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*For every complex problem  
there is an answer that is  
clear, simple, and ...  
wrong.*

*Henry Louis Mencken*



# Are we doing the right research right?

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Office of  
Aquaculture

Michael Rust, Science Coordinator, Office of Aquaculture

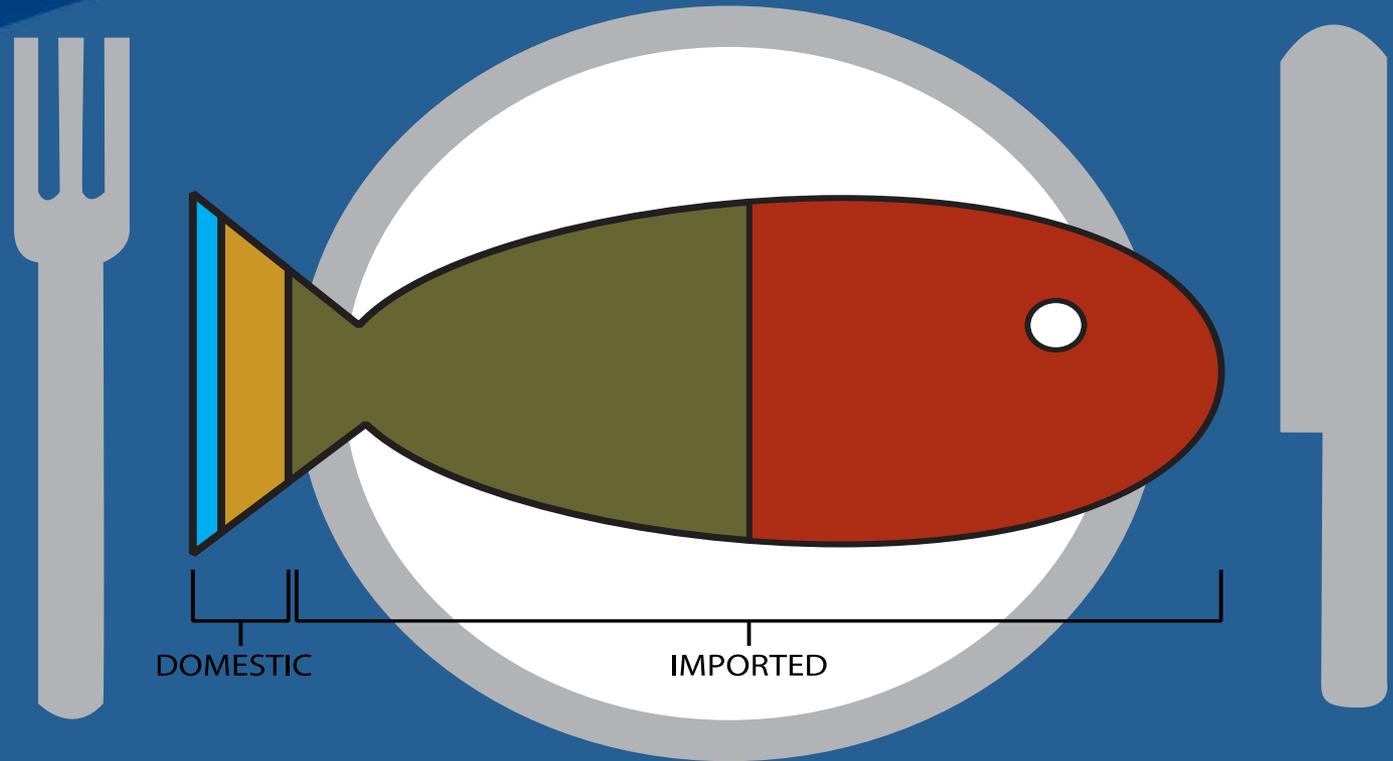
February 2014



# Sources of all seafood consumed in U.S.



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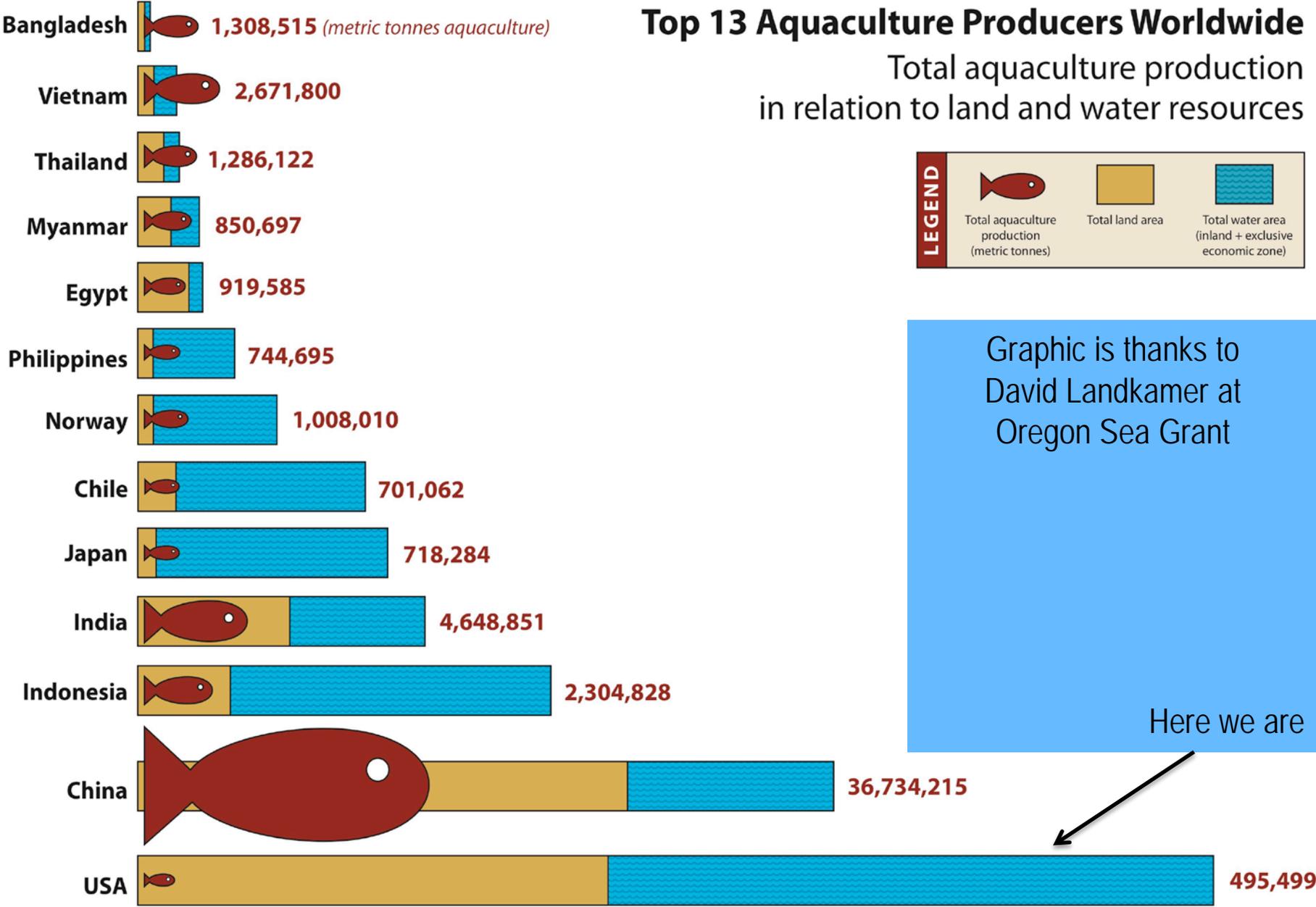
U.S. Farmed	U.S. Wild-caught	Imported Wild-caught	Imported Farmed
<b>2.5%</b>	<b>6.5%</b>	<b>45%</b>	<b>46%</b>

Data 2012, NOAA National Marine Fisheries Service.

David J. Landkamer, Ed.D., Aquaculture Extension Specialist, Oregon Sea Grant Extension Program.  
Infographic by Patricia Andersson, Oregon Sea Grant

# Top 13 Aquaculture Producers Worldwide

Total aquaculture production in relation to land and water resources



**LEGEND**

- Total aquaculture production (metric tonnes)
- Total land area
- Total water area (inland + exclusive economic zone)

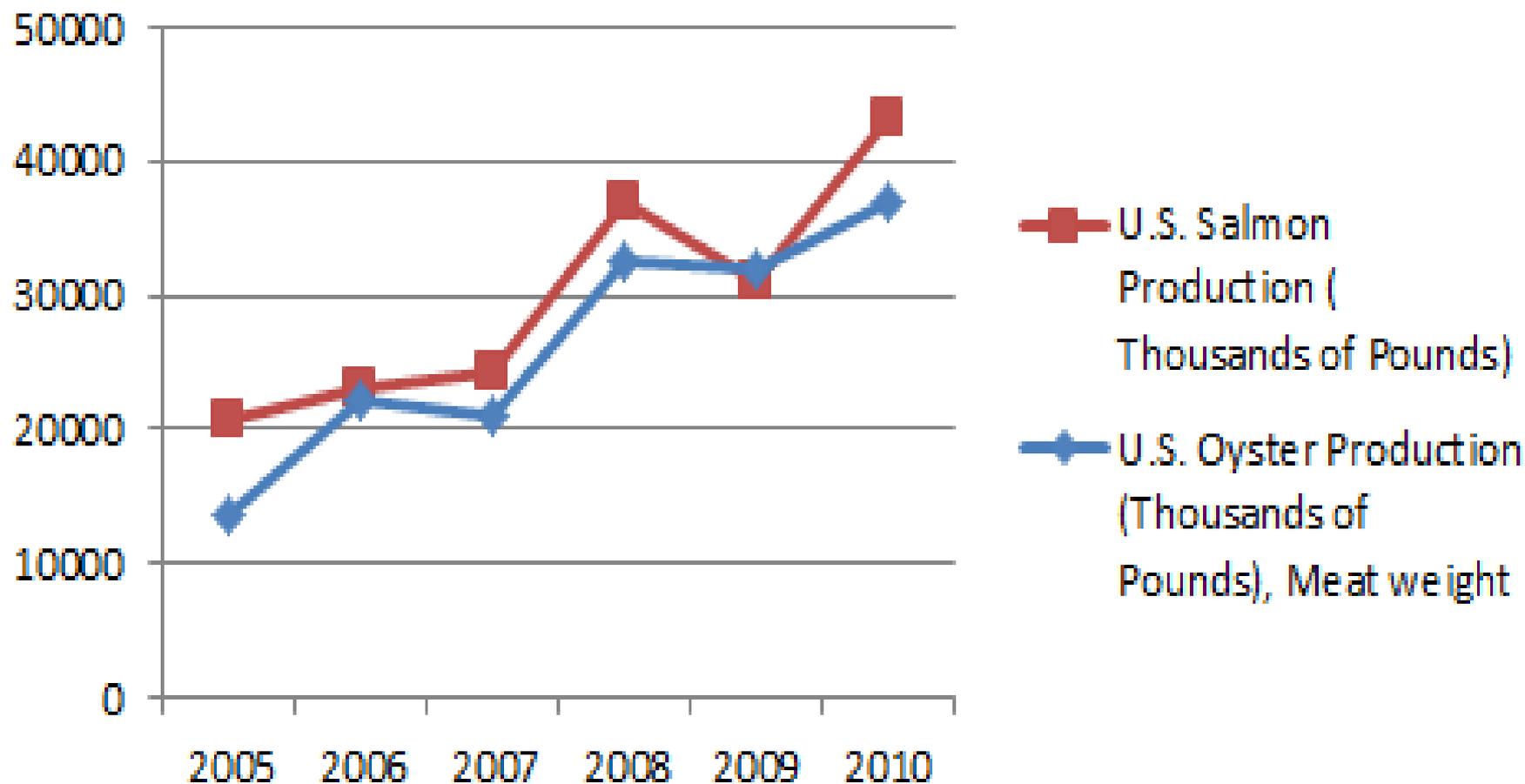
Graphic is thanks to David Landkamer at Oregon Sea Grant

Here we are



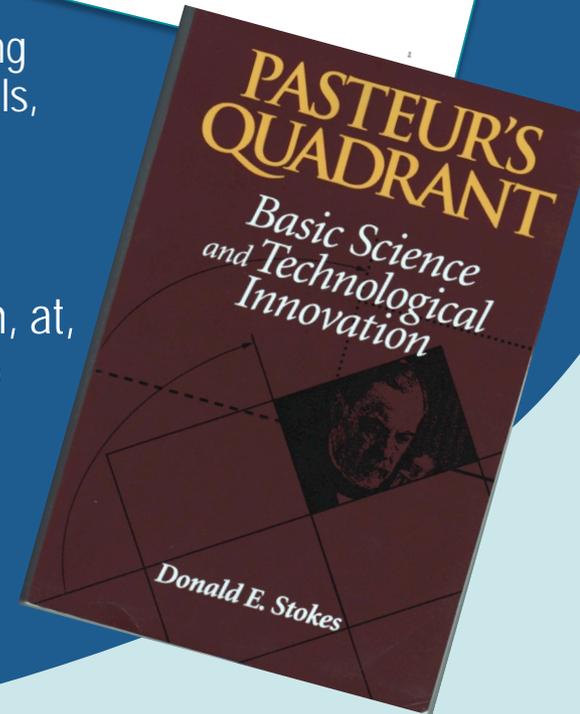
2010, UN Food and Agriculture Organization

# U.S. Salmon and Oyster Production (Thousands of Pounds)



# “Use-Inspired” Research

- Federal definitions of research and development set by the National Science Foundation.
  - Research is the “systematic study directed toward a more complete scientific knowledge or understanding of the subject studied.”
  - Development is the “systematic use of the knowledge or understanding gained from research, directed toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes.”
- Rather than trying to distinguish between basic and applied research, at, we strive for R&D that are “use-inspired;” *simultaneously* intended to improve our fundamental understanding of the world *and* yield applications that are useful and used.



<http://www.nsf.gov/statistics/nsb1003/definitions.htm>

Stokes, D. (1997). *Pasteur's quadrant : Basic science and technological innovation*. Washington D.C.: Brookings Institution Press.

# One way to think about research or Understanding researcher

Used by customers for the good of mankind

Short Term  
Ready for prime time

Mid Term  
5-10 years out

Long Term  
More Basic  
20 years out

Three bucket approach.  
When do you ask your customers what they need?

# If our research is suppose to be “use-inspired” then what is the use?

Should we ask the users?

If so, then who?

Industry?

Regulators?

Futurists?

Environmentalists?

Fishermen?

Politicians?

Bureaucrats?

Academics?

The Public?

Who pays the bills?



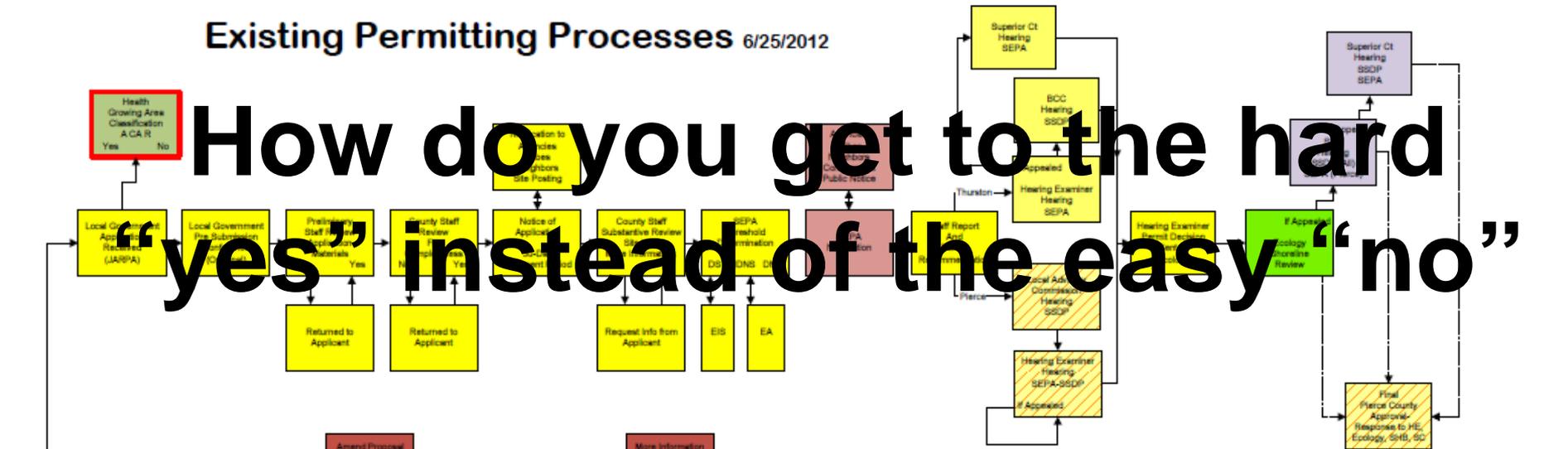
# Who is your customer?

- What is your product?
  - Information? Technology? Both? Peer-reviewed papers?
- Who cares?
  - Who reads peer-reviewed papers?
  - Does somebody want this? Ok that is easy
  - Does somebody need this but maybe doesn't want it?
- Which customer would really get aquaculture moving in the US?
  - Industry? Government? Public? Regulators?

# Who is your customer?

- Industry – That is the easy one? Is a lack of technology for industry the issue limiting development of aquaculture in the US?
- Public? - That is a hard one. The public is a diverse group.
- Regulator? - Walk a mile in their shoes? Why is “no” the easy answer? What can science/ information/ technology do to get to the hard “yes”?



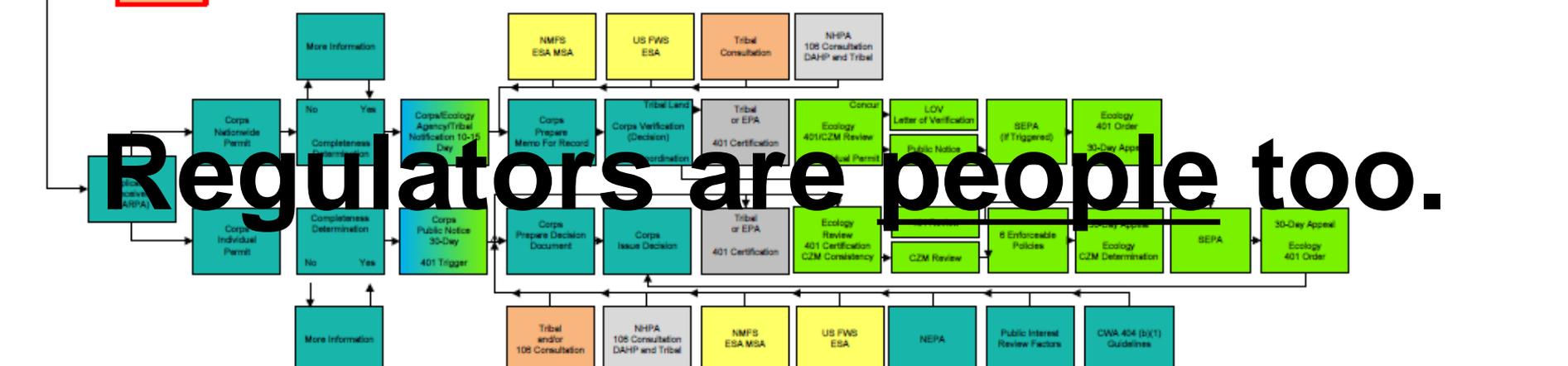


How do you get to the hard "yes" instead of the easy "no"



Need to feel safe saying yes

Requires thinking inside the box

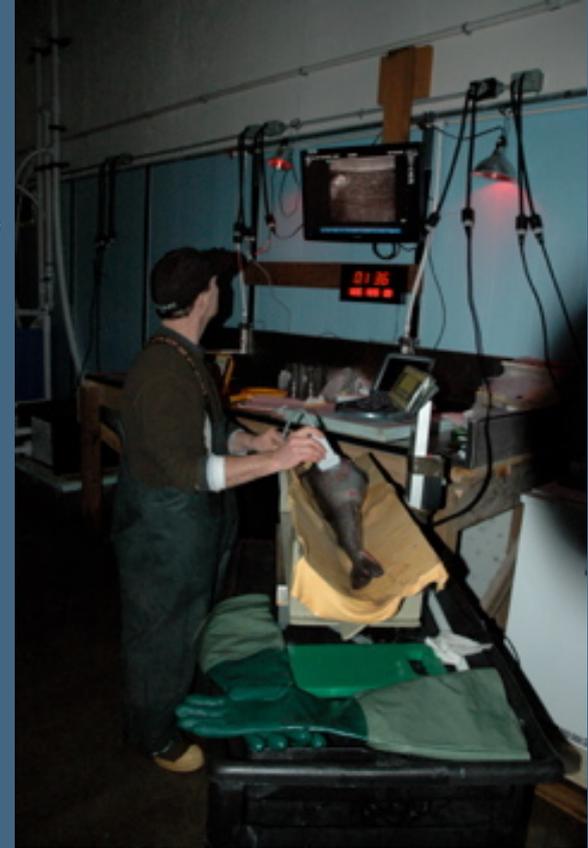


Regulators are people too.

# Best Practices

- Prioritize user involvement throughout the research applications process.

*The likelihood of new technology or knowledge being adopted is greatest when users are involved in the research.*

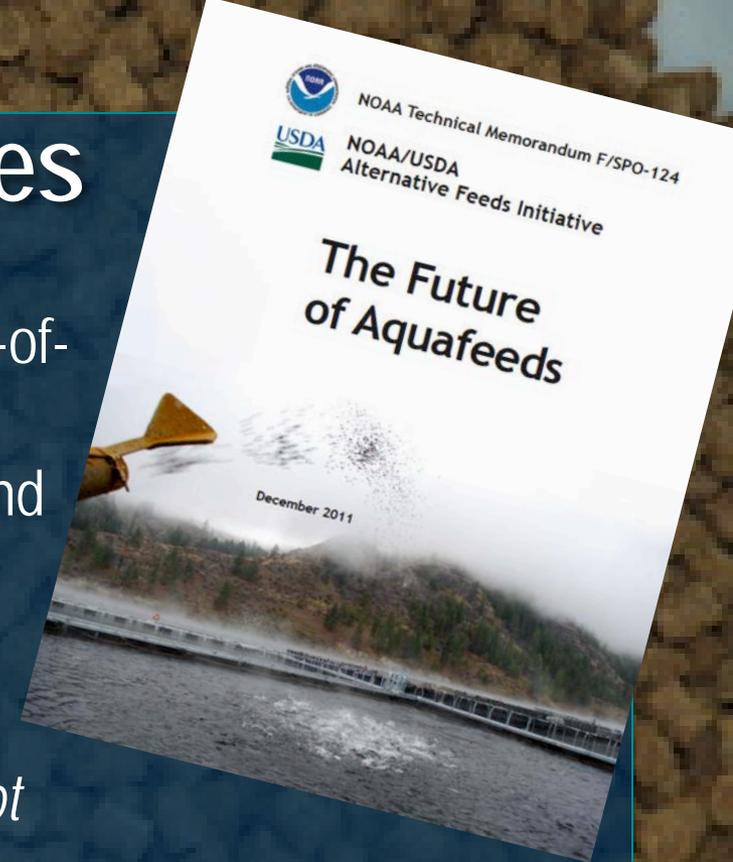


From the Research to Applications Task Force of the Ocean Research and Resources Advisory Panel

# Best Practices

- Conduct cross-organization (agency) state-of-the-science assessments that create consensus about the state of knowledge and identify gaps that define future research needs.

*The user community is most likely to adopt new approaches and technologies when there is broad, documented consensus that solutions are mature.*



# Best Practices

- Allocate the time, personnel and funding necessary to support research and development through application of the results. Don't stop at peer review.

*Application/acceptance timelines are often much longer than a typical research grant funding cycle. Researchers (and funding agencies) should develop a staged process that minimizes the funding gaps for technologies on the transition path.*



# Adopt a triple bottom line...

- To help the environmental performance of aquaculture
- To help the economic performance of aquaculture
- To be socially acceptable (What society is asking for)

Why? Because having all three will make the development and technology transfer part easy.

Two out of three ain't bad.

# Models For Working With Scientists

- Joint Proposals
- CRADA's → Cooperative Research and Development Agreements
- Internships
- Visiting Scientist or sabbatical positions.
- Partnerships of all kinds

Don't be afraid to ask...



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Aquaculture

# Right research right?

*Much of what science can do to allow US aquaculture to develop into a respected environmentally sensitive industry in the US is to simply produce:*

- *high-quality information served up in an*
- *easy-to-understand package,*
- *focused on the key issues in the*
- *public's mind.*

“Resilience is not just about what we measure or know; it is about how and whether we use that knowledge to act. It’s about taking the concept off the pages of policy documents and reports, and putting it into action in our communities.”

“...foresight is key to resilience”

Dr. Kathryn Sullivan, Acting NOAA Administrator. Keynote address at Capitol Hill Oceans Week 2013.



QUESTIONS?