

# Making the Economic Case for Ocean Observing Systems in the 2<sup>nd</sup> Decade of IOOS

NERACOOS Annual Meeting  
Hauke Kite-Powell, WHOI  
December 5, 2012



# IOOS and Economics?!?



# IOOS

“The U.S. Integrated Ocean Observing System (IOOS®) is a coordinated national, international, regional and local network of observations, modeling, data management and communications that provides the knowledge needed by society to protect life and property, to sustain a growing economic vitality, to safeguard ecosystems, and to advance quality of life for all people.”

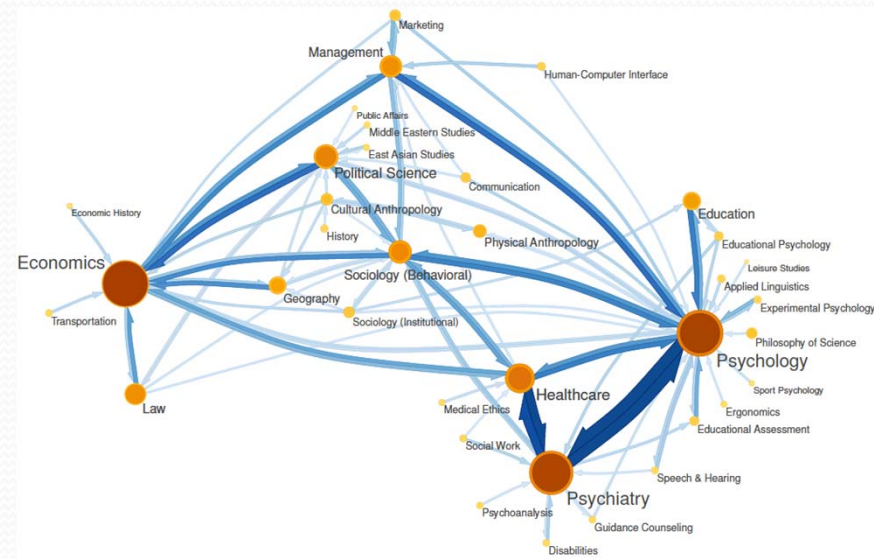
- ocean observation data & models
- supports real-time decision making
- governance framework for a federal/regional partnership
- essential data and techniques/methodologies for monitoring and predicting
- data standards for interoperability on diverse systems
- broad set of public and private stakeholder communities



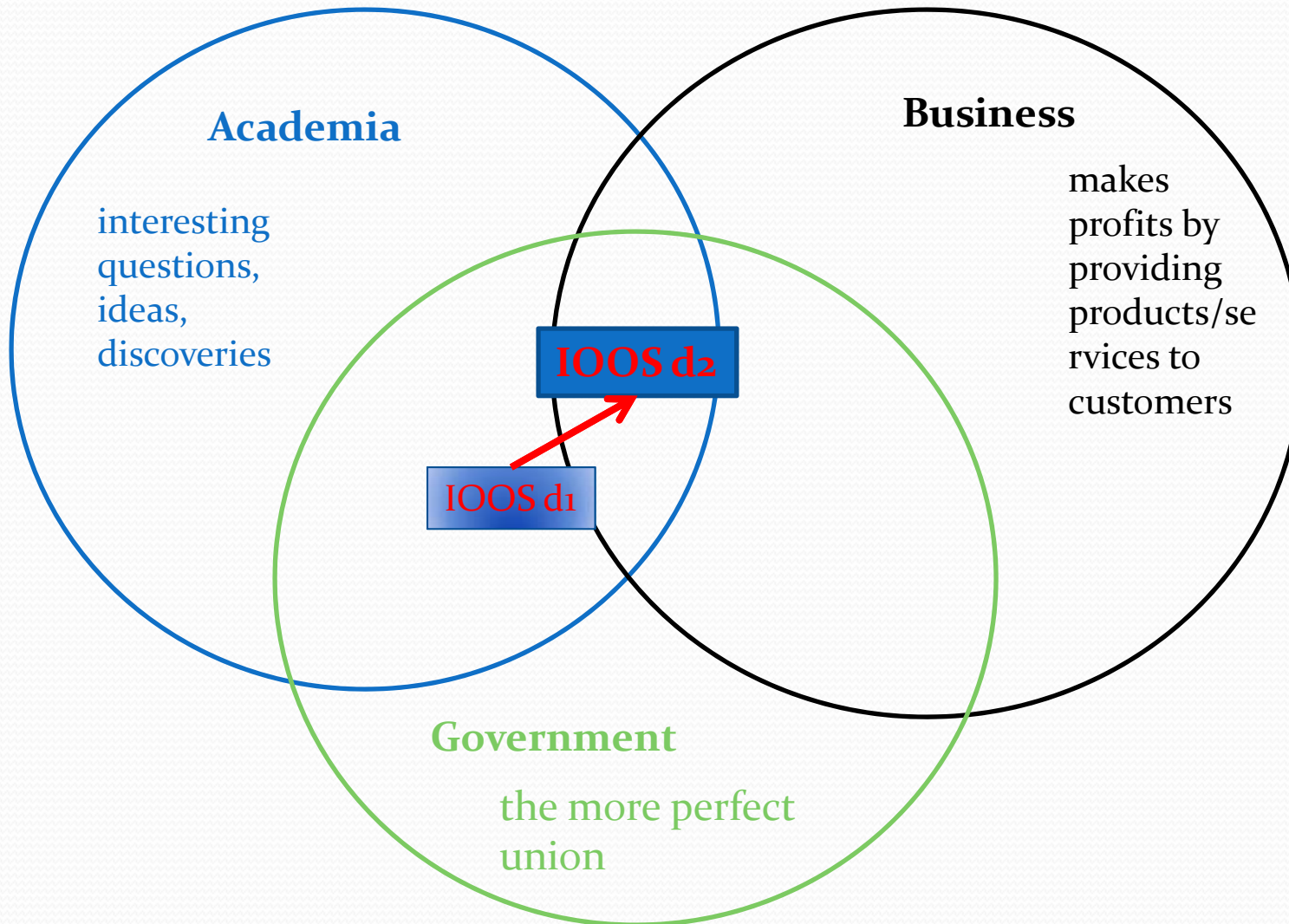
# Economics

The study of production, distribution, and consumption of goods and services (in the context of scarcity)

- behavior of basic elements of the economy, including individual agents and markets, and their interactions (microeconomics)
- entire economies, unemployment, inflation, economic growth, and monetary and fiscal policy (macroeconomics)



# IOOS Context





# IOOS Decade 1

- Government funding, with societal goals
- Academic institutions at the core of regional associations (e.g. 50% of NERACOOS board)
- ...and impressive results! at NERACOOS and in other regions

The screenshot displays the NERACOOS website interface. At the top, the logo reads "IOOS INTEGRATED OCEAN OBSERVING SYSTEM" and "NERACOOS Northeastern Regional Association of Coastal and Ocean Observing Systems". A navigation bar includes links for Home, About, Data & Tools, Focus Areas, News and Events, Education, Feedback, and GoMOOS. A search bar and social media icons are also present.

The main content area features a "Hourly Data" section with a map of the Gulf of Maine and a "Real Time Data Portal" with a "GO!" button. A "Latest Conditions" box provides weather and wave data for Matinicus Rock and Jeffrey's Ledge. A "GoMOOS.org has retired" banner is visible, along with logos for NEOSSEC and GoMOOS.

The "NERACOOS News" section lists several articles from October 2012, July 2012, and July 2011, including a news release about \$2 million in federal funding for ocean observing in the Northeast. A "Sign Up for Our Newsletter" button is located at the bottom right.

Additional sections include "NERACOOS Data and Tools" with "WAVE FORECAST", "GRAPHING/DOWNLOAD", "SURFACE CURRENTS", "OCEAN FORECASTS", "MODEL DATA VIEWER", and "MAPS FOR PLANNING".



# What's next for IOOS?

- There's more to be done...from the 2012 IOOS Summit Declaration:
  - “All IOOS components currently under-observe their target phenomena.”
  - “IOOS will incorporate emerging technologies as a standard operating procedure...”
  - “Improved and more sophisticated models will better exploit IOOS observations...”
- BUT...sustained federal funding looks challenging.





# IOOS Summit Declaration 2012

- “We are delivering real value to the American public and foresee even greater contributions in the coming decades.”
- “Federal support has been and will continue to be critical to the success of IOOS.”
- **“New approaches to product development and distribution need to consider a broadening of funding support, additional funding sources, and innovative public-private partnerships.”**





# What does this mean?

- An even greater focus on customers
- Basing investments on expected returns (value generated, \$\$)
- An operating model and framework for public-private and non-profit/for-profit partnerships
- A governance structure to support all this

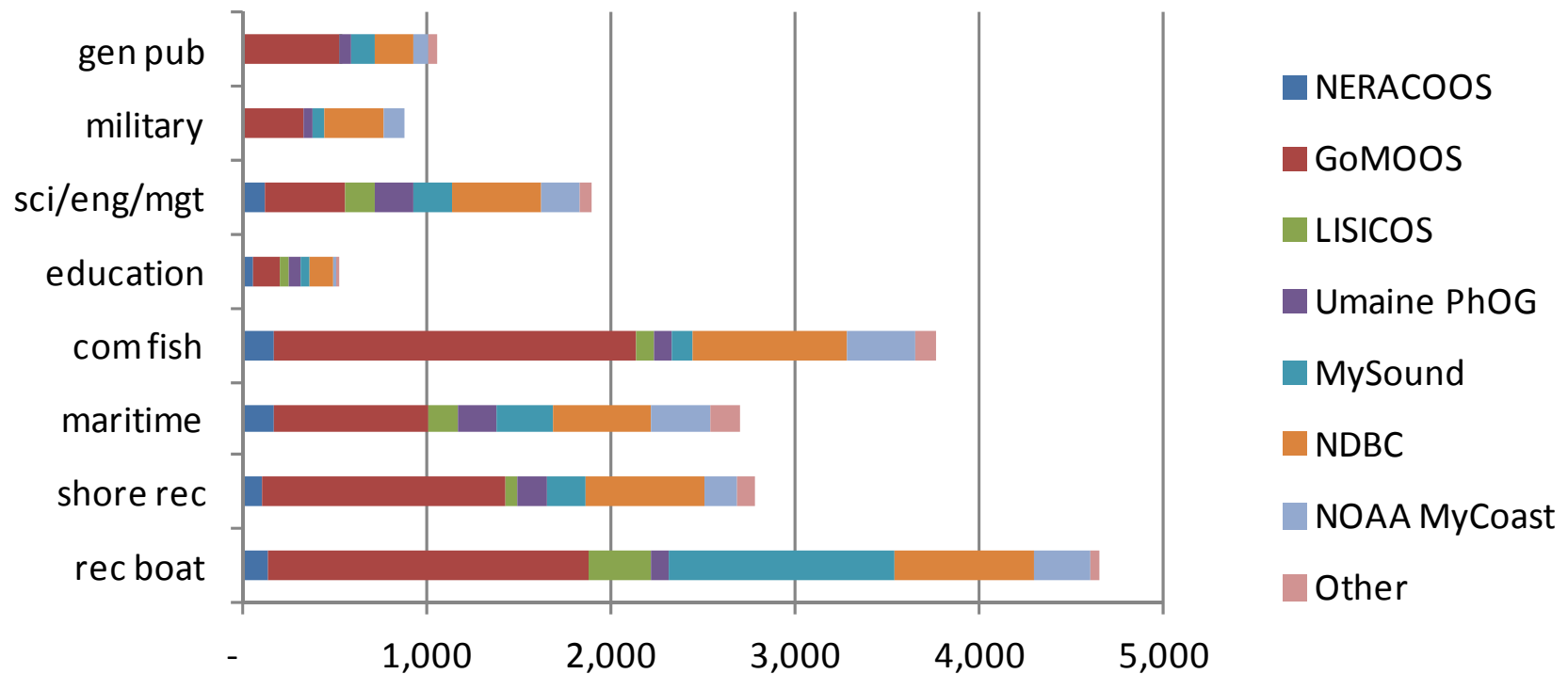


# Customer Focus

- Understand who are the customers (users)
- Understand what products they use, and how
- Understand how this generates value
- Identify opportunities for greater value
  - Other information
  - Other delivery mechanisms
  - Greater “market share”

# Fall 2011 Online User Survey

## Estimated Visits (Oct 2011) by User Group





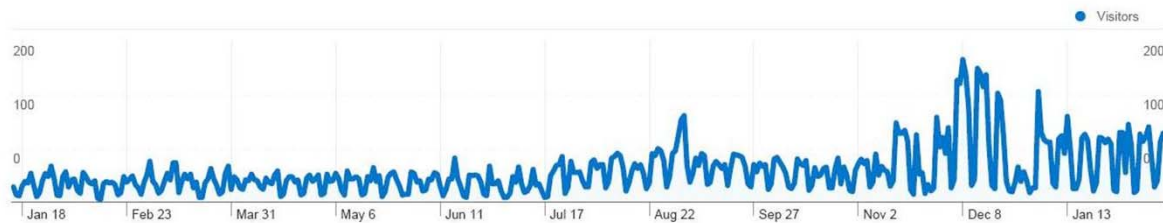
# Website Analytics (NERACOOS)

www.neracoos.org

## Visitors Overview

Jan 15, 2010 - Feb 15, 2011

Comparing to: Site



**7,199** people visited this site

**19,512** Visits

**7,199** Absolute Unique Visitors

**105,688** Pageviews

**5.42** Average Pageviews



# User Categories

- (1) casual or “one-time” visitors – use observing system web site once/year
- (2) occasional users visitors – use observing system site on average 10 times/year
- (3) intensive users – use observing system site on average 100 times/year

# Scaling from Survey to Global

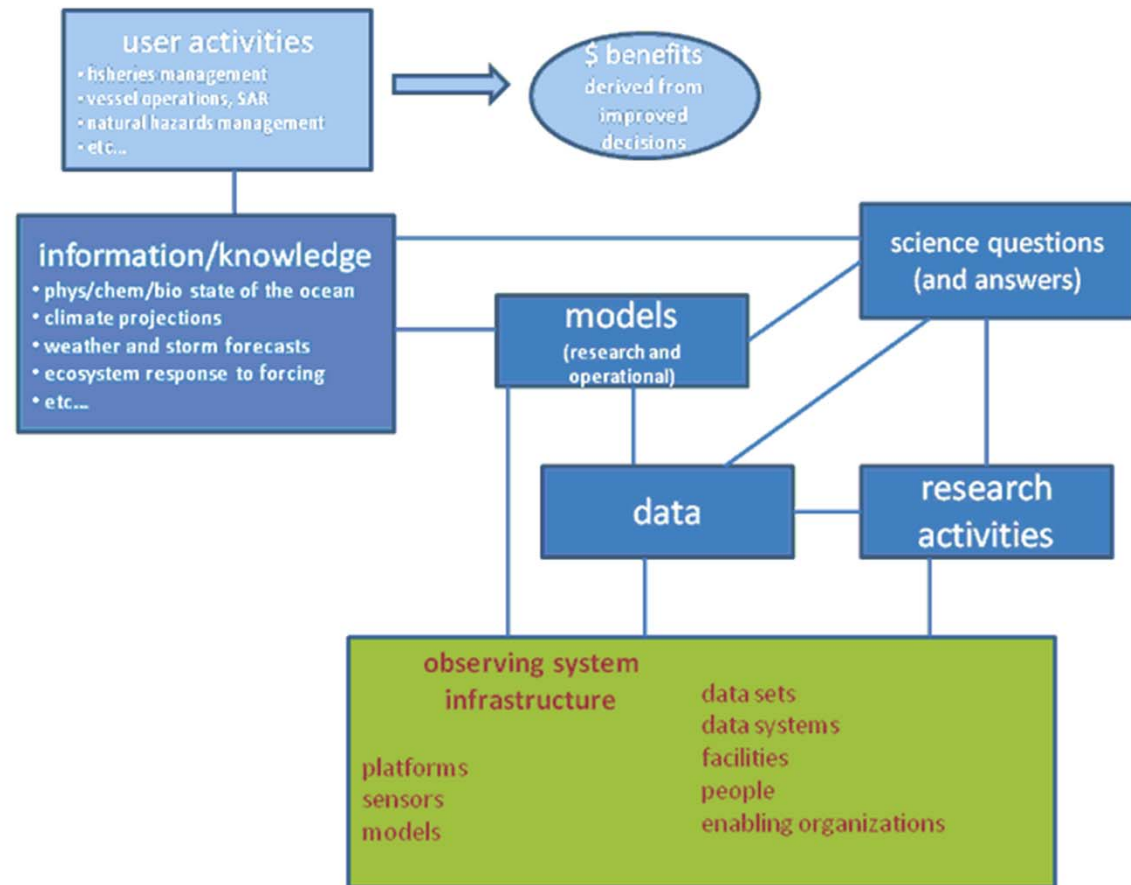
	Survey respondents composition			Global user group population			Global annual visits
	s <sub>1</sub>	s <sub>2</sub>	s <sub>3</sub>	casual	occasional	intensive	
<b>Rec boating</b>	0	60%	40%	3,780	2,264	1,510	177,000
<b>Shore recreation</b>	0	30%	70%	1,370	410	960	101,000
<b>Maritime</b>	0	0	100%	560	--	1,310	131,000
<b>Commercial fishing</b>	0	10%	90%	910	210	1,900	193,000
<b>Education</b>	0	70%	30%	910	70	30	5,000
<b>Sci/Eng/Mgr</b>	0	2-0%	80%	1490	30	130	15,000
<b>Military</b>	0	0	100%	250	--	250	25,000
<b>Gen public</b>	0	60%	40%	190,000	1,040	690	269,000

- About 200,000 individual users, >1 million “uses”
- <10,000 users account for 90% of uses



# Base Investments on Expected Returns

- Need a coherent financial model of how **investments** (assets, models, etc.) lead to **value**
- Commit to using it!





# Notes on Economic Value

- Not absolute – depends on societal context and (changeable) human preferences
  - As opposed to, for example, temperature!
- Defined at the margin – limits of extrapolation
  - Economic value is meaningful only for something that you can (realistically) “trade away”
- Value vs. impacts
  - Jobs, research budgets, ...
- Value added (GDP) is usually the best measure

# Rough Estimate of Value Generated

	Global annual visits	Approx. benefit per decision (\$)	Economic benefit generated (\$)
Rec boating	177,000	1	177,000
Shore recreation	101,000	1	101,000
Maritime	131,000	10	1,313,000
Commercial fishing	193,000	10	1,932,000
Education	5,000	1	5,000
Sci/Eng/Mgr	15,000	10	150,000
Military	25,000	100	2,500,000
Gen public	269,000	0	--
<b>Total</b>			<b>6,200,000</b>





# The Big Questions on Investments

- Basic: what is the value generated by NERACOOS today?
- Better: How do we know this is the maximum value we can generate with today's resources?
- Best: What is the additional value that NERACOOS can generate with the next increment of funding – and how should that be deployed?



# Next Steps on Incorporating Economics into NERACOSS Investment Decisions

- Compare global user population estimates with user group size to identify outreach opportunities
- Complete mapping of NERACOOS infrastructure components (existing and proposed) to products
- Estimate value of proposed future investments or alternative configurations of NERACOOS



# Operating Model & Framework

- Consensus on boundaries between public and private roles (economic theory can help)
- Frameworks and legal structures for partnerships (resource flows, rights)
- Liability, quality control, etc.
- Build on lessons learned at NWS, NOS





# Governance

- Mission
- Board composition
- Commitment of resources to market research, financial modeling, simulation experiments, and investment analysis



# Summary

- It has been a good 10 years since Aerialie
- The next 10 should be even better
  - Solid foundation in place
  - Need for ocean obs/info is clear
- Big challenge is sustained funding
- Build a governance and operational foundation for partnerships with private industry