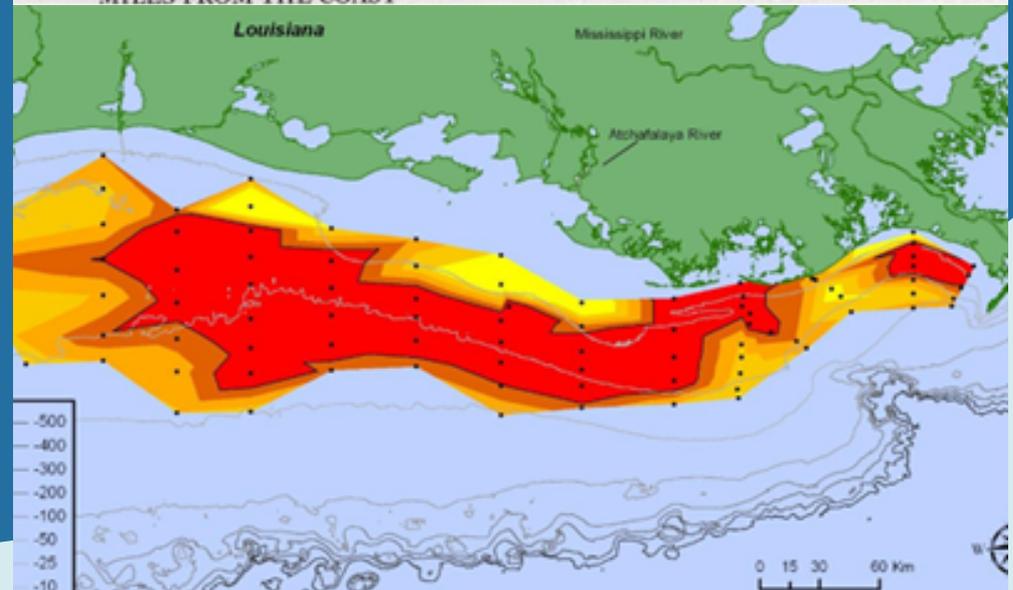
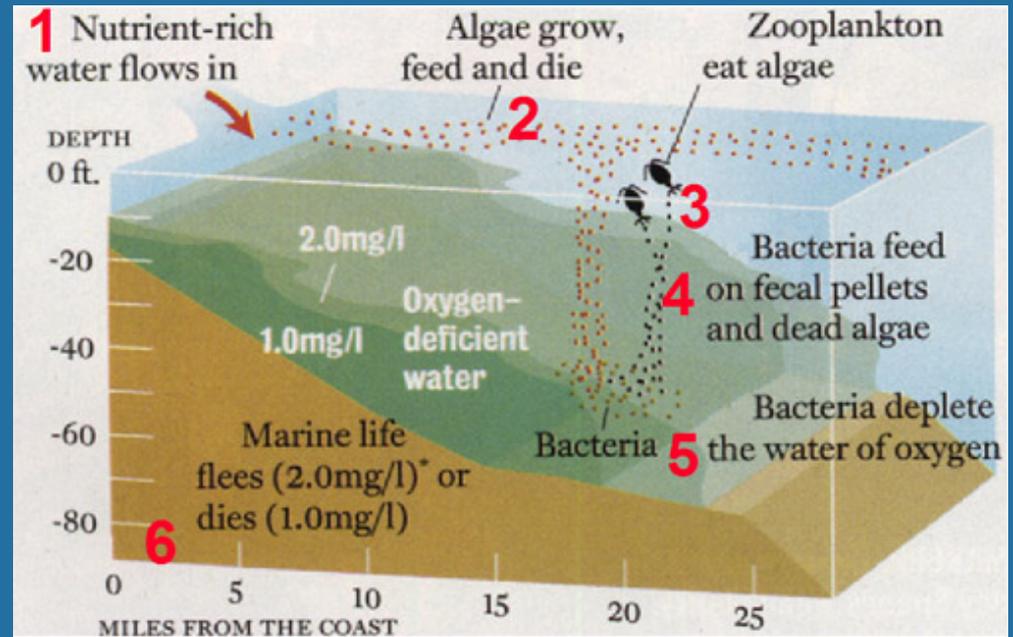
# Why is Social License important?



Easy "No" or Hard "Yes"

# Excess nutrients, not enough oxygen and too much CO<sub>2</sub>

- Ecosystem Services?
- 6000-7000 sqmi in the GOM, but the basics apply broadly.
- But the opposite can also be true!





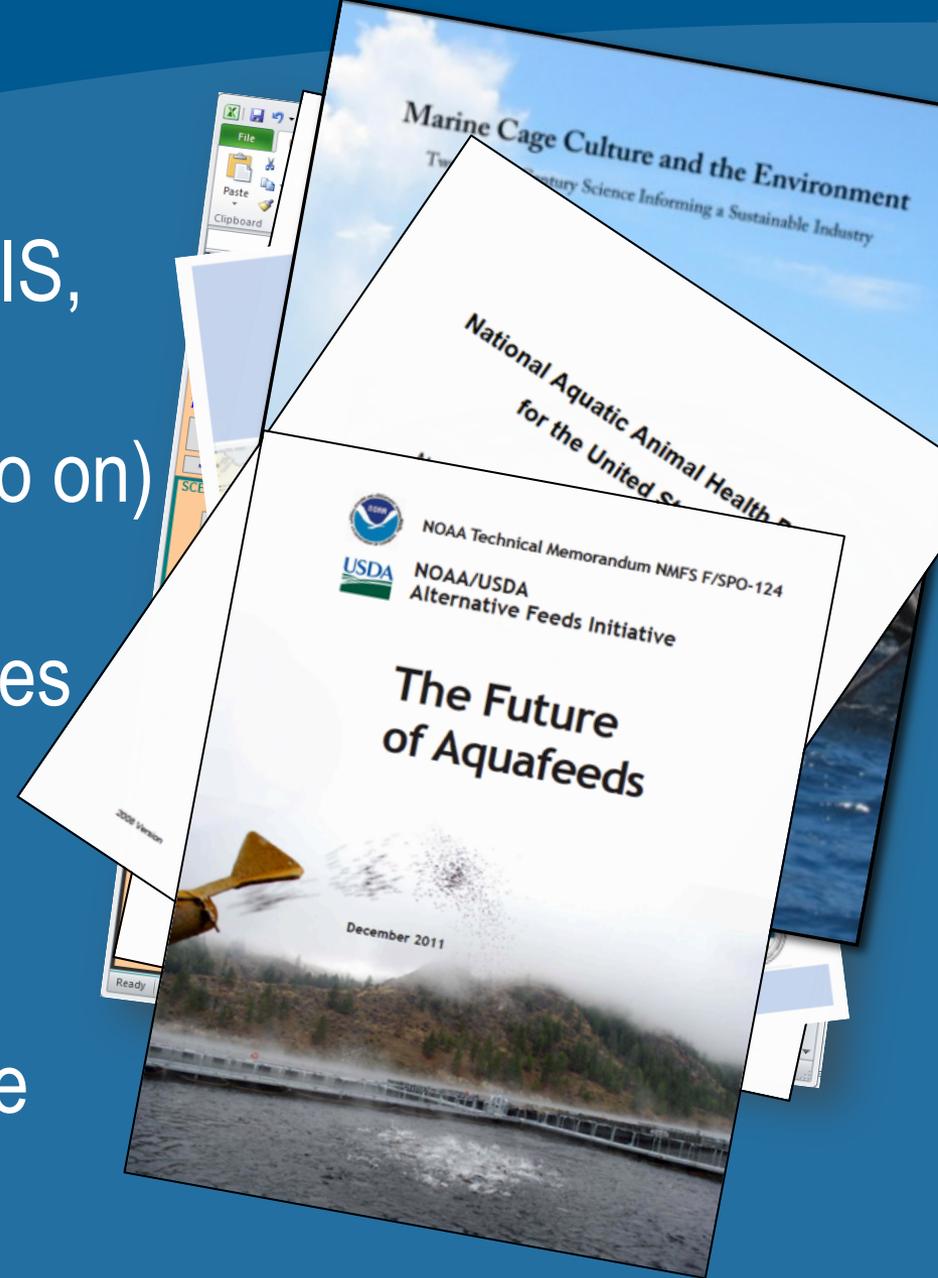
# Tools for Rules?...or how can science be used for smart decision making?

- Needed to help regulators get to the hard “yes” instead of the easy “no”
- Needed to help pioneers make smart site selection decisions and make money
- Needed by those that follow pioneers by avoiding the bad rap of failure
- Needed by society to feel good about industry development
- Needed by policy makers, planners and politicians so they can understand the potential in their corner of the world.
- Needed by managers to make sure industry does due diligence and to manage for cumulative impacts.
- Needed to inform and prioritize research.

Improve the chances for good decision making all around

# Tools are:

- Models (Mass Balance, GIS, Production, Circulation, Economic, Coupled and so on)
- Risk Assessments
- Best Management Practices
- Synthesis documents (including reviews and analysis)
- Combinations of the above
- Other



# Managing Use Conflicts

Hawai'i Aquaculture  
Marine Mapper

Zoom To: *Which One?*

Customize & Share

Site-Selection Model

Data Layers

Clear Layers

- Base
- Marine Uses & Infrastructure
- Oceanography & Climatology
- Biology & Conservation
- Aquaculture
- Land Use
- Site Selection Result (Demo)

Basemap

Site Selection Parameters Summary for Demo

Selected variable(s) with weights

Water Depth - 50  
Distance From Harbor - 35  
Water Temperature - 15

Selected exclusion area(s)

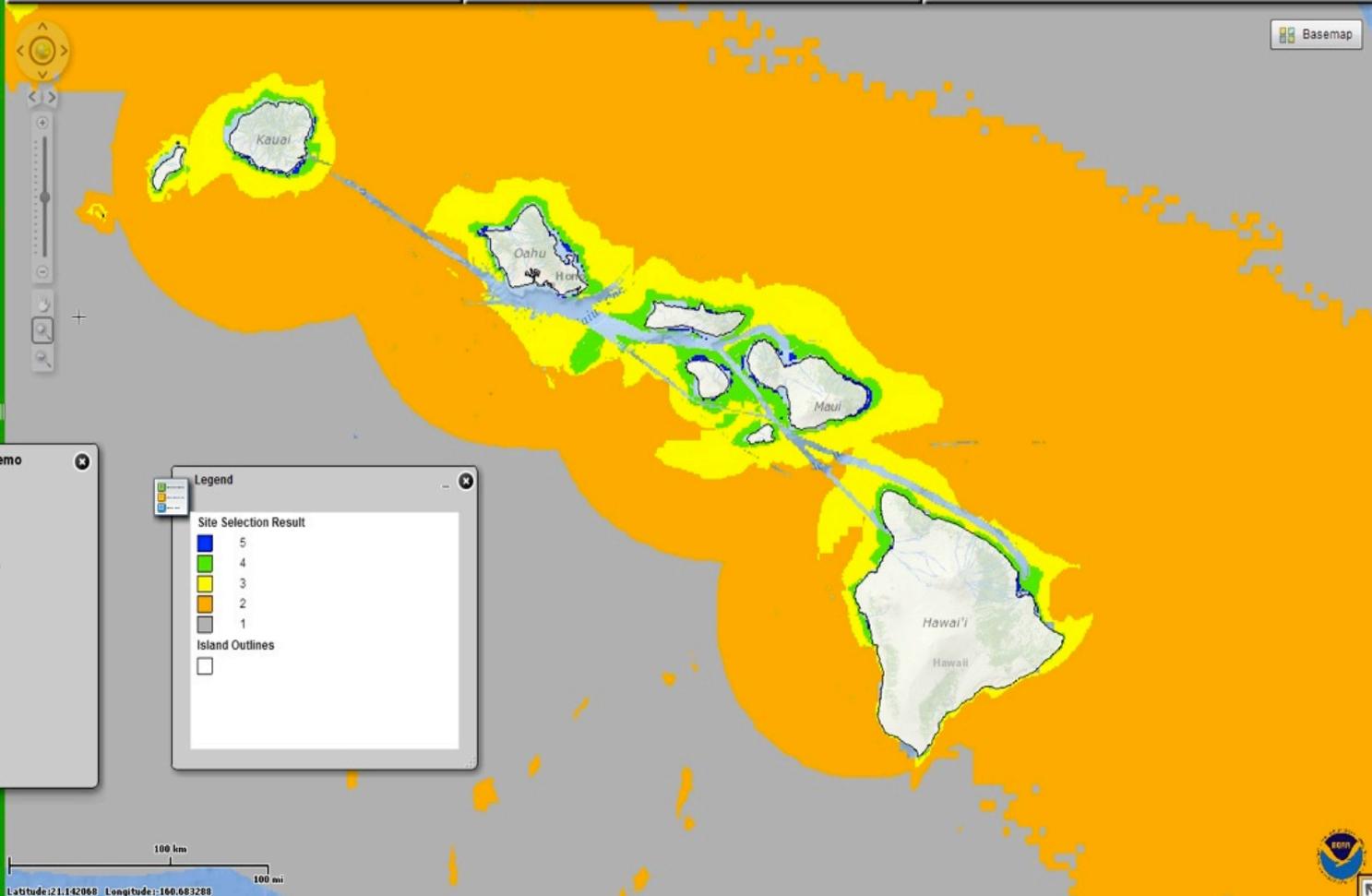
Major Shipping Routes  
Reefs

Legend

Site Selection Result

- 5
- 4
- 3
- 2
- 1

Island Outlines



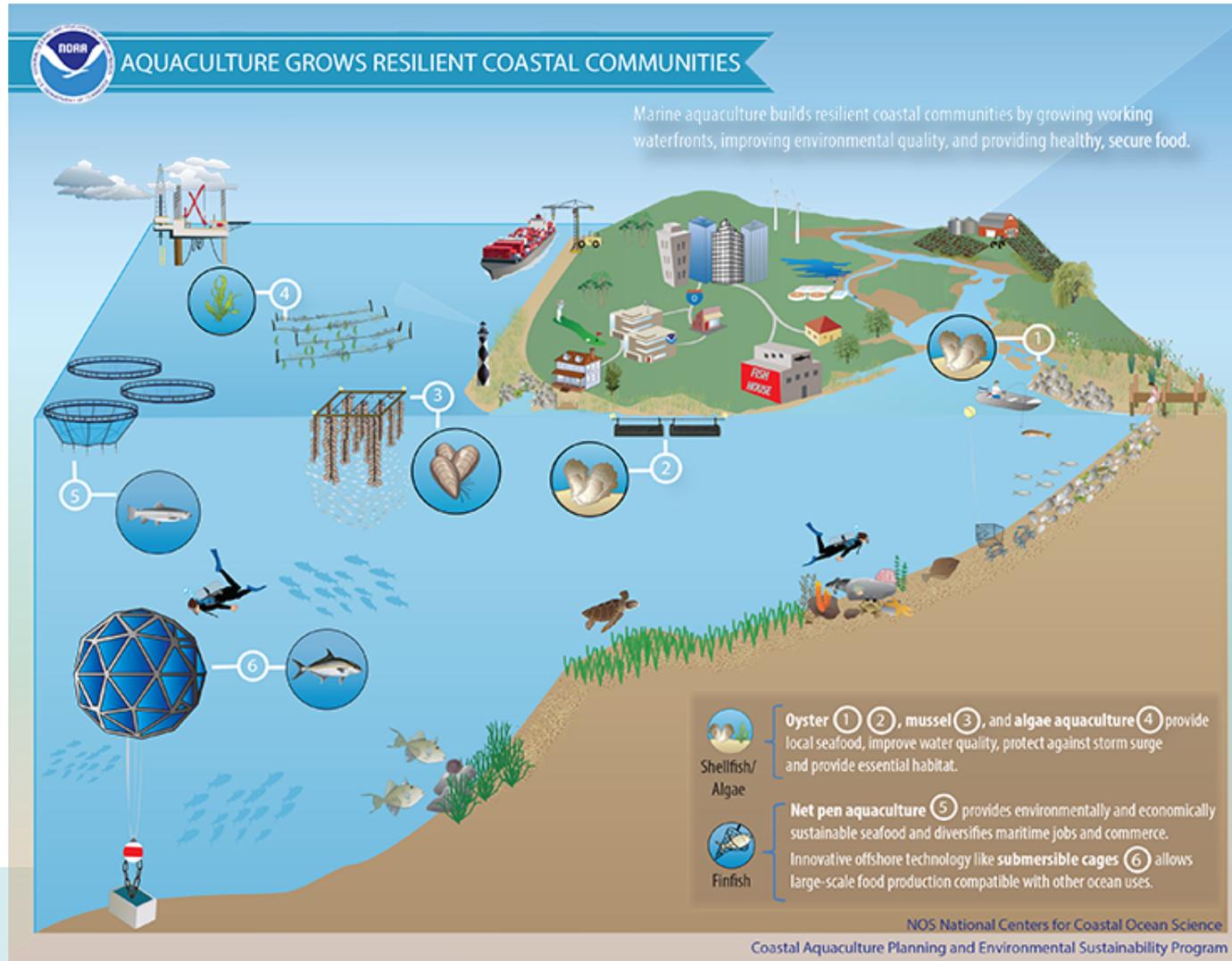
# Integrated growth, production and circulation models

## Suitable Sites based on Aquaculture Mapping Atlas

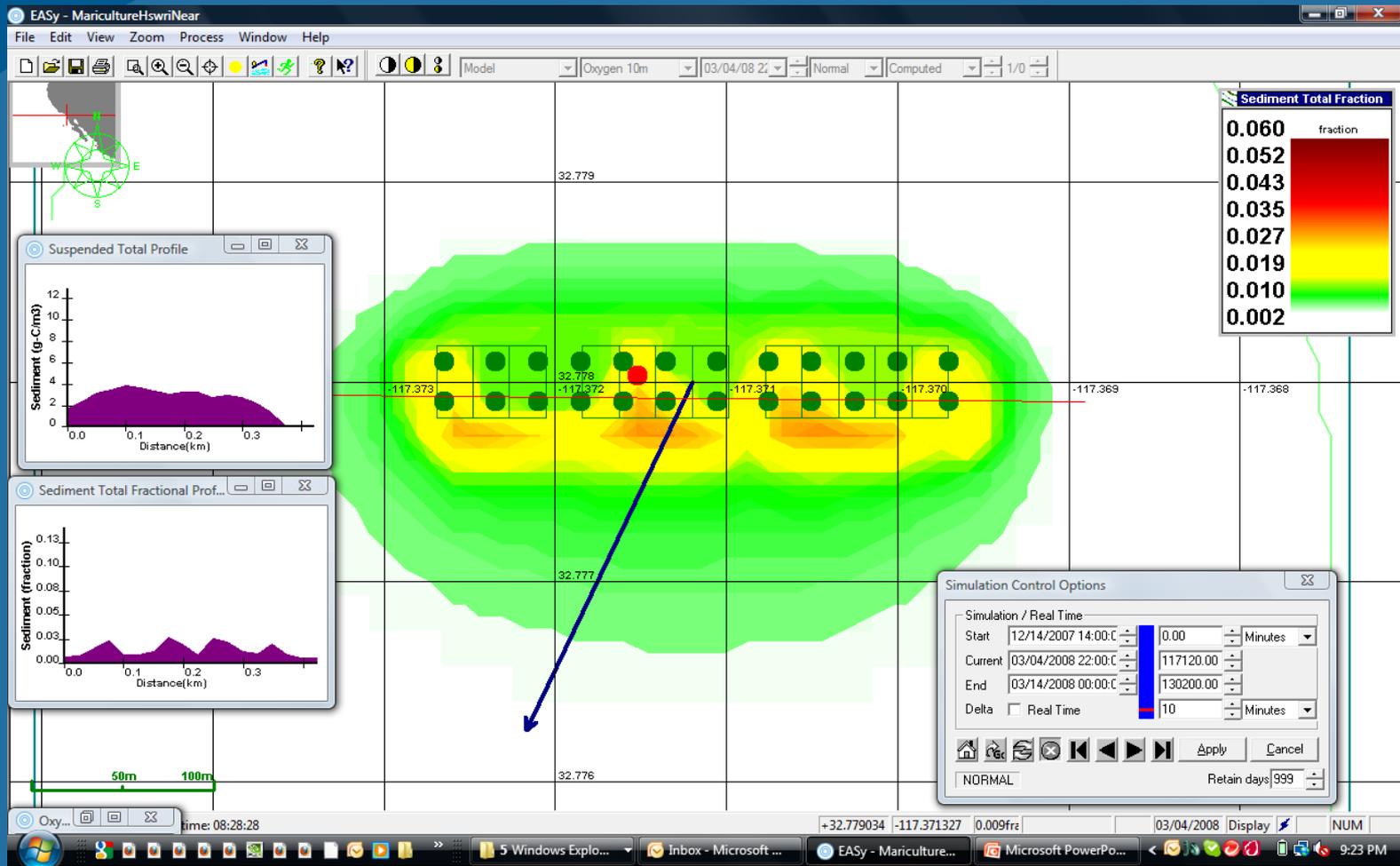


# Marine Spatial Planning (opportunities) + Ecosystem Approach to Aquaculture + Economics

- Needs to include not just seaweeds but alternatives as well
- Are we planning seaweed farms or aquatic fields?
- As industry grows a multi-tropic mix might be the best solution



# Fish Production model (Aquamodel)



# Thank you

- Use a triple bottom line evaluation
- The road to biofuels runs through chemicals, food, feed and fertilizer.
- Don't ignore ecosystem services
- Social license eases development
- Embed science in tools to help industry develop and managers make smart decisions
- Think of "Ocean Fields" not just seaweed farms.
- Let's use science to give ocean homesteaders a map.