



Advancing the role of social science in the North Pacific Research Board's research program

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Summary

This report presents the results of a half-day workshop held on behalf of the North Pacific Research Board (NPRB) in January 2014 in which participants considered how the Board could better integrate social sciences into its mission. Participants were pleased with the Board's recent efforts to advance the integration of social and natural sciences, and were optimistic about future prospects. They were also satisfied with the review paper commissioned by the Social Science Working Group on social science integration with natural resource management, and were eager to further the conversation begun at the first Social Science Workshop.

To identify the actions most likely to achieve the desired integration, workshop participants took part in an outcome mapping exercise intended to articulate how best to achieve an integrated science program. Participants were asked to identify 1) challenges to the integration of natural and social sciences in Alaska; 2) short- and long-term outcomes that would demonstrate progress; and 3) actions that would enable the desired outcomes.

Participant responses were organized in themes defined by the challenges articulated. The themes were used to organize participant feedback, and formed the basis of the recommendations for how the Board can best advance science integration. While the themes are not independent, nor the only way to organize the challenges and opportunities facing the Board, they do capture the diversity of input identified by workshop participants and provide a useful format to frame advice to the Board.

Thematic challenges to the integration of social and natural sciences

Participant responses were organized into four themes: **Leadership**, **Practice**, **Communication**, and **Understanding**. Leadership concerns the Board, its research direction, commitment, and capacity. Practice includes all aspects of research including setting research objectives, conducting the diverse research necessary to support those objectives, and dissemination of results. Communication is related to community and stakeholder involvement, and increasing participation and collaboration among groups. Finally, an increased Understanding by decision-makers, natural scientists, and communities of what social science is and how it can contribute to sustainable resource management will support every aspect of the integration process, including potentially contentious issues related to equity, social justice, and the diversity of values.

Long-term, strategic outcomes to address the challenges

Workshop participants stressed the importance of clear priority research questions stemming from the needs of both communities and resource managers. Revising the Science Plan to include a more inclusive set of research objectives beyond those related to commercial fishing was another fundamental long-term outcome desired. Participants suggested these objectives be defined through conversations with rural and native communities, including elders, thereby reflecting an increased understanding and appreciation of the needs of affected communities. Understanding the ethnography of management institutions was also seen as central to defining holistic research objectives. Increased understanding of social science contributions, and a consultative, collaborative research environment would help research teams produce salient, legitimate, and credible advice for decision-makers while improving the relationship with communities and stakeholders.

Short-term, tactical outcomes: Getting the ball rolling

The transition to an integrated science approach will take time. However, participants identified a number of short-term outcomes within each of the four themes that would begin to build the Board's effectiveness and credibility both within the social science community and in coastal resource dependent communities. A key short-term outcome is to ensure the social science community is aware of and responding to the NPRB Annual Requests for Proposals (RFPs). Another often-mentioned outcome was a revised RFP process that explicitly accommodates social and integrated projects within its scope. Increased understanding of the value of social sciences to sustainable resource management by resource managers, natural scientists, and the Board is strongly desired. While inevitably an on-going process, facilitating conversations between decision-makers, natural and social scientists, and communities would begin to address this outcome.

Conclusions

The most desirable long-term outcome expressed by workshop participants was the identification of clear priority research questions stemming from the needs of Alaskan communities and resource managers. Many felt that a revised Science Plan developed through an increased understanding and appreciation of the needs of affected communities and the ethnography of the relevant institutions would better prepare the Board to develop RFPs that are inclusive of a range of social science topics and questions.

Participants believed the information generated through such consultative and collaborative research scientists, local communities, and decision-makers would gain an increased appreciation of each other's contributions, in particular the value of social science. Participants emphasized that this will not be an easy task. However, it was generally agreed that with its ability to influence the direction of research in Alaska, the NPRB is uniquely positioned to become a leader in integrated marine sustainability science.

Next steps

Workshop participants identified many ways in which the Board can enable the process of science integration. However, the actions that help enable the largest number of outcomes are best undertaken early in the process. Based on our understanding of workshop participants' contributions, the following actions could lead to considerable progress over the short term. The actions are described in more detail in the Conclusions section.

1. Encourage social scientists to make full use of existing NPRB funding opportunities and mechanisms for contributing to the Board's composition and research planning with the goal of promoting integrated science in Alaska.
2. Establish a workshop series to bring scientists from various disciplines together to tackle specific challenges.
3. Establish a program to identify the needs and values of Alaskan stakeholders, including marine resource-dependent communities.
4. Articulate the Board's commitment to science integration by initiating a conversation about how to make research more salient, legitimate, and credible to decision-makers, communities, and stakeholders.
5. Engage the social science community to help identify high value, short-term research activities that would demonstrate the value of social science work to the Board and others.
6. Consider the revisions proposed to the RFP process including more targeted social science research questions (as was achieved in the 2013 RFP), adjusting reporting requirements to better suit social sciences, and extending the time between proposal call and deadline.
7. Identify how best to leverage online networking tools to improve dissemination of information among natural and social scientists, and provide a venue for those interested in interdisciplinary, integrated work to build connections.
8. Define a common platform on which effective and meaningful integrated studies can be based, a long-term plan can be supported, and informed decisions can be made.
9. Review other initiatives within and beyond a fisheries context, for example those regarding marine spatial planning. A number of organizations and research programs have made valuable contributions that can inform NPRB on aspects of science integration.
10. Develop a long-term strategy for establishing integrated science as the NPRB's approach to integrated management. Including priorities, approaches, and pathways in such a strategic plan would provide continuity, allow progress to be tracked, ensure alignment of the diverse processes involved, and support the retention of institutional knowledge.

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Key definitions

Action	The steps required (alone or in combination) to reach short- or long-term outcomes; in this context most actions are recommended steps for the NPRB to achieve an integrated science program.
Credible*	Knowledge that has passed some level of validation, with peer-review as the most common form in this context.
Ethnography	The scientific description of the customs and cultures of a group of people.
Inter-disciplinary	Science that draws approaches across traditional academic disciplines into one research-based activity.
LTK (local & traditional knowledge)	Including both local ecological knowledge (LEK) and traditional ecological knowledge (TEK), LTK removes the constraint that such knowledge is strictly ecological.
Legitimate*	Knowledge that is gathered in ways that assure it is correct, complete, and unbiased; it can be strengthened by involving a wide range of stakeholders to help define research questions.
Objective	The main purpose of a project or program that follows from achieving long-term outcomes, e.g., an objective of NPRB is to more effectively fund social sciences.
Outcome	A state or consequence that is achieved after an action or combination of actions is taken (can be short- or long-term).
Program	In the context of the NPRB, a program is a funding envelope that comes with a research theme, an administrative component, and typically a multi-year funding commitment.
Salience*	Knowledge that is timely and relevant for the purpose it is generated.
Strategic	Long term, policy-related thinking: where do we want to end up?
Stakeholder	Defined as any individual or group with an interest in the sustainable use of marine resources (e.g., industry associations, fishing gear groups, environmental groups, and regulatory bodies). While the definition includes communities, they are often explicitly mentioned for emphasis.
Tactical	Short term, management related thinking: how do we accomplish the next steps?
Trans-disciplinary	A team-based approach to science that includes researchers from different disciplines working with stakeholders and others outside academia to whom the results are relevant.

**Terms that describe research supporting the link between knowledge and actions as detailed in: Rowe, A. & Lee, K.N. 2012. Linking Knowledge with Action: an approach to philanthropic funding of science for conservation. A report to the Conservation & Science Program, David & Lucile Packard Foundation.*

Introduction

About the North Pacific Research Board

Established in 1997, the North Pacific Research Board (NPRB) is committed to building a clear understanding of the North Pacific, Bering Sea and Arctic Ocean ecosystems that enables effective management and sustainable use of marine resources. Since 2002, the Board has supported a wide-ranging science program to address pressing fisheries management and ecosystem information needs in these areas. Research is organized through programs, including an Annual Research Program (distributing \$3.5-14M annually according to the 2005 Science Plan), a Graduate Student Award Program (six awards of \$25,000 each), and a newly established Long-term Monitoring Program (\$400,000 annually for five years). Integrated Ecosystem Research Programs are multi-year, multi-million dollar efforts directed at developing a more integrated understanding of Alaska's three marine ecosystems. NPRB issues requests for proposals (RFPs) for both its Annual Research Program (<http://www.nprb.org/annual-research-program/request-for-proposals>) and Long-term Monitoring Program (<http://www.nprb.org/long-term-monitoring-program/request-for-proposals>).

Composition of the 20-member Board is mandated by its enabling legislation, and includes representatives of major management agencies, two members representing fishing interests, and one each representing the interests of Alaskan Natives, the environment, academia, and the oil/gas sector. The Board is supported by a Science Panel and an Advisory Panel. In addition to reviewing proposals and technical evaluations, the Science Panel helps shape the research program, advises on science planning and identification of research priorities, and helps draft annual RFPs. The Science Panel is dominated by natural science expertise primarily in oceanography, marine ecology, and fisheries management, although social sciences are recognized as an area of sought-after expertise in the call for nominations. The Advisory Panel ensures meaningful community representation across the science programs by providing advice on setting priorities, defining research questions, and keeping stakeholders informed of Board activities.

The main operational challenges for the Board include balancing commitments to long-term projects against the possibility of emergent issues requiring immediate attention, and preparation of RFPs for the Annual Research Program. Annual RFPs are based upon the research priorities of other agencies as well as input submitted by organizations and individuals throughout the year. These priorities are refined by the Science Panel and reviewed by the Advisory Panel. Suggestions for Annual Research Program priorities are welcome at any time.

The emerging social science imperative

NPRB's engagement with, and support of, physical and biological sciences has been highly successful. However, comparatively less progress has been made in the social sciences. NPRB recognizes that social sciences can help inform fisheries policy as well as a broader range of management issues including, for example, the implications of ecosystem change on community resilience. However, because the process for defining research priorities reflects a

certain disciplinary familiarity, there is the potential for social science priorities to be lost given the dominance of natural science perspectives, particularly on the Science Panel. The Board has begun to balance this trend by creating an internal Social Science Working Group, which has contributed social science priorities to the annual RFPs in the last two years. In January 2012 the NPRB held its first Social Science Workshop with the goal of incorporating social sciences more effectively into NPRB science programs. The workshop report¹ noted a willingness to renew the relationship between the NPRB and the social science community, and emphasized that there is a greater capacity for social science in Alaska than is evident from responses to the RFPs. This led to a special social science focal section in the 2013 RFP with \$400,000 in target funding, and a commissioned review paper² to inform the Board on relevant social science research and the role of social sciences in natural resource management.

The 2014 Social Science Workshop

To continue the conversation from the 2012 Social Science Workshop and to follow up on the review paper, NPRB contracted a half-day workshop in January 2014 with the goals of:

- 1) Gathering feedback from the social science community on the commissioned review paper;
- 2) Discussing promising research directions and priority social science topics falling within the NPRB mission;
- 3) Discussing social science approaches that can help elevate and advance the science; and
- 4) Providing recommendations to the NPRB on how to proceed in the social science realm.

To identify the actions most likely to achieve the desired integration, workshop participants took part in an outcome mapping exercise intended to articulate how best to achieve an integrated science program. Outcome mapping is intended to track an organization's progress through a complex strategic process.

Participants were asked to read the previous workshop report and the review paper, and to answer a set of preparatory questions to begin identifying 1) challenges to the integration of the natural and social sciences in Alaska; 2) short- and long-term outcomes that would help advance the desired integration; and 3) actions that would help achieve these desired outcomes. Prior to the workshop, these challenges and desired outcomes were combined into themes and redundancies were removed. This synthesized feedback (challenges and outcomes, organized by theme) was presented to workshop participants, who were asked, as part of the outcome mapping exercise, to identify additional actions and outcomes.

1 Dutton et al. (eds.) 2012. Social Science Workshop Report. North Pacific Research Board.

² Ounanian et al. 2013. Global review of social science integration with natural resource management. Research report to the North Pacific Research Board. http://www.nprb.org/assets/images/uploads/ifm_ssreport_final.pdf.

Outcome mapping

We believe that the integration of social and natural sciences within the Board's research program is a strategic challenge with desired outcomes in both the short- and long-term. We therefore adopted an outcome mapping approach, where actions lead to short-term outcomes that in turn facilitate longer-term outcomes and eventually combine to overcome the challenges. Participants were asked for feedback within this framework before and during the workshop.

Outcome mapping begins by articulating the ultimate goal - In this case, *advancing social science within NPRB's research program to contribute to effective management and sustainable use of Alaskan marine resources*. The next step in the process is to articulate the Challenges (or barriers) to achieving that goal, then the Outcomes that would overcome those challenges are described. Finally, Actions that will lead to achieving those desired outcomes are identified.

To help advance the process in the limited time available, participants were provided with the long-term outcomes solicited prior to the workshop at the beginning of the outcome mapping exercise. Working in groups, participants then strived to organize the outcomes in order of dependency, identifying long-term outcomes that would be necessary to reach the ultimate goal, and working backwards to shorter-term outcomes that would facilitate the long-term outcomes. Finally participants identified actions that would lead to accomplishing the short-term outcomes.

This was not a trivial exercise. The relationships between short- and long-term outcomes are frequently complex and context-dependent. There are few 1 to 1 relationships. Formal outcome mapping exercises typically require a team of experts working for several days, often for a number of iterations, before a comprehensive map is derived. Nevertheless, the value of an abbreviated process is considerable because it generates a list of desired outcomes and the actions necessary to achieve them - exactly the information NPRB requires to proceed with science integration.

Despite the time constraints, participants made good progress, generating a considerable list of desired outcomes and enabling actions, and exploring how specific actions connect to short-term and long-term outcomes, as shown on the (very preliminary) outcome maps (Appendix B). Some clear linkages between outcomes within and between themes became evident in this exercise. For example, communication strategies initiated by the Board (short-term outcome) would lead to natural scientists gaining a more complete understanding of the contributions that social science can make (long-term outcome). Also, a revised RFP development and evaluation process (short-term outcome) could lead to a more equitable distribution of funding (long-term outcome).

At this early stage, the maps do not provide a comprehensive organization of actions and resultant outcomes, but they do contain most of the elements necessary to achieve the ultimate goal. With more effort, these preliminary results could be transformed into an outcome map with arrows indicating the order in which specific actions and outcomes are best addressed and necessary *and sufficient* outcomes are identified, allowing progress to be tracked and priorities updated, thereby providing a roadmap for science integration in Alaska.

Results of the workshop

We grouped the feedback received from workshop participants into four themes (Leadership, Practice, Communication, and Understanding). While these themes are not independent, nor the only way to organize the challenges and opportunities facing the Board, they capture the diversity of input from workshop participants and provide a useful way of framing advice to the Board. For each theme, we summarized challenges and related them to the most desirable short- and long-term outcomes expressed by workshop participants. The responses divided well into short-term outcomes, achievable in the next 1-3 years (i.e., within the context of the current Science Plan), and long-term outcomes, potentially achieved after 3 or more years.

The basis of these results is contained in Tables 1 and 2, which organize the synthesized responses from workshop participants. The un-edited, un-attributed responses from both pre-workshop feedback and the workshop itself are contained in summary tables (Appendix A). The visual representation of actions and outcomes created by participants during the workshop is shown in Appendix B. Workshop participants are listed in Appendix C, along with feedback on how the participants felt about the effectiveness of the workshop. In the results below we have synthesized the most prominent, cross-cutting outcomes for each theme, and summarize the actions participants suggested the Board could take to achieve those outcomes. We conclude with a list of concrete next steps for the Board's consideration.

Leadership

The theme of Leadership captures challenges related to the direction NPRB's science support will take, and decisions necessary to travel that path. Challenges include guiding research to identify priority interdisciplinary questions and fostering inter- and trans-disciplinary efforts. Leadership must also deal with the challenges of equity and justice, which include removing real and perceived biases, and ensuring equitable funding strategies.

Board composition and representation emerged as a challenge to the integration of social sciences in the research program, as did the need for more social science context and familiarity with methods on the Board. Participants also emphasized the importance of providing clear, specific research questions to the social science community. This relates to NPRB's overarching challenges of explicitly setting the research direction and deciding whether to support social sciences directly, or to focus on integrated social/natural science projects, as well as how to better involve marine-dependent communities in the research. More fundamentally, the Board faces the challenge that interdisciplinary and social science research results are perceived to threaten established interests.

Two broad outcomes emerged as necessary to help overcome these challenges. In the short-term, the need to further advance the integration of the social science community into the Annual RFP Program was identified as a key outcome. The long-term outcomes most desired by workshop participants include an improved relationship between natural and social scientists and the increased salience of the Board's work to local communities reflected in a more diverse Science Plan. Specifically, broadening the meaning of "pressing fisheries management issues" to include non-commercial use of resources and the extension of ecosystem effects into communities was seen as a key outcome.

Including a broader range of research objectives within the NPRB Science Plan is dependent on extending research to a full suite of fishing interests (i.e., fishing industry, communities, and subsistence). Participants suggested this would stem from research to gain a deeper understanding of the diversity of needs and values in communities that depend on fisheries, mammals, and other marine resources. Participants believed regular presentations to the Board regarding social science methodologies and objectives would effectively increase in the Board's capacity to understand the contribution of social sciences to the sustainability of marine communities, ecosystems, and resource use.

Other long-term outcomes that can help measure progress towards science integration from a leadership perspective include increasing capacity on the Board and the Science Panel to appreciate and evaluate social and integrated research; rewarding inter-disciplinary projects; increasing the level of funding dispersed; committing to long-term projects; and integrating local and traditional knowledge (LTK) into research projects. To begin this process, participants acknowledged that it would be best to start with short-term, high return activities identified by social scientists that will clearly demonstrate the value of social science research to improving natural resource management. Such short-term successes would improve how social science is perceived and help justify and reinforce the Board's move toward a more integrated science program. Enabling identification of priority research projects to initiate these efforts, developing ways of encouraging multi-disciplinary teams, and focusing on community concerns offer clear, immediate actions the Board can take.

Other short-term leadership actions identified by workshop participants to further science integration include building on the valuable work begun by the SSWG to create RFPs that better resonate with the social science community, and revising the project reporting requirements to better accommodate social and integrated science projects. Recommended revisions to the RFP process include making the value of research explicit by requiring proposals to answer the question of who benefits from the work and how it is realized; devising a scoring method to incentivize social and integrated science; supporting community-generated projects and capacity building; and designing a two-tiered review process with a small committee assessing proposals for community values (i.e., establishing salience) before passing the proposals to a larger, balanced review panel. Suggestions for demonstrating NPRB's commitment to integrated science include enhancing Native representation and participation; balancing Board composition; supporting research to identify community needs; and addressing controversial topics through social science research.

Practice

The practice of science – how it is enabled and conducted – presents challenges rooted largely in the institutionalized, disciplinary nature of research. Interdisciplinary practice is also challenged by competition for limited funding and resources, and the isolation of research objectives within disciplines. The integration of social and natural sciences will require a commitment from researchers to work collaboratively, to engage stakeholder groups, and to address research questions relevant to all Alaskans.

A fundamental challenge to integrated science emphasized by workshop participants is the common perception that social and cultural requirements are often seen as a box-checking exercise to be included in collaborative research. This perception can lead to a lack of adequate funding, the minimization of social science contributions, and late inclusion of social scientists in research proposals and projects. These consequences lead to insufficient time for social science research to be conducted effectively, thereby undercutting the credibility and salience of interdisciplinary work. Another major challenge expressed was the lack of clear social and integrated science research objectives, making it difficult for the social science community to fully engage in the NPRB research process.

Improved collaboration between natural and social scientists is a key long-term outcome that will help overcome these challenges. Engaging communities and decision-makers in research activities will also help improve both the legitimacy and the salience of research practice. Other desired outcomes articulated by participants included adequate funding, particularly for LTK and ethnographic studies; an improved understanding of data needs; and research conducted to fill important gaps linked to a broader, more inclusive set of research objectives. The engagement of social scientists at the project inception phase and the definition of clear research objectives extending beyond commercial fishing were also identified as key long-term outcomes.

Leading towards these outcomes are shorter-term milestones, such as NPRB recognizing the importance of mixed methods (combining different quantitative and qualitative techniques in one study) for social science and integrated research, building trust, salience, and credibility with integrated science teams, ideally including communities, and supporting trans-disciplinary pilot projects. Workshop participants strongly supported an enhanced science-policy dialogue to engage decision-makers and local communities in the identification and prioritization of research needs.

Recommended approaches³ to enhance the practice of social sciences in Alaska include studying the ethnography of political institutions and process, applying mixed methods where appropriate, and collecting and integrating LTK. Exploring differences between federal and state social impact assessment (SIA) processes to understand fisheries policy and management decisions and the implications for community sustainability is also recommended. Involving social sciences in the project planning phase was seen as critical by participants to the formation of effective interdisciplinary teams. Finally, recognition that humans have been part of Alaska's coastal ecosystems for over 10,000 years, and the cultural implications therein, would substantially broaden the scope of natural science research and the social applicability of its results.

Specific actions to advance the practice of integrated science include identifying community-based research questions for RFPs; designing research projects to involve local people; and requiring that funded projects report results and updates back to affected communities. Other important actions that would fulfill outcomes relevant to the practice theme include support

³ Approaches in this section were presented in Ounanian et al. (2013) and at the workshop.

for and commitment to long-term research and focusing on under-represented areas of social sciences, such as ethnography.

Participants identified a number promising social science research activities to incorporate into its RFPs. These include understanding the social impacts of resource extraction and use policies, and assessing how management actions and policy implications are interpreted through different world views and the implications this has for policy-makers. By supporting projects that feature ethnographic methods (including key respondent interviewing, case studies, participant observation), rather than solely quantitative methods, NPRB could further its understanding of the social dynamics of natural resource use and management. An example of this method would be an assessment of individual, household, and community responses to regulatory changes, such as those conducted before the implementation of subsistence halibut fishing regulations by the NPFMC and IPHC in 2003 (participant response).

Soliciting research that integrates commercial and subsistence fisheries is another valuable area for the NPRB to engage researchers, as the existing split prevents commercial managers from attaining relevant information and disconnects subsistence fisheries from management decisions. This could be facilitated by engaging the existing social science capacity in Alaska regarding indigenous resource use and subsistence.

Finally, the communication of results to diverse groups remains a challenge for all scientists. Participants noted that when managers or policy-makers receive social science information, it is not in the usual, natural science format (i.e., text and data-rich reports), and can thus be even more difficult and time-intensive to read, understand, and integrate. Actions were therefore proposed to improve the communication skills of Alaskan researchers. These include creating a framework for reporting research outputs from diverse disciplines to diverse audiences, and leveraging online networking tools (e.g., ResearchGate⁴ or something similar to GulfBase⁵).

We distinguish between science communication and the *Communication* theme below because the communication of scientific results is a widely recognized as a challenge for the science community. However, many of the actions included in the following theme are likely to improve scientists' communication skills, leading to better understanding of social science results by decision-makers, and an increase in the number of social science presentations at conferences and meetings, both desired objectives expressed by participants.

Communication

Considerable communication challenges exist within and between natural and social scientists, decision-makers, local communities, and stakeholder groups. These challenges include the prevalence of disciplinary jargon, limited opportunities for inter- and trans-disciplinary conversations, and a general disconnect between communities affected by management decisions and the research intended to support such decisions. Further, it was reported that

⁴ ResearchGate is a network dedicated to science connections and collaborations: <http://www.researchgate.net/>.

⁵ GulfBase is a database of resources about the Gulf of Mexico to help researchers, policy-makers, and the public work together to insure long-term sustainable use and conservation: <http://www.gulfbase.org/>.

scientists from different disciplines tend to interact poorly or not at all because of disciplinary isolation, perceptions of disciplinary dominance (e.g., natural sciences, economics) and poor collaboration skills. This lack of communication inhibits the emergence of important research questions from both decision-makers and affected communities. Options for improving communication, building collaborations, and sharing knowledge are limited.

Improved communication skills throughout the Alaskan research community was thus identified as a critical long-term outcome. Desired short term outcomes include engaged rural and native communities, especially elders; increased stakeholder consultation; research being supported and valued by communities; increased opportunities for successful collaboration; enhanced awareness among social scientists about the NPRB and the opportunities it provides researchers; and improved connections between decision-makers and impacted communities.

Recommended actions to achieve these outcomes focused on providing sufficient opportunities to share ideas and results across groups, building and using a common vocabulary, and improving stakeholder outreach and interdisciplinary communication. It was recommended that social scientists present examples of outstanding research to the Board and Science Panel, as well as reviews of qualitative methodologies and their appropriate role(s). Such presentations would enhance the Board's ability to understand and assess strong social science proposals.

Interdisciplinary training in communication would begin reducing ambiguous terminology and help scientists make their results more accessible to managers, community groups, and other scientific disciplines. Such training would also foster inter-disciplinary teams, promote common understanding, and dispel assumptions and miscommunications.

Understanding

Understanding is perhaps the most fundamental challenge to the integration sought here. This challenge relates primarily to a misunderstanding of the role of social science and its relevance to natural marine resource management in Alaska.

The role of social sciences and social scientists is not always clearly defined, understood, or valued on the same level as that of natural sciences, and is often confused with community facilitation and public relations. Participants described how past efforts to incorporate social sciences into NPRB's research program suffered from perceptions about what is and is not science. Consequently, social science results (other than economics) are often ignored, often because the potential contributions of social science research are simply not understood.

Desirable long-term outcomes for improved understanding of social science mentioned by participants include improved social science literacy of natural scientists, students, and policy-makers; rural community appreciation for social science methods, results, and applications; and policy-makers who understand social science research.

The most popular proposed action to achieve the understanding outcomes was to assemble diverse groups of scientists to develop integrated questions that require multiple methods to investigate, and to require the results to be presented holistically. Participants noted that such

projects could be incentivized with a broadened RFP scope and a more balanced review process (see *Leadership*).

In a manner similar to the *Communication* theme, participants emphasized that the understanding and appreciation of social science would be enhanced through a workshop series focused on developing an understanding and appreciation of social sciences, specifically around the goals, objectives, complexity, methodologies, and time required for such studies to be successful.

Other recommended actions to improve understanding include creating a 'science shorts' series for a lay audience; broadening the communication forum at Alaska Marine Science Symposium meetings; hosting presentations featuring Alaska Native elders explaining their world views; sponsoring social science capacity building workshops; sharing the discussions from this workshop with a wider audience, hosting a discussion forum on the NPRB website; and increasing NPRB presence at conferences and events outside of Alaska.

These actions would enhance the credibility and relevance of social science among natural scientists and policy-makers, lead to increased acceptance of social sciences beyond economics, and improve the NPRB's understanding of social science methodologies and the importance of each as part of a holistic approach.

Conclusions & recommendations

The most desirable long-term outcome expressed by workshop participants was the identification of clear priority research questions, stemming from research into the needs of Alaskan communities and resource managers. Many felt that by reflecting community needs and values in the revised Science Plan, the Board would be better prepared to develop RFPs that are inclusive of a range of social science topics and questions (**Leadership**). However, participants made it clear that revisions to the Science Plan would be best developed through an increased understanding and appreciation of the needs of affected communities and the ethnography of the relevant institutions (**Practice, Communication**). Through the consultative and collaborative research needed to generate this information, scientists, local communities, and decision-makers would gain an increased appreciation of each other's contributions (**Understanding**). This would in turn facilitate the creation of trans-disciplinary research teams capable of generating salient, legitimate, and credible advice to decision-makers, and improve the relationship with communities and stakeholders (**Practice**).

Participants emphasized that this was not an easy task. Considerable academic attention has been paid to the development of inter- and trans-disciplinary work and it is challenging to get it right. However, with its ability to influence the direction of research in Alaska, the NPRB is uniquely positioned to become a leader in integrated, marine sustainability science.

Opportunities for advancing science integration

There are clear, significant, and on-going opportunities for the social sciences to become more prevalent in NPRB's short- and long-term research priorities. Nominations for the Science and Advisory Panels are held regularly, and feedback on the Annual RFP priorities is welcomed at any time. The graduate student award program provides opportunities to develop social science capacity around the Board's research priorities. Ensuring the social science community is aware of these opportunities and encouraging participation is the most immediate, direct way to begin improving the integration of social sciences into the Board's research program.

The workshop identified a number of opportunities for the Board to advance social science research in Alaska by facilitating communication and focusing on innovative, collaborative studies. One of the most compelling opportunities for the Board is breaking down disciplinary "silos" that appear when scientists do not sufficiently interact. As a recognized innovator pushing the frontiers of research, the Board is well positioned to support integrated marine science work that is challenging to fit into traditional funding categories.

To begin building credibility among social scientists and Alaskan communities, research will need to be increasingly perceived as salient (by community leaders and decision makers) and legitimate (to social scientists and communities). To begin travelling this path, a focus on oral histories, long-form and comparative ethnographies, political system ethnographies, and science-policy process studies is suggested. Projects assessing local community research priorities, describing the ethnography of fisheries management, and elucidating the value of social and cultural ecosystem services to different stakeholder groups would be particularly valuable first steps.

Such projects would begin to shed light on some of the more controversial questions facing the Board. While not explicitly articulated by participants, the amount of funding provided to social science projects depends critically on NPRB's working definition of "effective management" and "sustainable use." These definitions relate to the broader questions of social justice and equity that were raised by participants. The Board could lead a discussion about what these key phrases actually mean, and more importantly, how they can be pragmatically operationalized. Clarification of what the Board can and cannot fund will broaden the opportunity to partner with other agencies (e.g., NSF) to accomplish more holistic objectives.

In the short-term, trust around NPRB's long-term commitment to science integration will increase from achieving shorter-term outcomes such as broadening RFP scope, consulting with rural and tribal communities to solicit research questions, and enhancing two-way communication with these communities (e.g., by NPRB representatives regularly traveling to communities). Achieving such short-term outcomes would also contribute directly to the longer-term outcome of a revised Science Plan that is more inclusive and engaged with local communities and their knowledge sources.

The transition to integrated science will take time. However, workshop participants identified a wide range of actions and objectives that allow clear recommendations to be made to the Board to advance social science research within its research mandate, and to build the Board's effectiveness and credibility both within the social science community and in coastal, resource dependent communities that often do not understand the relevance of marine science as currently practiced.

What the NPRB cannot do

A number of actions proposed by workshop participants seem to be beyond the mandate of the NPRB. These include suggestions such as legislation mandating more social science research, requiring mandatory SIAs for large management decisions, establishing equitable governance structures for fisheries management, and the recognition of equity, precautionary principle, justice, etc. in policy-making. While relevant, these actions would require a revision of the NPRB's policies and procedures, and in some instances, its enabling legislation. Although the NPRB cannot directly effect these changes, it can work toward some of them through longer-term, strategic decisions aimed at supporting integrated marine science research.

Other proposed actions such as adding a social science director or program manager, increasing staff to craft RFPs and evaluate proposals, and creating a Social Science Panel to parallel the existing Science Panel may prove challenging for the Board, given that the cap on administration makes it difficult to increase staffing levels. While considering how to achieve such increases in staffing, we suggest the Board also work to increase the capacity of existing staff to become more familiar with social and integrated science approaches.

Next steps

Workshop participants identified many ways in which the Board can enable science integration. However, the actions that help enable the largest number of outcomes are best undertaken

early on in the process. Based on our understanding of workshop participants' contributions, we believe the following actions would lead to considerable progress over the short term:

1. Encourage social scientists to make full use of existing NPRB funding opportunities and mechanisms for contributing to the Board's composition and research planning with the goal of promoting integrated science in Alaska (e.g., nominations to the Science Panel, suggestions for Annual RFP research priorities).
2. Establish a workshop series modeled on the NCEAS⁶ approach to bring scientists from various disciplines together to tackle specific challenges. This promising action would support a number of short-term objectives related to leadership, communication, understanding, and practice. NCEAS successfully supports collaborative research and synthesis by assembling teams across multiple fields of inquiry to address challenging environmental problems at a broad scale, and could be very applicable for this context.
3. Establish a program with the specific objectives of identifying needs and values of Alaskan stakeholders, explicitly including marine resource-dependent communities. Ideally, this program would encourage repeat visits, two-way communication between researchers and stakeholders, and stakeholder involvement in data collection.
4. Articulate the Board's commitment to science integration through a collective interpretation of its mandate, informed by a conversation (e.g., working groups, public forums, solicited feedback from key informants) about how to make research more salient to decision-makers and communities. Participants wanted to see community needs reflected in all projects (i.e., who will benefit from the work, and how?). This sentiment is captured by Rowe and Lee (2012) in their concept of linking knowledge with action. The idea that research must be salient to the information users provides a powerful way to view research priorities. Framing the Board's actions within the goals of salience, credibility, and legitimacy will greatly increase the value of the Board to communities, and further the goal of integrated science.
5. Reach out to the social science community to help identify high value, short-term research activities that would demonstrate the value of social science work to the Board and others. Possible projects include oral histories, ethnographies, and science-policy process studies.
6. Consider some of the revisions proposed to the RFP process including more targeted social science research questions (as was achieved in the 2013 RFP), adjusting reporting requirements to better suit social sciences, and extending the time between proposal call and deadline.
7. Identify how best to leverage ResearchGate⁷ or other online networking tools (e.g., a version of GulfBase⁸) to improve dissemination of information among natural and social

⁶ The National Center for Ecological Analysis and Synthesis (NCEAS) in CA: <http://www.nceas.ucsb.edu/>.

⁷ ResearchGate is a network dedicated to science connections and collaborations: <http://www.researchgate.net/>.

⁸ GulfBase is a database of resources about the Gulf of Mexico to help researchers, policy-makers, and the public work together to insure long-term sustainable use and conservation: <http://www.gulfbase.org/>.

scientists, and provide a venue for those interested in interdisciplinary, integrated work to build connections.

8. With the help of inter-disciplinary expert groups, define a platform using a common language and shared understanding on which knowledge could be collaboratively developed and broadly shared. This platform would work within the long-term science plan to guide and support effective and meaningful integrated studies. Components of the platform would likely include: the role of social science in sustainable resource management, the ethnography of coastal resource management, the diversity of values in Alaska coastal communities, and the research needs of Alaska coastal communities.
9. Review other initiatives within and beyond a fisheries context, for example those related to restoration and marine spatial planning. For example, Ecotrust⁹ and the T. Buck Suzuki Foundation¹⁰ have linked societal values with fisheries, the Puget Sound Partnership and the Puget Sound Institute work towards similar goals of integrated science,^{11,12} and some researchers have examined similar questions for decades (e.g., Evelyn Pinkerton¹³, Barbara Neis¹⁴). All of these organizations and programs have made valuable contributions that can inform NPRB on aspects of science integration.
10. The NPRB would benefit from a long-term strategic plan describing how integrated science will be enabled and advanced to further the NPRB's goal of integrated management. To be effective, such a plan needs to consider, at a minimum, barriers, priorities, approaches, and pathways. A strategic plan would demonstrate commitment and provide continuity, progress tracking, a means to ensure alignment of the diverse processes involved, and the retention of institutional knowledge for the SSWG and the Board. Outcome mapping is one approach to developing such a strategic plan, and the preliminary outcome maps created at the workshop could form the basis of further efforts.

⁹ See: http://ecotrust.ca/program_area_overview/fisheries.

¹⁰ See report "Understanding values in Canada's North Pacific: capturing values from commercial fisheries": <http://ecotrust.ca/fisheries/understanding-values-canadas-north-pacific>.

¹¹ See report "Social Science and Monitoring Needs for Puget Sound Recovery": <http://www.eopugetsound.org/articles/social-science-and-monitoring-needs-puget-sound-recovery>.

¹² See report "Human Dimensions of Puget Sound and Washington Coast Ecosystem-based Management": <http://blog.pugetsoundinstitute.org/wp-content/uploads/2011/12/HumanDimensionsWorkshopReport2011.pdf>.

¹³ See: <http://www.rem.sfu.ca/people/faculty/pinkerton/>.

¹⁴ See: http://www.mun.ca/soc/fac_staff/neis.php.

Table 1. Challenges and related long-term outcomes as identified by workshop participants, organized into four themes (the challenges and outcomes included here have been synthesized to remove redundancy and improve clarity; unmodified feedback is contained in Appendices A1 and A2).

Theme	Challenges	Long-term outcomes
Leadership (by the NPRB)	<ul style="list-style-type: none"> • The NPRB Board composition may not be conducive to promoting social sciences • NPRB lacks expertise to evaluate social science proposals • Truly interdisciplinary and social science outputs may threaten established commercial interests • NPRB is not versed in the important social science questions and appropriate methodologies • Creative projects with big potential are often viewed as too risky • Inertia of the <i>status quo</i> challenges the development of new funding programs/approaches 	<ul style="list-style-type: none"> • Science plan requires research proposals to be salient • Social Science director champions social science at the Board level • Board’s understanding of Social Science increased • Composition of Board reflects a more balanced approach to social and natural sciences • Board representation of commercial fishing interests is reduced • Mandate of NPRB expanded beyond enhancing commercial fishing • Level of commitment to natural and social science integration articulated by Board and Science Advisory Panel • Social sciences are successfully engaged in research relevant to Alaska • Funding for social science increased • Value of LTK reflected in funding levels • Science Plan includes inter-disciplinary research themes, e.g., community, sustainability, resilience, food security, well-being. • Capacity for social science peer-review is adequate • Sufficient high quality, Integrated research is produced to warrant journal special issues • The NPRB is a leader in integrated management research • Importance of community values and perspectives are recognized • Social science is integrated into management/policy decisions on spatial marine use • The range of values used in policy making is broadened • Social science integrated into NPRB’s practice • The social science community trusts NPRB’s commitment to integrated science • The vision of the NPRB is achieved

<p>Communication (between all groups)</p>	<ul style="list-style-type: none"> • Time constraints make it difficult for managers to read and synthesize text-rich reports • Role of social sciences not always clearly defined, understood, or valued on the same level as natural sciences; can be confused with roles such as community facilitation and public relations • Lack of interaction and dialogue between natural/social scientists, social/social scientists, and scientists/policy-makers • Disciplinary jargon inhibits broad understanding • Options for knowledge dissemination are limited 	<ul style="list-style-type: none"> • Inter-disciplinary interactions are fostered • Mutual understanding between social and natural scientists is enhanced • Inter-disciplinary interactions are fostered through information technology • A common vocabulary is in place for inter-disciplinary work in Alaska • A framework for reporting research outputs is developed to accommodate knowledge products from diverse disciplines • Methods are developed to identify and inform managers of impacts management decisions have on resource and users • Communication between policy-makers, managers and scientists is enhanced • Communication skills of Alaskan research community are improved • The value of social and cultural ecosystem services is recognized as dominant for many stakeholders • The value of social science to policy is recognized • Local communities understand the value of funded research questions • The role of people in resource management is acknowledged and integrated into the Science Plan
<p>Practice (how research is or can be conducted)</p>	<ul style="list-style-type: none"> • Important research questions need to come from decision-makers • Scientists have difficulty forming true interdisciplinary teams • Social science often requires different time scales for effective data collection than natural science¹ • Perception that social science is often a box-checking exercise to include social and cultural data¹ • Late inclusion of social sciences in research proposals and projects • Lack of social science capacity in Alaska • Lack of adequate funding • Lack of baseline social science data • Social scientists do not know the ethnography of political institutions 	<ul style="list-style-type: none"> • Social science research is informed by Ounanian et al. (2013) • Funding for integrated science increased • Social science engaged at project inception (Integrated research is credible) • Research supported by RFPs extends beyond fishing industry to consider diversity of management measures (Informed by social science) • Value of ecosystem services to stakeholders is quantified • Relevant ecosystem service and social science indicators are developed and monitored • Databases of social Indicators are developed, maintained, and made available • Understanding of policy implications and outcomes of fisheries management decisions on community sustainability is advanced • Well known integrative processes are prioritized and undertaken by a

	<ul style="list-style-type: none"> • Perceived dominance of economics • Definition of relevant stakeholder and research communities of interest 	<p>trans-disciplinary team</p> <ul style="list-style-type: none"> • Application of techniques highlighted in Ounanian et al. (2013) that utilize knowledge of both social and ecological systems • Rural and tribal communities are more active and meaningfully involved in research and management • Reduction/elimination of spatial/temporal conflicts with indigenous subsistence marine harvesters. • Concept of sustainable use (i.e., stewardship) is expanded to include the full range of resource use activities • A diversified understanding of resource use creates a broader base for inter-disciplinary research
<p>Understanding (of the value/ contribution of social science)</p>	<ul style="list-style-type: none"> • Value of integrated science has not been demonstrated in Alaska • Relevance of social science to decision making is poorly understood • The important research questions, which data are required, and how such data can be collected and analyzed need to be understood • Contributions of social science are not recognized/understood and reports from social scientists are dismissed as being “just about feelings” • The social science context of research results is often misunderstood • Natural scientists assign social science a secondary, ineffective role • Qualitative methods are perceived as difficult to use and data are not widely recognized as valuable • Quantitative methods are often solely advocated to answer social science questions • Reluctance to support mixed methods of data collection • Social questions presently in the RFPs do not resonate with social scientists and produce proposals 	<ul style="list-style-type: none"> • The diversity of social science approaches are understood and recognized in the Science Plan. • Different ways of understanding fisheries and fishing are recognized • Social science is recognized as an integral component of management • Inter-disciplinary researchers develop a mutual understanding of approaches, methods, and outcomes • Social sciences is recognized as having a key role to play in resource management • Social science research is more acceptable and has a bigger role in decision making

Table 2: Actions and short-term outcomes as identified by workshop participants, organized into four themes (the actions and outcomes included here have been synthesized to remove redundancy and improve clarity; unmodified feedback is contained in Appendices A3 and A4).

Theme	Actions	Short-term outcomes
Leadership (by the NPRB)	<ul style="list-style-type: none"> • Clarify commitment of NPRB to fund social science and/or integrated research • Revise the Science Plan with input from local social science experts and community feedback • Include integrated science in the NPRB mission statement, Science Plan, and RFPs • Identify themes for natural and social science in lead up to RFPs • Remove the funding limit on outreach • Create opportunities for holistic questions that may not effectively fit into existing funding platforms • Fund projects with an overlap between commercial and subsistence fisheries in RFPs • Formulate RFP questions for a broader audience and clarify RFP standards • RFPs should have a longer lead time to allow sufficient collaboration planning, and should be advertised more broadly • Use feedback from social sciences and communities to narrow RFP focus on the kind of social science research to be funded • Ensure community needs are reflected in the scope of all funded projects • Create an explicit statement of what products will facilitate development of collaborative proposals • Develop a proposal review process that treats social and integrated science proposals equitably 	<ul style="list-style-type: none"> • Board composition reflects commitment to integrated science • NPRB has capacity to request and fairly review social and integrated science proposals • Input from the Science Panel and Advisory Panel to the Board helps address controversial subjects in the social sciences • The human component of the Science Plan is revised and expanded, especially in terms of identifying integrated research areas/priorities and including communities in research • Priority research projects for social and integrated science are identified • Social science funding is balanced to address community concerns • RFPs include full range of social science approaches to address current problems and assess impacts on and values of communities • RFPs encourage multi-disciplinary teams to propose salient research projects • NPRB begins with short-term, high return social science projects to demonstrate value • NPRB funds more creative, integrated/interdisciplinary, applied projects • NPRB develops guidelines for how social and natural science integration will work to support ecosystem management

	<ul style="list-style-type: none"> • Formalize flexibility of final report to accommodate social and integrated science projects. 	
Communication (between all groups)	<ul style="list-style-type: none"> • Reach out to rural and native communities (including elders) to identify community needs • Organize meetings/workshops for social scientists, natural scientists, and stakeholders to increase mutual understanding and form collaborations • Organize meetings/workshops for scientists and communities to define research questions and develop research ideas (including LTK) • Fund collection of community values and preferences to aid decision making • Identify and include existing entities engaged in inter-disciplinary work (e.g., AVCP, Kawerak) • Organize inter-disciplinary training in communication to a non-scientific audience • Support presentations by decision-makers about how studies can more effectively inform policy/management • Organize a workshop around methodologies presentation to build internal capacity to effectively write and review RFPs for social science and integrated research • Develop/leverage an online networking platform (e.g., ResearchGate) • Develop an integrated science newsletter for communicating role of all disciplines in understanding fisheries and ecosystem science in Alaska to explain concepts, methods, etc. to a lay audience • Approach journals to develop special issues around natural-social science integration • Build capacity in natural scientists to better understand/ assess strong social sciences 	<ul style="list-style-type: none"> • Awareness among social scientists about the NPRB is increased • Social science community understands opportunities offered by NPRB • Inter-disciplinary communication is improved • Social science response to RFPs is increased • Communication with and among stakeholder groups is improved • Long-term research with the community involved is supported • Social science results are presented in ways that decision-makers will understand • The number of social science presentations at AMSS is increased • Research outputs are communicated across disciplines
Practice (how research is or can be)	<ul style="list-style-type: none"> • Establish an integrated science team to build trust, salience, and credibility, and to identify/prioritize research needs • Incorporate local and traditional native and community 	<ul style="list-style-type: none"> • Collaboration between natural and social scientists is increased • Social science funding levels reflect understanding of effort involved to truly engage communities and build trust

conducted)	<p>knowledge (including hunting/fishing) into research plan</p> <ul style="list-style-type: none"> • Treat LTK knowledge holders as collaborators • Include local/community training and participation in research projects • Include ethnography as a research focus area • Inform future research with a social science gap analysis • Share results and foster ties with communities after research is complete • Make existing social science databases accessible 	<ul style="list-style-type: none"> • Research on impacts of management activities on rural communities is funded • Communities are able to engage in research and monitoring • Community generated LTK studies are funded • Research is targeted at filling identified data gaps • Data needs for social/integrated studies are understood • Translational science is developed and applied to discipline-specific outputs • Increase in ethnographically focused projects related to fisheries resource (not just fish) use/management • Research results are more closely linked to relevant objectives • Student participation in relevant research is supported
Understanding (of the value/ contribution of social science)	<ul style="list-style-type: none"> • Assess the perception of management and policy implications of different world views • Invite researchers to explain ethnographic (and other) methods and approaches to the NPRB • Commission a review of how specific social science methods have been used in decision making beyond Alaska, especially integrative projects and results • Develop strategies to address social science topics that are considered controversial 	<ul style="list-style-type: none"> • NPRB learns (and shares knowledge gained) about the different social science methodologies and importance of each as part of holistic approach • Acceptance of social science is extended beyond economics • Credibility and relevance of social science is enhanced among natural scientists and policy-makers • Recognition that social science can answer questions as well as other disciplines (e.g., TEK studies of marine mammals) • NPRB recognizes the need for diverse relationship-building • Mutual understanding and sense of worth between natural and social scientists is increased • Breadth and depth of community engagement are recognized

Appendices

Appendix A contains the unedited, unattributed responses provided by workshop participants and other interested parties. The tables show how these responses were synthesized, and grouped into the four themes that emerged from the workshop. Each appendix in Section A contains the responses to a particular question posed in advance, and reviewed during, the workshop.

Appendix A1. Challenges identified by workshop participants

(Question: What are the real and perceived barriers to the integration of social and natural science in Alaska?)

Appendix A2. Long-term outcomes identified by workshop participants

(Question: What are the main strategic (i.e., long-term) outcomes that would enable the integration of social and natural sciences by the NPRB?)

Appendix A3. Short-term outcomes identified by workshop participants

(Question: What are the more short-term outcomes the NPRB achieve to accomplish these long-term outcomes and create the impact desired?)

Appendix A4. Actions proposed by workshop participants

(Actions identified by workshop participants both during the workshop and provided in response to the above questions.)

Appendix B contains the results of the outcome mapping exercise, where workshop participants were asked to organize actions, short-term, and long-term outcomes according to six themes (these have since been consolidated into the four themes presented in this report).

Appendix B1. Outcome map for Capacity Building theme

Appendix B2. Outcome map for Collaboration theme

Appendix B3. Outcome map for Communication theme

Appendix B4. Outcome map for Governance theme

Appendix B5. Outcome map for Leadership theme

Appendix B6. Outcome map for Research theme

Appendix C includes the **Workshop participant list** and summarized **Feedback** on the workshop solicited from participants, including unedited comments on workshop satisfaction.

Appendix A1. Challenges facing the integration of natural and social sciences in Alaska, and the participant responses that led to their identification (unattributed).

Challenge	Participant responses
<p>The potential contributions of social science to NPRB's objective are not recognized or understood</p>	<p>Inadequate appreciation of the role of social science in fisheries and ocean policy (a global issue). Lack of understanding of the value of social science. The perception of social science as a "soft" science, anecdotal, methods lacking rigor. The view among some natural scientists and fisheries managers that social science research is not "real science," at least not unless all findings are quantitative. Lack of understanding of the sociocultural context in which "hard" science topics are given more credence than social science. Social Science may not have a place in scientific research, or may skew the scientific research. There is also a concern on the part of non-Social Scientists that much of the material produced is subjective and therefore unable to pass the rigors of the scientific method/testing. This pushes many out of their comfort zone.</p>
<p>The relevance of social science to decision making is poorly understood</p>	<p>Lack of understanding of how social science research can be integrated into management decisions. Difficulty in making social science quantifiable without losing its analytical value – decision-makers want easy to understand data, preferably in charts or numbers or statistics. Different approaches, assumptions, and standards for actionable conclusions between social and natural sciences.</p>
<p>Qualitative data is not recognized as having the same value as quantitative data.</p>	<p>There is very little research money available to the social sciences in part because of the qualitative nature of some findings. The latter is perceived as being anecdotal and therefore resulting in greater uncertainty and as such of less value. Natural scientists seem to be uninterested in social science data if it does not fit into their quantitative data sets. They do not know how to integrate (or perhaps understand) qualitative data and social scientists are unsure how to develop data that natural scientists can / want to use. Non-social scientists attitudes stem (in part) from misunderstanding of 1) the field of Social Science and 2) the benefits/uses of collecting social science data. It is very hard to shift from science that is primarily quantitative over to qualitative work. Many see Social Science as "soft science" and feel that anyone (including those with no social science background) is qualified to collect these data.</p>

Lack of understanding leads to social science being assigned a secondary, often ineffective role by natural scientists	Thus, given the secondary importance assigned, along with the lack of understanding, Social Science often ends up “tacked on” to a study as an after-thought.
Inertia	Institutional memory - this is not how we have done it before. Limited historical capability to integrate the interests of the SAC and the AC for NPRB.
Lack of baseline data is a challenge to producing results in short term	Lack of baseline data to make inferences from; comparisons to.
Board composition	Political pressure and special interest groups that are currently charting the course of NPRB. Currently the NPRB board is comprised of many political appointees and industry representatives. Given the research focus of NPRB, the board is underrepresented when it comes to research expertise by academia and other scholars.
The outputs from social science may threaten established interests	Social science research is closely connected to politics and may lead to tension.
There is a mismatch in the time scales required to complete social and natural science projects, and with the more immediate needs of management decisions.	Social science research progresses slowly whereas management decisions seem to need to be done fast. Oceanographers work at different spatial and time scales than local observers. There is a balance between asking the same questions, in the same communities, year after year (longitudinal studies, maybe even following same persons) and providing context-specific information that captures the nuance and particularities of the cases. Attrition is also an issue with any long-term study and NPRB may have difficulty funding decades-long research.
Creative projects with big potential seen as too risky.	The peer review process for proposals does not usually reward high risk – high return projects, and young scholars, who are often better trained for interdisciplinary work, may not feel that they have the leeway to write risky proposals from a professional development perspective. NPRB might create a “young researcher” or “high risk research” category to address this. Lack of incentives for new and new types of social scientists to engage with NPRB. Finding funding for multi-faceted research projects.
The NPRB lacks the expertise to evaluate social science proposals	Perception among social scientists that it’s not worth it to invest in preparing an NPRB proposal. The proposal review process is a barrier to more community involvement or participation in the process. Proposals are reviewed under the very western, peer-review process. Science always takes precedence over good community involvement or a project that truly addresses and fulfills community needs. I have

	<p>experienced and other social scientists have echoed that projects, which have excellent reviews on the LTK and community involvement but if one reviewer has a question or problem will the science, the project is shut ... even if the project receives high marks by other scientist. Some reviewers even seem to have an agenda, as their comments do not reflect a good understanding of the project. Sadly, I have seen many tribes lose faith in the process, and the program in general, and feel that it is a waste of time. As the report notes, some communities are disadvantaged in this process.</p> <p>Leadership at top and from whomever allocates money and determines procedures for constituting peer review processes.</p>
Disciplinary jargon hampers communication	<p>Lack of shared vocabulary.</p> <p>Natural scientists have trouble understanding the writing and language of social scientists. Both types of scientists should endeavor to make their communications more generally comprehensible.</p>
Economics is perceived as the dominant social science	<p>Traditional quantitative fisheries economics (costs & profits) needs to be balanced with qualitative assessments (value of resources for cultural use). So besides integrating SS with natural science, we need to integrate fields within the social sciences to get a full picture of costs and benefits to inform management decisions.</p>
Definition of community is unclear?	<p>Defining what is considered a 'community', e.g., Alaska Native organization, marine mammal commission, regional non-profit organization like Kawerak, Inc., Inuit Circumpolar Conference Alaska, etc.</p>
Lack of individuals willing/able to work as a team	<p>Scientist sometimes lack of social skills, or training for working in a team environment, willingness to listen to others with different belief and scientific training, and patience.</p>
Lack of funding	<p>Competition for scarce funding resources.</p> <p>Resources dedicated</p>
Lack of interactions between natural and social scientists	<p>Connecting scientists from different institutions, and difficulties in collaborating from disparate locations.</p> <p>It is often difficult for social and natural scientists to connect and to get to know each other, leading to collaborations focusing on research questions. Such familiarity might be easier at a university where multiple disciplines co-exist than at smaller research based institutions that focus on one or the other of the broad fields. The NSF used to sponsor workshops that encompassed both social and natural sciences but does not do so anymore, leading to few opportunities for scientists from the two fields to meet and to hear what their respective fields have to offer each other.</p> <p>Lack of communication between natural and social scientists,</p>
The value of integrated science has not been	<p>Disparity in finding common ground for social and natural science. Both have specific scientific methods, and</p>

demonstrated (in Alaska)	<p>we can only move forward if certain types of people and questions can produce tangible and fulfilling scientific results. NPRB should provide science planning seed money support for those groups of natural and social scientists that want to work together to develop a focused project in response to a NPRB call.</p> <p>Not enough examples (or not enough that are highlighted) of successful collaborative projects that support integration of social and natural sciences that will encourage thinking outside the box.</p>
Lack of social science capacity in Alaska	Lack of social science capacity in Alaska (both specialist and at community level).
Options for knowledge dissemination are limited	Finding media (journals, etc.) for disseminating findings from such projects.

Appendix A2. Long-term outcomes necessary to overcome the challenges facing the integration of natural and social sciences in Alaska, and the participant responses that led to their identification (unattributed).

Theme	Outcome	Participant responses
Leadership	Science plan requires research proposals to be salient	A new NPRB science plan that gives greater emphasis to social science both as a distinct category and as a linked element of other research categories – i.e. all other research program should explicitly identify how that work contributes to improved understanding and management of North Pacific Fisheries/ecosystems.
Leadership	Social Science director champions social science at the Board level Board’s understanding of Social Science increased	Hire a social science director that is poised to integrate (and defend!) social science to the biologists and Board, many of whom do not understand the topic, nor agree on its importance.
Leadership	Composition of Board reflects a more balanced approach to social and natural sciences	A more balanced (natural & social science) approach reflected in how the board of directors is comprised.
Leadership	Board representation of commercial fishing interests is reduced Mandate of NPRB expanded beyond enhancing commercial fishing	Membership is not skewed to enhancing commercial fishing in Alaska (as it isn’t the only mandate for the NPRB)
Leadership	Level of commitment to natural and social science integration articulated by Board and SAP	Get the Board and the Science Panel to agree on level of commitment/how they wish to engage on the topic.
Leadership	Social sciences are successfully engaged in research relevant to Alaska	RFPs that successfully engage social sciences in research relevant to Alaska.
Leadership	Funding for social science increased	More dedicated funding or dedicated calls for Social Science-centered research.
Leadership	Value of LTK reflected in funding levels	The NPRB to put LTK and western science on a more equal level (the NPRB Science Plan indicates the importance and value of LTK, but RFPs only include \$200K for LTK and community

		involvement, a small fraction of the funds dedicated to traditional science).
Leadership	Science Plan includes interdisciplinary research themes, e.g., community, sustainability, resilience, food security, well-being.	RFPs should prioritize research on both social and natural phenomena that incorporates methods and theories from both social and natural sciences (the Ounanian et al. report lays out some possible general themes: community, sustainability, resilience, to which I would add food security and well-being)
Leadership	Capacity for social science peer-review is adequate	Better oversight of composition and actions of peer review committees so that proposals are not killed off in peer review.
Leadership	Sufficient high quality, Integrated research is produced to warrant journal special issues The NPRB is a leader in integrated management research	Encourage academic journals to have special issues focusing on social science integration, accompanied by calls for papers.
Leadership	Importance of community values and perspectives are recognized	Increased input from communities in the areas to provide recognition for the importance of social perspectives.
Leadership	Social science is integrated into management/policy decisions on spatial marine use	Acceptance and integration of social science as an invaluable resource in management/policy decisions regarding marine spatial use.
Leadership	The range of values used in policy making is broadened	Increased importance for recognizing values of equity, precautionary principle, justice, etc in policy making.
Leadership	Social science integrated into NPRB's practice	Increased focus for operationalizing social theory in practice. NPRB promotes decision making that is based on equity and an understanding of community profiles, histories, and potential impacts Decision frameworks integrate natural and social science
Leadership	The social science community trusts NPRB's commitment to integrated science	Building trust in the social science community that NPRB has a long-term commitment to funding this kind of research and an understanding of what it takes to do it well.
Leadership	The vision of the NPRB is achieved	Clearly fulfill the "Vision" of the organization "a clear understanding of the North Pacific, Bering Sea and Arctic Ocean ecosystems that enables effective management and sustainable use of

		marine resources.”
Communication	Inter-disciplinary interactions are fostered	Interactions and opportunities to share and connect between disciplines – there should be more of these.
Communication	Mutual understanding between social and natural scientists is enhanced	More opportunities to interact social science researchers with natural science to figure out how to integrate more. Eg - How is natural science being reviewed and studied by social science? And, how does social science know what types of natural science research is being conducted?
Communication	Inter-disciplinary interactions are fostered through information technology	Create a network/portal that allows natural and social scientists to contact each other more easily, and learn about each other’s areas of expertise.
Communication	A common vocabulary is in place for inter-disciplinary work in Alaska	A more common vocabulary.
Communication	A framework for reporting research outputs is developed to accommodate knowledge products from diverse disciplines	There is a need to develop a common mode of data presentation and analysis between products from natural and social science for specific topics. For example, how do you quantify a social science verbal product into a comparison to natural science number result? How do you keep emotion from statements in a science product that could show a bias of a personal perspective? There needs to be some common overlay to goals and products to satisfy the needs for specific questions that can be realistically evaluated in a compare and contrast view of the results from the two disciplinary types of science.
Communication	Methods are developed to identify and inform managers of impacts management decisions have on resource and users	Development of a methodology(ies) to provide resources managers with inclusive data that may identify potential impacts to the resource and its users when implementing management decisions.
Communication	Communication btwn policy-makers, managers and scientists is enhanced	Stronger policy-management/science collaboration and dialogue.
Communication	Communication skills of Alaskan research community are improved	Flexibility in communicating and understanding other viewpoints.
Communication	The value of social and cultural ecosystem services is recognized as dominant for many	A fundamental recognition that for many people, the cultural services provided by ecosystems (marine resource-based culture) are as or more important than provisioning services (food).

	stakeholders (Critical Research Question!!)	
Communication	The value of social science to policy is recognized The role of people in resource management is acknowledged and integrated into the Science Plan	Recognition of the value of social science research, particularly in addressing policy questions and recommendations; the widespread recognition that natural resource management is actually more about managing people than the resources themselves.
Practice	Research priorities are identified by an inter-disciplinary research team Best practices for inter-disciplinary data synthesis are identified, developed, and applied	Multi-disciplinary research in which social scientists are working with natural scientists to 1) identify research questions and 2) conduct new research (or synthesis studies) that incorporates different kinds of observations (local knowledge and scientific measurements/ecological data).
Practice	Social science research is informed by Ounanian report	Priorities for social science research that are informed by the Ounanian report.
Practice	Funding for integrated science increased	Fund projects and programs that are designed to have both social and natural science components.
Practice	Social science engaged at project inception (Integrated research is Credible)	Social scientists must be involved in the “problem definition” phase of any issue. Bringing in social science team at the end (as it typical) makes for poor outcomes.
Practice	Research supported by RFPs extends beyond fishing industry to consider diversity of mgmt measures (Informed by social science)	Ensure that RFPs are not dominated by research around the fishing industry and are focused on more than one method of managing catch.
Practice	Relevant ecosystem service and social science indicators are developed and monitored	Generation of human/community indicators dataset complemented with long-term ethnographic/qualitative research on key or bell-weather communities or segments of society. Research monitors how, how fast, and why vital ecosystem services are changing, and how the resilience of communities might be affected

Practice	Databases of social Indicators are developed, maintained, and made available	Contribute to accessible databases that include a range of social indicator data for Alaska communities (demographic, economic, subsistence harvests, etc.) (building upon what exists at the Alaska Fisheries Science Center [Community Profiles] and ADF&G [Community Subsistence Information System]).
Practice	Understanding of policy implications and outcomes of fisheries management decisions on community sustainability is advanced	A body of study findings that contributes to an understanding of the policy implications and outcomes of fisheries management decisions as they relate to community sustainability. Understand the role that various economic systems approaches (centralized vs. non-centralized, small scale vs. large scale fisheries, different allocation regimes, capitalism vs. socialism-driven government involvement, etc.) have on local fisheries Understand vulnerability, risk and resilience as related to management plans Understand social and ecological sustainability
Practice	Well known integrative processes are prioritized and undertaken by a trans-disciplinary team	A trans-disciplinary team needs to be formed and start with any of several processes reported in the literature.
Practice	Application of techniques highlighted in Ounanian report that utilize knowledge of both social and ecological systems.	Application of techniques highlighted in Ounanian report that utilize knowledge of both social and ecological systems.
Practice	Rural and tribal communities are more active and meaningfully involved in research and management	More active and meaningful involvement of rural tribal communities in research and management.
Practice	Reduction/elimination of spatial/temporal conflicts with indigenous subsistence marine harvesters.	Reduction/elimination of spatial/temporal conflicts with indigenous subsistence marine harvesters.
Practice	Concept of sustainable use (i.e., Stewardship) is expanded to include the full range of resource use activities A diversified understanding of	Sound Stewardship and mgmt. for rec, comm, and env health of the NPac – of which comm activity is critical, rec is a big part, and tourism, tribal interests... use a broader lens than just enhancement of comm fishing industry → broader foundation for social science integration

	resource use creates a broader base for inter-disciplinary research	
Understanding	The diversity of social science approaches are understood and recognized in the Science Plan. Different ways of understanding fisheries and fishing are recognized	RFPs should recognize that not all social science is hypothesis driven or quantitative, but that this doesn't make the products less relevant to the mission of NPRB – a “social dimensions of fisheries” theme could be permanently added. Note that here, too, interdisciplinary work would be relevant, i.e., it need not just be social scientists asking social science questions, but could include health researchers, psychologists, economists, etc. The difference, though, is that the products of this research would be valued for how they bring additional ways of understanding to bear on the context of fisheries and fishing, even if the benefits to management are not immediately recognized or quantifiable.
Understanding	Social science is recognized as an integral component of management	Recognition of social science as an integral component of management decisions.
Understanding	Inter-disciplinary researchers develop a mutual understanding of approaches, methods, and outcomes	Shared assumptions about approaches, outcomes and methodologies between social and natural science practitioners would enable more effective integration.
Understanding	Social sciences is recognized as having a key role to play in resource management	There needs to be a change in the paradigm such that social science research (eg ecosystem effects of climate change, the effects of fishery management on humans, and the implications for community resiliency) can stand next to natural science research.
Governance (out of NPRB scope)		Implement the intended enabling legislation of the Magnuson Stevens Fishery Conservation and Management Act of 1976, the subsequent Sustainable Fisheries Act of 1996 and the National Standards for Fishery Conservation and Management as set forth in P.L. 94-265 § Sec. 301 104-297.
Governance (out of NPRB scope)		Government level legislation for more social science research as part of management.
Governance (out of NPRB scope)		Mandatory Social Impact Assessment for large management decisions.

Appendix A3. Short-term outcomes necessary to begin the process of integrating natural and social sciences in Alaska, and the participant responses that led to their identification (unattributed).

Theme	Outcome	Response
Leadership	NPRB begins with short-term, high return social science projects to demonstrate value	Specific tasks that are doable in a short period to broaden area of responsibility of NPRB and demonstrate value of social science
Leadership	Board composition reflects commitment to integrated science	More and more diverse representation of social scientists on the NPRB SAC. More (different) social scientists and Alaska Native representatives on the NPRB advisory/science committees to bring new and different perspectives.
Leadership	NPRB has capacity to request and fairly review social and integrated science proposals	NPRB are less industry-focused NPRB builds capacity to review RFPs around categories such as community, sustainability, resilience, social dimensions of fisheries, food security, and well-being Always have one (preferably several) social scientists involved in reviewing proposals. Science projects should be reviewed by reviewers with expertise in those the appropriate fields. The same applies to LTK or community involvement projects: they should be reviewed by individuals with expertise in field.
Leadership	RFPs include full range of social science approaches to assess impacts/values of communities	Solicit and fund projects that feature ethnographic methods (key respondent interviewing, case studies, participant observation) rather than solely focusing on quantitative methods and findings
Leadership	RFPs encourage multi-disciplinary teams in salient research projects	Support of projects that feature multi-disciplinary teams (social scientists, biologists and/or other natural scientists, and local community participants) that address a specific research problem ...
Leadership	NPRB funds more creative, integrated, applied projects	NPRB shouldn't be afraid to fund controversial topics and practical applications (there's nothing in the NBRB mission statement that suggests it should only fund basic research - how about a

		<p>little more emphasis on applied research?).</p> <p>Try stuff out! See what works. Generally, if you fund it, we will come.</p>
Leadership	Integrated projects are identified and supported	Both the natural and social science modes have specific core products that are not necessarily resulting in useful products for the other group. However, additional, specific and relevant questions can be developed that jointly produce a synergistic result that benefits both the natural and social science fields, then we have added to the overall understanding of the ecosystem, including the human component.
Leadership	NPRB develops guidelines for operationalizing integration in support of ecosystem management	<p>Perhaps develop a list of principles for NPRB to follow? NPRB may want to suggest organizational cultural adaptation, we have the laws – ecosystem management, however we lack the basic skills and training to operationalize integration.</p> <p>Dissemination of the National Standards for Fishery Conservation and Management as identified in the Magnuson Stevens Fishery Conservation and Management Act, and engagement of the scientific researchers, resource managers, resource users, University and other interests at the onset of these discussions.</p>
Leadership	Priority research projects for social and integrated science are identified	Researchers should meet with Alaska Native organizations or marine mammal commissions to discuss potential projects (AMSS allows a great opportunity for this), e.g., certain sea-ice conditions where walrus are likely to be found – a short term impact that could lead into long-term change.
Leadership	Science Plan identifies integrated research areas/priorities	Identifying some research areas in the annual RFP that must be addressed using a combination of natural and social science approaches.
Communication	Inter-disciplinary communication is improved	Such collaborative projects support communication across disciplinary lines ...
Communication	Social science community understands opportunities offered by NPRB	Broaden interest and awareness of the opportunities offered by NPRB funding to the social science community.
Communication	Improved communication among	Establishing good infrastructure for communicating your efforts.

	stakeholder groups	Widely share ecosystem vulnerabilities among all groups.
Practice	Social science funding levels reflect understanding of effort involved to truly engage communities	Perhaps they should include a separate fund which proposers can apply to meaningfully involve communities? A boost to dedicated social science funding – dedicated social science funding should rise to more than 30% of all NPRB funding in the next five year plan. A balanced funding approach to both natural and social sciences alike, especially funding integrated (interdisciplinary) research.
Practice	An integrated science team is established to build trust, salience, and credibility, and to identify (and prioritize) research needs	NPRB might initiate and fund a task force of social and natural scientists to interact at the community level in multiple communities across Alaska to identify research needs. I would volunteer for such an initiative, and I believe that the outputs over the long-term would be huge by way of knowledge creation and partnership creation.
Practice	Research on impacts of management activities on rural communities is funded	Fund projects that examine the outcomes of fisheries management decisions and fisheries management processes as they relate to sustainable communities, and especially rural Alaska communities.
Practice	LTK studies are funded	Fund LTK studies. The last RFP, as example, moved away from that ... focused more on techniques to how to use LTK.
Practice	Research results are more closely linked to relevant objectives	and produce clear results that can be assessed based on project objectives.
Practice	Research is targeted at filling data gaps identified using social science methods	Fund data development when compelling gaps are identified (apparently they already have been in some cases for fisheries stock, harvest, and spatially explicit effort data). Social science quantifies the value of additional data, providing important information for allocation of research funds
Practice	Data needs for social/ integrated studies are understood	Need to know what social science data sets are needed to undertake different methodologies discussed in Ounanian report (e.g. what social science data is needed on fisheries that is not already collected?).

Practice	Translational science is developed and applied to discipline-specific outputs	NPRB needs to support translational science to address specific questions that allow natural and social scientists to find common ground to actual address questions that produce defined products that are useful to both disciplines.
Practice	Collaboration between natural and social scientists is increased	Inclusion of relevant social science questions in large programs such as the Bering Sea Program, with PI meetings at which scientists from both fields can come together and interact, will lead to stronger ties between the two communities and will help each community identify ways in which they can work with the other to address relevant science questions.
Practice	Communities are able to engage in research and monitoring	Building science capacity at the community level to engage in marine science research and monitoring (e.g. LEO and COASST type programs). Facilitate local community involvement in projects, including capacity building.
Practice	Value of ecosystem services to stakeholders is quantified	Approaches that quantify the value of existing natural capital and the value of its ecosystem services to stakeholders are fostered
Understanding	NPRB recognizes the need for relationship building	NPRB should recognize that work with communities costs significant amount of money. It takes time and patience to build and establish relationships and trust. While the plan and RFPs encourage community involvement, the funding levels are so tight that it does not include sufficient funds to adequately establish relationships, build trust, and engage communities in the process.
Understanding	Concept of social science is extended beyond economics	More of a focus on non-economic (underrepresented) social science.
Understanding	Credibility and relevance of social science is enhanced among natural scientists and policy-makers	Formal presentations to both natural scientists and policy-makers outlining results and implication of social science research projects. Greater emphasis on social science at NPRB meetings and in NPRB communications – communicating the social relevance of NPRB science ought to be a hallmark of the next phase of NPRB research. Educate the benefits of involving tribes and other communities in science. Many managers and scientist still don't see the real benefits of LTK and community involvement ... or know how to engage in community involvement in an effective and meaningful way. NOAA does well with

		<p>marine mammals, but I believe is lagging far behind in fisheries.</p> <p>Social science does not have to be “interdisciplinary” to provide valuable and important outcomes. NPRB should not focus solely on “interdisciplinary” projects, but a mix of interdisciplinary and more focused projects.</p> <p>How much more “sound science” do we need to inform sustainable management decisions? i.e. the question is not so much about understanding ecosystems but what we are doing to protect them—the barriers are obviously economic and political—social science addresses these questions too.</p>
Understanding	Mutual understanding and sense of worth between natural and social scientists is increased	<p>Promote communication and other exchanges that build confidence that social scientists and natural scientists can provide value to each other’s efforts.</p> <p>Support frequent workshops and symposia that feature social science and multi-disciplinary projects; encourage critical, constructive review of these projects.</p> <p>Maybe sponsor some sort of workshops where members of both communities could come together to focus on pulling existing data together or describing the state of the system for some focused, addressable problems so that both communities could become more adept at integrating the two approaches and could see what each others’ approaches have to offer.</p> <p>I think we often look at this topic as integrating social science/TEK with the natural sciences, but rarely do we (non-social scientists, anyway) look at it as integrating natural sciences with social sciences. The burden is often put on social science proposals to prove how their research is relevant to the natural sciences, but very rarely is the opposite true.</p>

Appendix A4. Actions with the potential to enable the short-term outcomes needed to support the integration of natural and social sciences in Alaska, and the participant responses that led to their identification (unattributed).

Theme	Actions	Participant response
Leadership	<ul style="list-style-type: none"> • Clarify commitment of NPRB to fund social science and/or integrated research • Revise the Science Plan with input from local social science experts and community feedback • Include integrated science in the NPRB mission statement, Science Plan, and RFPs • Identify themes for natural and social science in lead up to RFPs • Remove the funding limit on outreach • Create opportunities for holistic questions that may not effectively fit into existing funding platforms • Fund projects with an overlap between commercial and subsistence fisheries in RFPs • Formulate RFP questions for a broader audience and clarify RFP standards • RFPs should have a longer lead time to allow sufficient collaboration planning, and should be advertised more broadly • Use feedback from social sciences and communities to narrow RFP focus on the kind of social science research to be funded • Ensure community needs are reflected in the scope of all funded projects • Create an explicit statement of what products will facilitate development of collaborative proposals • Develop a proposal review process that treats social and integrated science proposals equitably • Formalize flexibility of final report to accommodate social and integrated science projects. 	<ul style="list-style-type: none"> • NPRB needs to balance the proposal selection for scientific with social science integration • Decide how focused NPRB wants to be on integrated science • NPRB clarifies its position on integrated science • Develop NPRB social science plan by summit of local social science experts • Expand community component in the Science Plan – current plan contains two pages on humans • Keep what works – AMSS has everyone together, Bering Sea Project had some success to build on, etc. • Assess successful NPRB ventures (e.g., AMSS, Bering Sea Project), identify elements that led to success; improve others • Visits to coastal communities to establish trust and solicit ideas; provide culturally relevant honoraria to rural participants • NPRB visits rural communities • Provide opportunities to consult more with local communities to determine ‘relevant’ ecosystem research • Remove the limit of funds to spend on outreach and decide case by case • NPRB allocates money to community engagement and establishes an informed point of contact – NPRB community liaison • Social scientist on NPRB staff • Social scientist on the Board • Add social science experts to Board staff to reflect expanded scope • Social scientists are involved in the “problem definition” phase of RFPs • More involvement from social scientists in RFP development • Invitation to knowledgeable people to participate in NPRB • NPRB hires nation-wide expert reviewers in social sciences • Expand social science review panel by nation-wide search

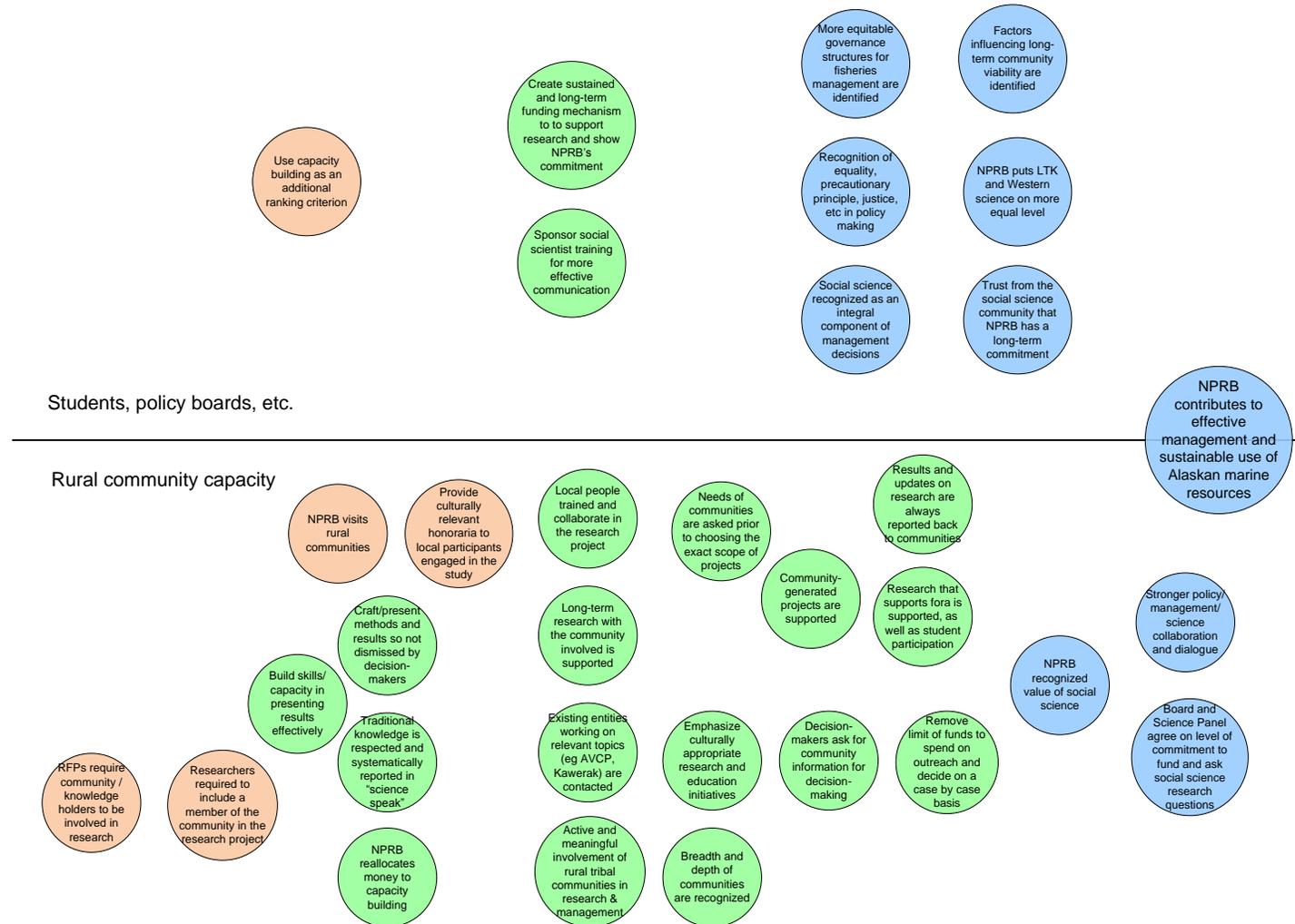
		<ul style="list-style-type: none"> • The appropriate social scientists and community members should review social science proposals • RFPs require community knowledge holders to be involved in research • Researchers are required to include community members in research project • Emphasize culturally appropriate research and education initiatives • RFPs require in-depth community/knowledge holder involvement in all components of funded TEK research, far beyond the 'education/outreach' components currently included • Narrower focus in RFPs on the kind of social science research to be funded • Formalize flexibility of final report format to accommodate social and integrated science efforts, and remove bias from natural sciences • Longer lead time before RFPs are due so there is more opportunity to develop partnerships • Better notice of calls (RFPs) to past applicants and others • Review proposals in terms of global importance • Score proposals with a social science component higher • Hire social scientist(s) and consult experts on RFP creation and proposal review • Include natural and social scientists, and community members as reviewers. • Clarify standards for integrative RFPs and review of proposals • Alternative two-tiered approach for social science: 1. social science review, 2. global review • Always have at least one social scientist involved in reviewing proposals, and a natural scientist reviewing social proposals • Separate review panels for natural, social science, and inter-disciplinary • Have an integrated review panel for interdisciplinary projects/proposals • Include integrated science in policy documents – mission statement, science plan, RFPs • Build a longer lead time into RFPs to allow sufficient collaboration planning, and advertise more broadly • Include a community member on RFP review board • Score higher / extra points for social science component of inter-disciplinary proposal
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<p>Communication (between all groups)</p>	<ul style="list-style-type: none"> • Reach out to rural and native communities (including elders) to identify community needs • Organize meetings/workshops for social scientists, natural scientists, and stakeholders to increase mutual understanding and form collaborations • Organize meetings/workshops for scientists and communities to define research questions and develop research ideas (including LTK) • Fund collection of community values and preferences to aid Leadership • Identify and include existing entities engaged in inter-disciplinary work (e.g., AVCP, Kawerak) • Organize inter-disciplinary training in communication to a non-scientific audience • Support presentations by decision-makers about how studies can more effectively inform policy/management • Organize a workshop around methodologies presentation to build internal capacity to effectively write and review RFPs for social science and integrated research • Develop/leverage an online networking platform (e.g., ResearchGate) • Develop an integrated science newsletter for communicating role of all disciplines in understanding fisheries and ecosystem science in Alaska to explain concepts, methods, etc. to a lay audience • Approach journals to develop special issues around natural-social science integration • Build capacity in natural scientists to better understand/ assess strong social sciences 	<ul style="list-style-type: none"> • Train in how to successfully develop an RFP • Visit rural/coastal communities to solicit research ideas and establish trust, and provide honoraria for participants • Encourage rural participation in AMSS • Workshops and presentations featuring native elders • Researchers should meet with Alaska Native organizations and marine mammal commissions to discuss potential projects • Keynote invitation to people who practice LTK • Re-evaluate outreach with alternative meeting options and funding to participate on local time with regard to cultural norms • NPRB effort to solicit questions from communities through village travel • Community generation of research questions • More interdisciplinary meetings, with time for introductions • Workshop on effective communication – keep and expand AMSS Monday forum specific to Alaska context • Organize a workshop around methodologies presentation to build internal capacity to effectively write and review RFPs for social science and integrated research • Workshop(s) at next AMSS to develop key questions, ideas for RFPs, ISRPs, etc. – project development not abstract discussion • Create opportunities for social scientists to obtain traditional knowledge held by Alaskan natives. • NPRB outreach to social science events (conferences, programs, etc.) • Support frequent workshops and symposia that feature social science and multi-disciplinary projects • Host workshops, perhaps on topic or region for multi-disciplinary researchers to develop collaborations • Decision-makers ask for community information relevant to decision making • Training for social scientists in presenting results for decision-makers • Training/discussion by decision-makers about what and how social science can inform them • Presentations to NPRB of different social science methodologies so they
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		<p>understand method and importance of some</p> <ul style="list-style-type: none"> • More opportunities for networking – portal, forum online, tabs • Web-based collaboration with bios and research interests • Natural, social, and integrative scientist contact database and opportunities for interaction • ResearchGate.net type of network opportunities and research questions • Make these discussions available, eg via website, discussion forum, short reports, etc. • Start a policy/research newsletter as a communication tool between decision-makers and scientists • “Science shorts” - experts writing for the lay audience to explain key concepts, ideas, methods, etc. • Encourage special journal issues on social science integration, and calls for papers • Hold more social science talks/sessions at AMSS
Practice	<ul style="list-style-type: none"> • Establish an integrated science team to build trust, salience, and credibility, and to identify/prioritize research needs • Incorporate local and traditional native and community knowledge (including hunting/fishing) into research plan • Treat LTK knowledge holders as collaborators • Include local/community training and participation in research projects • Include ethnography as a research focus area • Inform future research with a social science gap analysis • Share results and foster ties with communities after research is complete • Make existing social science databases accessible 	<ul style="list-style-type: none"> • Needs of communities are solicited before defining scope of projects • Use traditional native knowledge and nuanced understanding to better inform biologists • Include local people as collaborators and train local people in research methods • Fund community-conducted research • Allow hunters and fishermen to provide information to scientific communities • Solicit and fund projects that feature ethnographic methods • Fund data developments when compelling gaps are identified • Fund collection of community information for decision making • Conduct more ethnographic studies • Involve affected communities in culturally appropriate research. • More scientists travel to villages to present results (work with MAP et al.) • Results and updates on research are always reported back to communities • Ensure funded research includes sharing results of studies with affected communities • Use aerial photos and GIS to examine social-ecological systems and resiliency

		<ul style="list-style-type: none"> • Broaden the science agenda to incorporate linkages between terrestrial and marine ecosystems • Fund a systematic and comprehensive integrated ecosystem study that incorporate humans fully into the foodweb/ecosystem • Use LTK to better inform biologists of simple baseline data such as species distributions and develop a more nuanced understanding of the relationships between species • Conduct integrated social, ecological assessment of major developments • Quantify human preferences and values as well as analyzing whose values count
Understanding	<ul style="list-style-type: none"> • Assess the perception of management and policy implications of different world views • Invite researchers to explain ethnographic (and other) methods and approaches to the NPRB • Commission a review of how specific social science methods have been used in decision making beyond Alaska, especially integrative projects and results • Develop strategies to address social science topics that are considered controversial 	<ul style="list-style-type: none"> • Assessment of the management and policy implications of different world views • Explanation of ethnographic methods, approaches, etc. • Assessment of how social science results have been used in decisions – look beyond Alaska • Highlight integrative projects/ results to show what is possible • Understand how to address social science topics that are considered controversial

Appendix B1. Outcome map for Capacity Building theme (pink circles indicate actions, green circles indicate short-term outcomes, blue circles indicate long-term outcomes)



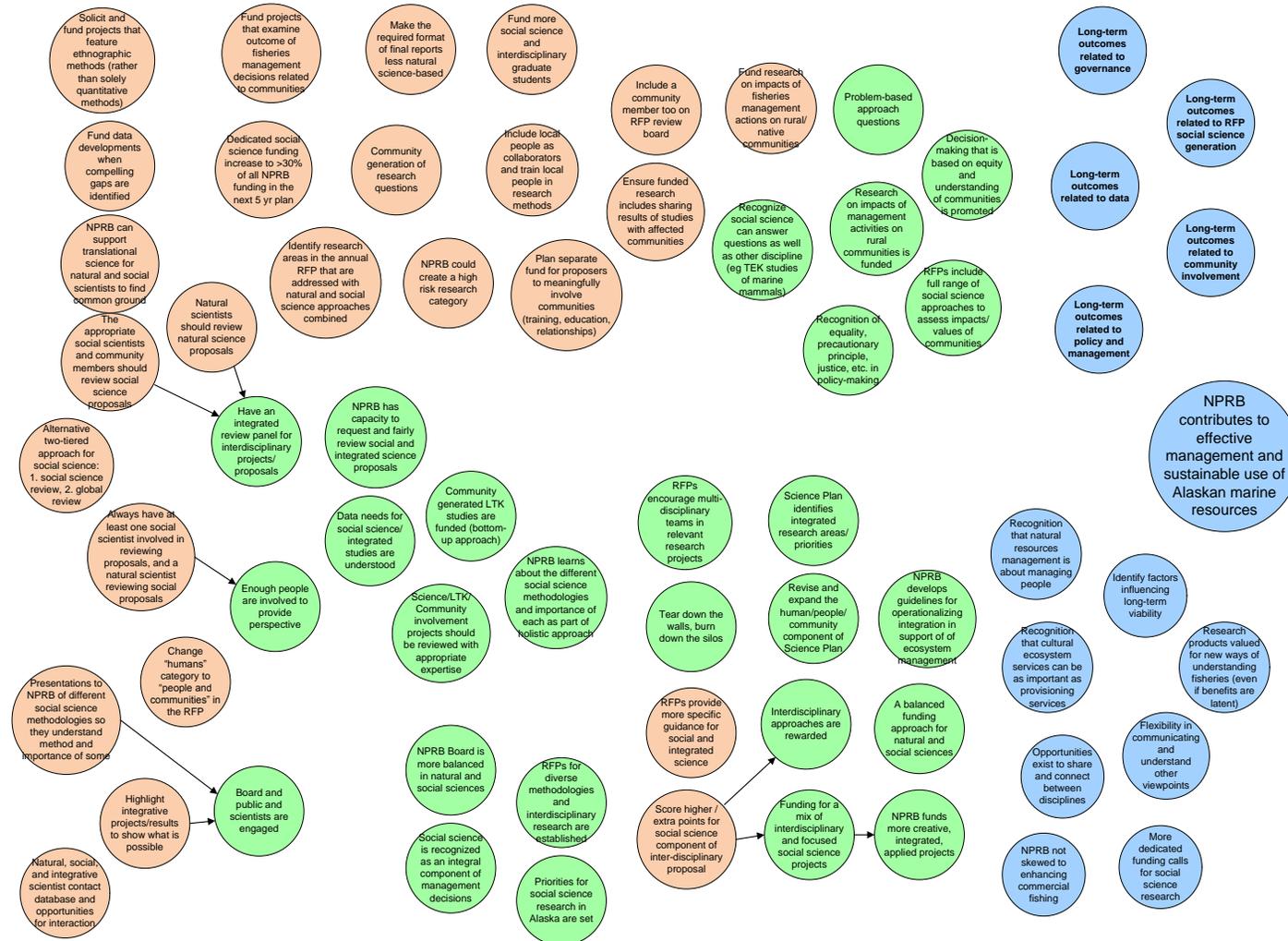
Appendix B2. Outcome map for Collaboration theme (pink circles indicate actions, green circles indicate short-term outcomes, blue circles indicate long-term outcomes)



Appendix B3. Outcome map for Communication theme (pink circles indicate actions, green circles indicate short-term outcomes, blue circles indicate long-term outcomes)



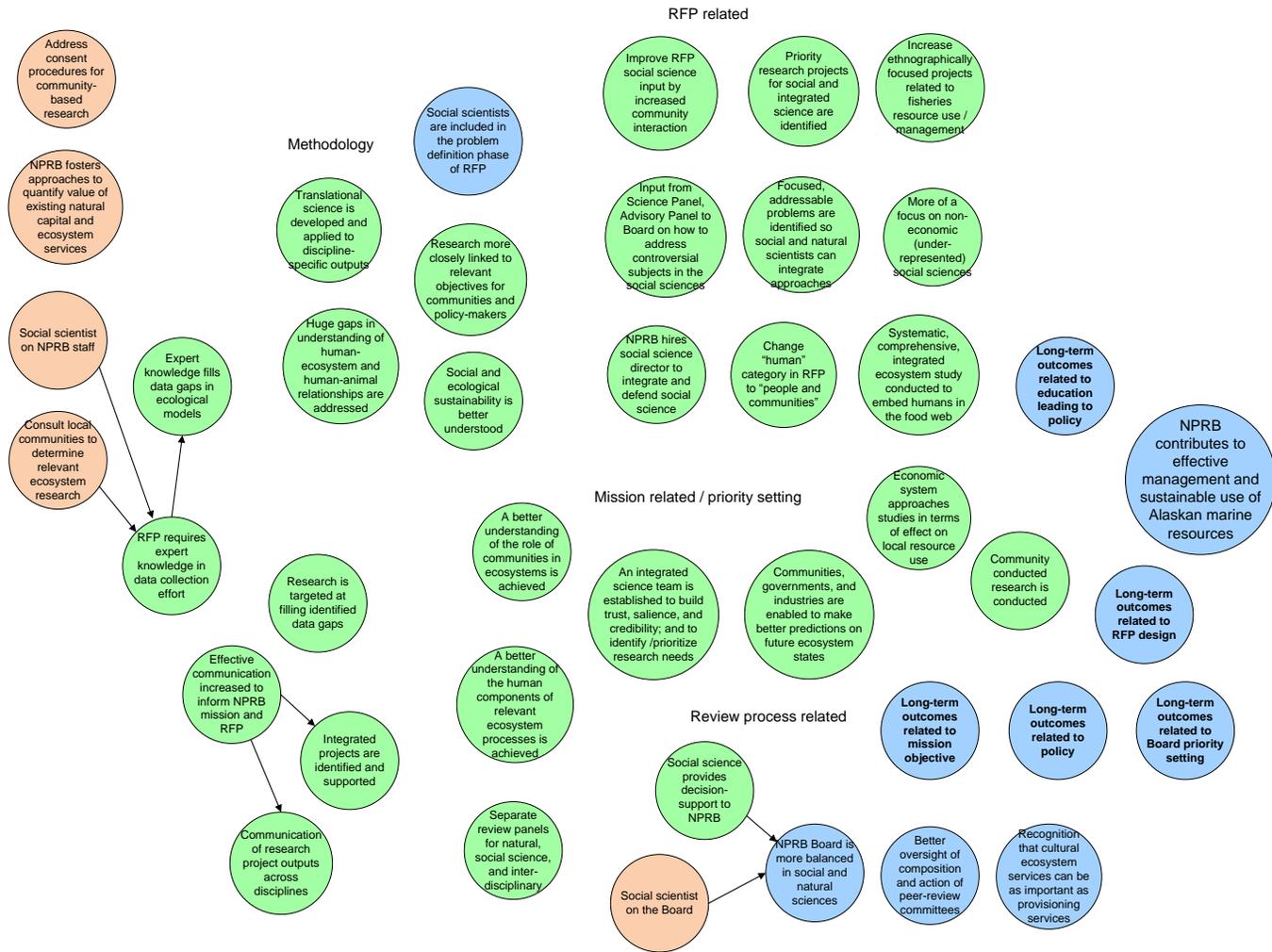
Appendix B4. Outcome map for Governance theme (pink circles indicate actions, green circles indicate short-term outcomes, blue circles indicate long-term outcomes)



Appendix B5. Outcome map for Leadership theme (pink circles indicate actions, green circles indicate short-term outcomes, blue circles indicate long-term outcomes)



Appendix B6. Outcome map for Research theme (pink circles indicate actions, green circles indicate short-term outcomes, blue circles indicate long-term outcomes)



Appendix C. Workshop Participants and affiliations

Carin	Ashjian	Biology, Woods Hole Oceanographic Institution
Matthew	Baker	NOAA Fisheries
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Cheryl	Rosa	NPRB SSWG, US Arctic Research Commission
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Glenn	Seaman	Fisher, Homer, AK
Charles	Smythe	ANCSA Regional Corp.
Jeff	Stephan	NPRB Advisory Panel
Sarah	Wandersee	Biological Sciences, University of Alaska Anchorage
Katharine	Wellman	Puget Sound Partnership, Northern Economics, Inc.
Erling	Westlien	Shell Exploration and Production
Polly	Wheeler	NPRB SSWG, US Fish and Wildlife Service

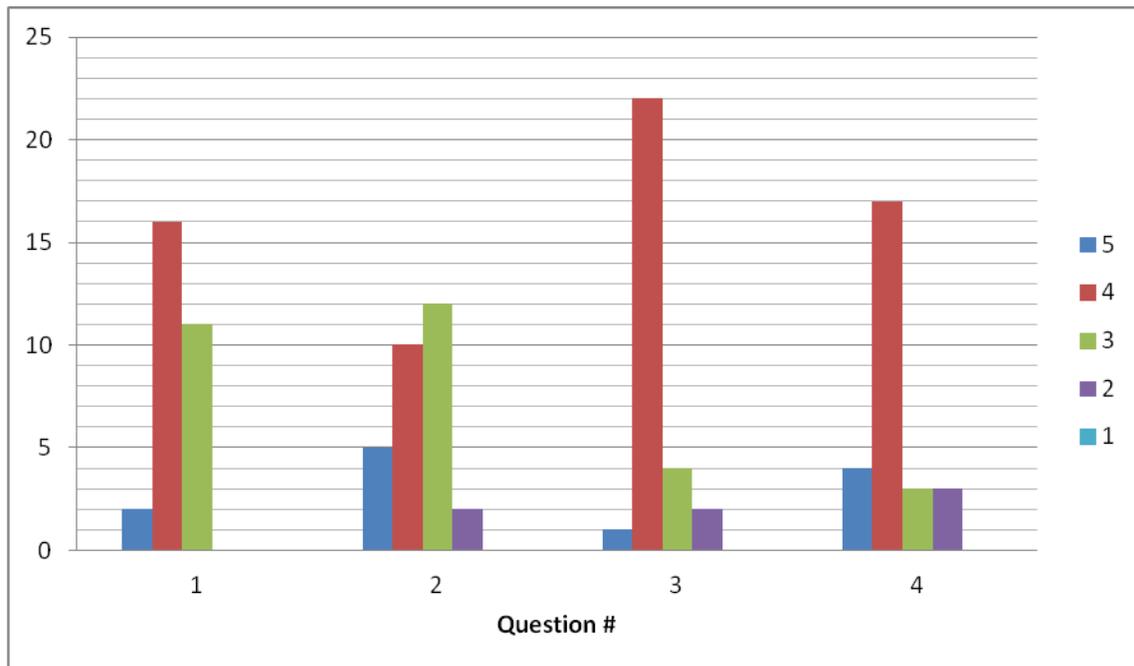
**Social Science Integration Workshop
Anchorage, 24 January 2014**

Participant Feedback

Evaluation Questions

1. How well did the workshop meet your expectations coming in?
2. Did you like the format of this workshop?
3. Do you feel you could contribute and/or acquire useful information at this workshop?
4. Would you recommend participating in a workshop like this to others?

Results



Ratings are from 1 (lowest) to 5 (highest), and shown in decreasing order (left to right)

Please include any comments for the NPRB and/or PacMARA.

- Would have been nice to include how to integrate TEK or look at projects that successfully did this. TEK is synthesis that is continually correcting and improving our knowledge (hunters) to better understand environment/ecosystem whereas scientists hypothesize then collect data to test proposed hypotheses.
- Better than I expected. Thanks, could have been longer.
- Expand the social science aspect of the plan; implement some of the work that has been done today.
- I found the workshop very interesting.
- I am not a big fan of shuttling around the room moving topic to topic. I find it distracting and limiting. Asking people to develop steps to achieve a goal in only 10

minutes is just too short a period. I think a better approach would be to ask people to concentrate on one area but to feel free to move around based on interest area. So few of the blue stickies [long-term outcomes] were addressed and those that weren't may not mean they weren't viewed as important but maybe we just didn't get to it.

- I liked the small group discussion.
- Very well organized, mostly on time, well thought-out in advance so efficient use of time. Lots of good ideas, learned a lot, hopefully I was also of use. Very good that Denby spoke and was there entire morning. Good work all!
- Great initiative!
- Splitting the group into topics works well. Consider allowing groups to concentrate on one topic for the entire time allotted. Consider inviting hunters to join such meetings.
- Need a full day for this, plus follow on meetings more often than every other year.
- Need much more time to explore the issues and develop regulations. 1.5 days would have been better to really dig in. really broad topic. May have been useful to focus on a subset of the issues. Good first step.
- I applaud NPRB for working hard to integrate social science in marine research.
- This workshop is a start. I think NPRB should facilitate additional workshops on integrated theme development, consider social science / natural science theme session at AMSS 2015.
- Personally, I don't find this kind of event that useful or efficient. I would prefer to spend 4 hours writing down my comments.
- I would encourage NPRB to consider a three-stream funding approach that supports natural, social, and integrated sciences. There are research topics and questions that don't require integrative approaches. I think focusing solely on integrative proposals risks further marginalizing the social science within NPRB. It can potentially result in the social science aspect being an afterthought or add-in to the (natural science) research design and scope.
- Prepare similar research paper that relates social science to Alaska contexts.
- Thanks for the discussion.
- A key feature to distinguish is outreach from social science research. Could NPRB provide a white paper or guidance on this topic? Some of the output from the communication group could be applied to the communicating science workshop offered at the AMSS meeting. Could NPRB provide a forum for those looking for collaborations – seeding new research ideas (twitter, blog, etc.)?
- There were more biological scientists and administrators than actual social scientists in the discussion, which might not have been your intention? Perhaps a forum like this at a social science symposium would have better results? Thank you!