

Human dimensions research to improve science networks and marine resource management effectiveness

“Why won’t you talk to me” (the “me” is “you”)

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Creating space for interdisciplinary marine and coastal research: five dilemmas and suggested resolutions

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THEMATIC SECTION
Interdisciplinary Progress
in Environmental
Science & Management

SUMMARY

Important changes are needed to disciplinary theories and methods to support interdisciplinary and integrated ocean and coastal management policies and implementation. This review argues that theories and methods should conform to a perspective that ocean management is a societal activity with diverse goals ideally informed by interdisciplinary information. The review focuses on the integrated coastal management (ICM) and marine ecosystem-based management (EBM) frameworks and the marine protected areas (MPA) management tool. It begins by suggesting that at present there is a notable imbalance in the degree of effort allocated to monitoring the ecological and social dimensions of ocean resource use and policy processes. Based on how Western society and an influential epistemic community construct 'the environment' and society's relation to the environment, natural sciences play an inordinately important role in the description of the problem and policy recommendations. The discourse advocating for a global networks of marine protected areas, without adequate consideration of society impacts and responses, represents an example of this imbalance. Rebalancing the contributions of scientific disciplines encounters various dilemmas with epistemological, methodological and sociological dimensions. The analysis concludes with suggestions for balancing ocean and coastal interdisciplinary research and reframing key issues, creating self reflexive and multidisciplinary research teams, and reworking educational programmes.

Keywords: coastal, ecosystem-based management, integrated coastal management, interdisciplinary research, marine, marine protected area

INTRODUCTION

This review paper primarily considers the role and practice of research to inform ocean policy making and the realized or potential role of interdisciplinary research (IR). IR can be defined as investigations which link epistemologies,

theories, methods and skill sets across disciplines, which had previously been pursued independently, to create synthetic understandings (Pickett *et al.* 1999). IR, as conceptualized here, goes beyond the linking of disciplines, theories and methods within the natural, physical or social sciences, to consider the more challenging linkages between these realms.

The rationale for this review is grounded in a growing interest in IR-based environmental policy making (Pickett *et al.* 1999; Tress *et al.* 2005; Omenn 2006), while the current state of ocean-relevant IR and the policy conditions to foster such IR are inadequately developed at the present (Mascia *et al.* 2003; Campbell 2005). This review considers a variety of reasons for the current state of ocean-relevant IR and IR-based ocean policy making, and will focus on one of the key hindrances to progress, namely how ocean environmental problems are constructed (Steinberg 2001). Currently, natural sciences dominate the construction of environmental problems and there is little integration of natural and social science. IR will never be adequately developed unless there is a significant demand for synthetic information with adequate human and financial resources.

The predominant environmental policy process has assumed, implicitly or explicitly, that the key knowledge gap to effective policy making is inadequate knowledge of ecological function (Christie *et al.* 2002; Ruckleshaus *et al.* 2009). With this construct, the priority has become developing adequate understandings of biology, non-human population dynamics, ecological communities and ecosystem function. Such information has been fed into the policy process, with the expectation that it will provide the key to raising awareness of environmental problems and lead to policy solutions. This has been a generally failed experiment in policy making, resulting in incomplete understandings of scale and interrelationship, inadequate policies and frustrated scientists of various disciplines (including ecologists). As an alternative, if environmental problems are construed as imbalances in coupled social-ecological systems, then the role of IR necessarily expands within the policy-making process. A comprehensive, effective and balanced policy process requires detailed empirical understandings of not only ecological, biological and physical processes, but also humanistic, ethical and social processes, derived from both basic and applied research.

A review of the predominant discourse surrounding ocean decline is a useful starting point. The decline of ocean

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Take home message

- While improving, a persistent disciplinary imbalance persists within the EBM and MPA discourses
- Reason 1: worldview → social construction → epistemic community
- Reason 2: inherent disciplinary tensions
- Resolution: educational change and re-balanced research agenda

Background

Is Puget Sound (or PICES) science integrated?

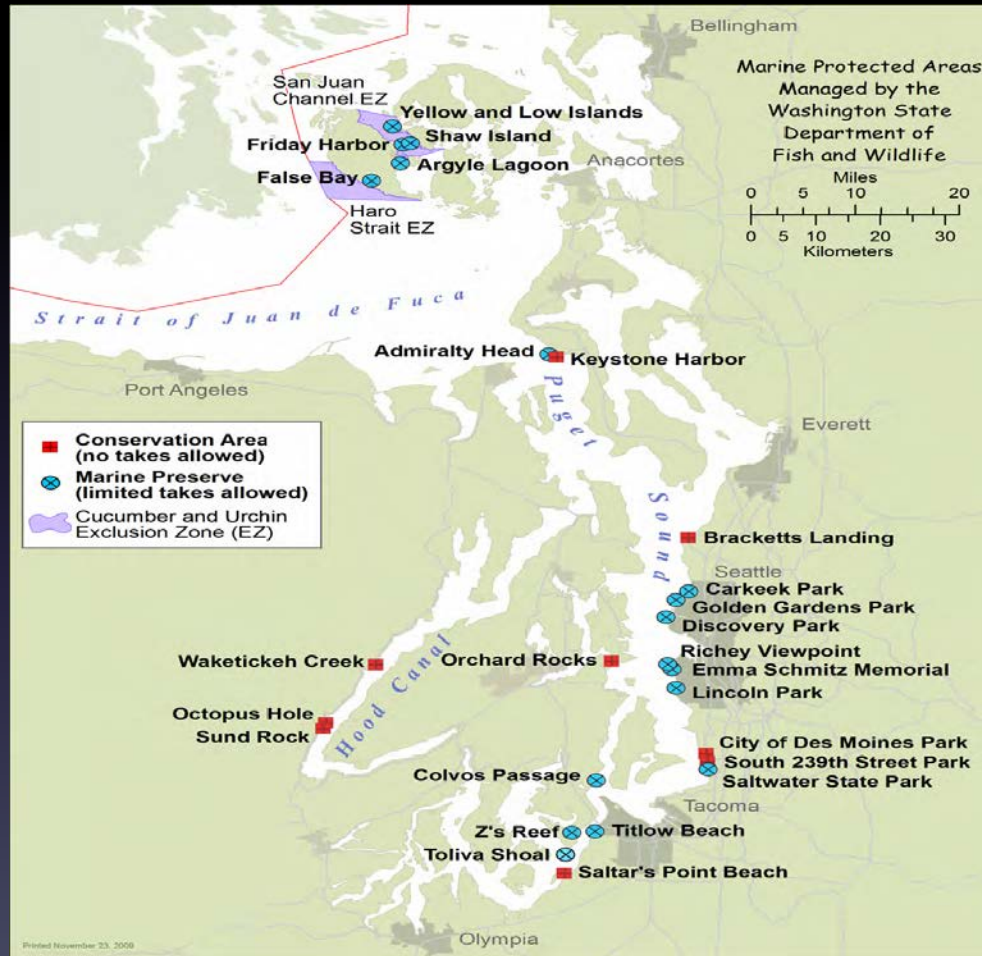
- Between disciplines
- Between topical focus areas
- Between institutions
- Between science and policy

Has the research community been framing the “research problem as a decision”?

Background

- The increased need for linkages between the various disciplines and between science and policy making is becoming more apparent (McClure and Ruckelshaus 2007 and Weber et al. 2010)

Background: Site



Methods

Initial Project Scoping and Design:

- Focus is Puget Sound nearshore habitats, species and processes
- Sample included researchers and policy makers/resource managers working with researchers

Data Collection: TRIANGULATED approach

- Preliminary interviews (3 key informants)
- Focus Groups in Olympia and Seattle (2): Agencies, academics, tribes, etc.
- Social Survey (254 total responses): Researchers and policy makers
- Semi-structured, key informant interviews (20 key informants)

Methods

Data Analysis:

- Interview and focus group data were transcribed and analyzed using an inductive, exploratory approach
 - ATLAS.ti v.7
- Survey responses were analyzed using descriptive statistics and with social network analytic methods
 - UCINET Software for Social Network Analysis (Borgatti et al. 2002)

Survey question

- "Please identify **5-10 researchers** that you **most frequently** collaborate with in the course of your work, and provide information about each of these contacts... If you are not a researcher, please answer this survey with a focus on your contacts who are researchers...
- The term "**collaboration**" will be used broadly to encompass diverse interactions, which could include:
 - Direct collaboration on shared research projects;
 - Consulting with researchers to discuss ideas and get feedback;
 - Sharing research findings;
 - Or participation in the same panel, committee, volunteer program, or other group or activity."

Narrative Analysis

The screenshot displays the ATLAS.ti software interface. The main window shows a document titled "P41: Jane Lubchenco_NOAA_October_30_2012.docx". The text in the document is as follows:

79 Jane: um I was aware of cti before I went to noaa, in part because there was a lot of interest and buzz about it um in the ngo community in the conservation community more broadly I um my first year at noaa so I started at noaa in march of 2009 and my um family had already planned a dive trip to Raja Ampat for December of that year and because I was always already going there in my personal capacity I tacked on some additional noaa related visits to various ministries and different people around Jakarta while I was there. And also was briefed by the relevant noaa team to come up to speed on what the cti efforts were all about and what the entailed. Also, I think it was that year um or maybe the following, it must have been the following, no it was the following year the cop meetings in Copenhagen I attended and I think those were in December but I'm not sure about that at any rate I had met the key minister who was involved on the Indonesia part with cti, I had met him in Jakarta he was the minister of fisheries and they had a broader portfolio than just fisheries I don't remember his full title so I had met and interacted with him fairly extensively in Jakarta and he was extraordinarily proud of cti and of Indonesia's leadership in cti and when I went to Copenhagen he was there as well as was his president, sby, and he gave his presentation his plenary presentation at the meetings was all about cti and how important that was for the region. So for multiple different reasons I had a occasion to be briefed about and come up to speed at least at a very high level with the cti efforts that noaa was involved in. the final piece of that was in preparation for the coral reef symposium meetings in um Canberra, um I again connected with janna and with rusty brainard and the other noaa folks and um was briefed on the current state of play. At those meetings I met with the leadership team from the governance side so the individuals the delegates from the different countries who were taking advantage of the international coral reef symposium meetings to come together and have a some of their routine meetings and make decisions so I interacted directly with the leaders of the program from the different nations that were involved and had opportunities to talk to them about the program, what they thought about it what changes were needed, etcetera, so my engagement in the effort was um varied but always at very top level. So I can't speak to how the program has evolved though time um or you know what their rationale was for setting it up I mostly saw and was very very impressed with the what I would say very significant progress had been made in bringing diverse countries, diverse cultures together around the concepts of both protecting communities and ocean coastal ecosystems in light of climate change and ocean acidification. But around the concepts of ecosystem based sustainable fisheries um and more broadly just ecosystem based management.

10 Patrick: yeah that's nicely put actually jane and I think that you know as you talked about there I mean the cti program is really intended to work simultaneously on biodiversity conservation, climate change, planning and adaptation, fisheries management um and also as you stated really try to pull together these countries in those efforts crossing not only within the Asian countries difference but across the Asian Melanesian barrier if you will, which is a very significant one

11 Jane: It is but even within single countries like Indonesia you know it is so different from on island to another and so you know and that is just amplified across the region. I also should mention Patrick that I interacted fairly extensively with the usaid folks about the program in part because I was so impressed with the program I wanted them to appreciate how important it was and how unusual it was and growing capacity in a way that I think is actually very unusual and very savvy centered on problem solving and drawing on cultural differences but really training leaders to work together and solve problems in a collaborative cooperative fashion with ngos and with local communities and I think that is highly unusual and was working in a very impressive fashion I was deeply disappointed with the program when the program was not refunded and think that it really is exactly the kind of program that should be being supported it takes time to grow capacity and I say grow capacity deliberately, people usually talk about build capacity and building

The Code Manager window on the right lists the following codes:

- Awareness raising~
- Capacity development: institutional~
- Capacity development: Leadership developer~
- Challenges: General~
- Challenges: Institutional capacity~
- Context impact~
- Empowerment~
- Enforcement and compliance~
- Governance: Horizontal integration~
- Governance: Inter-NGO interactions~
- Governance: NGO-government interactions~
- Governance: Vertical integration~
- Great quotes~
- Innovative strategies~
- Institutionalization~
- Learning networks~
- Monitoring~
- Next steps~
- Policy development~
- Program design issues and observations~

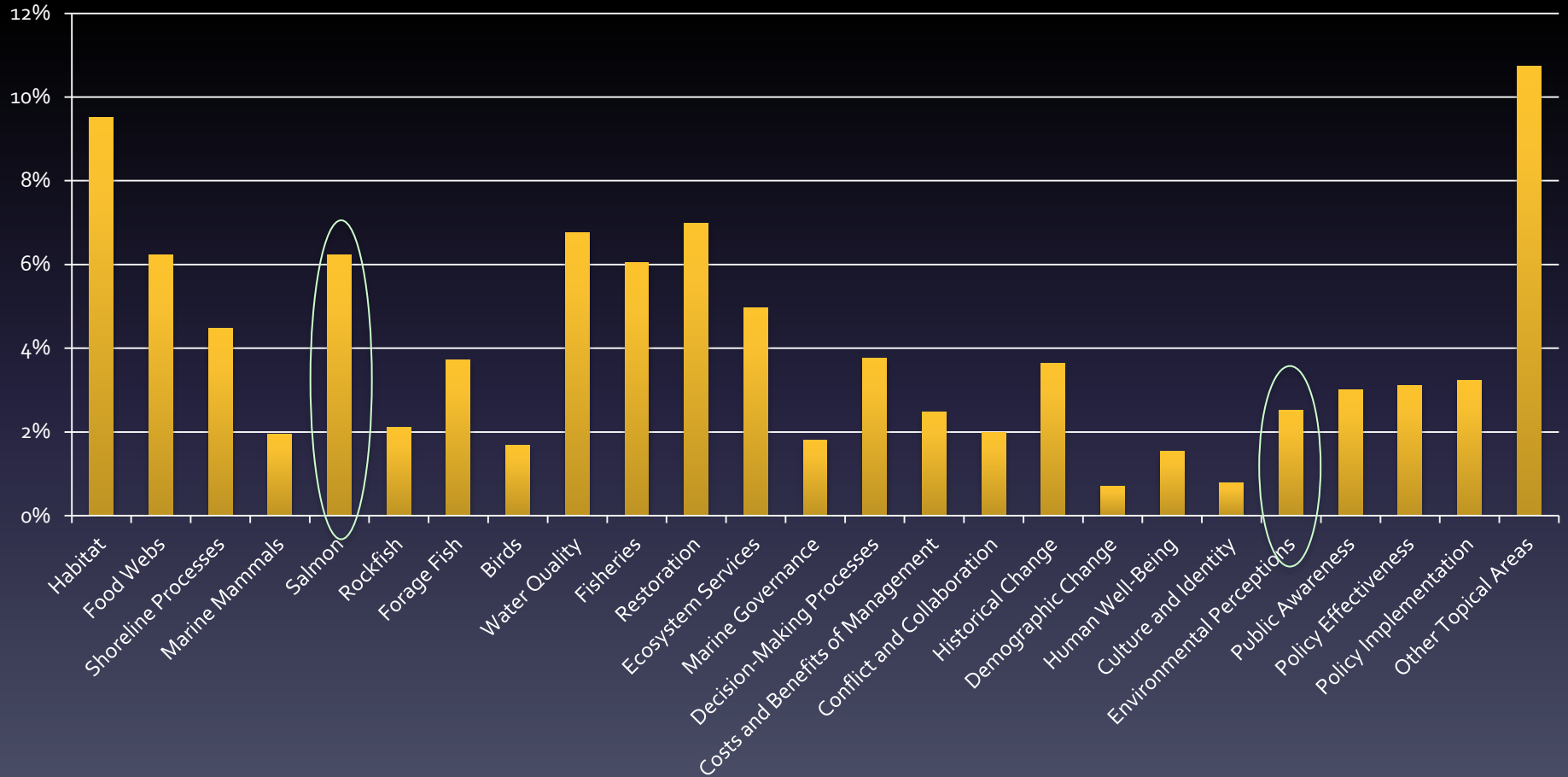
A note is visible below the code list:

11/19/2013 11:10:25 AM
Examples of when leadership among people involved in the CTI was fostered, or CTI/USCTI participants demonstrated leadership. Leadership could be demonstrated by CTI nationals (at the national or community level) or expats.

At the bottom of the window, it shows "33 Codes [1] Capacity develop All Name - Title".

Description of the Network

Distribution of Topical Areas of Focus Listed By Survey Respondents

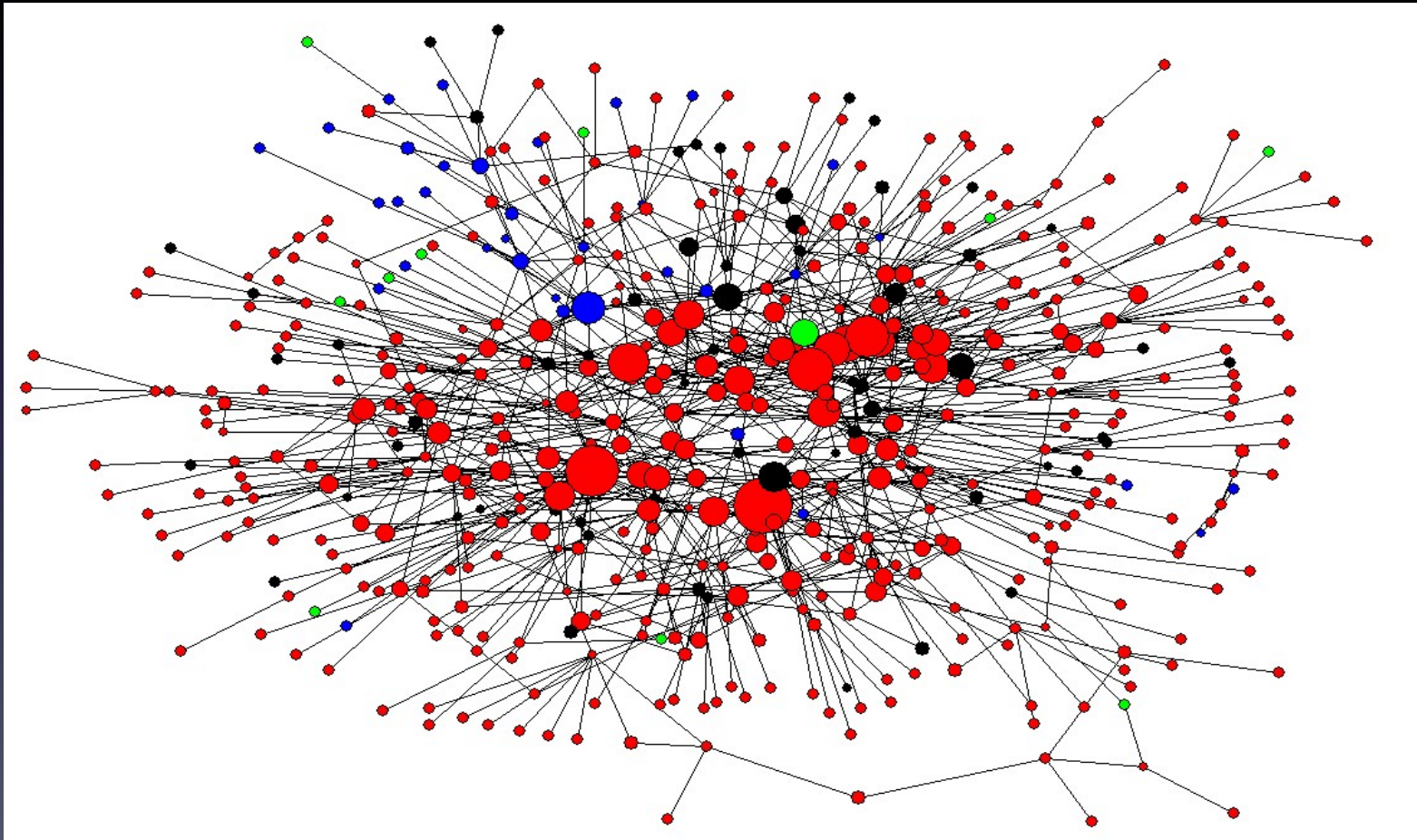


Social Network Analysis

Discipline Legend

- Natural Science
- Social Science
- Other
- Interdisciplinary

Entire network map: 60% ecologists, 12% policy analysts

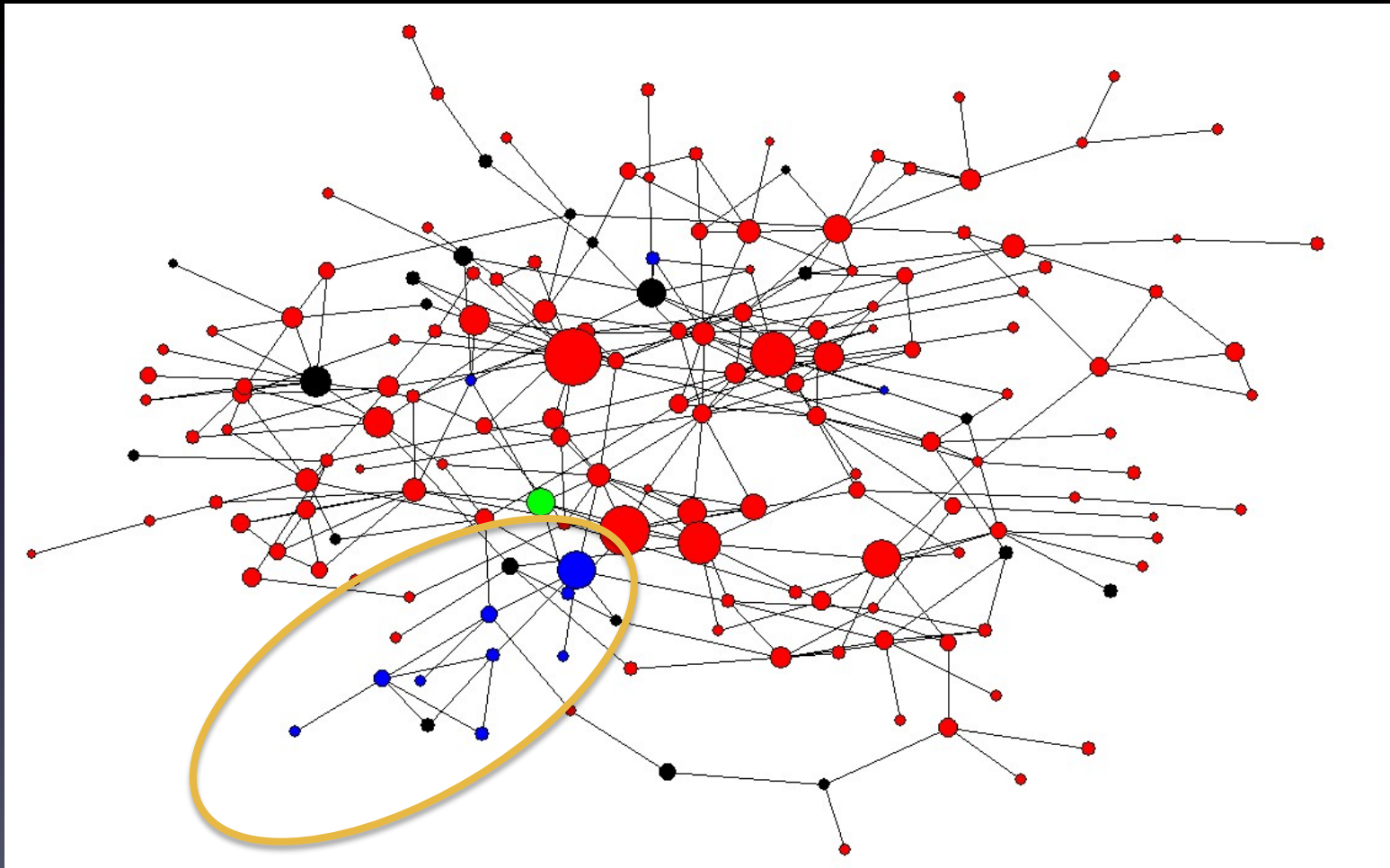


Social Network Analysis

Discipline Legend

- Natural Science
- Social Science
- Other
- Interdisciplinary

Researcher network

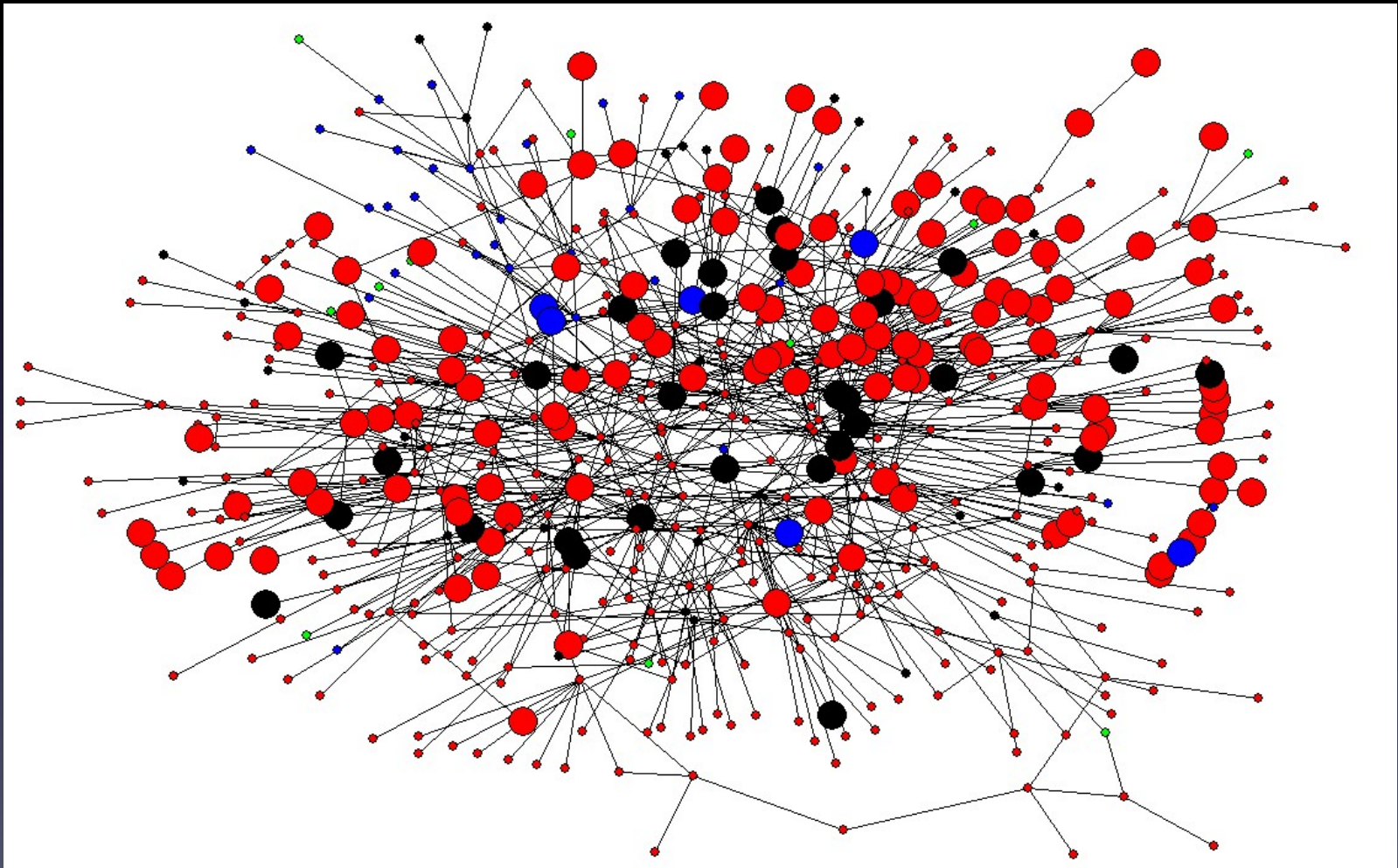


Social Network Analysis

Topic: Salmon (whole network)

Discipline Legend

- Natural Science
- Social Science
- Other
- Interdisciplinary

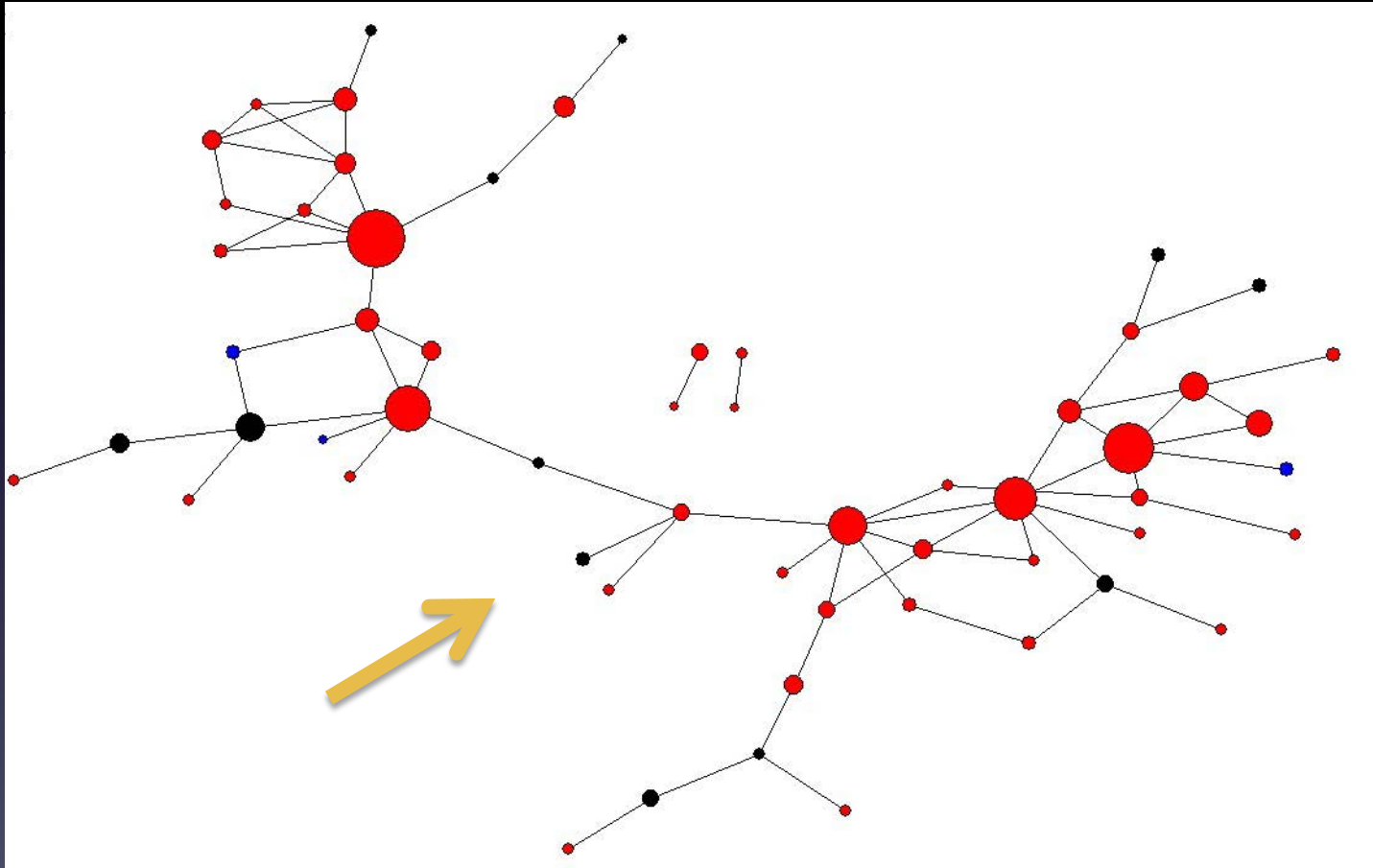


Social Network Analysis

Topic: Salmon (researchers only)

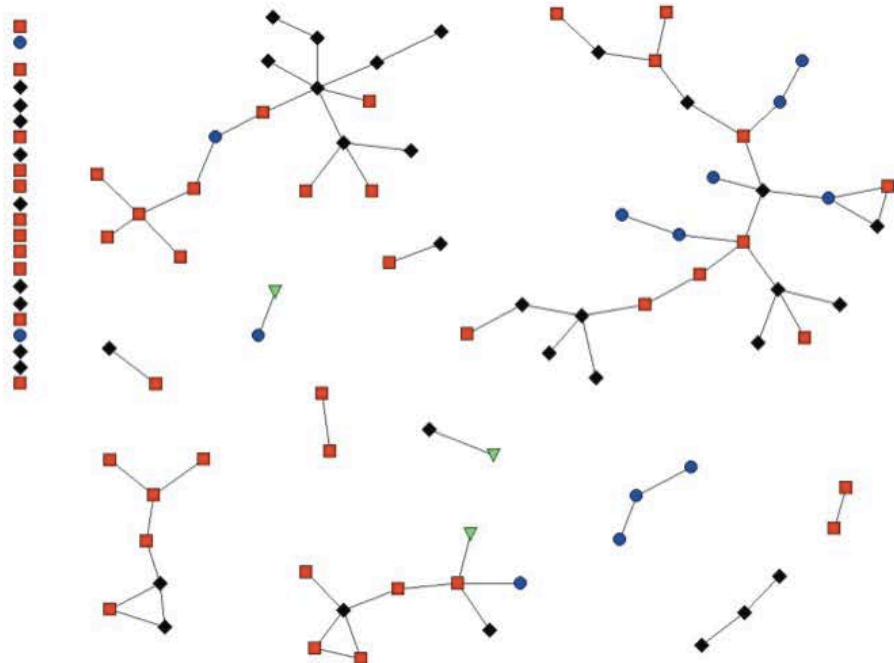
Discipline Legend

- Natural Science
- Social Science
- Other
- Interdisciplinary



Network Fragmentation

A) Environmental Perception and Awareness



B) Salmon

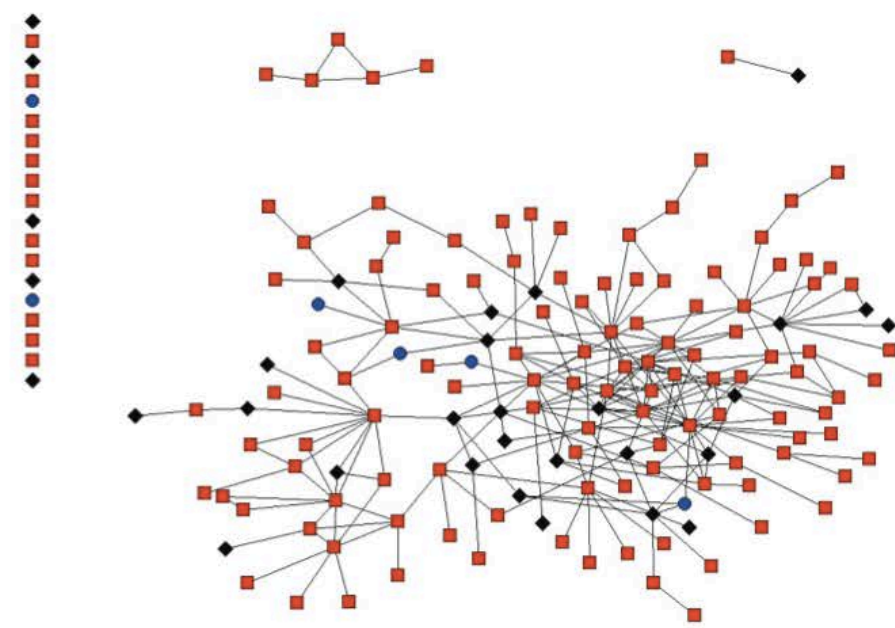


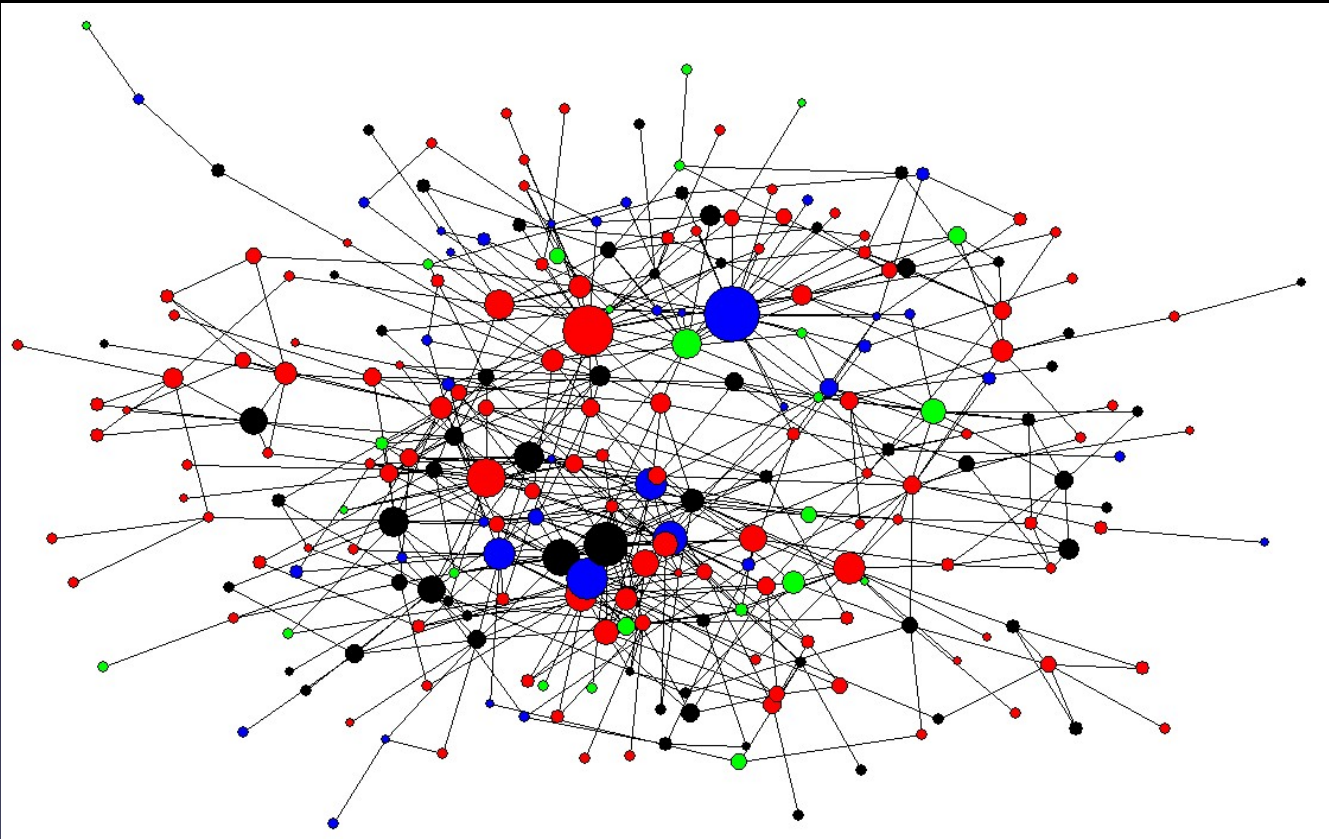
Figure 3. A) Map of the "Environmental Perception and Awareness" topical focus sub-network. This sub-network received the highest fragmentation score of all topical focus groups. (Number of nodes = 101, Density = 0.014, Average Degree = 1.386, Fragmentation = 0.887, Closure = 0.090). B) Map of the "Salmon" topical focus sub-network. This sub-network received the lowest fragmentation score of all topical focus groups. (Number of nodes = 166, Density = 0.017, Average Degree = 2.855, Fragmentation = 0.289, Closure = 0.165). Colors and shapes pertain to the disciplinary categories specified in the legend.

Social Network Analysis

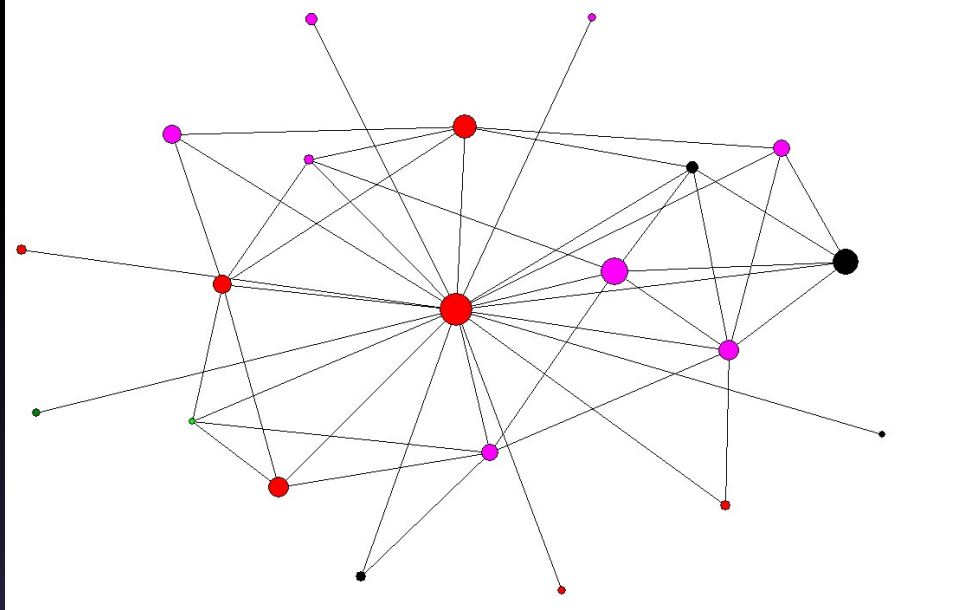
Links between researchers and others
(only survey respondents)

Discipline Legend

- Research only
- Policy only
- Other (no resp or "no")
- Both research and policy



EgoNetworks: Long standing, academic natural scientist



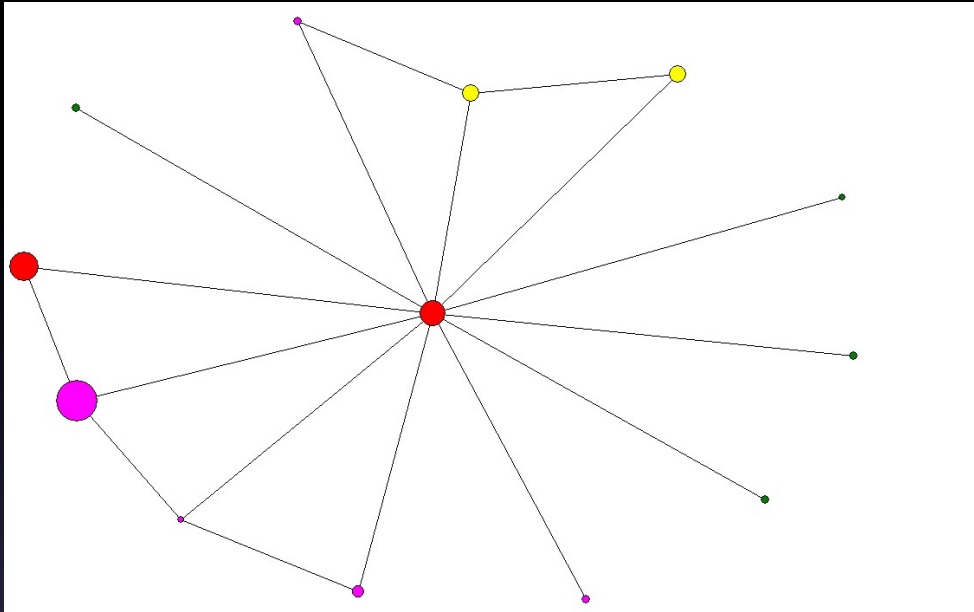
Employer Legend

- Federal Agency
- Research Institute
- Academic Institution
- State Agency
- Non-profit/NGO
- Tribe / Tribal Council / Organization providing services to a Tribe
- Consulting firm/Consultant

“Monitoring has disappeared. The Partnership is not to fund monitoring. It’s to take data and make management decisions... It destroyed the monitoring framework of the action team.”

“The Salish Sea conference used to [highlight science and relevance to management], but the PSP takeover sort of caused it to become a poorly represented meeting in terms of the science.”

EgoNetworks: Independent, interdisciplinary scientist



Employer Legend

- Federal Agency
- Research Institute
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- Tribe / Tribal Council / Organization providing services to a Tribe
- Consulting firm/Consultant

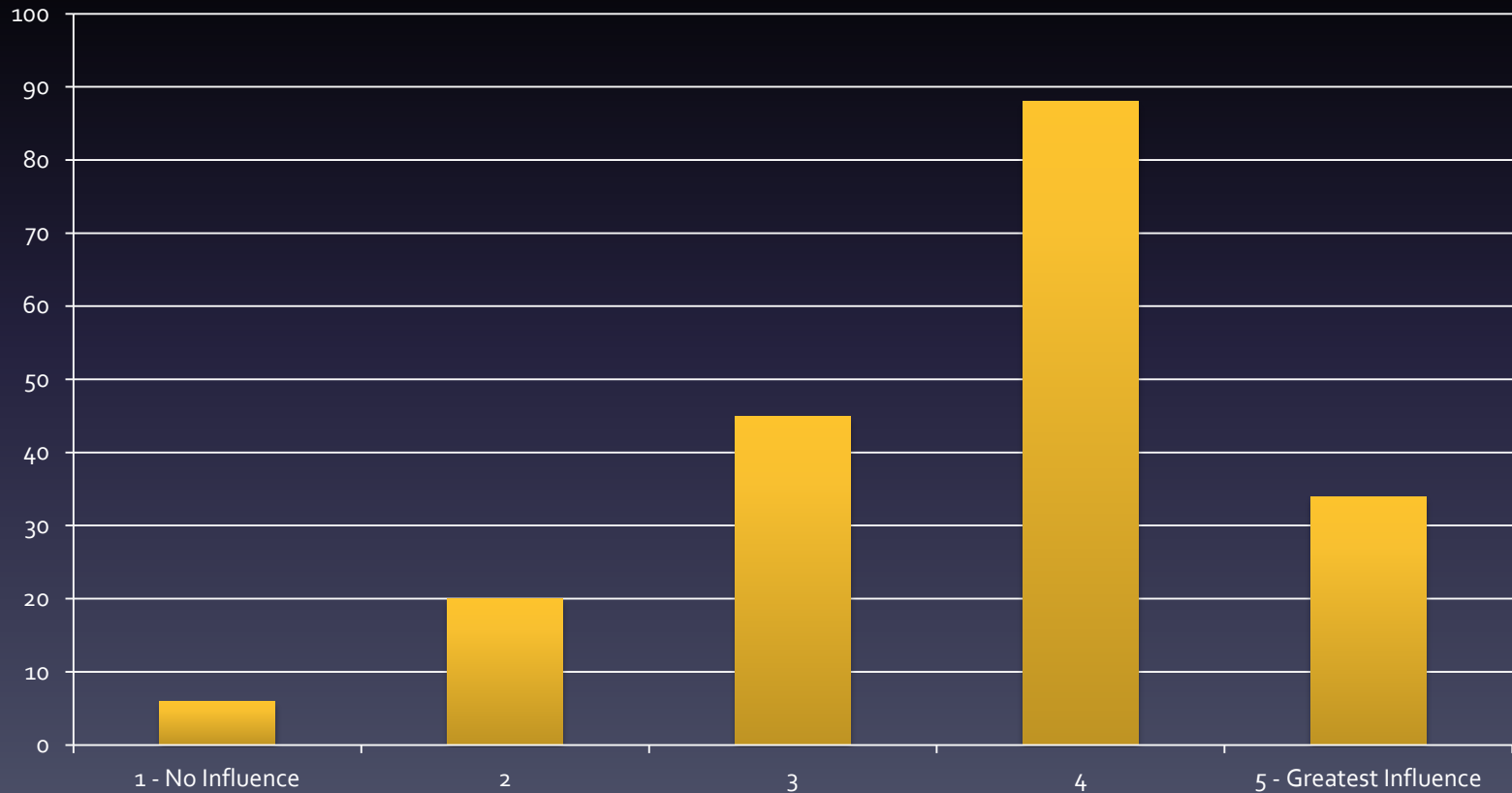
"Incentives are few and far between. For those who just truly want to make a difference or influence policy and management, then the incentives are more personal and not often rewarded in a departmental sense."

"Our approach is to mindfully work with the end user from the beginning. [We] try to talk to people who use the information and they help constrain the question. Sometimes it's a NGO or government entity and then [we] make sure the academic information can be used."

"The big one [that creates high-impact] is having an iterative relationship between science and policy..."

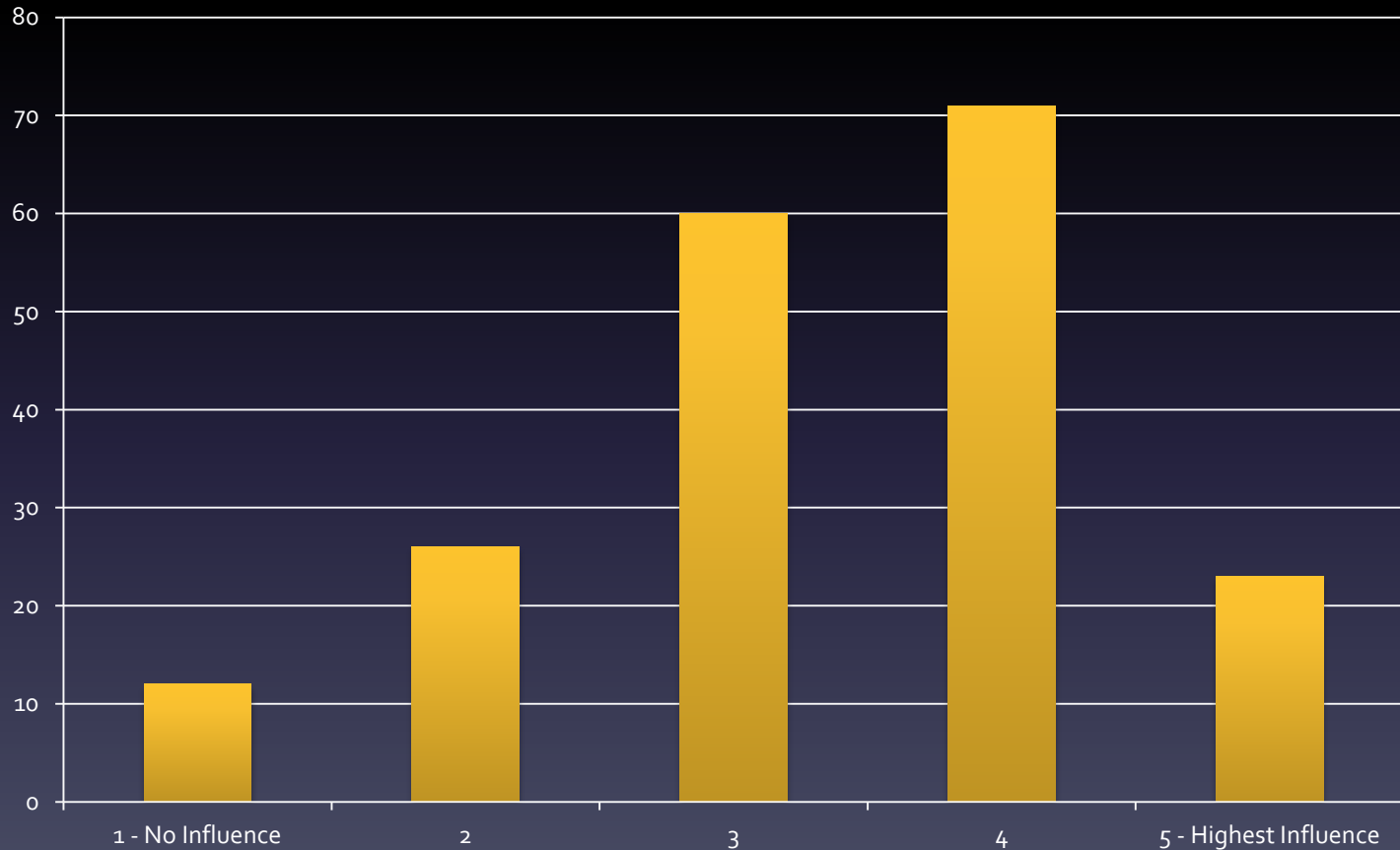
What shapes research?

Influence of policy needs on the research questions



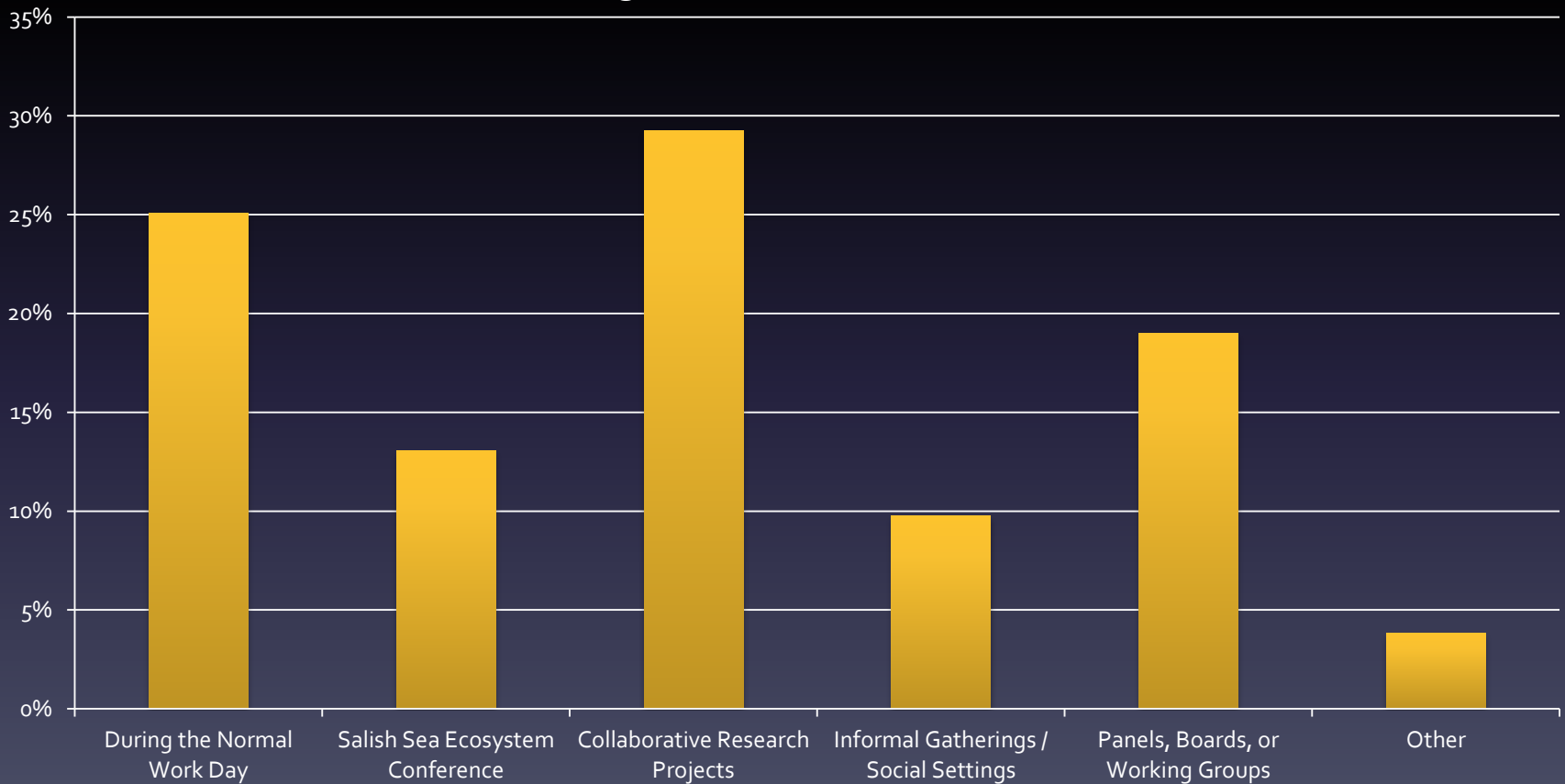
What shapes research?

Influence of funding availability on research questions



How is information shared?

Relative Frequency of Settings Chosen as 'Productive Venues for Exchange of Scientific Information'



Recommendations and Next Steps

- Query dataset regarding different forms of collaboration, factors shaping SN and collaboration
- Sample more heavily within particular networks/topics
- Foster linkages within communities working on high-priority topics (like environmental awareness)
- More effort and funding aimed toward long-term, collaborative, interdisciplinary research...including end users
- Determine variables influencing the role of human dimensions research/ers in Puget Sound and environmental recovery?

References and Acknowledgements

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