Human Dimensions of Puget Sound and Washington Coast Ecosystem-based Management

A Workshop Report Prepared for the Puget Sound Institute and Washington Sea Grant

July 2011

Prepared by

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1 Introduction and Executive Summary

On June 13th, 2011, the Puget Sound Institute and Washington Sea Grant sponsored a workshop to bring together social sciences academics and professionals to discuss social science research to inform Puget Sound and wider Washington Coast ecosystem recovery and management. Participants were asked to focus on several areas identified as important and urgent by the Puget Sound Partnership (PSP) and the Social Science Advisory Committee. This report summarizes the workshop sessions by describing the objectives and organization of the workshop and the results of the sessions, including four major recommendations for action:

a) **Conduct Assessment of Social Sciences for Management** – The Puget Sound Partnership to perform an assessment of how its work incorporates both natural and social science. How does scientific research inform programs and priorities? What tradeoffs are inherent in ecosystem recovery?

b) **Develop Human Dimensions Actions Framework** – Several specific research projects were highlighted in discussion: a literature review, an institutional analysis of the Shared Strategy approach used by the PSP, an evaluation of public engagement and behaviors, and building a conceptual model so that the human dimensions components of the Open Standards Framework can be completed. Participants also highlighted the importance of spatial and temporal scale, especially in scenario analyses regarding future ecosystem states.

c) **Develop a Social Sciences Strategic Plan** – A clear need is to develop a strategic plan for incorporating the social sciences into ecosystem recovery programs.

d) **Conduct a Follow-up Workshop** – A second workshop is recommended to review a draft Social Sciences Strategic Plan to be created b the Social Sciences Advisory Committee.

2 Workshop Objectives

The goal of the workshop was to support the Puget Sound Partnership and other regional agencies in understanding the existing research and gaps in scientific understanding about the human dimensions of ecosystem recovery.

The workshop was intended to advance a social science research agenda that (1) builds upon existing social science research, and (2) identifies priority research needs that will effectively and efficiently fill identified knowledge gaps. Other regional agencies and organizations will also benefit from the output of the workshop as the meeting clarified research needs that transcend any specific location, and also that can inform requests for proposals related to social sciences and human dimensions.

Workshop participants (Appendix A) included academic social scientists from the University of Washington and other regional universities, professional social scientists from other agencies, and PSP staff and leadership. Participants were selected at the recommendation of PSP Science Panel and Social Science Advisory Committee members, drawn from a list of academics listed in a recent white paper compiled by Judy Thornton, College of the Arts and Sciences, University of Washington (Society, Culture and Institutions in the College of the Environment).

Professor Michael Orbach (Duke University) was the invited keynote speaker. His talk, "Social Science in the Estuaries: A Practical Guide," (Appendix B) described ecosystem management as the management of human behavior towards specific outcomes and emphasized the important role of trained professional social scientists and their research for informing the process of governance (Appendix B). He challenged the workshop participants to envision a social science research strategy for Puget Sound.

The workshop format provided an opportunity for inter-disciplinary cooperation. Each participant was assigned to a facilitated group (one in the morning and one in the afternoon) made up of individuals from a variety of social science disciplines. Disciplines ranged from anthropology, sociology, economics, demography, institutional design, landscape planning, history, urban ecology, public policy, and environmental psychology. Each group also included PSP leadership and staff and invitees from several other agencies.

Participant groups rotated through six different topics over the course of the day. The discussion questions for each topic were vetted by Puget Sound Partnership staff and the Social Science Advisory Committee. Topics were: Values, Behavior, Risk, Indicators and Targets, Infrastructure, and "other questions" as defined by participants (full questions in Appendix C). For each topic, participants were asked specifically to consider:

- Whether the topic was framed appropriately
- Key references for existing research, conceptual models, and datasets
- Relevant research tools, techniques, and case studies
- Other disciplines not represented in the workshop that should be part of research

The transcribed results of participant discussions (Appendix D) provide a rich source of theory, references, and concepts to:

- inform the 2011 Puget Sound Partnership Action Agenda update
- assist with prioritization of on-the-ground projects and programs
- provide further input to the Puget Sound Science Update
- inform development of the next Biennial Science Work Plan

3 Workshop Outcomes

Across the group discussions of each topic, a rich array of responses and resources were shared by the participants. Summaries are provided below. A complete list of participants' comments for each of the six topic areas is available in Appendix D.

3.1 Values

Questions: *How do we better understand people's relationships with the environment? How do various populations' cultural identities and individual history affect perceptions of ecosystem recovery? How can we measure the economic and non-economic values that various populations attach to ecosystem goods and services?*

In general, participants felt that it was first, necessary to assess if social sciences research is being used in our regional ecosystem recovery work and how the science is utilized. Then, it is important to understand what are the management implications, to PSP and other institutions, of accounting for human values as part of ecosystem recovery. In order to answer these concerns participants felt that we must get a clearer picture of the use of social science research in decision-making and at what point in the process are human values taken into account. In addition, there is a need to better understand the constraints/opportunities associated with institutions, legal mandates, etc. that affect the use of such information in decision making. Understanding human values allows managers to more easily identify tradeoffs that will need to be made, recognize which stakeholder groups will be more or less impacted, and more effectively identify priority recovery actions. It is important that managers treat the study of values in a scientifically systematic way and integrate such studies as an ongoing process in ecosystem recovery. Research opportunities and approaches suggested by participants included:

- Ethnographic studies of various stakeholder groups using participatory approaches
- Economic studies of ecosystem goods and service benefits using both observed behavior and stated preference approaches
- Behavioral studies of patterns, preferences, etc. using surveys and observation tools
- Characterization of place using GIS and geospatial tools that support future analysis and that can be used to communicate data and results to broad audiences
- Visioning scenarios to better understand what people wish to see in 2020 and beyond using alternative futures and visioning tools, evaluation of traditional knowledge, and tribal relationships to western science and practice

3.2 Behavior

Questions: *How can we understand motivation, behavior, and processes of behavioral change for current Puget Sound population sectors? How might demographic trends change these behavioral patterns over time?*

This topic concerns why and how people interact within their environment as they pursue their livelihoods, seek spiritual inspiration, or spend their leisure time. Then how are these interactions shaped by historical processes? What can be done to modify behaviors to achieve recovery goals?

Participants expanded this topic to incorporate not only individual behavior but also institutional and political components of Puget Sound ecosystem recovery.

Research needs and approaches identified by participants included:

- Studies that assess what motivates people to act specific to Puget Sound recovery including a synthesis of "good" behaviors (what motivates people to act in a steward-like manner) using in-person interview techniques, secondary data analysis (e.g., Seattle Public Works water use data), and social marketing
- Studies to learn more about the differences in populations with differing amounts of time on the landscape and how this influences their perceptions, beliefs, and motivations using interviews, focus groups and cluster analysis and social mapping (the spatial capture of attitudes etc). The latter could be used to help focus on whose behavior matters.

3.3 Risk

Questions: *What are the perceived risks and benefits of implementing ecosystem-based management and Puget Sound? What is the risk if no action is taken? What affects particular communities' resilience and vulnerability to these risks?*

The organizers of the workshop intended this topic to address the tradeoffs (collective costs and benefits) associated with ecosystem recovery, but participants took the concept much further. Concepts such as risk perception, probability of outcomes, and who is at risk enriched the discussion.

Some of the suggested research needs and approaches included:

- Studies of the risk associated with management actions/inaction using a standard cost/benefit framework
- Analyses of comparative vulnerability and risk perception (for both changes in the ecosystem and associated ecosystem services as well as those associated with management actions) across different sectors of the population of recovery efforts using cognitive dissonance, alternative future/scenario analysis, and survey research
- Analyses that parallel the work related to risk and uncertainty of climate change
- Studies that assess the regulatory risks faced by commercial business when making choices to move to or remain in this region. Is environmental regulation adverse to industry in the short or long term? There may be a place here to use social marketing and or case study approaches to address these questions.
- Studies that assess the levels of vulnerability and resiliency of sectors of the population using tools and survey methods to identify trends and relationships between people and their view of the regulatory and management arena

3.4 Indicators and Targets

Questions: *What are appropriate indicators of quality of life and behavioral change relevant to Washington's coasts and particularly Puget Sound recovery? How can social indicators reflect the positive and negative effects of recovery actions? Are there other indicators that would allow us to consider inherent tradeoffs in ecosystem recovery?*

The PSP is preparing a systematic framework of human quality of life indicators comparable to keystone biophysical indicators of Puget Sound health. The PSP has had two parallel processes, one used to identify "Dash Board" indicators as a measure of the efficacy of ecosystem recovery actions and status indicators, many of which have fallen out of the Open Standards process. In both cases, less attention was paid towards indicators that relate to the human dimension. One of the reasons for this is the lack of data to support indicators that may in fact be valid measure of status and effectiveness. To date the indicators related to the human dimension on the PSP indicator roster are (1) commercial fish catch; (2) recreational fishing permits sold; and (3) open accessible swimming beaches. Two additional indicators are being designed by the PSP including a quality of life index and measure of behavioral change. Social sciences findings could inform development of these indicators.

Suggested research needs and methods included:

- Develop human-dimension conceptual models on par with those that exist for Puget Sound natural capital. Use such models to discover which human-dimension indicators are related and/or causally linked to status targets for the ecosystem. The Open Standards for the Practice of Conservation could be modified and used as an analytical framework. Alternatively, the Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST) tool of the Natural Capital Project may provide a useful approach.
- Explore the development of an indicator that the active engagement of people that captures human values, preferences and relationship with the environment. These must explicitly recognize political values. Surveys, visualizations and animations may be used. Such approaches make communication to the public much more accessible.
- Explore the development of an indicator for quality of participation within and across sectors of the populations using ethnographic methods and network analysis.
- Identify common extractive/non-extractive uses of Puget Sound resources and develop indicators which reflect principles of sustainability.

3.5 Infrastructure

Questions: *How can we analyze and characterize existing social infrastructure (social capital)? Are there gaps in the current social and institutional network related to ecosystem-based management and recovery and how might those gaps be bridged?*

Given that the role of the PSP is as a coordinating body with no regulatory authority, it is very important for the organization to understand the social and institutional network that the agency is working with. What are the challenges to reaching various audiences, how do they harness existing social capital, and how do they coordinate existing infrastructure?

Several suggestions include:

- Conduct an institutional assessment, to be mapped, followed by a gap analysis.
- Assess what institutions and organizations can do. What organizations are not meeting expectations or responsibilities? Review the work of the west coast ocean policy and regional councils.
- Assess what kind of infrastructure is needed to secure public/community involvement. Assess methods to engage social capital including religious organizations, the arts, and other stakeholder groups not usually considered in ecosystem recovery efforts.

3.6 Other Questions – What Have We Missed?

Questions: *What research is needed to address additional questions of urgent priority? How can today's discussion translate into strategies to affect individual, institutional, and societal values and behaviors? What conceptual model(s) should guide the role of social sciences in various steps of restoration and ecosystem-based management?*

Participants suggested several topic areas that should be included in a social science research agenda. They included:

- Studies regarding social justice including issues of gender, race, class and cultural issues interlinked with Puget Sound recovery. Participants felt that it is not possible to succeed in ecosystem recovery without including social justice.
- Conduct work that is cross-disciplinary. Cross-disciplinary collaboration could be fostered by making it a grant requirement, hosting workshops that help untrue cross-disciplinary communication and understanding.
- Categorize different sectors of people correctly. Different groups are impacted differently and to different degrees by ecosystem management. What are the opportunity costs of Puget Sound recovery to these various groups?
- Communication to the public must resonate. Dashboard indicators need to be place-based and spoken in a language that is accessible. Find a means to illustrate how ecosystem recovery improves livability.

4 Recommendations

The workshop discussions led to the following major recommendations.

4.1 Conduct Assessment of Social Sciences for Ecosystem Management

It is important to better understand how social science information/research would be used to inform management decisions, as well as at what point in the management process it should be introduced. The Puget Sound Partnership should consider assessing how it is currently using science (both natural and social). An assessment should include the dynamics of how social sciences research informs the policy decision-making process, its prioritization across recovery actions, the tradeoffs that are inherent in recovery, and existing tensions between the social and biophysical sciences.

4.2 Develop a Human Dimensions Actions Framework

Social sciences have been less well represented than biophysical sciences in Puget Sound recovery programs to date. Learning from the development stages of PSP's science to action efforts to date, workshop participants discussed focused actions that would quickly integrate the social sciences for better socio-ecological understandings. Workshop participants emphasized four immediate research needs:

- **Baseline Literature Review.** A baseline social science literature review is needed to identify current resources and determine where gaps remain. This literature review would include studies directly pertaining to Puget Sound. It would also incorporate studies from other major basin systems in the nation (e.g. Chesapeake Bay, the Everglades for relevant findings.
- **Institutional Analysis.** There is a need apply institutional analysis to the overall management framework to evaluate where the PSP (Shared Strategy) approach is the most efficient and effective. This research could take the form of institutional/management mapping, network analysis and an evaluation of existing social capital and organizational capacity (within and across institutions) to achieve ecosystem recovery goals. Are there other models that might work better to reach ecosystem recovery goals? It is time to readdress opportunities and constraints to more effectively and efficiently restore the Puget Sound. An outcome from this analysis would be to increase the capacity for institutions, NGOs, and the tribes to work better together, recognizing the need to bridge (in particular) western and tribal values and management approaches.
- **Public Engagement Assessment.** There is a need to complete a comprehensive characterization and evaluation of public engagement in support of ecosystem recovery (behaviors, patterns, preferences, etc.) including citizen science, stewardship, and changes in behavior. This knowledge will inform programmatic design and implementation over time. Engaging the arts, religious groups and other non-traditional communities would be a means by which to expand "public" support, involvement, and engagement over time.
- **Draft Human Dimensions and Open Standards for Conservation.** The PSP should complete the human dimensions portion of the Open Standards for the Practice of Conservation Framework. This would involve the development of a conceptual model of contributing factors for our current state of the ecosystem as a means to define objectives/outcomes needed to advance ecosystem recovery goals for the human dimension of the ecosystem.

Workshop participants particularly noted the need to explicitly incorporate notions of scale (spatial and temporal) in any social science research efforts. This will ensure that communities, agencies, and social groupings are accurately characterized and relationships between science and practice are understood. This could be done within the context of alternative futures analysis and other related tools that would allow for the articulation of future desired conditions of the residents of this region.

4.3 Next Steps – Draft Social Sciences Strategic Plan and Second Workshop

A proactive and strategic plan of social sciences actions targeted towards ecosystem recovery in Puget Sound is a critical need. It is recommended that the PSP Social Science Advisory Committee review other coastal management social sciences strategic efforts for suggested plan outlines and, with this background, develop a preliminary draft work plan. A second workshop should be held to engage the social sciences professional community in a peer review of the plan. Disciplines that should be represented in addition to those engaged in the Social Science Workshop include organizational theorists, psychologists, landscape designers and planners, public administration professionals, and risk analysts (especially from the climate change community). The goal of the review during this second workshop would be to develop a social science strategy for Puget Sound ecosystem recovery that explicitly links social science inputs to the biophysical sciences and decision-making needs of lead agencies, NGOs, and the Tribes.

A Social Sciences Strategic Plan could help focus limited resources on shared goals of investigation and program application. Such a document establishes shared goals and objectives to guide research activities and science outreach across all recovery stakeholders and their respective funding efforts. Examples of such documents were introduced by the workshop keynote speaker, and are listed in the document cited in Appendix B.

Appendix A: Workshop Schedule and Participants

Schedule

Time	Activity	Speaker	Location	
7:30-8:15	Registration and continental breakfast		Foyer	
8:15-8:30	Introductory remarks and charge to group	Prof. Joel Baker (Puget Sound Institute); Dr. Penny Dalton (Washington Sea Grant)	102	
8:30-9:00	Keynote address: "Social Science in the Estuaries: A Practical Guide"	Prof. Michael Orbach (Duke University)		
9:00-9:15	Small group logistics: Social science needs identified by PSP Social Science Advisory Committee, group instructions	Dave Ward (Puget Sound Partnership); Dr. Katherine Wellman (PSP Social Science Advisory Committee Chair)		
9:25-10:10	Work session 1		Yellow	229
			Blue	314
			Green	329
10:20-11:05	Work session 2		Yellow	314
			Blue	329
			Green	229
11:15-12:00	Work session 3		Yellow	329
			Blue	229
			Green	314
12:00-12:45	Lunch		203, kitchen, and deck	
1:00-1:45	Work session 4		Yellow	229
			Blue	314

Time	Activity	Speaker	Location	
			Green	329
1:55-2:35	Work session 5	Psst: Snacks available near 203 from 2pm	Yellow	314
			Blue	329
			Green	229
2:45-3:30	Work session 6		Yellow	329
			Blue	229
			Green	314
3:30-3:45	Workshop evaluations			
4:00-5:00	Final plenary: small groups report	Dr. Katherine Wellman, facilitators	102	
5:00-6:30	Reception		Foyer	

Participants

Participant	Background
Joel Baker **Professor and Director** **Puget Sound Institute,** **University of Washington** jebaker@uw.edu **environmental chemistry, water quality, modeling, pollutant fate and transport, risk assessment**	Trained as a reductionist environmental chemist and engineer, I have been fortunate to work on large scale ecosystem restoration efforts in the Great Lakes, the Chesapeake Bay, and now Puget Sound. While my research remains grounded in fundamental natural sciences, I spend an increasing amount time advising regional resource management agencies, including serving as the first chair of the Puget Sound Science Panel. These activities leave me with the nagging suspicion that we often forget about the most influential species in the ecosystem which, believe it or not, is not salmon.
Sarah Brace **Facilitator** **Soundwide Starrfish Environmental Consulting** sbrace@soundwide.net **Facilitation, reporting, communications**	Soundwide Starrfish Environmental Consulting offers technical facilitation services to scientists, planners and resource managers. The firm excels in translating technical and scientific information to non-scientists, decision-makers and the public.

Participant	Background
Sara Jo Breslow **Environmental Anthropology,** **University of Washington** sarajo@uw.edu **Environmental conflict, senses of place, salmon habitat restoration, political ecology, science studies, socioecological complexity. interdisciplinary collaboration**	Sara Jo Breslow is an environmental anthropologist specializing in socio-ecological complexity, environmental conflict, the anthropology of science, and interdisciplinary and international research collaborations. In 2011, Sara completed a PhD at the University of Washington where she studied the conflicting values, knowledge, and senses of place complicating efforts to restore salmon habitat and preserve farmland in the Skagit River Valley. To present the results of this research for a public audience, she co-authored a theatrical documentary about the same topic, called "The Last Best Place." Her dissertation is titled, "Salmon Habitat Restoration, Farmland Preservation, and Environmental Drama in the Skagit River Valley."
Patrick Christie **Associate Professor** **School of Marine and Environmental Affairs,** **University of Washington** patrickc@uw.edu **Social ecology, Marine protected areas**	I conduct local and international research on social ecological impacts of marine protected areas and EBM. I recently led interview-based research in 7 MPA sites in Puget Sound involving 900+ informants. I am active in teaching on EBM and MPAs with UW and Northwest Indian College Native American students. I have been involved in improving the management of the Maury Island Aquatic Reserve. I am interested in how international MPA and EBM experience can inform local efforts.
Hilary Culverwell **Facilitator** **Soundwide Starrfish Environmental Consulting** hilary@starrfish.org **Facilitation, reporting, communications**	Soundwide Starrfish Environmental Consulting offers technical facilitation services to scientists, planners and resource managers. The firm excels in translating technical and scientific information to non-scientists, decision-makers and the public.
Penelope Dalton **Director** **Washington Sea Grant,** **University of Washington** pdalton@u.washington.edu	
Nives Dolšak **Associate Professor** **School of Marine and Environmental Affairs,** **University of Washington** nives@uw.edu **common pool resources, institutional designs, market instruments, global climate change**	I am interested in common pool resources—such as the atmosphere and the ocean—and factors that impact human decisions (individual, community, organizational, and governmental) regarding their governance and use. I am starting a new research project using the “ecology of games” framework to study collaborative efforts to restore salmon runs along the West coast.
Gretchen Glaub **Graduate Student** **University of Washington** gglaub@uw.edu **stewardship, community engagement**	Pursuing concurrent masters degrees at the Evans School and the School of Marine and Environmental Affairs at UW. Interested in decision making, collaborative management, stakeholder involvement, and community engagement and stewardship. Background in community outreach and engagement, stewardship program management, and young adult leadership development.

Participant	Background
David G. Gordon **Science Writer** **Washington Sea Grant,** **University of Washington** davidg@uw.edu **communications, public information**	David G. Gordon has served as the Science Writer for Washington Sea Grant since 1998. As founder of David George Gordon and Associates, Incorporated, he met the environmental writing, interpretation and outreach of clients including the Monterey Bay Aquarium, Nisqually River Interpretive Center Foundation, NOAA National Marine Sanctuaries, Puget Sound Action Team, King County (Washington) Wastewater Treatment Division and National Geographic Kids magazine.
Steve Harrell **Professor of Anthropology** **University of Washington** stevehar@uw.edu **anthropology, resources, communities, resilience**	I am interested in the interaction of population, resources, and culture, and in applying the concept of socio-ecosystem resilience to understand this interaction and plan for the future. Though my own research is in China, I teach actively about these issues in the Puget Sound region and in the Pacific Northwest more generally.
Andy James **Research Scientist** **Puget Sound Institute,** **University of Washington** jamesca@u.washington.edu **phytoremediation, bioremediation, eutrophication, stormwater, international development**	I have spent much of my non-academic career working overseas, in various roles from teaching to project development/implementation/management to strategic planning, always working with highly diverse groups. In this regard, and related to EBM in the Puget Sound, I am interested in the way the different aspects of restoration projects and activities are valued by various stakeholders.
Jennifer Knauer **Facilitator** **Knauer and Associates** jennknauer@gmail.com **landscape planning**	
Martha Kongsgaard **Leadership Council Chair** **Puget Sound Partnership**	
Tom Leschine **Professor** **School of Marine and Environmental Affairs,** **University of Washington** tml@uw.edu **environmental decision making, long-term institutional management**	social and institutional aspects of environmental restoration; oil spill prevention and response; harmful algal blooms
Alex Mitchell **Puget Sound Partnership** alex.mitchell@psp.wa.gov **performance management, performance tracking, data, research, analysis**	Alex started working for Puget Sound Partnership in March in the performance management team. He is currently involved in developing a 'quality of life' measure for Puget Sound's dashboard of ecosystem indicators.

Participant	Background
Karma Norman **Social Scientist** **Northwest Fisheries Science Center** karma.norman@noaa.gov **Environmental anthropology, common pool resources, fishing communities, natural resource management institutions**	I hold both an M.A. and a Ph.D. in environmental anthropology from the University of Washington, which I obtained in 2001 and 2007 respectively. I joined the Northwest Fisheries Science Center in May 2003 to fill the center's first non-economic social science research position. Since then, I've been involved in a coordinated national effort to define criteria for fishing communities under the National Standard 8 protocols described in the Magnuson-Stevens Act, including Puget Sound communities. I've also worked on researching institutions associated with management of Puget Sound watersheds in terms of salmon habitat, surveys of pier-based fishermen, developing indicators of resilience for marine-dependent communities, and a social network survey for the groundfish trawl fishery.
Tim Nyerges **Professor** **Geography, University of Washington** nyerges@u.washington.edu **GIS, CyberGIS, sustainability management, participatory decision support**	For the past fifteen years he has undertaken research projects funded by NSF and NOAA to explore development and evaluation of networked GIS, particularly as supported by cyberinfrastructure technology, for enabling stakeholder participation in environmental decision support. Many of the ideas from that research focuses on sustainability management and appears in his recent textbook titled Regional and Urban GIS: A Decision Support Approach published by Guildford Press.
Mike Orbach **Professor of Marine Affairs and Policy** **Duke Marine Lab** mko@duke.edu **Coastal and marine social science and policy**	Mike Orbach is Professor of Marine Affairs and Policy and Director of the Coastal Environmental Management Program in the Nicholas School of the Environment at Duke University. He has worked as Social Anthropologist and Social Science Advisor with the National Oceanic and Atmospheric Administration; Associate Director of the Center for Coastal Marine Studies at the University of California at Santa Cruz; and Professor of Anthropology in the Department of Sociology and Anthropology at East Carolina University. He joined the Duke Marine Laboratory in 1993, and was Director of the Marine Laboratory from 1998 to 2006. Mike has performed research and has been involved in coastal and marine policy on all coasts of the U.S. and in Mexico, Central America, the Caribbean, Southeast Asia, Europe, Alaska and the Pacific, and has published widely on social science and policy in coastal and marine environments. He was a formal advisor to both the U.S. Commission on Ocean Policy and the Pew Ocean Commission, has served on the Ocean Studies Board of the National Research Council, the Surfrider Foundation and Ocean Conservancy Boards of Directors, and has held numerous other appointments to Boards and Commissions, both public and private. Mike has spent extensive time on the U.S. West Coast, including the Pacific Northwest, and has been involved with the National Estuary Programs since the 1980s.
Mark Plummer **Economist** **NOAA Fisheries** mark.plummer@noaa.gov **Economics; ecosystem services**	My current work includes examining methods for valuing ecological goods and services for Puget Sound and studying methods for assessing the cost-effectiveness of salmon conservation actions.

Participant	Background
Tim Quinn **Habitat Chief Scientist** **WA Dept of Fish and Wildlife** Timothy.Quinn@dfw.wa.gov **wildlife, landscape ecology, forest, science-policy interface, applied science**	I am interested in understanding how science informs decision makers and when and how scientific information is deemed inadequate to institute change. I am also interested in the dynamics (assumptions, social science conceptual models and working hypotheses) of bottom up approaches to conservation.
Lynda Ransley **Program Director: Public Engagement & Boards** **Puget Sound Partnership** lynda.ransley@psp.wa.gov	
Jeff Rice **Managing Editor** **Puget Sound Institute, University of Washington** jeffrice@uw.edu **Science communication, journalism**	
Rebeca Rivera **PhD Candidate** **University of Washington** rebeca@uw.edu **anthropology, ethnographic methods, consumption, common property, sustainability, urban ecology**	I am finishing a doctoral program in environmental anthropology with research on sustainable consumption. I was also a fellow in the urban ecology program as well as the project for interdisciplinary pedagogy in Interdisciplinary Arts and Sciences (IAS) at the University of Washington, Bothell (UWB) campus. I am currently a pre-doctoral lecturer at UWB and teach classes on sustainability, consumption and common property.
Clare Ryan **Professor** **University of Washington** cmryan@uw.edu **policy, planning, collaboration, governance, urban ecology, resource management**	Clare Ryan is Professor of Natural Resource Policy at the University of Washington's School of Forest Resources, with adjunct faculty appointments in the Daniel J. Evans School of Public Affairs, the School of Marine Affairs, and the Law School. She received her PhD from the University of Michigan. Her research and teaching focuses on applications of policy formation and implementation, collaborative governance, and urban ecology theories to the field of natural resource management. Recently, she completed research projects and publications examining: best practices in National Environmental Policy Act (NEPA) implementation; use of best available science in regulation development; interactions between federal research scientists and managers; implementation of adaptive management on federal forestlands; and institutional analyses of collaborative watershed planning groups. Prior to joining the University of Washington, Dr. Ryan worked as an environmental scientist and regulatory specialist for state (Washington Department of Ecology) and federal (U.S. Environmental Protection Agency) resource management agencies.

Participant	Background
Elizabeth Skewgar **Research Scientist** **Puget Sound Institute,** **University of Washington** skewes@uw.edu **ecology, management, policy, international development**	At the Puget Sound Institute, I work to identify and synthesize relevant science to inform restoration of Puget Sound. I have worked at the science/policy interface for the Wisconsin Department of Natural Resources, the Washington Department of Fish and Wildlife, and the U.S. Department of State. I earned my doctorate in Biology at the University of Washington, crafting a mathematical model of penguin movements at sea and inexorably drawn to write about fisheries, ecotourism, and marine management.
Usha Varanasi **Affiliate Professor** **College of the Environment,** **University of Washington** ushav@u.washington.edu **Bioavailability and metabolism of chemical pollutants in marine organisms. Science policy interface in areas of ESA listing and recovery of fish and marine mammals, Puget sound Partnership's science panel reviewing ecosystem based management and recovery**	Dr. Usha Varanasi is an affiliate professor in the School of Aquatic and Fishery science and the Chemistry department of University of Washington. She is a member of Puget sound partnership's science panel. She recently retired as the Science and Research Director of the National Oceanic and Atmospheric Administration's Northwest Fisheries Science Center where she has dedicated much of her career to applying chemistry to critical biological questions, advancing our understanding and improving regulatory, management, and public policy decisions. Her research on how marine organisms accumulate and process contaminants revolutionized the field and led to the development of techniques that reduce the impacts of pollution (including oil spills) on fisheries resources and ensure that seafood is safe for human consumption. From 2004-2010, she served as the director of NOAA's West coast Center of Excellence for Ocean and Human Health. Through this center, scientists close a critical loop by more completely assessing how the oceans affect the health and well-being of people. From 2007-2010, Dr. Varanasi also served as the lead for Department of Commerce (through NOAA) on the Executive Committee of the West Coast Governors Agreement on Ocean Health. Dr. Varanasi has published articles in many scientific journals, edited two books, and is deeply committed to the education of students in the sciences. She received her B.Sc degree from Bombay University in India, her M.S. degree in chemistry from the California Institute of Technology, and her Ph.D. in organic chemistry from the University of Washington.
Dave Ward **Stewardship Program Manager** **Puget Sound Partnership** dave.ward@psp.wa.gov **Behavior change, Social marketing, Aquatic resource management**	Dave manages the social strategy work of the Puget Sound Partnership and is responsible for developing, implementing, and evaluating strategies to advance broad-scale, citizen-based efforts to restore Puget Sound to health. These efforts include stewardship initiatives, social marketing, coalition management, social science integration, market research, audience and issue segmentation, and best management practice identification. The overall program draws on multiple integrated resources, principally, Social Capital, Diffusion of Innovations, Stages of Change, and Behavioral Economics.

Participant	Background
Katharine Wellman **Marine Environmental Economist** **PSP Science Panel, PSP Social Science Advisory Committee, Northern Economics, Inc.** katharine.wellman@norecon.com **ecosystem service benefits of shellfish aquaculture, fisheries management, economic cost and benefits of ecosystem recovery, stakeholder involvement**	I hold a PhD in natural resource economics and an MMA in marine policy, both from the University of Washington. Prior to joining Northern Economics I was a private consultant in marine resource economics and coastal management for five years. Before that I worked as a research scientist and natural resource economist for Battelle Memorial Institute and a resource economist for NOAA. I specialize in environmental economics as applied to marine resource management and policy. I am currently working on the assessment of ecosystem service benefits of shellfish aquaculture in Puget Sound and New England. I also work for the Environmental Defense Fund on issues associated with new fisheries management plans in the Pacific and New England groundfish fisheries, including observer program cost sharing and bycatch risk sharing pools. In addition, I am a very active member of the Puget Sound Partnership Science Panel, working to ensure that the human dimension is an integral part of Puget Sound recovery.
Anne Wessells **Assistant Professor of Urban Studies** **University of Washington, Tacoma** atw5@uw.edu **urban planning, public policy, collaborative governance, sustainable urban development**	My research is focused on the urban governance challenges of waterfront planning and sustainable development. I rely on theories of adaptive, collaborative governance for environmental management and urban redevelopment; as well as urban regime analysis, or seeking to understand how political power relates to the creation of urban spaces that are able to address both social equity and ecological health. I publish and present in the fields of urban affairs, planning and public policy.
Kristoffer Whitney **PhD Candidate** **University of Pennsylvania** kwhitney@sas.upenn.edu **history of ecology, sociology of science, shorebirds, endangered species, fisheries**	My graduate training is in the history and sociology of science, and I am currently in the final year of earning my PhD at the University of Pennsylvania. My dissertation is a historical and sociological study of the environmental controversy surrounding endangered shorebirds and the horseshoe crab fishery on the U.S. east coast. I live in Seattle, and am interested in exploring the socio-political aspects of similar common pool resource conflicts in the ecosystems of the Northwest.
Kathy Wolf **Research Social Scientist** **U.S. Forest Service and Forest Resources, University of Washington** kwolf@uw.edu **urban greening, human health and well being, environmental psychology, stewardship**	My position is at UW but I have a joint appointment with the US Forest Service PNW Research Station to help develop a program on Urban Natural Resources Stewardship. The project is an effort to understand the entire civic stewardship 'footprint' and its social and ecological outcomes across landscape systems. My research and outreach is based on the principles and methods of environmental psychology; the research is an effort to better understand the human dimensions of urban forestry and urban ecosystems. Overview of research programs: www.naturewithin.info; Green Cities: Good Health project: www.greenhealth.washington.edu
Mary Ann Rozance. **Graduate Student** **University of Washington** **Forest Resources**	

Appendix B: Michael Orbach Keynote Presentation

Available at http://www.tacoma.washington.edu/urbanwaters.

Appendix C: Workshop Session Questions

The objective of this workshop is to learn what relevant social science research exists, what input social science disciplines can provide, and what additional research is needed to support ecosystem-based management of Washington's marine resources and ecosystem recovery led by the Puget Sound Partnership and other organizations, working within the existing political system.

Values: How do we better understand people's relationships with the environment? How do various populations' cultural identities and individual history affect perceptions of ecosystem recovery? How can we measure economic and non-economic values various populations attach to ecosystem goods and services?

Behavior: How can we understand motivation, behavior, and processes of behavioral change for current Puget Sound population sectors? How might demographic trends change these behavioral patterns over time?

Risk: What are the perceived risks and benefits of implementing ecosystem-based management and Puget Sound recovery? What is the risk if no action is taken? What affects particular communities' resilience and vulnerability to these risks?

Indicators and targets: What are appropriate indicators of quality of life and behavioral change relevant to Washington's coasts and particularly Puget Sound recovery? How can social indicators reflect the positive and negative effects of recovery actions? Are there other indicators that would allow us to consider inherent tradeoffs in ecosystem recovery?

Infrastructure: How can we analyze and characterize existing social infrastructure (social capital)? Are there gaps in the current social and institutional network related to ecosystem-based management and recovery and how might those gaps be bridged?

Other questions: What research is needed to address additional questions of urgent priority? How can today's discussion translate into strategies to affect individual, institutional, and societal values and behaviors? What conceptual model(s) should guide the role of social sciences in various steps of restoration and ecosystem-based management?

Requested group output:

- Appropriate framing of target question and other related questions
- Key references for existing research, conceptual models, and datasets
- Relevant research tools, techniques, and case studies
- Other disciplines not reflected in workshop that should be part of research
- Bullet points for request for proposals

Appendix D: Facilitator Notes

Meeting Record, Social Science Workshop; June 13, 2011; University of Washington Fisheries Sciences Building

Crosscutting Summary Themes

1. There is a need for baseline information and a social science literature review.
2. There is a need for a proactive and strategic social science work plan.
3. Evaluating or studying management framework around PS recovery, specific emphasis on Shared Strategy approach (PSP's approach) with respect to other models (NW Straits, etc). Is our current approach the best approach, from literature (bottoms up v other)?
4. Need to update the 1970s institutional map to ID who's doing what in the region, what social capital exists, and what is needed. Barriers and bridges. (opportunities and constraints)
5. Defining future desired conditions. Alternatives futures analysis and other tools.
6. How to get institutions, tribes and organizations to work together - capacity and bridging of western and tribal values, management strategies.
7. Disconnect between biophysical and social science academic/theoretical communities.
8. Priority need to understand how SS info/research would be used to inform management decisions, as well as at what point in the management process. This needs to be understood prior to defining the SS research agenda.
    a. This is related to institutional/management mapping, network analysis, and evaluation of organizational capacity (within and across entities) to achieve ecosystem recovery goals.
    b. This is related to the manner in which SS/HD research inform political processes/prioritization, trade off assessment and tension with biophysical.
9. Prioritize completing a characterization of public engagement in support of ecosystem recovery (behaviors, patterns, preferences, etc) including citizen science, stewardship, etc. This knowledge will inform programmatic design and implementation over time.
10. Engaging the arts, religious groups and other non-traditional communities in support of expanding public support, involvement and engagement over time.
11. Scale. Incorporate appropriate spatial/temporal scales when designing Social Science/Human Dimensions research projects - to ensure that communities, agencies, groups, etc are accurately characterized and relationships between science and practice are understood.
12. Complete the Human Dimensions portion of the Open Standards for the Practice of Conservation Framework. A priority need is to develop the conceptual model of contributing factors to our current state of the ecosystem as a means to define objectives/outcomes needed to advance ecosystem recovery goals for biophysical portions of the ecosystem.

1. Values

Existing research, literature, studies (values)

- Kenney. Value Based Thinking (book)
- Kate Milton Loving Nature
- Nordhouse et. al Death of Environmentalism
- Kemper et. al. American Values and Environmentalism
- Upstream. book re: institutions and salmon recovery
- Ed Whitelaw, Second Paycheck (timber industry)
- Joseph Taylor, Making Salmon
- Richard White, PhD - land use and environment (Whidby focus)
- Matthew Klingle, Environmental Historian
- Variety of research associated with the Chesapeake system/recovery: fish and agriculture
- Wallace Stegner
- Cascade Land Conservancy, USGS and others. Alternative futures visioning (EPA funded research)
- Variety of municipal studies (King, Snohomish, and others) understanding motivations, behaviors, and values
- Jamie Danatuto, PhD research: tribal values associated with shellfish resources
- Paul Sabatier "Advocacy Coalition Framework" (political science, beliefs, policy arena, partnerships)
- Tom Leschine. Ecosystem services research and work
- Keith Basso. "Senses of Place". Place bound communities
- Thomas Wallick. "Synthetic History of Environmentalism"
- Kate Soper. "What is Nature?"
- Andrew Light. "Philosophy of Restoration"
- Richard Florida. Social and Natural Capital research. Evaluated the qualities of the natural and social environment that attracts people and commerce
- Fran Whitesell. Evergreen. Perception of Management Actions.
- Sara Singleton. Western WA University. Native perspectives, work underway
- Judy Innes. CALFED (?) Communicative and collaborative planning/analysis, linking human values to management decisions. Not environmentally based
- Patrick Christy et. al. Socio economic survey research (funded by Sea Grant?)
- Kaplan et. al University of Michigan. Social Psychology, as applied to landscape architecture
- Sara Breslow PhD dissertation: assessed three groups within the Skagit Valley (fish, farm issues)

- Todd Lee. Stated Preferences Survey (NOAA)
- Marzloff. Urban Ecology
- Forthcoming research: NOAA. Contingent behavior assessment of shellfish harvesting and beach availability
- Puget Sound research and conference proceedings from Puget Sound Georgia Basin conferences (now called Salish Sea ecosystem conference)
- Many masters and PhD level research completed at UWA, WWU, etc
- Puget Sound Water Quality Authority (pre-Ecology) white papers
- Federal and State agencies and organizations who sponsor research

Recommended Research (Values)

- Bottoms up, recovery strategy and set of assumptions guiding PSP and others involved in recovery
    - Does bottoms-up/collaborative management work?
    - Evaluate NW Straits Commission, as a possible case study
- Evaluate the role of informal groups/institutions (and respective sets of values) in ecosystem recovery. Eg. Fisherman wives groups, 'friends of' groups, etc
- Research that integrates the qualitative with the quantitative. Purpose and expected results need to be specified. This is not currently taking place in Puget Sound. Check out NYC stewardship program research, for example
- Evaluate trade-offs across groups. How can contingent values compete/contend with rationale values? What are the opportunities for collaboration and benefits across groups?
- Assess conflict resolution techniques to get to the bottom of issues, identify contributing factors to allow for trade-off evaluation and assessment of changed management behaviors
- How is Social Science evaluation research being used in decision-making? At what point in the process are human values accounted for? What are the constraints/opportunities associated with institutions, legal mandates, etc? Understanding the management context (how SS research will be used) will help define a social science research agenda.
    - Is SS research being used and how, across the problem definition to management decisions being made over time, continuum
    - What are the management implications, to PSP and other entities, of accounting for human values as part of ecosystem recovery?
- How do values influence institutions?
- Gain a deeper understanding of broader array of stakeholders/constituents
    - Use a common format to array values across groups
    - methods/tools depends upon questions
    - imperative to complete ethnography prior to development of survey methods
- Evaluate stated values/preferences versus contextual/inherent values

  - tools/methods: contingent valuation
- Regional governance. How to work together given differing mandates and cultures?
  - interview and surveys
  - performance measurement and metrics
- Trans-disciplinary research
  - For example, link fisheries scientists with agricultural scientists to complete a landscape scale evaluation of the Skagit Delta or other well defined geography/scaled study area
  - How has agricultural science influenced farmers' values?
  - Effect of agricultural policy and science set at broader scales upon local communities
- Better understand the use of traditional knowledge and tribal relationships to western science and practice
- How do value systems translate to the selection of indicators?
- Scale. How do processes at different space/time scales affect practices, decisions, etc?
  - Develop smaller scale studies of human values (spatial and temporal). Start small and work up in scale.
- Vision. What do people value that they wish to see in 2020 and beyond as part of recovery? Skagit, Willamette, Tillamook - examples of visioning processes underway or completed
- Characterization of place to understand what people truly care about, why they are there, satisfaction and other values.

Suggested approaches & research considerations (values):

- For any tribal research undertaken, be sensitive as to who is doing the research with respect to tribal values, trust, etc.
- Identify and specify whose values are being surveyed, as values are not uniform
- ethnographic studies
- Observed behavioral actions (willingness to spend, etc to derive economic value)
- Survey approaches and design needs to be collaborative, so results may be translated. For example, include economists in survey design so results can be translated to inform design of conservation markets
- Puget Sound recovery would benefit from a centralized clearinghouse for social science research, one that's accessible to all and promotes collaboration, sharing of knowledge, and ideas
- Treat the study of values as a science and ensure they have an early and ongoing role in research agendas and management decisions

Tools, Methods, Models (Values)

How We Study Values is Important!!! (agreement reached across groups)

- Business Analyst (ESRI GIS tool)

- Focus groups
- Ethnography, including rapid ethno assessment. Ethnography should always precede the design of research methods. Narratives and stories are important
- State Preferences Survey
- GIS and geospatial tools that support the analysis and communication of data/results to broad audiences
- Behavioral studies: patterns, preferences, etc (surveys and observation)
- Archival research. Establish the environmental history for contextual purposes
- Advocacy coalition framework approach
- Participatory research
- Alternative Futures and Visioning Tools
- Adaptive Management Frameworks

2. Behavior

Appropriate Framing of Target Question? (Behavior)

- The question is missing the institutional and political components of the issue. It's not just about understanding the behavior of individual citizens, but about understanding the values and behavior of institutions (both the institution as an entity in and of itself, and the individuals within the institution). The political infrastructure also needs to be studied.
- Values and behavior are two sides of the same coin and the two issues should be addressed/discussed simultaneously. Having them separated is awkward.

Existing Research, Literature, Studies (Behavior)

- DOH and EPA are good places to look for research on behavior motivators around environmental issues.
- Behavior studies around environmental issues have been done on the East Coast and the Great Lakes.
- Sara Breslow's dissertation (Skagit farming/salmon recovery issues).
- Paul Robbins (of Arizona) "Lawn People".
- Terry Saterfield's work at UBC
- Common Pool Resource literature should be looked in to, especially Eleanor Ostrom at Indiana University.
- Conservation psychology (or social marketing) literature should be looked at (information that helps us understand what motivates behavior).
- Example of Yakima Nation's forest waste to energy plant project.
- Peter May's work with boat owners/marinas.
- Chris Jordan—Columbia River Basin Synthesis (Kevin St Martin at Rutgers will know him)

- Marina Alberti's work

Recommended Research (Behavior)

- In general, more localized research on behavior (motivations, etc) is needed. There is a lot of research on what motivates people to act, but very little of it is localized and specific to the Puget Sound recovery issue.
- Research is needed on the relative benefits of different approaches to motivating behavior change. (incentive programs, education/outreach, etc)
- We need to understand how certain factors influence the variables that influence behavior? (e.g., when the economy is slow, do the motivators still work?)
- Need to understand immigrant community perceptions of the issue. There is a lot of research elsewhere that can be tapped, though not a lot of localized research. For example, we need to understand how different cultures view aesthetics (mowed lawn vs. native plants, etc).
- A synthesis of "good" behaviors is needed—what motivates people to act in a steward-like manner, and how can we capture that info for show and tell?
- Institutional mapping should be conducted—it will help us understand barriers as well as opportunities. The map should address all sectors: government; NGOs; and the private sector.
- We need to understand the differences in populations with different amounts of "time on the landscape", and how this influences their perception, beliefs, motivations, etc. (third generation farmer perception vs. first generation, etc)
- Research/analysis should be conducted on the Shared Strategy approach/framework (since this seems to be PSP's adopted approach) and whether or not it was successful?
- Should look at Shared Strategy and PSP and how they address governance. Is it working? Is it based on existing theories and examples of successful governance models?
- A "meta" plan is important. There is no coherence across the relevant research. Need a sustainable social science research agenda that is proactive, not reactive. Also, we need to scale the research appropriately, and be strategic about how to go about attacking the various pieces—so need to build a strategic planning process into the development of the plan.
- Important to first address fundamental questions about the system that generates the behavior (e.g., that get at behavior theory) while at the same time addressing immediate needs identified in the PS Action Agenda (dealing with shoreline landowners; polluting surfaces, etc)
- Research needs to address and incorporate *historical elements* (attitudes and behavior change as demographics change) as well as *temporal elements*.
- Should collect baseline info and update it frequently; e.g., incorporate monitoring and adaptive management.
- We need to better understand how/whether programmatic results are linked to funding. Are programs that achieve the behavior change we want getting the funding? If not, what's the problem and where is the funding going?

Tools, Methods, Models (Behavior)

- "Social mapping" (spatial capture of attitudes etc) should be used to help hone in on ***whose*** behavior matters. This has been successfully in California and the Chesapeake Bay. For example, identify on a map (utilizing GIS and Google Earth) the populations whose behavior you are trying to understand and/or change (for example, fishers). Then tie this with the specific issue you're trying to address (overfishing) Overlay resource data (e.g., fish populations). This will help you figure out who needs to be targeted with what messages in a more efficient and effective manner.
- Clustering analysis is a useful tool to look at population sectors/groups.
- Political Ecology as a conceptual framework will be useful.
- Language being used to communicate is extremely important. Different things resonate with different people.
- In-person research techniques (e.g. interviews) are particularly helpful.
- Visual preference methods are important—for example, representing the options and places visually so that people can immediately grasp what you're referring to.
- Scenario development is very helpful (e.g. charrettes).
- Focus groups are helpful.
- Secondary data can be very useful-for example, SPU's water use data (gathered for customer's use of water, tracks on their bills, etc)
- Observational techniques are helpful (from the field of anthropology)
- Google Earth should be utilized (tracking things like bulkheads and docks, etc) to help understand behavior

Other (Behavior)

- Need to broaden the "stakeholder" community to encompass the business community, particularly Microsoft.

3. Risk

General Comments on Question (Risk)

- Do we mean vulnerability?
- What is a risk?
- Risk associated with people regarding people
- Benefits: consequences, impacts, probability
- Risk perception
- Who is at risk? Stakeholders, technical experts, managers, disadvantaged populations; make sure we know our values (who is the 'we'?)
- Probability of an outcome

Existing Research (Risk)

- Adaptive management risk literature
- Public health risk literature
- Bostrom (US) Climate, communication
- Decision documents (suggested by Clare Ryan)
- Policentric governance (Kathy Wolf)
- Resiliency Thinking (book by Swedish author)
- MIT study on regulations and implications (Clare Ryan)
- Work by McKenzy Moore
- E. Ostrom C.P.R. Source – conditions (such as inclusivity, enforcement, policy boundaries) that lead to folks supporting management.
- Water Districts in CA – see their reports
- Coupled natural/human systems program at National Science Foundation
- Sara Breslow study on farming and habitat issues in the Skagit region
- Mental Modeling study – making use of mental mapping. UW. (Tim N.)
- Australian study (Penny D)
- Welsh and CIG on Climate planning (Penny)
- Judith Layser. Natural Ecosystem Management (Natural Experiments)
- Brian Walker. Resilience thinking.
- Panarchy
- Brian Wynne et al. Work on risk
- Literature on people voting with their feet
- Shared Strategy salmon recovery – example of cross coordination that is now working.
- Resilience Alliance -- Ecology and Society Panarchy.

Recommended Research (Risk)

- Willingness of businesses to regulate: What are the risks of businesses moving associated with regulations? Do businesses leave an area with enforced and/or new regulations? Is environmental regulation adverse to industry in the short and long term?
- Vulnerability to resiliency – how can communities (e.g. fishing) adapt? How do we measure this risk? Once identified, how do we act?
- Risk associated with changes in the environment and associated services
- Risk associated with management action/inaction
- How do different groups perceive risk in Puget Sound? What would we do with information from communities and their perception of Puget Sound's health?

- Risk of law suits
- Social marketing – what motivates?
- Look for parallels with Climate Change efforts that work
- The effectiveness of advertising/marketing – more trusted if coming from government/communities/businesses/etc. Source is important
- Management scenarios
- Institutional framework – risk of giving up control
- What is ultimately at stake for multiple groups/communities?
- What are the risk perceptions
- What do we need to know relative to next decision-points? What is the information that would lead to a decision? What is the value of information? The further 'upstream' you can go, the better (from community to government)
- Does ecosystem-based management work? What are the drivers competing with ecosystem base management (such as growth pressures)?
- What are the components of social resilience – what do you measure?

Tools, Methods, Models (Risk)

- Stakeholder participation – lowers the risk of diminished out come
- Use marketing community to help study/evaluate risk
- Alternative futures analysis
- Case study analysis – lessons, learned, patterns, consequence of decisions
- "Foot in the door" approach – dog waste example (an action that already resonates with public)
- Bayesian statistics
- Mental mapping
- Cognitive dissonance
- Participating in research and decision-making
- Scenario analysis
- Vulnerability assessments
- Silvia – tool used in fishing community (get reference?)
- Survey research to ID trends and relations (quantitative data)
- Qualitative methods to help design survey
- Extractive research (e.g.: Survey of Puget Sound Region on marine Protected Areas)
- Perception-based research (e.g.: biological information embedded in a survey)
- Social networking analysis

- Institutional network analysis and knowledge.
- What are the drivers

Other Disciplines (Risk)

- Landscape and built environment community
- Organizational theorists
- Public administration
- Climate change community -- the ICC has adopted perception of risk that is different from the environmental community.
- Marketing -- use tools from the marketing community to help convey the risks.
- Cross-institutional/organizational collaboration on outreach on risks
- Engaging multiple stakeholders on messaging and developing approaches
- Physical sciences
- Psychology
- Epidemiological risk analysis (human health)

RFP Bullets

- Look at NSF applications for coupled natural/human systems

Additional comments/questions:

- The framing of rules/community based approaches is important
- Try the word 'trade-offs' instead of RISK.
- Puget Sound vs. coast
- The more complex the regulatory framework, the lower the likelihood of success.
- Biophysical and socio-economic risks are important to consider together

From Note taker:

- Come confusion over what is meant by risk? The risk to whom or to what? the risk to people, management agencies? the unintended consequences?
- The further upstream you can move in participation and in knowledge generation, the more it is possible to avoid situations where the public reacts against information.
- Land use problems fail where you have a consensus based process. Land use is a huge driver -- can't stop malls when you have voluntary compliance.
- General public perception of risk vs. do we have an understanding of the actual outcome of actions?
- How do the nature of the message and the source of the message help convey the 'risk'?

4. Indicators and Targets

General Discussion (Indicators and Targets)

- Conceptual models and indicators are only appropriate for the biophysical world and may not be appropriate for social science/HD domain - group did not reach consensus on this point
- Conceptual models are needed to capture tradeoffs, evaluate causal effects and relationships
- Is there research that evaluates if indicators/benchmarks even work? This question was posed broadly, as well as focused upon HD/QOL
- HD/QOL indicators assist with lobbying and achieving political outcomes. Different purposes than those developed for biophysical world
- Ecological economics: potentially dangerous as the numbers/values are ephemeral
- Cost indicators - a possible way to measure the cost of policies to accomplish targets as well as to measure inaction
- There needs to be a clear analytic trail between effectiveness indicators and success/failure of reaching targets
- Put aside the term 'quality of life' as the label is not informative. Underlying human dimensions are important and provide context for the health of ecosystems

Existing Research (Indicators and Targets)

- PSP Quality of Life behavioral index (Alex @ PSP work)
- Great Barrier Reef case study (possible indicators)
- Great Lake Program (possible indicators)
- Plummer and Schneidler (2009) PSP indicator selection, framework, assesses attributes of possible indicators
- Chesapeake Bay - indicator selection and adaptation over time
- "Redefining Progress" organization in San Francisco with Human Dimension indicators
- PSP State of the Sound documents
- Cascadia Scorecard - Sightline Institute
- Puget Sound Regional Council (4 counties in Puget Sound) - environmental, economic and transportation indicators
- Collaborative adaptive management frameworks: Foundations of Success/Conservation Measures Partnership 'Open Standards for the Practice of Conservation'; USAID, and World Bank models
    - These models link management outputs with effects to the system
    - These frameworks provide a means to measure 'outcomes' rather than the conventional measurement of 'outputs'
- Marine Protection Area (MPA) initiative: funding is predicated upon benchmarks; links outputs to outcomes, similar to Open Standards

- Quality of life metrics from the health sciences (dave ward follow up)
- GMAP social indicators
- Jamie Danatuto, PhD research: indicators for toxic shellfish, tribal consumption, health and spirituality. Challenges EPA standards
- UWA Center for Demography (Steve Harrell)
- Ecosystem Services studies: MEA, Marine Invest; Earth Economics studies
- Hines Center, State of the Nation report
- Melanie Cox. Environmental management; quality of life relationships to recovery of marine systems
- Climate Concerns. climateconcerns.org

Research Needs (Indicators and Targets)

- No current measure of behavioral change in current suite of indicators. No tracking ability to ID if actions/strategies of the PSP and partners are affecting behavior change
- No current indicators of quality of participation within and across groups - ethnographic methods and network analysis will provide insight
- Discover which HD indicators are related and/or causally linked to status targets for ecosystems
- Which behaviors have increased potential to influence status of the sound's health?
- Develop more accessible, user-friendly models (similar to online carbon footprint models) that communicate key principles to the public
- A lack of agreed upon Human Dimension conceptual models limits the region's ability to select HD indicators
- What would be the ways to make performance management/accountability institutionally acceptable and encourage transparency?
- Scientifically derived indicators are typically different than those identified by the public at large. Best available science is at times, at odds with public values
- Start small. Select indicators/targets to reflect smaller spatial scale. Track data using pilot project approach.
- Complete the Open Standards process for Human Dimension components - currently a significant gap
- Identify common extractive/non-extractive uses of Puget Sound resources - develop metrics which reflect principles of sustainability
- Examine the relationships between political values and social science/HD indicators
- Explore the development of a new indicator that captures the active engagement of people that captures human values/preferences/caring for the environment
- How do we align measures of engagement and stewardship activity with changing laws and regulations?

- Human Health is the most obvious way that people are connected to the environment. Explore related indicators of nutrition, recreation, walkability, etc. that link environmental health with human health

Tools, Models and Approaches (Indicators and Targets)

- Open Standards for the Practice of Conservation (conservation measures partnership - adaptive management framework)
- Coastal Conservation Educational Association (marine system metrics)
- Surveys, visualizations, animations: tools need to take data and research findings and communicate these results to broader audiences
- INVEST. Stanford Natural Capital Project

5. Infrastructure

Existing Research (Infrastructure)

- WRI – mapping Puget Sound's institutional networks
- Preserve our Islands -- Glacier Gravel permit example (Patrick)
- Mayor's Conference – Philippines example of brining 700+ mayors together to tackle environmental issues
- Public participation GIS
- Citizen science
- Common Property literature (Rebecca)
- *Pelkey and Sabatier*. UC Davis Watershed Partnerships Project.
- *Lubell*. UC Davis Watershed collaboration on NEPs
- *Lubell et al*. UC Davis. Swimming Up Stream.
- *Patsy Healey*. Collaborative healing. Interplay between regulatory and private "soft and hard" infrastructure).
- *Putnam* Elements of Social Capital
- *Ostrom* work on institutions
- *Neil Gunningham* work on top down-bottom up institutional analysis. Gains/losses with various approaches
- *Quick and Feldman* inclusion and deliberation
- *D. Holland* see body of work
- *Betsilla and Corell* – measuring institutional influence
- *Clare* see watershed planning

Recommended Research (Infrastructure)

- GAP analysis – what organizations can do what? Who's not doing their role?
- How do we engage social capital? Challenges of combining social capital – which ones make the most sense to combine efforts/bond?
- How do we engage religious organizations, arts, other groups than the 'usual'?
- Ocean policy and regional councils (west coast)
    - Puget Sound
    - Columbia River
    - Outer Coast (MRCs)
- Tribes
- Transboundary
- Coastal marine special planning – in progress
- Institutional map – does this exist in Puget Sound? Would help in understanding where to build bridges
- Institutional capacity and capability assessment – are agencies capable of managing their issues?
- Social capital needs assessment (PSP is doing this mapping)
- How are agencies coordinating across different disciplines via Puget Sound funding?
- Need a group 'watch-dogging' the permitting process
- What kind of infrastructure is needed to secure public/community involvement?
- Institutional connection to tribes – understand why this is not working
- SEA-streets – how do communities view these approaches?
- Eco-Districts – grass roots sustainability life style and community cohesion. Relevant here? Adopt in PS?
- Fisheries Farmers Markets – bring food source together with the community. Could do this here. Community oyster gardening – what scale?
- What maintains divisions between groups? (e.g. mistrust)
- Bridging groups – cross intuitions and scale. Improve integration
- What is happening in Puget Sound? Where can we achieve efficiencies?
- Assessment of intellectual infrastructure in Puget Sound
- What are the opportunities for citizen science?
- Local knowledge pathways
- Electronic/digital tools – how well are these working?
- How to best link foundations to federal agencies?

- Stewardship mapping – where are the activities? What are the goals? Are activities aligned with policy questions?
- Is out reach/education working?
- Institutional resiliency – impression that PSP are the 'bad guys'. What in the system has made that difficult?
- How do we boost involvement in the community? Motivations and goals of groups?
- What are necessary skills around successful participatory democracy?
- Tools – how do these make a difference in outcomes?
- Identify the actors – who is our Nelson Mandela? Why actors chose to participate in particular partnerships. What do players want? influence, resources, information, etc.
- Bottom up vs. top down. What work, what doesn't? Does top-down remove the incentive to organize and collaborate? Each option has different investment requirements.
- Integration between policy and agencies – we need to understand this.
- History of PS Programs and institutions. From Puget Sound Water Quality Authority to PSP.
- What influence does PSP have as an institution? What are the outputs/ avenues of influence? Relationships with other institutions?
- Underlying structure (such as Clean Water Act) and what needs to change? What further progress do we need now?
- Understand the History of institutional framework. Good place to look for good/bad functions
- Institutional vs. Mgt decisions. What about governance?
- Other organizations that get missed – churches, community groups, etc.
- Pros/cons of different institutional approaches
- Do we have the facilities/capacity to change behavior?
- Do we have institutions to affect changes in indicators? Institutional pathways to change indicators?
- Sort our public/private authority and process
- Characterize existing pieces of social infrastructure and the cultural underpinnings of our institutional structure
- Are there effective models of successful public/private partnerships and coordination?

Tools, Models and Approaches (Infrastructure)

- Successful case studies
- Theater, arts
- Need institutional mechanisms in place to coordinate natural and social sciences
- Charrettes, community visioning
- Replicate of NY, Chicago studies:

- Site surveys
- On-line surveys
- Interviews
- Organizational network analysis
- Civic and environmental stewardship is a viable solution – extent? Outcomes?
- Decision-making training – important skill
- Participatory democracy
- Public Participation GIS
- Smart Phones used in citizen science
- VGI – Voluntary Geographic Information
- Social networking tools
- Puget Sound PAC
- Describe institution and their role in changing indicator outcomes. Comparative approach
- Maps of organizations and the ecological landscape
- Tools of historians – birth and progress of institutions
- Ethnographic tools – surveys, interviews around structures that influence their own decision-making
- Strategies for policy goals – need prioritizations.
- Communications – who does this role?
- Clearing house/broker – think tank to provide a standard for research
- Social and institutional network analysis
- Planning – develop a plan and approach to optimizing collaboration
- Facilitation
- Measures of centrality, connectivity – use UCINET software to create diagrams to illustrate connections between nodes.
- Ostrom-based tool – monitoring. How well do institutions do this?
- Lead scientist for each agency to link between lead agencies and funding sources
- Coastal management approaches that are mandatory
- Meetings, conferences.

Opportunities, Partnerships, and Suggested Approaches (Infrastructure)

- Regulatory watch-dog groups
- Psychologists – input on strategy
- Churches/religious groups

- Tribal communities
- Ecosystem monitoring community
- Theater, arts

RFP Bullets

- What is the state of governance of Puget Sound? (revisit Sea Grant report from 1970s)
- Recommendation for section in Puget Sound Update – model how to collect and report information

Additional Comments

- One size does not fit all – scale relevance for some problems
- Partnership has no authority – NEPs do not have regulatory authority but made up of regulatory agencies and institutions

From Note taker:

- Undercurrent that government agencies are wasteful.
- Stewardship mapping -- look at motivations of constituency and groups.
- Tools make a difference -- Public Participatory GIS
- What are the cultural underpinnings of the existing institutions specific to Puget Sound -- what is the existing structure and what needs to change?
- How does the fact that PSP does not have regulatory power impact success of the Partnership?

6. Other

This purpose of this section was to give participants a) an opportunity to discuss any other categories of social science research not captured by the other sessions and b) continue dialogue about topics covered in other sessions that warranted additional thinking. This section is organized around these two concepts.

Are all the categories of social science research captured?

- Social justice; gender; race; class and culture issues are all interlinked with the Puget Sound recovery issue. They need to be included, possibly as their own category. We cannot solve environmental issues without also addressing inequality, social justice, etc.
- Open and participatory processes—an issue that should be studied.

General comments from ongoing dialogue

- There is a disconnect between the social sciences and the physical sciences. There is a bias in favor of the physical sciences. Social scientists have a credibility issue that needs to be addressed.
- Cross-disciplinary collaboration and communication is very important. There is an entire body of literature that addresses this topic and it should be looked at. PSP and others could foster cross-disciplinary collaboration by 1) making it a requirement of grant applications and/or 2)

hosting workshops that help nurture cross-disciplinary communications and understanding (for example, a workshop on the various methodologies used by the different sciences and why they are appropriate).

- Before PSP develops a plan/framework for incorporating the social sciences into its overall strategy, it needs to do an honest assessment of how it's **currently** using science. There was a strong sense from participants that there is no real strategy/framework/etc for tying in the physical science. This needs to be dealt with before trying to figure out the social science piece.
- There should be a socio-economic impact analysis of environmental activities: what is the true cost and true benefits of particular environmental policies and activities, including conservation? Who wins and who loses? Need an honest assessment so that we can be honest and truthful as actions are taken.
- Language and concepts need to resonate to help gain traction.
- Are there other customers for Social Science research beyond PSP?
- Humanities can plan a role, too (art, literature, etc).
- Need to make a compelling case for social science and how it can help inform decisions.
- Need a lot of models of successful interdisciplinary work.
- "Other questions" should remain its own question throughout this work, since they will always bubble up.
- Decision-making and decision-makers should be assessed.
- Look at "Sustainable Sites Initiative"—look at certification systems.
- Need to categorize people appropriately. Different people have different degrees of impact; also, different people are impacted differently by environmental issues. (those with the biggest impact are not the ones most impacted by regulations, for example)
- Opportunity costs of Puget Sound recovery should be fully assessed.
- How can we show that Puget Sound recovery improves livability? Look at HUD/DOT livability principles.
- For a lot of people, the scale of Puget Sound doesn't mean anything. Need to speak to people where they're at, and in language that resonates with them, on topics they care about. Dashboard indicators need to be place-based and parsed out so that they resonate.
- Need to understand the types of people, as well as the areas of expertise, needed to get the job done.
- Should do a network analysis of all entities engaged in the effort.
- Need to better understand power dynamics.
- Need to look at federal, state and local policies (flood insurance, for example) and how/whether they integrate. Need to identify inconsistencies.