

How can natural science and social science research be integrated into science advice so that it is useful to policy makers and the broader society?

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Jorn Schmidt (Keil University and SCICOM-ICES; SIHD)

Considerations for this session

- (i) What natural and social science evidence-based knowledge do marine policy makers and policy advisors want, consider, and need?
- (ii) What natural and social science evidence-based knowledge do marine dependent communities and stakeholder want, consider, and need?
- (iii) Are large scientific programs a good platform to stage this science and provide advice?
- (iv) What improvements, if any, would be recommended?
- (v) What is required to improve the marine science-policy-society interface?

Quick synopsis

21 ppts	GLOBAL/LARGE	REGIONAL/ NATIONAL	CASE STUDIES (9)	MODELS
N.....+S	IMBER	NOAA		
S.....+N		TransD-Arctic		
N&S	TBTI; NEREUS	Oceans Past Platform; Bering Sea; US Sport Fish Restoration Program	Small scale fisher's perceptions of climate and oceans conditions in the South Brazil Bight (GULLS project)	Poseidon; Agent BM
S			Part Fishers, Part Farmers: Livelihood Strategies and Diversification in a Coastal Community	
			Social-ecological dynamics of the artisanal fisheries in Sundarban mangrove forest	
			Social-Ecological Systems Analysis in the Concept of World Heritage: Fisheries Management in the Shiretoko	
			Economic impacts on Fishermen about Establishing Three Islets Marine National Park in Northern Taiwan	
			"Barter": The Persistence of Illicit Trade in Commercial Fishing Industry	
			How can natural science and social science be integrated for proper use of aquaculture area?	
			Residents' Perceptions of Developing Sea Farming Demonstration Zone in Mao'ao Fishing Community in Taiwan	
			Fishermen's Perception on the Marine Resources	

THEORY

The responsible path forward for management science for fisheries – Dorothy Dankel

REFLECTION

Does interdisciplinary research pay?
Reflections of a journey down the inter-disciplinary science path.
Stewart Frusher et al,

Social-Ecological Systems Analysis in the Concept of World Heritage

Fisheries Management in the Shiretoko World Natural Heritage Site

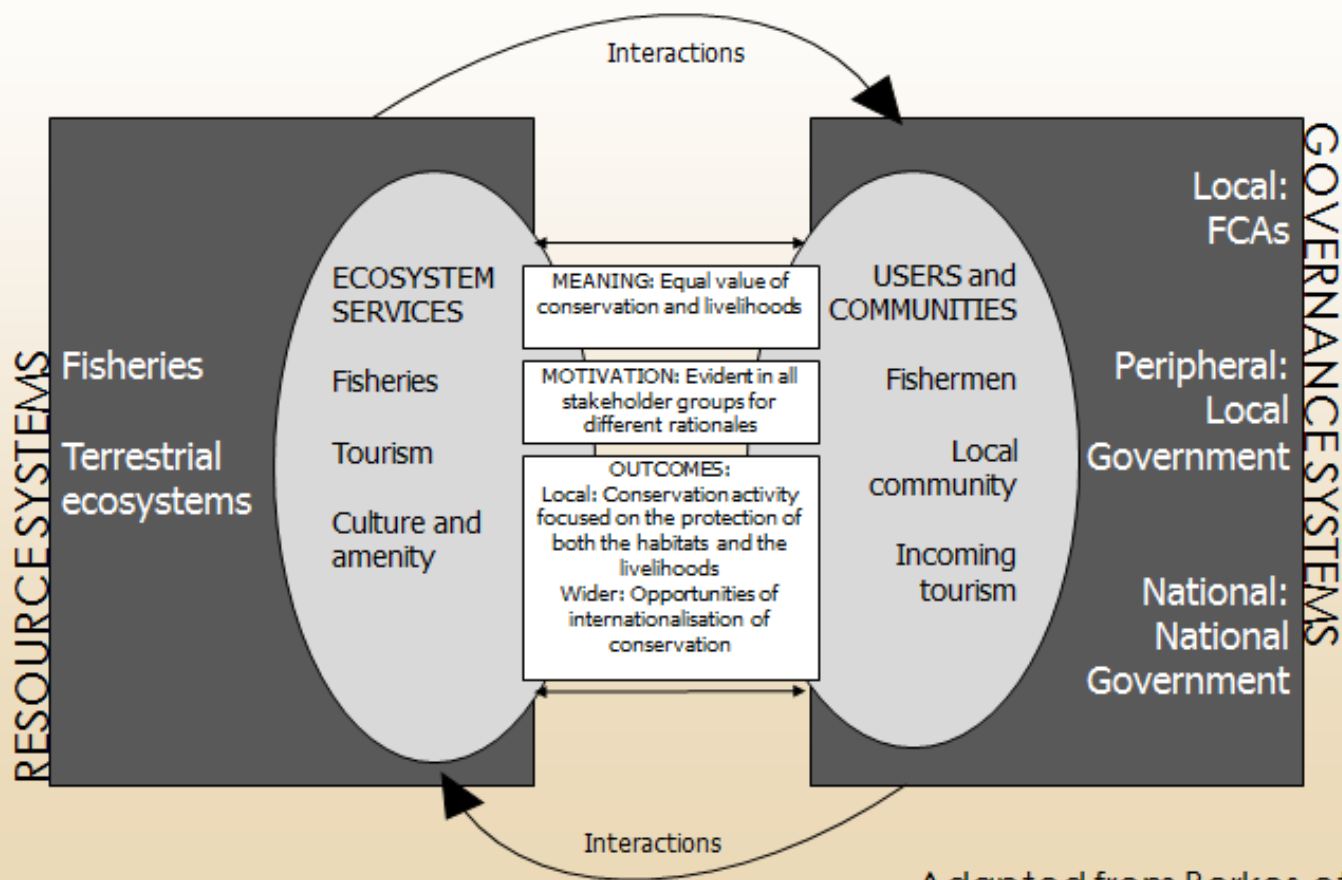
Eirini Ioanna Vlachopoulou

Mitsutaku Makino

Darien D. Mizuta

Hiroyuki Matsuda

Social-Ecological Systems Analysis



Adapted from Berkes et al., 2014

further discussion at MSEAS

- SP1: Fisheries as wicked problems/post-normal science
- SP2: What about starting with the social questions?
- SP3: The Scale Myth
- SP4: Integration, transaction costs and project evaluations
- SP5: On the (changing?) role of natural scientists
- SP6: All models are wrong
- SP7: Science and policy – on-going question
- SP8: Is there a need for a Research Forum for Inter-D research?

SP1: Fisheries as wicked problems/post- normal science



Let's embrace complexity: The role of transdisciplinarity in addressing global change. Chuenpagdee, Ratana

FISHERIES GOVERNANCE IS A WICKED problem

- 'Social problem' vs. 'Scientific problem'
- Difficult to define and differentiate from other problems
- No formula, no stopping rule
- No solution, only *resolution*
- Every problem is novel and unique
- Mistakes are costly



Rittel and Webber (1973); Jentoft and Chuenpagdee (2009)



Fish are
 NORMAL
 but
 Fisheries
 POST-NORMAL

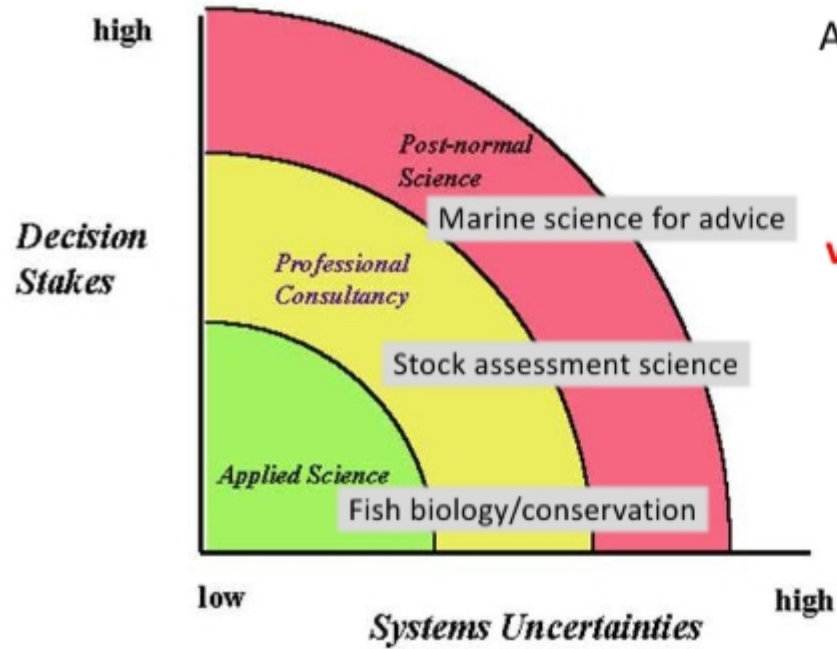
A Responsible Path
 Forward for Management
 Science for Fisheries

Dorothy J. Dankel
 University of Bergen, Norway
 Nordic Marine Think Tank



Responsible Path, WFC

Post-Normal Science



A methodology of inquiry that is appropriate for cases where **"facts are uncertain, values in dispute, stakes high and decisions urgent"** (Funtowicz and Ravetz, 1991)

Funtowicz, S.O. and J.R. Ravetz (1990). *Uncertainty and Quality in Science for Policy*. Kluwer Academic Publishers, the Netherlands.
 Funtowicz, S.O. and Jerome R. Ravetz (1991). "A New Scientific Methodology for Global Environmental Issues." In *Ecological Economics: The Science and Management of Sustainability*. Ed. Robert Costanza. New York: Columbia University Press: 137-152.

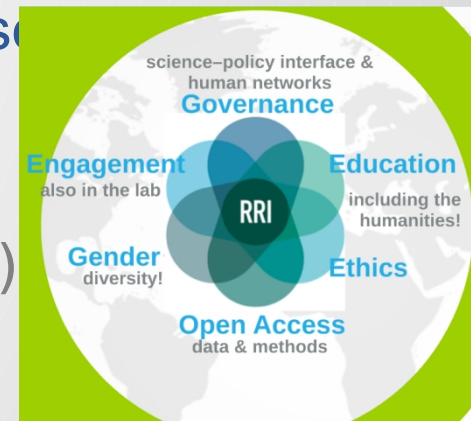
On the need for transdisciplinarity

- Let's embrace complexity: The role of transdisciplinarity in addressing global change
Chuenpagdee, Ratana –

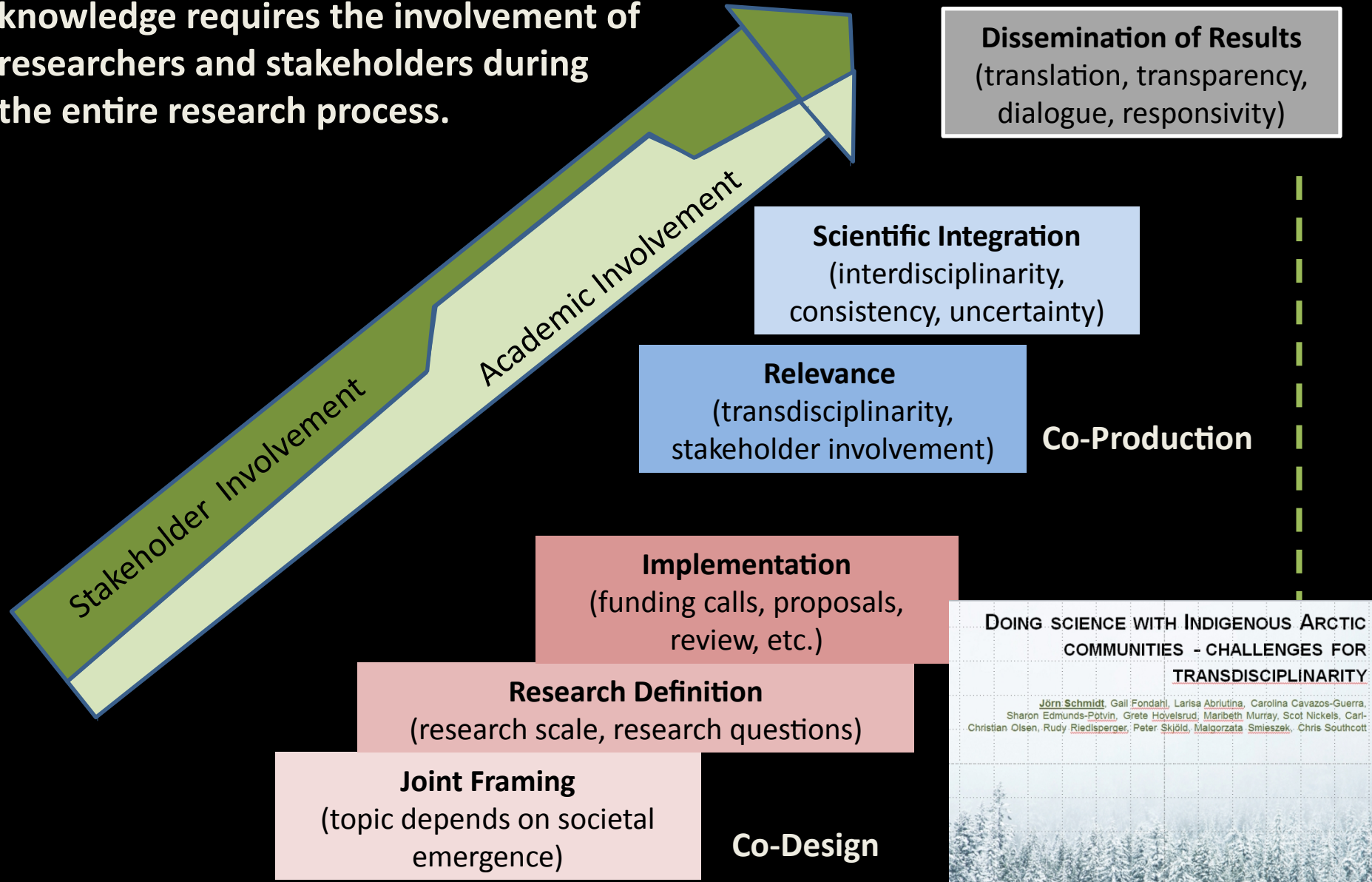
“No solution, only *resolution*”



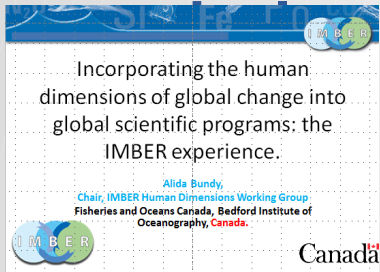
- Transdisciplinary science with indigenous arctic communities: challenges and paths forward Schmidt, Jorn
- The responsible path forward for management science for fisheries Dankel, Dorothy –
“Integrated Solutions” (focus on human processes on model output)
- Responsible Research and Innovation
(Co-design; co-production of research etc.)



Co-design and co-production of knowledge requires the involvement of researchers and stakeholders during the entire research process.



SP2: What about starting with the questions?



- Too often, Research questions framed through natural lens
- Social Sciences as an add-on

- Need to be integral to the design
- Even the starting point?
- See case studies

So
Natural Sciences



**How can natural science and social science be integrated for proper use of aquaculture area?
-A case study of Shizugawa bay, Japan-**

Yinji Li

School of Marine Science and Technology
Tokai University, Japan

Background factors

a. Several types of farming in single designated area for risk diversification.

b. Illegal changes of aquaculture types

c. Illegal lease of fishery right

d. Silent approval on the illegal activities.



Map of fishing ground distribution

5. Conclusion : Integration of NS and SS for proper use of Shizugawa bay

◆ Key questions towards proper use

/Are current utilization rules most appropriate?

/Would agreements on utilization of fishing ground function well in the future?

/would it lead to development of regional fisheries in the future?

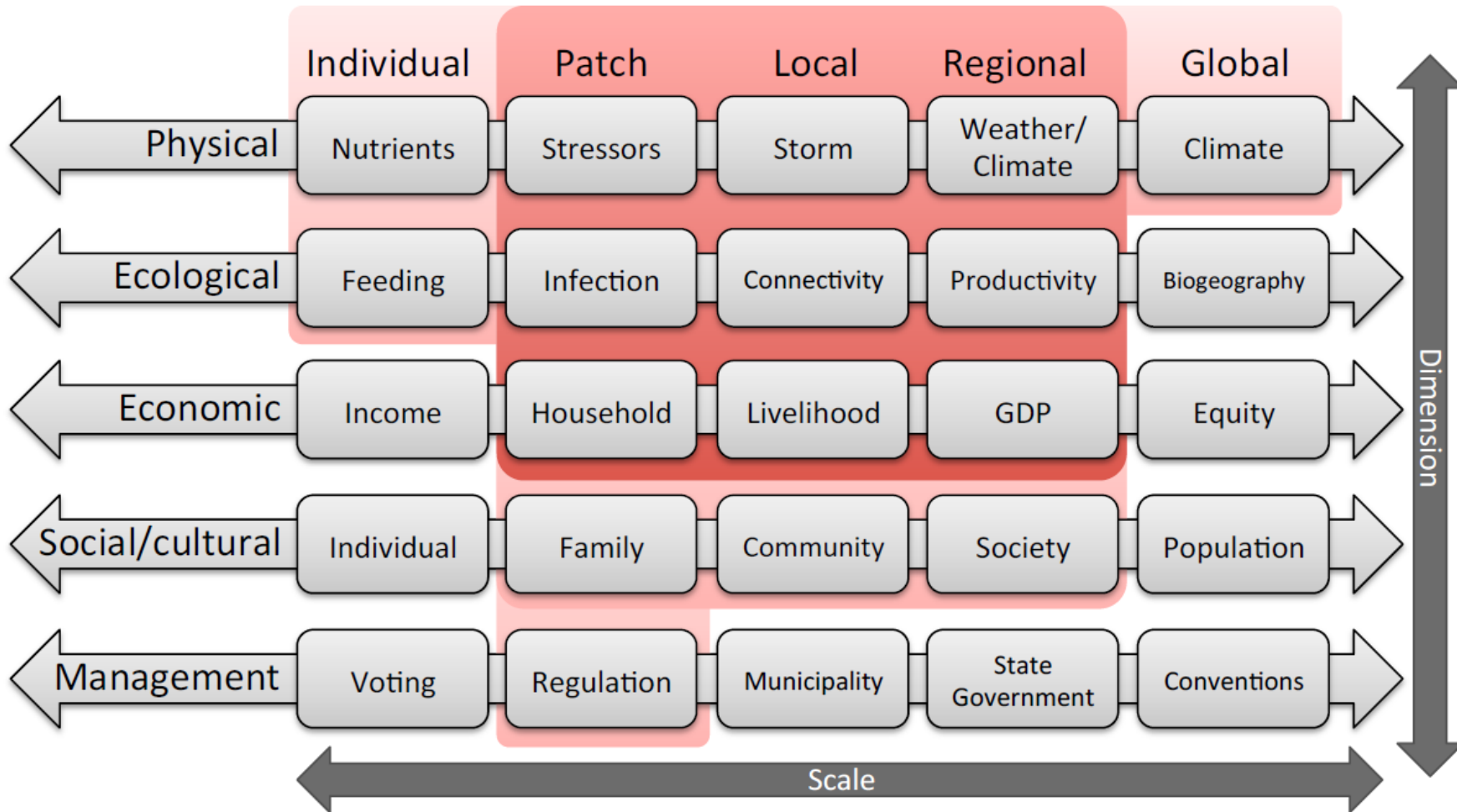
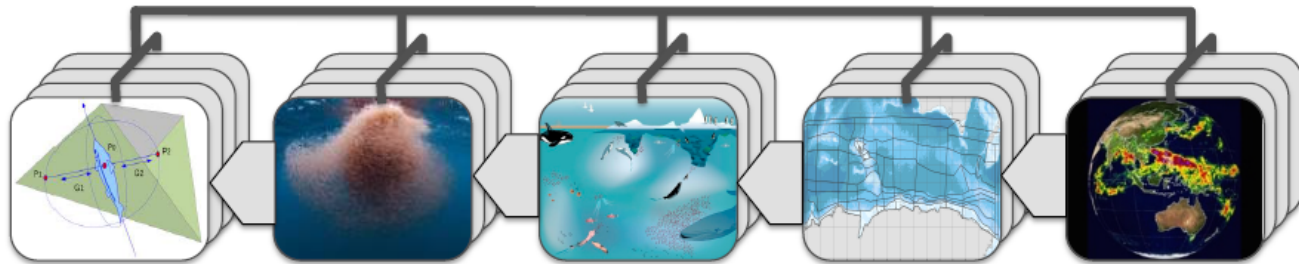


◆ Expected scientific support

/Estimation of carrying capacity

/Estimation of optimum production level

/Estimation of optimum operation scale



An open, web-based, interactive information system

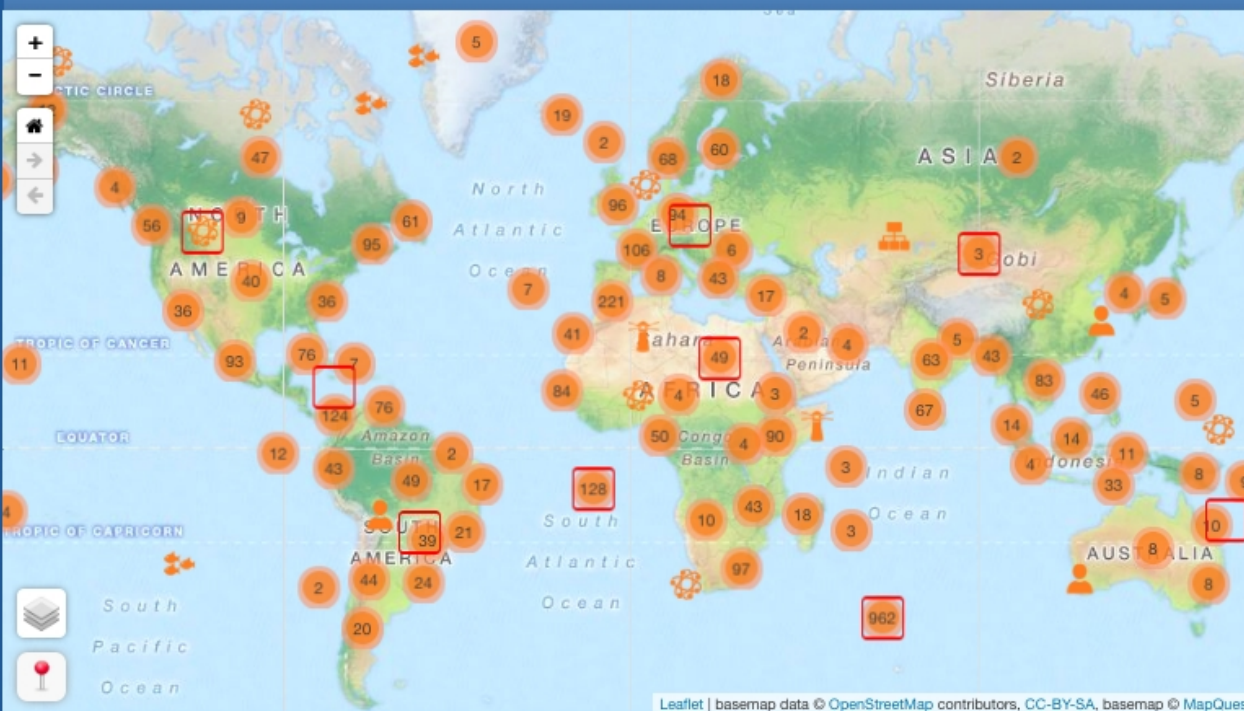


Select Language | Login | Sign up | HELP



Map

Table

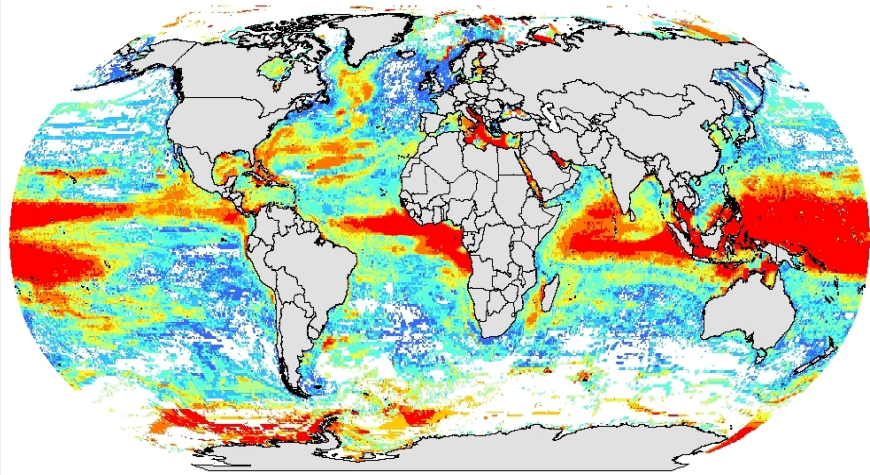


- Who's Who in SSF research
- State-of-the-Art
- SSF Profile
- SSF Organizations
- SSF Capacity needs
- SSF Experiences
- SSF Case study
- SSF Guidelines

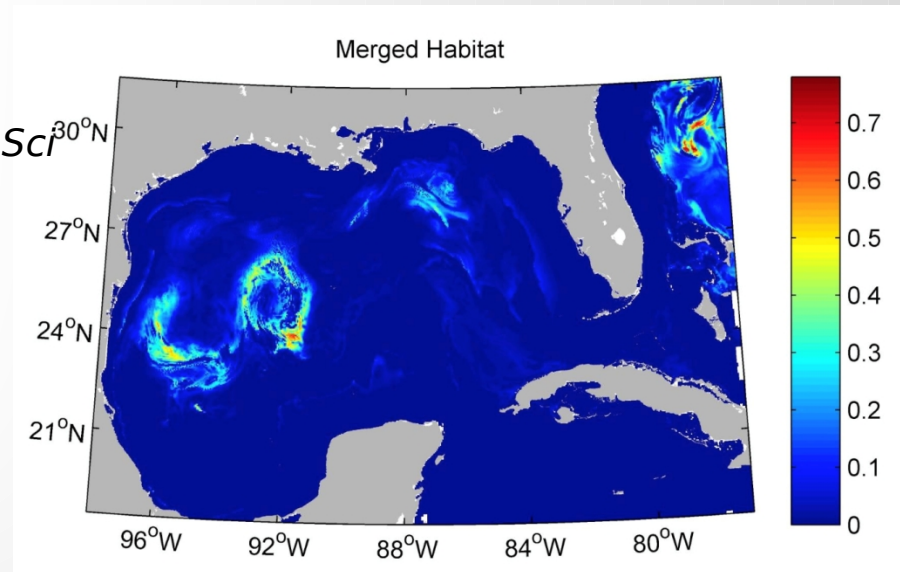
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Issf.toobigtoignore.net

Research Focus: Cross-scale



Jones and Cheung (2015) *ICES J Mar Sci*



Boustany et al. (in prep)

NEREUS
PROGRAM
Predicting Future Oceans

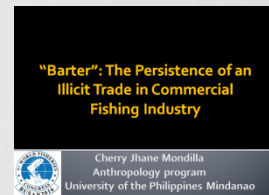
日本
財団
THE NIPPON
FOUNDATION

SP3: The Scale Myth

- Both have global surveys:
 - Remote Sensing – Global
 - World Bank/FAO collect data at the global level
- Both have national/regional surveys
 - Fisheries independent surveys
 - Censuses – National/sub-national/smaller
- Both have small-scale studies
 - Fish behaviourFish harvester behaviour – where/when/how?
 - Fish habit studies.....flow of fish and benefits in fishing communities

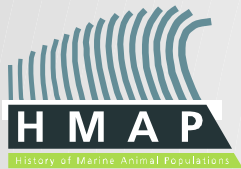
HOWEVER – other types of scale issues – eg.

- Urgent issues of communities don't match scientific interest (Jorn Schmidt)



SP4: Integration, transaction costs and project evaluations

Integration takes time



1999-2010



WGHIST 2009-...



2011-

EU COST Action
Oceans Past Platform

Poul Holm and Henn Ojaveer
with contributions from James Barrett, Gesche Krause, Cristina Brito and Kathleen Schwerdtner Mániz

The 7th World Fisheries Congress, Busan, South Korea, 2016

The image shows a slide from a presentation. At the top left is the COST logo (European Cooperation in Science and Technology) and the OPP logo (Oceans Past Platform). The main text reads 'EU COST Action Oceans Past Platform' followed by the names 'Poul Holm and Henn Ojaveer' and a list of contributors: 'with contributions from James Barrett, Gesche Krause, Cristina Brito and Kathleen Schwerdtner Mániz'. At the bottom left is the logo of the University of Tartu (Tartu Ülikool / Universitas Tartuensis) and the text 'The 7th World Fisheries Congress, Busan, South Korea, 2016'.

oceans past platform



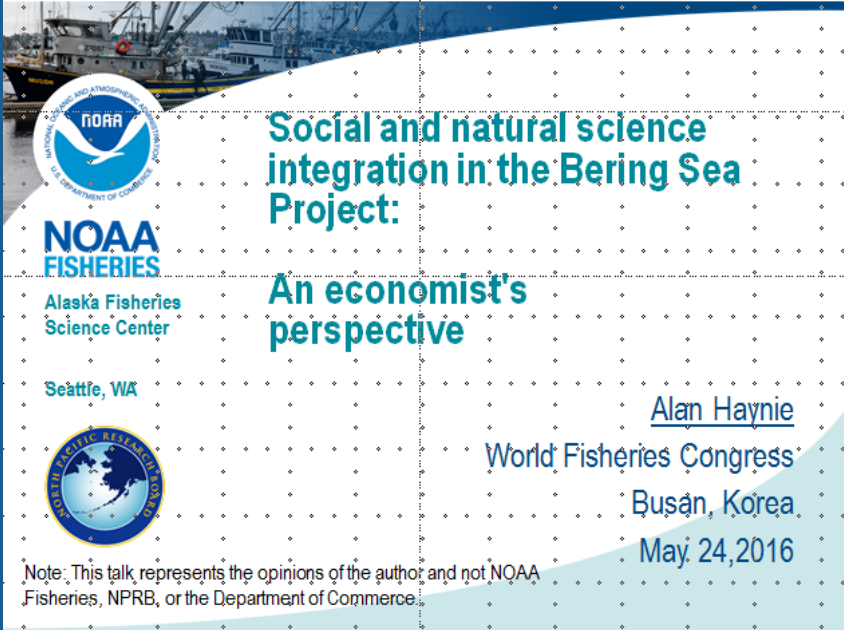
OPP 2015-2018


Integration is Hard!


Need to do it early

Need to do lots

Needs to be a driving force in the project




NOAA
FISHERIES
Alaska Fisheries
Science Center
Seattle, WA



**Social and natural science
integration in the Bering Sea
Project:**

**An economist's
perspective**

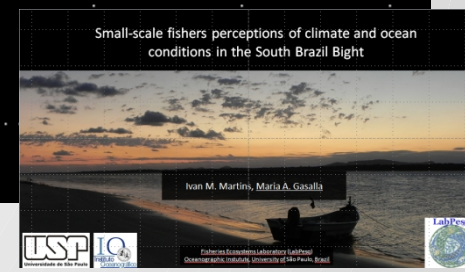
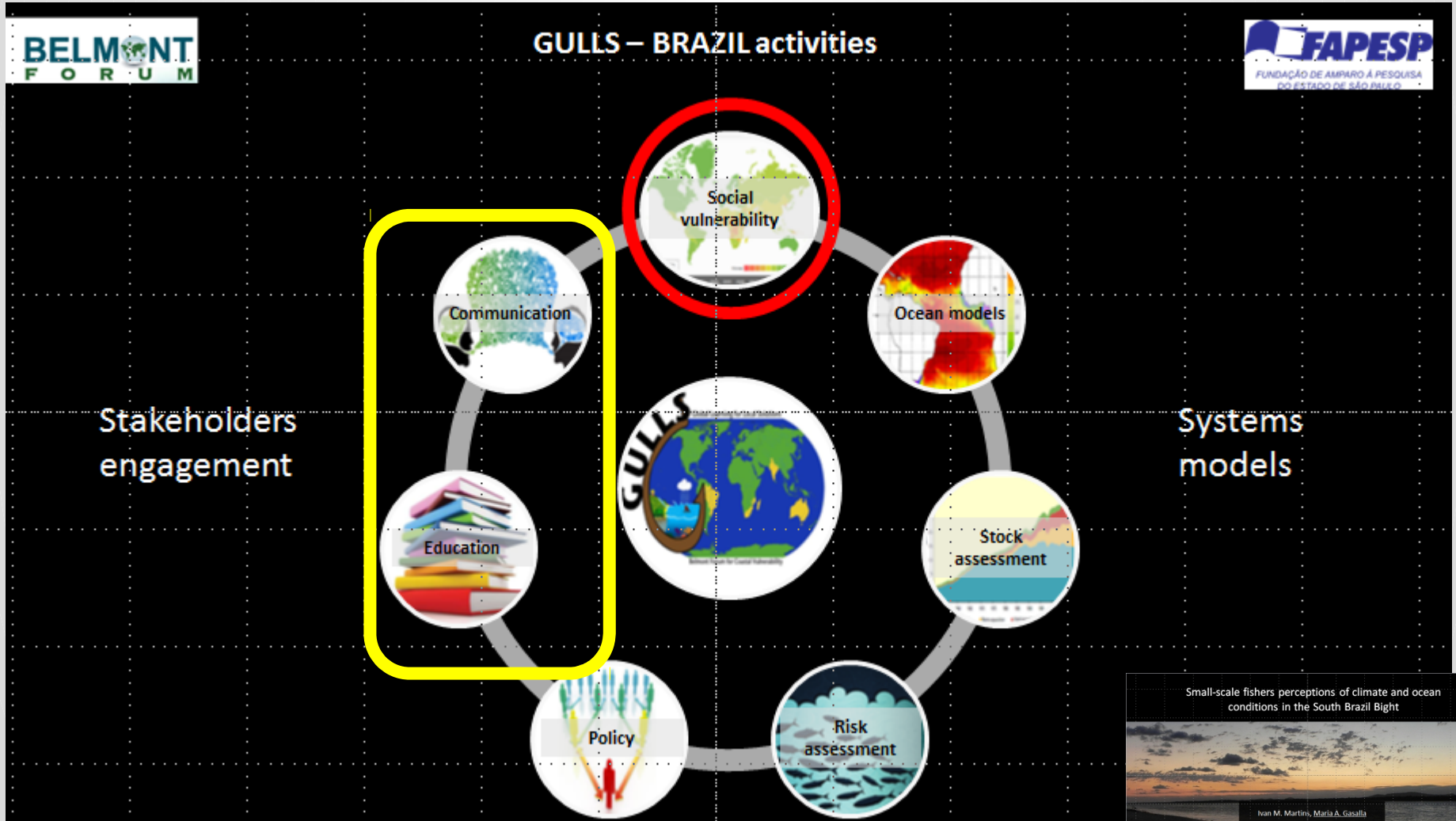
Alan Haynie
World Fisheries Congress
Busan, Korea
May 24, 2016

Note: This talk represents the opinions of the author and not NOAA Fisheries, NPRB, or the Department of Commerce.

Transaction Costs

- It takes time to engage with communities, to build trust
- Can't helicopter in, or view remotely from a satellite

Transaction Costs



SP4: Integration, transaction costs and project evaluations

- Project components may depend on other parts of the project and can be held up.
 - Particularly true of integrating project components
- Project organisation often less interactive than required
- Funding for research projects normally doesn't include the development of the research question
- Funding challenges for interdisciplinary projects
- Also does not include a project evaluation

(changing?) role of natural scientists

- Do natural scientists need to change?
- Do social scientists need to change?
- Do economists need to change?
- How often do social scientists look to engage natural scientists in their projects?

SP6 Responsible Modelling

- What if all models are wrong? (Dorothy Dankel)



Seattle, WA



Social and natural science integration in the Bering Sea Project:

An economist's perspective

Alan Haynie
World Fisheries Congress
Busan, Korea
May 24, 2016

Note: This talk represents the opinions of the author and not NOAA Fisheries, NPRB, or the Department of Commerce.

- Avoid naïve projections / predictions and ensure that messages are properly understood
 - More work with end-users needed to understand how they interpret uncertain outputs.
- How do hypotheses best drive research across disciplines?
- How do bottom-up vs. top-down models look different?

SP7: Science and policy

– on-going question

policy – on-going question

- Overall, less focus on this issue
- TBTI – Input to FAO Small Scale Fisheries Guidelines



- Most research programs working to influence policy
- NEREUS identified need for social innovation that can bring about sustainable and equitable ocean policies –
 - More science?
 - More researchers?
 - More engagement?
 - Identifying social needs
 - Opportunities for networks beyond traditional academic partnerships
 - Nurture research entrepreneurship in academia.



communication
advice
science

Have we studied
policy makers
perceptions?
(M. Makino)

ORDINARY PEOPLE
FILL THEIR

HEADS
WITH ALL
KINDS
of
RUBBISH
AND THAT MAKES IT HARD TO GET
AT THE STUFF THAT MATTERS

SP7: Science and policy – on-going question

- How can different “types” of scientists influence policy
 - Government scientists (fewer social scientists)
 - Academics
 - NGOs
 - Consulting firms
 - Community practitioners (?)
- Transdisciplinary means going between, across and beyond disciplines and across “types” of scientists

SP8: Is there a need
for a Research Forum/
Commuciation
Network for Inter-D
research?

Progress is happening and happening rapidly

National Centres

- Sweden: Stockholm Resilience Centre
- Australia: Centre for Marine Socioecology
- Growing national integrated social science, economics, and IEA programs (e.g., NOAA)

International agencies

- PICES: Human dimensions of marine systems
- ICES: Strategic Initiative on the Human Dimension
- IMBER: Human dimensions working group

International conferences

Within conferences

- S13-How can natural science and social science research be integrated into science advice so that it is useful to policy makers and the broader society?
- S05MS1- GS: Management and social ecological systems 1 & 2.
- S07- Bio-economic, socio-biology and other mixes. The advantage of linking disparate data to gain new insights into the exploitation of marine fish resources.

Brest
France

**Understanding marine
socio-ecological systems**
including the human dimension in
integrated ecosystem assessment

May 30 - June 3, 2016

www.MSEAS.org



But how well is it co-ordinated????

Stewart Frusher, CMS

- Targeted

communication
platform



Worth noting

- Science that will be relevant for people almost always has a strong development component, which requires the engagement not only of people and scientists, but also practitioners and institutions (Jorn Schmidt)
- Need to new methods and innovation to get to the next level of thinking for sustainable oceans
- Controversial issues or disasters as catalyst for action
- Issue based research

