

SOCIAL SCIENCE IN THE PACIFIC FISHERY MANAGEMENT COUNCIL PROCESS

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Acronyms

ABC	acceptable biological catch
CEQ	Council on Environmental Quality
CMER	Cooperative Marine Education and Research Program (National Marine Fisheries Service)
CORE	Coastal and Ocean Resource Economics Program (National Ocean Service)
Council	Pacific Fishery Management Council
CPS	Coastal Pelagic Species
EA	environmental assessment
EIS	environmental impact statement
EO	Executive Order
EPA	Environmental Protection Agency
FMP	fishery management plan
GAO	Government Accountability Office
HMS	highly migratory species
IFQ	individual fishing quota
MARFIN	Marine Fisheries Initiative Program (National Marine Fisheries Service)
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NESS	non-economic social science
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
OMB	Office of Management and Budget
OY	optimum yield
PIFSC	Pacific Islands Fishery Science Center (National Marine Fisheries Service)
PRA	Paperwork Reduction Act
RFA	Regulatory Flexibility Act
SAFE	Stock Assessment And Fishery Evaluation
SIA	social impact assessment
SSC	Scientific and Statistical Committee
VA	Veteran's Administration

EXECUTIVE SUMMARY

This white paper addresses non-economic social science needs in the fisheries management process—specifically, for the Pacific Fishery Management Council (referred to here as the Council or Pacific Council, depending on context). Many federal rules mandate the consideration of social information in fisheries decision making. In addition, social science can be used for non-mandated purposes such as to improve outreach and education efforts, increase participation by stakeholders, and increase the effectiveness of enforcement.

This paper briefly summarizes how regional fishery management councils (RFMCs) and other natural resource agencies use social science; provides a brief history of social science use in the Pacific Council process; and describes federal mandates for social science, current social science efforts, barriers to using social science in the council process, and social science information needs for the Pacific Council.

The National Oceanic and Atmospheric Association (NOAA) Social Science Review Panel (2003) defines social science as “the process of describing, explaining and predicting human behavior and institutional structure in interaction with their environments.” Some common research methods in social science include surveys and questionnaires; interviews; ethnography; rapid assessment; documentary research; and other methods such as cognitive or conceptual mapping, the pile-sort method, and consensus analysis.

The way that qualitative and quantitative analytical results are presented to managers is important. Qualitative analytical results are often presented in a narrative form, while quantitative results are often presented as tables or graphs. Unlike narrative data, numbers can be easily summarized and compared, and tables and graphs are often easier for managers to digest. In addition, managers and the general public generally understand methods for analyzing quantitative values better than those for analyzing qualitative information. Educating managers about the qualitative data collection, analysis, and use will increase the effectiveness of social science in the fisheries management process.

Social Science at NMFS

Fish biology and stock dynamics have been the primary focus of funded research used in fisheries management, while social science (including economics, anthropology, sociology, and related fields) has been a lesser priority. National Marine Fisheries Service (NMFS) has recently made an effort to expand its social science program. The agency’s goal is to have 140 social scientists (75% of whom will be economists) on staff by 2007 (National MPA Center 2003). Currently, the NMFS Northwest Fisheries Science Center has two non-economic social scientists on staff.

NMFS is developing operational guidelines to help social scientists and fishery managers conduct sociocultural and economic analyses. These include *Guidelines for Assessment of the Social Impact of Management Actions* (NOAA Fisheries 2001) and a *Sociocultural Practitioners Manual* that will recommend data elements to be collected for community profiles.

Nationally, NMFS is conducting an ongoing, nationwide effort to provide profiles of all U.S. fishing-dependent communities in consistent, comparable formats. Scientists at the NMFS Northwest, Southwest, and Alaska Fisheries Science Centers are collaborating on a community profiling project that builds upon detailed community profiles compiled by the Alaska center. The centers are currently developing 122 profiles of communities in Washington, Oregon, and California.

Efforts are also underway to develop a model that will help translate qualitative social science information into quantitative information that can be easily used by fishery managers. The “Social

Science Social Impact Assessment Conceptual Model Project” aims to create a set of conceptual models for predicting the social impacts of fishery management action alternatives on commercial, recreational, and subsistence fisheries. This effort is motivated, in part, by a desire to mirror the modeling approaches taken by biologists and economists. If the models prove useful and accurate, they could be useful tools for assessing the impacts of management actions on communities.

In 2002-2003 the NOAA Social Science Review Panel was charged with reviewing the types and level of social science research in NOAA and recommending short- and long-term research agendas (NOAA Social Science Review Panel 2003). Specific to NMFS, the panel called for each line office to develop a social science research plan and a strategy to implement it; to establish specific targets for social science research; and for Sea Grant to accept a larger role in supporting social science research. The panel identified needs for research on human behavior; community structure; institutional structure; economics of fisheries; regulatory analyses; and the culture of fisheries.

Social Science at Regional Fishery Management Councils

Staffing and planning for social science varies considerably among the eight RFMCs. Three out of eight RFMCs have non-economic social scientists on their Scientific and Statistical Committees (SSC). Two RFMCs use social science advisory committees to supplement their SSCs. The Western Pacific Fishery Management Council’s Social Science Research Committee makes recommendations and sets priorities for social science research and is collaborating with the Region and Science Center to create a strategic plan for social science research. The New England Council’s Social Science Advisory Committee mirrors its SSC on socioeconomic issues. The committee’s work involves reviewing socioeconomic impact analyses, promoting socioeconomic analyses of fishery management actions, deciding which Council actions call for guidance on socioeconomic analysis, providing advice on how to gauge the economic impact of decisions, and organizing socioeconomic data.

Social Science at Other Natural Resource Agencies

In looking at research needs for fishery management, it is informative to look at how other federal natural resource agencies have approached social science research. Many other federal agencies have used social science methods, including ethnography, to learn about the communities with which they interact. For example, the National Park Service’s (NPS) Applied Ethnography Program uses ethnography to understand tribes and communities and the meaning of park resources to community members (GAO 2003), and the Environmental Protection Agency uses ethnographic methods to identify community cultural values, beliefs, and behaviors related to the environment. Other, non-natural-resource agencies also use social science methods.

Buck (1995) notes that federal legislation regulating fishery management places more emphasis on social considerations than do many comparable renewable resource management laws. However, agencies such as the U.S. Forest Service have significantly, more comprehensive social science programs than do NMFS or the RFMCs.

Brief History of Social Science in the Council Process

The Pacific Council does not have a strong history of involvement in social science. This can be seen by the historical lack of non-economic social scientists serving on the SSC, the body responsible for reviewing the science used in Council decision making. The Council staff has also been weighted toward biologists, and to a much lesser extent, economists.

The National Environmental Policy Act (NEPA) has been the main driver of formal social science use in the Council process. Environmental impact statements (EISs) require social science information (such as regulatory impacts on fishing communities) to be included in descriptions of the affected environment. Limited social science, primarily economic analyses of landings, exvessel value, and income impacts, has also been incorporated into fishery management plans and stock assessment and fishery evaluation (SAFE) documents.

Information on community impacts has also been provided to the Council through testimony during Council meetings. Such public input is important to the decision-making process and is required by law, but it should not take the place of professionally gathered scientific data.

Current Status of Social Science in the Council Process

The bulk of EISs, fishery management plans (FMPs), and SAFE documents are devoted to biological and harvest information rather than to information about the communities affected by fishing regulations. Biological information is needed to set optimum yields (OYs) and acceptable biological catches (ABCs) and to rebuild overfished groundfish stocks, as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSA) and needed to effectively manage fisheries. When attention turns to resource allocation, social science data and methods may be used to explore distributive impacts and other social implications of allocation.

The Council's formal use of social information is mainly limited to the "affected environment" sections of environmental impact statements, as well as socioeconomic sections of FMPs and SAFE documents. Most of these data are economic in nature. Social science methods are also used to analyze scoping comments (public comments taken as part of the NEPA process) and to improve communication in the Council process. The Council's Research and Data Needs document outlines needs for biological, economic, and other social science information.

Currently, there are five non-economic social scientists working for fisheries management agencies in the Pacific Council region. Two are at the NMFS Northwest Fisheries Science Center; one is at the Pacific States Marine Fisheries Commission; one anthropologist works part-time on social science projects on the Council staff; and one human geographer works full-time for the Council, mainly focused on the NEPA process.

In general, the community information included in the Pacific Council's SAFE documents and FMP falls short of the information that NMFS recommends be included in these documents. However, the breadth and depth of community information has improved in recent years, and more recent FMPs, such as the Highly Migratory Species (HMS) FMP, include much more community and social science information than earlier FMPs.

MANDATES FOR SOCIAL SCIENCE DATA

Major Federal Mandates

A large collection of federal acts and mandates builds a case for consideration of communities and social issues. While some of these do not deal directly with fisheries, they set the stage for requiring public input or social impact assessments in natural resource management.

NEPA and the Sustainable Fisheries Act (also called the MSA) are the major mandates for the use of social science in fisheries management. However, these mandates are broad and unspecific.

1970 National Environmental Policy Act

NEPA requires federal agencies to evaluate, and disclose to the public, the environmental impacts of any major action they are planning. Agencies must assess “aesthetic, historic, cultural, economic, social, or health” impacts, “whether direct, indirect, or cumulative” (40 CFR 1508.8). Depending on the action being undertaken, under NEPA the Council may be required to prepare an environmental impact statement (EIS) or an environmental assessment (EA).

1976 Magnuson Fishery Conservation and Management Act, 1996 Sustainable Fisheries Act

The Magnuson Fishery Conservation and Management Act (later known as the Magnuson-Stevens Fishery Conservation and Management Act, or MSA) is the other primary driver of social science needs in fisheries management. The MSA requires consideration of economic and social impacts whenever a “system for limiting access to the fishery in order to achieve optimum yield” is required (MSA 303(b)(6)). In addition, the MSA requires fishery management plans assess, specify, and describe the likely effects of conservation and management measures on participants in the affected fishery, and the effects on participants in other fisheries that may be affected directly or indirectly (MSA 303(a)(9)).

The MSA requires preparation of a fishery impact statement to describe likely effects of conservation and management measures on participants in the fishery or fisheries being managed, fishing communities, and participants in neighboring fisheries.

The MSA defines fishing communities geographically. Social scientists find this definition problematic. Its focus on a community as a geographic place raises questions about how the boundaries of such a community should be defined. The geographic definition of “community” also makes gathering some types of data more difficult. Data are sometimes not available on a local community level, so analyses must be conducted at the county or regional level.

Social scientists argue that for some analyses it would be helpful for the definition of “community” to include communities of occupation or interest, since this is more relevant to how RFMCs function. This expanded notion of community would also reflect the diverse ways community is conceptualized in the social science literature.

With the reauthorization of the MSA in 1996, three new National Standards were added. **National Standard 8** represents a substantial opening for the role of social science in fisheries management. National Standard 8 states, “Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.”

Other major mandates that affect fisheries management are Executive Order (EO) 12898, which requires consideration of environmental justice (the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income), and the Paperwork Reduction Act (PRA), which requires that agencies obtain Office of Management and Budget (OMB) approval before requesting most types of information from the public. The PRA applies to any collection of information from more than ten people, whether it be through interviews, surveys, questionnaires, web pages, telephone, or other information collection tools. Following the normal schedule for OMB clearance for any information

collection effort requires four to six months. This delay places a burden on agencies that are trying to collect timely information and creates a substantial hurdle for federal researchers collecting social data.

Social Impact Assessments

Social impact assessments (SIAs) are designed to address the social requirements of NEPA regulations, although they also address the requirements of the MSA and other mandates. SIAs have been called “the social equivalent of a stock assessment,” in that they assess the human environment (fishing communities, families, businesses, institutions, and values) and project future impacts of fishery management actions on that environment. SIAs can be used by decision makers to weigh the costs and benefits of different management actions. SIAs rely on baseline information such as community and fishery profiles.

Although SIAs may be useful to decision making and meet several important mandates, the SIA requirements present a dilemma to social scientists and managers. Fulfilling SIA requirements means devoting a great deal of staff or contractor time and funding to compiling existing research and conducting new research. If SIA mandates are too rigid, SIAs can become lightning rods for litigation, especially when lack of staff precludes RFMCs from creating comprehensive assessments.

USING SOCIAL SCIENCE INFORMATION

Federal mandates for collecting social information were developed because this type of information offers benefits to managers and society. Social science broadens the management information base beyond the biological resource, providing a greater array of information managers can use to make decisions. Non-economic social science recognizes that communities and fishery participants are multifaceted, and they are affected by management actions in ways that are not solely financial or economic. Human motivations, values, and strategies cannot be described in purely economic terms.

Federal mandates focus on understanding the impacts of fishery management actions on communities. Non-economic social science recognizes that communities and fishery participants are multifaceted, and they are affected by management actions in ways that are not solely financial or economic.

Apart from studying community impacts, social science can be used in other ways that benefit management. Understanding human motivations, values, and strategies can help managers develop relevant, effective, and enforceable management practices; reduce conflict among user groups; and increase involvement of constituents in decision making. Social science methods can also be effective in capturing local knowledge about biology, resource stewardship, harvest methods, and environmental factors.

Collaborative research combines social science with biological or environmental science by involving fishermen in the research process. Such research is being used effectively on both coasts. Collaborative research offers an opportunity to increase the public’s involvement and investment in fishery management while improving data collection. However, like any research, collaborative projects must meet high standards for research design and data collection.

Social science can also be used to create more stability in fisheries management. This is especially true with stocks that are at risk of being overfished, which can lead to dramatic fluctuations in both fish populations and profits. Management could take a more stable and conservative approach by focusing on the long-term stability of human communities, which could include integrating management with marketing considerations and managing the complexes targeted by fishermen (such as crab/salmon/albacore) for optimum stability and profit.

Finally, social science has been used, and will continue to be used, to learn about communication between fisheries managers and the public, to enhance constituent involvement and representation, and to find better ways to educate the public about the management process.

Obstacles to the Use of Social Science in the Council Process

A variety of obstacles prevent full integration of social science into the fishery management process. First, the Council was formed to manage fisheries, not communities. Despite National Standard 8 and NEPA mandates for considering community impacts, community concerns are secondary to the Council's function. There are times when community issues become a high priority in Council deliberations, particularly with regard to allocation issues. Usually, however, the Council focuses on a larger geographic scale, such as a region or state, rather than on individual communities.

Another barrier to the use of social science in the Council process is a lack of understanding on the part of both managers and social scientists about how social science information can and should be used. In order to produce relevant research findings, social scientists need a clear understanding of the Council's goals and objectives regarding fisheries management and community impacts.

Goals and objectives are listed in each of the Council's FMPs. In general, they focus on preventing overfishing, maximizing the economic value of the fishery, providing for diverse and traditional uses of the resource, promoting efficiency both in management and in fisheries, promoting equity in harvest opportunities and management impacts, minimizing gear conflicts, minimizing disruption to fisheries as much as possible, minimizing adverse impacts to communities, promoting safety, fostering effective enforcement and monitoring, cooperating with other entities, and recognizing traditional fishing rights. These commonalities could be used as starting points for those wanting to conduct research relevant to management.

Other, more general management goals have also been suggested. Clarifying and publicizing the Council's strategic goals and objectives—both for the Council as a whole and for each fishery—would be helpful both to managers and to those seeking to contribute to management through relevant research. The question of management's goals and objectives highlights the importance of relevant research to the Council. Social scientists should ask themselves what meaning their research will have to management and focus on the connection between their data and the Council's mandate. In addition, research results must be presented in a useable format. Information is often given in narrative form, or as raw data, the relevance of which is not immediately clear to those involved in decision making.

A common vocabulary of social science terms would help researchers conduct relevant social science and would help managers benefit from it. Similarly, social scientists need to agree on indicators of dependence, flexibility, and other factors. Creation of very basic indices of community dependence, resilience, and other factors would be most helpful to managers.

Managers considering the need for social science may be unaware that a large body of literature on fishing communities and management already exists. Unfortunately, much of this information is presented exclusively by academics to largely academic audiences at conferences and workshops. Finding a way to digest this information so that it is useful to management would be a worthwhile task.

In addition to the need for social scientists to be better informed about management needs, managers need to become better informed about social science and how it can be used. A curriculum for training managers about social science data could include information on the different types of social information, how such information is gathered and analyzed, the types of social information that already exist and could be relevant to management, the importance of communicating clear goals and objectives to

scientists, mandates for social science use, benefits of social science, and uses of social science in similar natural resource arenas.

An additional obstacle to use of social science information is that fishermen are not always willing to share socioeconomic information with researchers. When researchers employed by management agencies collect information from the fishing community, there can be no guarantee the data will not eventually be used in decisions that may reduce harvest levels. This leads to substantial distrust on the part of respondents. A study by Gilden and Conway (2001) concluded that reducing distrust was the best long-term solution to the problem of data collection in fisheries management. Educating the public about management and more effectively involving the fishing community in data collection and decision making would help them understand the relevance and need for both biological and socioeconomic data.

Low funding levels create an additional barrier to the use of social science in management. Although funding for social science has increased in recent years, social science funding remains at a very low level, especially given the federal mandates requiring socioeconomic data collection and analysis. In addition, legal mandates, such as the PRA and mandates for confidentiality, can stand in the way of efficient social science research.

Social Science Information Needs

There is no shortage of opinions about research needs for fisheries management. Many agencies and organizations, including federal agencies, educational institutions, and nongovernmental organizations, have posted their lists of research needs. Seventeen such lists are compiled in Appendix A. A list of major federal mandates and a summary of information required by each mandate is provided in Table 2.

Appendix A categorizes non-economic social science research needs into six types: (1) baseline descriptions of geographically-defined communities, (2) baseline descriptions of the commercial and recreational fishing industries (used for SAFE documents, FMPs, and SIAs), (3) data needed to assess regulatory impacts (for SIAs and NEPA documents), (4) data on nonconsumptive values (required for NEPA documents), (5) research needs for special projects and issues, and (6) other, general recommendations about research or research tools.

Even with this list of research needs—compiled by the Council, NMFS, Sea Grant, the National Academy of Sciences, and other bodies—the question remains: what type of socioeconomic information does the Council need to function? What is the value of social science in the Council process?

Several Council documents outline recommendations for economic and social information. The Council's Research and Data Needs document (PFMC 2000b) lists socioeconomic data needs, which are summarized in Appendix A. Similarly, the West Coast Fisheries Economic Data Plan (PFMC 2000c) lists numerous high-priority economic data needs for West Coast fisheries. Core socioeconomic data needs from this document are also included in Appendix A. In addition, the Groundfish Strategic Plan makes 11 science recommendations for the groundfish fishery (PFMC 2000c, p. 49).

Council members contacted for this project agreed there was a lack of understanding about how social science could be used in management decision making, and some were unclear on the definition of social science in general. Council members said for community information to be useful, it needs to be summarized and quantified; that the community sections of EISs could be made more relevant by providing more context and clarifying the implications of the data; that EISs needed to be more readable and understandable; and that they needed more information on the community implications of individual fishing quotas (IFQs). In addition, Council members observed a need to communicate with fishermen and communities about the implications of management decisions to their livelihoods; to learn about

public opinion regarding management measures; to educate fishermen and community members about management; to work more closely with fishermen on issues, such as commercial/recreational salmon allocation; to find ways to address negative perceptions of management; and finally, that they needed information on new concepts, such as community-based management.

CONCLUSION AND RECOMMENDATIONS

The following framework is an attempt to prioritize steps associated with integrating social science into the management process, improving management's understanding of fishing community issues, meeting federal mandates, addressing ongoing management data needs, and promoting better relations between the Council and its constituents.

The four goals the framework addresses are as follows:

- **Integrate both mandated and non-mandated social science into the management process.** Integrating social science would bring an additional perspective to management and would contribute to the effectiveness of the Council process.
- **Improve management's understanding of fishing communities**—status, issues, and concerns.
- **Collect information needed to address urgent and ongoing management issues.** Mandates require that SIAs be prepared and included in NEPA documents. With current funding levels, addressing these needs may mean hiring contractors or working with NMFS anthropologists to conduct the needed research. Mandates related to environmental justice and equity should be considered when designing the research.
- **Conduct activities to promote mutual understanding, communication, and credibility in interactions with fishing communities.**

Immediate Efforts to Include Social Science in the Pacific Council Process

1. **Create a social science advisory group.** Such a team would optimally include at least one anthropologist from the NMFS Northwest Fisheries Science Center; academic representatives familiar with fisheries management; a Council staff representative; at least one fishing community representative; and possibly a Sea Grant representative or extension agent. The tasks of this group could be as follows:
 - a. Advise the Council on the social science implications of management issues.
 - b. Help define goals and objectives regarding management in general and social science in particular.
 - c. Guide the integration of social science into the annual/biennial management process and into the development of amendments (in conjunction with plan development teams).
 - d. Contribute to the Research and Data Needs document and other long-term planning efforts (in conjunction with the SSC).
 - e. Identify criteria for Council members to consider when addressing community impacts.
 - f. The group would not need to meet at every Council meeting, but could be “on call” to address specific issues (such as the social implications of a particular management measure) and to guide the process of integrating social science into management.
3. **Identify or clarify goals and objectives related to fisheries management.** This would help both management and researchers in the long term. Social scientists need to understand management's objectives in order to carry out relevant research projects. A social science advisory body would be able to help clarify these goals.

4. **Make tangible efforts to educate managers about social science.** Managers need to better understand how social science is used and what it can offer to management. Such efforts could take the form of dialogues between managers and social scientists, written materials, presentations at Council meetings, orientation sessions, or other efforts.
5. **Look further into other RFMC's social science programs,** particularly those of the New England and South Atlantic Councils. How do those RFMCs integrate social science into their decision making processes?
6. **Conduct dialogues with fishing community members about pressing community needs and concerns related to fisheries.** Explore subjects such as current social issues related to fisheries management actions. The New England Fishery Management Council has conducted similar dialogues and would be a helpful model. Information gathered would contribute to SIAs and other NEPA documents, community descriptions, and effective management decision making.
7. **Make NEPA documents more user-friendly.** Social science and other information contained in NEPA documents tends to get buried and is not fully understood by readers. Find a way to shorten and clarify NEPA documents to make them more useful to management.
8. **Update Council documents,** including FMPs, SAFE documents, and community documents with current baseline information and data on cumulative effects and unquantified values when it becomes available.
9. **Follow through with Phases II and III of the Council Communications Enhancement Plan** to help address communications and constituent involvement issues.

Long-Term Management Efforts

1. **Encourage additional funding for social science research and staffing.** Funding and staffing for social science, both at NMFS and the Council, need to be increased if social science is to become an integral part of management decision making.
2. **Educate social scientists about management.** Social scientists need to understand how to effectively plan research and communicate results to management. A page on the Council website could be used to outline Council goals and objectives, research needs, and guidelines for presenting social science information to the Council. A social science advisory group would be useful in facilitating this effort.
3. **Address outreach, education, and communication needs.** In addition to following through with the Communications Enhancement Plan, conduct focused communication efforts related to IFQs and other important management efforts; increase efforts to educate the fishing community about management; consider training fishermen about the management process; and work to improve the public image of both management and fisheries^{1/}.
4. **Develop a system for formally incorporating industry information** (both socioeconomic and biological) into the management process. This long-term objective could involve cooperative research or other efforts. Incorporating industry information would lead to greater involvement by

1/ The New England Fishery Management Council has had success with three-day management workshops for fishermen. The workshops are funded by a nonprofit organization working closely with the Council. Fishermen are paid for their participation.

constituents in the management process, would improve the quality of data (providing that studies are well-designed), and would increase trust in the management and research process.

5. **Encourage changes to the PRA** to make data collection more efficient and timely.
6. **Work with NMFS** to ensure mandates for social impact assessments take into consideration the limited resources available to RFMCs.
7. **Encourage social scientists to develop agreed-upon indices** of community factors, such as dependence and resilience that can be easily communicated to managers. Integrate such efforts into the development of NEPA documents.

Long-Term Research Efforts

1. **Address socioeconomic data issues associated with IFQs.** Some pressing research topics include:
 - a. Analyze different limited access and rights-based management programs in the context of West Coast fisheries; research implications of IFQs in other areas.
 - b. Address impacts of IFQs on processors.
 - c. Collect information on historic diversity of vessel classes and how to preserve it under an IFQ system.
 - d. Collect ownership information related to prevention of absentee/foreign control of fishing enterprises.
 - e. Understand implications of IFQs for displacement of fishers and crew.
2. **Collect baseline information on fishing-involved communities.** Collection of baseline information is a necessary first step for understanding the status quo and changes to the status quo. NMFS social scientists are currently collecting baseline information on West Coast fishing communities.
3. **Collect information on cumulative effects of management.** Describing cumulative effects is required by NEPA. The new community descriptions mentioned above will help with this task.
4. **Collect information on unquantified and nonconsumptive values of resources.** This is also required by NEPA, which describes unquantified environmental amenities and values as “such factors as angler satisfaction, job satisfaction, an independent lifestyle for commercial fishermen, opportunity to see species in the wild, etc.”
5. **Address data issues associated with other pressing issues,** such as bycatch control (incentives for reducing bycatch, social factors in observer program implementation, etc.); allocation (community implications of different allocation strategies); capacity reduction (community impacts); marine reserves (displacement, nonconsumptive values, community impacts); and enforcement (incentives, communication of regulations, compliance).
6. **Address data issues associated with non-pressing issues that would benefit management,** such as incentives for stewardship (COMES 2003); developing a closer connection between management and markets (COMES 2003); routine monitoring of socioeconomic indicators (COMES 2003); and decreasing fragmentation in the fishing community (California Sea Grant).

Considerations for Social Scientists Working with Management

1. Data collected for management should be useful to management.

2. Data should be presented to the Council in a useful form (preferably a short, non-narrative form), with a discussion of the data's context and relevance.
3. To counter any doubts about the validity of social science information, existing guidelines for data quality need to be communicated to managers.
4. Existing (and relevant) social science research should be considered when considering social science needs.
5. Social scientists need to understand Council research needs before they begin collecting information.
6. Social scientists working with management need to agree on common methods, terms, and definitions.
7. Social scientists (including economists) need to develop permanent, continually updated databases and/or models of community and fishery information that allow consistent, comparable way to produce, analyze, and communicate social research. The "Pollnac model" may offer some progress in this direction.
8. Social scientists need to develop easily understandable community indicators that are useful and relevant to management.
9. Social scientists need to communicate with the Council about how they can contribute to the process.

SOCIAL SCIENCE IN THE PACIFIC FISHERY MANAGEMENT COUNCIL PROCESS

Introduction

This white paper addresses non-economic social science needs in the fisheries management process—specifically, for the Pacific Fishery Management Council (referred to here as the Council or Pacific Council, depending on context). Many federal rules mandate the consideration of social information in fisheries decision making. In addition, social science can be used for non-mandated purposes such as to improve outreach and education efforts, enhance data collection, increase participation by stakeholders, and increase the effectiveness of enforcement.

This paper briefly summarizes how RFMCs and other natural resource agencies use social science; provides a brief history of social science use in the Pacific Council process; and describes federal mandates for social science, current social science efforts, barriers to using social science in the Pacific Council process, and social science information needs for the Pacific Council.

The paper also proposes a first step for integrating social science into the Pacific Council process: the creation of a social science advisory group or steering committee. Such a committee would be instrumental in guiding social science efforts, identifying social science-related management needs, and defining objectives regarding social science.

What Is Social Science?

The NOAA Social Science Review Panel (2003) defines social science as “the process of describing, explaining and predicting human behavior and institutional structure in interaction with their environments.” The report notes that social science may include the fields of anthropology, demography, economics, geography, law, political science, psychology, and sociology. Political ecology also contributes to the field of social science.

The acronym NESS is sometimes used to differentiate “non-economic social science” from economics because in fisheries management the term “social science” is often used interchangeably with economics^{2/}. Social science sections in EISs and other documents are frequently limited to analyses of community economic impacts. While the non-economic social science disciplines listed above do incorporate economics and economic impacts in their analyses, in the fisheries management arena they primarily focus on data such as demographics, indicators of fishery dependence, measures of community flexibility and resilience, cultural values, cultural and community institutions, constituent involvement and representation, equity, ethnicity, gender, and other non-economic aspects of society and culture.

The role of social science and its benefits are often unclear to those involved in management. Many in fisheries management equate social science with National Standard 8 of the MSA, which requires managers to take communities into account when making regulatory decisions. In this guise, social science may be seen as a burdensome “hoop” that regulators must jump through before moving onto the more important (biological) aspects of fisheries management. Others see social science as a collection of interesting, but not very useful, anecdotal information. Still others see social science as a way for fishing communities to communicate with managers about the impacts of regulations. In fact, social science research, when planned and presented appropriately, can improve management decision making, while meeting the requirements of several federal mandates.

2/ Some social scientists prefer not to use the NESS acronym because it reduces the many non-economic social science disciplines to only being “other” than economics.

Some common research methods in social science are listed below.

Surveys and questionnaires. These tools are familiar to most managers and members of the public. They can provide either quantitative data (for example, cost/earnings information) or qualitative data (often gathered with open-ended questions). Surveys are used by all of the social sciences. There are reliable and proven methodologies for conducting surveys (Salant and Dillman 1994).

Ethnography and participant observation. Ethnography and participant observation are very closely related terms. Ethnography is both a set of research methods (including participant observation, interviews, and other methods) used to describe a group or culture, and the written product of such research, as in “an ethnography of a coastal fishing community” (Bryman and Bell 2003). The U.S. General Accounting Office (GAO 2004, p. 6) provides the following definition of ethnography:

Ethnography is research carried out in a natural setting—such as a workplace—and using multiple types of data, both qualitative and quantitative. The approach embraces diverse elements that influence behavior. Most important, it recognizes that what people say, do, and believe reflect a shared culture—a set of beliefs and values—that can be discovered by systematic study of their behavior. Ethnography produces a picture of social groups from their members’ viewpoint.

Participant observation refers to a method in which the researcher participates in the daily life of a community and observes interactions first-hand. Participant observation usually involves fieldwork, which may take a significant amount of time and be difficult to replicate.

Ethnographic methods, such as participant observation and interviews, can be used to gather both quantitative and qualitative information. They are often used to better understand issues like values, beliefs, and motivations. For example, what factors make fishermen more or less likely to respect closed area boundaries? How does involvement in the fisheries management process differ among commercial and recreational fishers? Why are some fishers more or less likely to respond to surveys about operation costs?

Interviews. Interviews may be used to explore specific issues (such as communication or attitudes towards fishing quotas) or to gather data for community and cultural descriptions. Interviews may be conducted individually or with groups. Ethnographic interviews rely heavily on open-ended questions and follow-up questions (Bernard 2002). Personal interviews are particularly effective when exploring sensitive or threatening subjects; for example, the GAO has used personal interviews to study patient safety in Veterans’ Administration hospitals (GAO 2004). An example from fisheries might be behavior in regard to closed fishing areas. Genzuk notes that “the fundamental principle of qualitative interviewing is to provide a framework within which respondents can express their own understandings in their own terms” (Genzuk n.d.).

Rapid assessment. Rapid assessment is an applied, team-based ethnographic approach that uses triangulation^{3/}, iterative data analysis^{4/}, and additional data collection to quickly develop a preliminary understanding of a situation from the insider’s perspective (Beebe 2001). Methods, such as ethnographic

3/ Triangulation is the use of more than one research method to study a particular subject and create more confidence in one’s results.

4/ In iterative data analysis, data are collected and refined (sorted, categorized, and re-categorized) as long as new data continue to emerge from interviews and observations. The number of interviews required is determined by examining when data become redundant and saturation has been established (Cole 2002).

interviews, participant-observation, surveys, and documentary research, may be used in rapid assessment studies. In fisheries, rapid assessment can be useful for developing community descriptions.

Documentary research. Documentary research involves analyzing existing primary documents, such as newspaper articles, logbooks, diaries, meeting minutes, videotapes, and other written or electronic materials. Text analyses are sometimes used with primary documents to uncover and explore broader sociocultural themes. Documentary research is often used to confirm, explain, or build upon findings from other social science research activities.

Other methods. Social scientists also use other methods. One example is *cognitive or conceptual mapping* (recording mental maps of concepts or experiences). Another is to present informants with maps, photographs, and other documents to elicit comments and memories. *Social network analysis* is used to “collect, analyze, and graphically represent data that describe the relationships within and between groups of people or organizations. It can also be used to represent how people interact with specific resources” (NOAA Coastal Services Center 2004). Social network analysis has been used to study representation on Oregon watershed councils (Smith 2002). The *pile-sort method* is used to understand local knowledge and cognitive systems. Using this method, research subjects organize terms or photographs into categories. This approach can be useful for fisheries research; for example, surveys of recreational fishing preferences would be improved if researchers better understood how fishermen classify fish. After using the pile-sort method to learn about fishermen’s classification systems, surveys could be designed in ways that make sense to respondents. *Consensus analysis* helps to describe social group boundaries and widely shared social and cultural views. This method can be used to identify the most knowledgeable people within a given community or group. Unlike some other social science methodologies, both the pile-sort method and consensus analysis lend themselves to quantitative analysis and description (Bernard 2002).

Social science *data* can be either qualitative or quantitative, and social science *analysis* can take either a quantitative or qualitative approach. Qualitative data may be elicited through ethnographic methods or surveys and may take the form of interview transcripts, letters, articles, audiovisual recordings, images or symbols. For example, recordings of Council meetings, public comment letters, transcriptions or recordings, and photographs of fishing communities are all qualitative in nature, but they can be analyzed either quantitatively or qualitatively. Bernard (2002:428-429) notes, “most quantitative analysis in the social sciences involves reducing people (as observed directly or through their texts) to numbers; most qualitative analysis involves reducing people to words—*your* words about the meaning of *their* words or actions or artifacts.”

The way qualitative and quantitative analytical results are presented to managers is important. Qualitative analytical results are often presented in a narrative form, while quantitative results are often presented as tables or graphs. Unlike narrative data, numbers can be easily summarized and compared, and tables and graphs are often easier for managers to digest. In addition, managers and the general public generally understand methods for analyzing quantitative values better than those for analyzing qualitative information. Educating managers about the qualitative data collection, analysis, and use will increase the effectiveness of social science in the fisheries management process.

Efforts are being made to find ways to systematically transform qualitative data into quantitative values for use in fisheries management. For example, a social science modeling project proposed by NMFS aims to develop models containing both qualitative and quantitative fisheries information. This effort is discussed in more detail below.

Numbers often *seem* more valid than narrative qualitative data, although the validity of both types of data depends on a combination of good research design and researcher objectivity and skill. There are

standard research methods in social science that, when adhered to, ensure validity and reliability for both qualitative and quantitative social science data. A large body of literature on social science research methods provides guidelines for conducting research that will result in valid, replicable results.

SOCIAL SCIENCE USE IN RELATED AGENCIES

Social Science at NMFS

Fisheries management is a complex undertaking that requires both biological and social information. Fish biology and stock dynamics have been the primary focus of funded research used in fisheries management, while social science (including economics) has been a lesser priority. Until recently NMFS relied on sociocultural studies by outside experts, rather than maintaining experts on staff. Often, these studies used different research designs, making comparison and longitudinal observations difficult (GAO 2003).

NMFS has recently made an effort to expand its social science program. In 2000, only 37 NMFS employees worked in the social science field nationally—34 economists and three anthropologists. At the time, the agency planned to hire 96 new social scientists over a period of five to seven years. About three quarters would be economists, and one quarter anthropologists and sociologists (Ocean Studies Board 2000, p. 8). As of April 2004, there were nine non-economic social scientists working full time at NMFS. The agency's goal is to have 140 social scientists (including economists) on staff by 2007 (National MPA Center 2003). The projected ratio of economists to other social scientists has not been changed.

Currently, the Northwest Fisheries Science Center has two non-economic social scientists on staff (Ms. Karma Norman^{5/} and Ms. Suzanne Russell); the Alaska Fisheries Science Center has one anthropologist (Dr. Jennifer Sepez); the Southeast Fisheries Science Center and Southeast Region each have one anthropologist on staff (Drs. Brent Stoffle and Palma Ingles, respectively); the Northeast Fisheries Science Center has four non-economic social scientists, two of whom are half-time (Dr. Patricia Clay, Dr. Lisa Colburn, Dr. Julia Olson, and Dr. Patricia Pinto da Silva); the Pacific Islands Fisheries Science Center (PIFSC) has one non-economic social scientist (Dr. Stewart Allen); and NMFS Headquarters has two non-economic social scientists (Drs. Susan Abbott-Jamieson and Peter Fricke). The Southwest Fisheries Science Center does not have a social science program, though they do have economists on staff.

Major social science projects and initiatives underway at NMFS are described below.

Guidelines and Definitions

NMFS is developing operational guidelines to help social scientists and fishery managers conduct sociocultural and economic analyses. The agency's *Guidelines for Assessment of the Social Impact of Management Actions* (NMFS 2001) (referred to here as the NMFS SIA Guidelines) lists data needs and methodologies for conducting SIAs. NMFS is also developing a *Sociocultural Practitioners Manual* that will recommend data elements to be collected for community profiles that can be compared over time and across different fisheries and regions. The required data will include information about social structure, culture, and demographics.

Defining fishing communities in practical, measurable terms is a first step in addressing the major mandates related to fishery management impacts. The MSA defines a fishing community as “a

5/ Doctorate pending.

community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such a community” (16 U.S.C. 1802 §3 (16)). In interpreting this definition, the NMFS has stated that “A fishing community is a social or economic group whose members reside in a specific location...” (50 CFR §600.345(b)(3)).

Many social scientists find this definition of “fishing community” problematic. Fishermen are mobile and sometimes maintain moorages at different ports. Which community should be considered their “home port,” and how is the determination made? In addition, the definition raises questions about how community boundaries should be defined. In Los Angeles, for example, a very small proportion of inhabitants are actively engaged in fishing. It could be argued that the geographic community as a whole is not “substantially engaged” or dependent on fisheries resources. How is this community-within-a-community identified, and how is dependence on fisheries measured? Dependence is often measured solely by economic means; however, such factors as history, values, infrastructure, specialization, social institutions, and regional economic relationships also need to be taken into account (Hall-Arber, *et al.* n.d.). The definition of community is so important to social scientists that Massachusetts Institute of Technology (MIT) Sea Grant notes, “the success or failure of fisheries management may be inextricably bound to notions of ‘community’” (Hall-Arber, *et al.* n.d.).

The geographic definition of “community” also becomes problematic in regard to data collection. Data are often not available on a community level, so analyses are often conducted on a county or regional level. Sepez (Sepez, *et al.* 2004) notes that due to time and funding constraints, detailed analyses usually focus on communities that are more likely to experience the most significant impacts, while many smaller communities that may be impacted cannot be analyzed on an individual basis.^{6/}

In its *Sociocultural Practitioners Manual*, NMFS outlines a process for identifying fishing communities, including 23 types of data that can be used to create indicators of dependence on and/or engagement in fishing (summarized in Appendix A of this paper). These 23 data types emphasize information that is most readily available. The manual will also provide recommendations on where to find the data needed.

Community Profiling Efforts

NMFS is conducting an ongoing, nationwide effort to create profiles of all U.S. fishing-dependent communities in consistent, comparable formats. The NMFS Northeast, Southeast, and PIFSCs are developing community profiles, and scientists at the NMFS Northwest, Southwest, and Alaska Fisheries Science Centers are collaborating on a community profiling project that models itself on the detailed community profiles recently compiled by the Alaska Center. The centers are currently developing 122 short-form profiles of communities in Washington, Oregon, and California. In addition to the short-form profiles, long-form profiles, which will include information from site visits and interviews, will be developed on a subset of communities. The project is scheduled for completion in April 2006.

Social Science Modeling Project

As noted above, efforts are underway to develop a model that will help translate qualitative social science information into quantitative information that can be easily used by fishery managers. The Office of Science and Technology at NMFS Headquarters is spearheading the “Social Science Social Impact Assessment Conceptual Model Project,” which aims to create a set of conceptual models for predicting the social impacts of fishery management action alternatives on commercial, recreational, and subsistence

6/ A discussion of the Alaska community profiling project can be found at <http://www.afsc.noaa.gov/Quarterly/amj2004/amj04feat.pdf>.

fisheries. The model is currently known as the “Pollnac Model,” after Dr. Richard Pollnac, an anthropology professor at the University of Rhode Island, who is involved in developing the model. The model will use both quantitative and qualitative indicators. For example, satisfaction and independence are included in the model because these influence individual decision making.

This effort is motivated, in part, by a desire to mirror the modeling approaches taken by biologists and economists. Such models are more familiar to Council members and may be more useful than narrative reports for decision making. In support of this, a recent study of Pacific Northwest fisheries managers’ knowledge of how to incorporate social values into planning and decision making concluded that it is unlikely that narrative community information can be used in fishery management (Sharp and Lach 2003).

The conceptual modeling project involves 12 experts in social science methodologies and modeling who are familiar with fisheries social science. The project began with a workshop in March 2004. The group is currently working on models of commercial fisheries, recreational fisheries, and subsistence fisheries. These efforts will be integrated into a set of conceptual models and, depending on future funding, will be tested in the real world. If the model proves useful and accurate, it could become a useful tool for assessing the impacts of management actions on communities.

Local Fisheries Knowledge Pilot Project

Traditional ecological knowledge has been a popular focus for anthropological research. The Local Fisheries Knowledge Project explores traditional knowledge of fisheries in Maine (NOAA Fisheries 2004). The project was developed by NMFS Office of Science and Technology in partnership with Maine educational institutions and brings together students and the fishing community by documenting cultural, environmental, and historical knowledge of fishing community members. Goals include increasing students’ awareness of the marine environment; promoting learning and careers in marine fields, including management; teaching students research and documentation skills; and documenting and preserving local fisheries knowledge. In its first year, the project involved approximately 175 students and 16 teachers. Information is entered into a database that may become a useful resource for social impact assessments and other social science applications. Information includes the history and culture of fishing communities; attitudes, perceptions, and beliefs among fishermen; and historic ecological observations. Beginning in 2005, professional researchers and community groups will be encouraged to archive interview transcripts in the database.

Other NMFS Social Science Projects

There is no single database of social science research projects being conducted by NMFS nationally; instead, apart from some national coordination of community profiling efforts, programs and regions develop their own projects and initiatives. In addition to working through its regional offices and science centers, NMFS sponsors social science through programs such as the Saltonstall-Kennedy Program^{7/}, the Marine Fisheries Initiative (MARFIN) Program^{8/}, the Cooperative Marine Education and Research

7/ The Saltonstall-Kennedy program provides funding for research and development projects to strengthen the U.S. fishing industry. In 2004, there were no grants due to insufficient funds.

8/ MARFIN funds commercial and recreational fisheries research and development projects in the Gulf of Mexico and South Atlantic states. Programs focus on fishery biology, resource assessment, socioeconomic assessment, management and conservation, harvesting methods, and fish handling and processing. In 2004 MARFIN funded 11 projects, of which two had a socioeconomic focus (see <http://sero.nmfs.noaa.gov/grants/programs/marfinffofy05.pdf>).

(CMER) Program,^{9/} and Sea Grant college programs. Under the National Ocean Service, NOAA's Coastal and Ocean Resource Economics (CORE) Program conducts marine-related socioeconomic research, including socioeconomic impacts of marine reserves, socioeconomic monitoring, valuation of artificial and natural reefs, and spatial patterns of socioeconomic data.

Apart from the Southwest Region (which is involved in Northwest Fisheries Science Center efforts), every NMFS region is conducting some form of social science research. The **Southeast Fisheries Science Center** has a social science research group that conducts applied social science, such as providing social impact assessments for fishery management plans. In addition, the **Southeast Regional Office** is identifying fishing communities for the future development of community profiles and is researching fishing crew in two locations. The **Alaska Fisheries Science Center's** Economic and Social Sciences Research Program conducts similar work. Current research includes community descriptions, studies of traditional ecological knowledge, an economic survey of halibut charterboat operators, measuring fishing capacity and capacity utilization, and an analysis of commercial crew demographics. The **Northeast Fisheries Science Center's** Resource Evaluation and Assessment Division houses a social science branch that conducts applied research on the use and management of commercial and recreational fisheries, protected species resources, and marine ecosystems. The Center is also working on fishing community profiles and is collecting oral histories from fishermen's wives to better document the cumulative impacts of regulations on fishing families. The **PIFSCs** is conducting an ethnographic study of the Hawaii-based longline fishing industry that explores how fishermen became involved in the fishery; attitudes about the fishery, management, and regulations; and social networks and demographic information. Researchers at the PIFSC are also creating community descriptions; studying human uses, values, and impacts associated with coral reef ecosystems in the Hawaiian Islands; and compiling catch and effort records on recreational and commercial catches.

In addition to the community profiling work described above, the **Northwest Fisheries Science Center's** researchers are working with the California Department of Fish and Game to explore the socioeconomic implications of geographic distribution in IFQs. The Center is also working with the Pacific States Marine Fisheries Commission on a study of the live groundfish fishery and has hired contractors to organize existing data on coastwide subsistence fishing.

NOAA Social Science Review Panel

In 2002-2003 the NOAA Social Science Review Panel was charged with reviewing the types and level of social science research in NOAA and recommending short- and long-term research agendas (NOAA Social Science Review Panel 2003).

The panel was critical of NOAA's social science program, finding that the agency's capacity to meet its mandates and mission was diminished by the under-representation and under-utilization of social science. The panel also found a lack of formal understanding of social science and its political contributions, but noted a willingness within the agency to look at an increased role for social science.

9/ The CMER program is a partnership between NMFS and four East Coast academic institutions. In 2004, 12 research topics were put forward by CMER as guidance for researchers. These included four social science projects: the role of culture and subsistence fishing in household food security in New England, human dimensions of ecosystem-based management, environmental justice in New England and the Mid-Atlantic, and evaluation of the viability of community management in urban and industrial settings.

In addition, the panel found that a lack of appropriate data (due to insufficient time series, restrictions on economic data, etc.) limited the usefulness of social science to NOAA, that NOAA's ability to understand and communicate with constituents was limited by a lack of expertise in social science survey methodology and perceived obstacles to conducting surveys, that NOAA's social science staffing was insufficient, and that the small number and fragmentation of social science staffers prevented a "critical mass" of social scientists. Staffing was too small to influence the long-term research agenda, and there was a lack of an established career path for social scientists. Among other things, the panel recommended conducting workshops to familiarize Assistant Administrators with social science and its potential contribution to NOAA's mission.

Specific to NMFS, the panel called for each line office to develop a social science research plan, and a strategy to implement it, to establish specific targets for social science research and for Sea Grant to accept a larger role in supporting social science research. The panel identified needs for research on human behavior, community structure, institutional structure, economics of fisheries, regulatory analyses, and the culture of fisheries.

In its draft strategic plan for 2005-2010, NOAA endorsed the Social Science Review Panel's findings and incorporated their recommendations into its strategic planning (National Oceanic and Atmospheric Administration 2004).

Social Science at Regional Fishery Management Councils

Staffing and planning for social science varies considerably among the eight RFMCs. Only one Council, the South Atlantic, supports a full time anthropologist. The Pacific Council has one staff member trained as an anthropologist who works part-time on social science issues, and one human geographer specializing in the NEPA process. The Western Pacific Council has an indigenous coordinator, but does not have a non-economic social scientist on staff. Economists are represented in slightly higher numbers. The North Pacific Council has three; the Pacific Council has two; and the South Atlantic, New England, Gulf of Mexico, and Western Pacific Councils have one economist each. Other Councils may contract out social science or economic work.

Three out of eight RFMCs currently have non-economic social scientists on their SSCs. The South Atlantic Fishery Management Council's SSC includes four anthropologists and one social psychologist. The SSCs of the North Pacific and Mid-Atlantic Councils each include one non-economic social scientist (Dr. Seth Macinko and Dr. Bonnie McCay, respectively). The Western Pacific Council's SSC includes two social scientists (Drs. Stewart Allen and Craig Severance). The Caribbean Council currently has one economist on its SSC and has had an anthropologist serve in the past. The New England and Gulf of Mexico Councils do not currently have non-economic social scientists serving on their SSCs.

Two of the eight RFMCs use social science advisory committees to supplement their SSCs. The Western Pacific Council has both a Social Science Research Committee and a committee on the rights of indigenous peoples. The Western Pacific Council's Social Science Research Committee includes Council members, academics, and researchers from the NMFS Pacific Islands Region and Fishery Science Center. The committee makes recommendations and sets priorities for social science research and is collaborating with the Region and Science Center to create a strategic plan for social science research. The committee meets on an ad-hoc basis, usually in conjunction with Council meetings.

The New England Council has a Social Science Advisory Committee that mirrors its SSC on socioeconomic issues. The committee includes seven economists, two anthropologists, one sociologist, one marine affairs specialist, and one geographer. The committee's work involves reviewing socioeconomic impact analyses, promoting socioeconomic analyses of fishery management actions,

deciding which Council actions call for guidance on socioeconomic analysis, providing advice on how to gauge the economic impact of decisions, and organizing socioeconomic data.

There are currently three economists serving on the Pacific Council's SSC. The Council does not have any non-economic social scientists serving on its SSC and does not have a separate panel devoted to social science.

The work conducted by anthropologists and sociologists on RFMCs includes supporting the NEPA process, addressing the community provisions of the MSA, developing baseline information on fishing communities, and performing other research to support the decision-making process. The South Atlantic Council is currently working on a long-term cost/earnings data collection program that gauges the economic health of specific commercial fisheries in the South Atlantic region. Among other things, this information will be used by managers to determine impacts of regulations on fishing operations. The staff anthropologist has also completed an ethnographic study of fishermen's social networks, which can be used to measure resilience in fishing communities.

The Western Pacific Fishery Management Council has created four plan amendments related to fishing communities. The amendments identify fishing communities and provide information on the economic and social importance of fisheries, geographic aspects of communities, history of fisheries, and other matters (WPFMC 2002).

Social Science at Other Natural Resource Agencies

In looking at research needs for fishery management, it is informative to look at how other federal natural resource agencies have approached social science research. Many other federal agencies have used social science methods, including ethnography, to learn about the communities with which they interact. For example, the NPS's Applied Ethnography Program uses ethnography to understand tribes and communities and the meaning of park resources to community members. The results are used to assess impacts of NPS actions and to ensure that diverse views and community concerns are considered in park planning (GAO 2003).

U.S. Forest Service

Buck (1995) notes that federal legislation regulating fishery management places more emphasis on social considerations than do many comparable, renewable resource management laws. However, agencies such as the U.S. Forest Service (USFS) have significantly more comprehensive social science programs than do NMFS or the RFMCs.

Many of the issues the USFS deals with are particularly relevant to fisheries. The National Forest Management Act of 1976, passed in the same year as the MSA, emphasizes the social and economic consequences of regulation, particularly in regard to fulfilling NEPA requirements. Buck (Buck 1995) notes that "community stability" has been a major focus of social science in forest management. This concept is set out in the Sustained Yield Forest Management Act of 1944, which promoted "the stability of forest industries, of employment, of communities and of taxable forest wealth through continuous supplies of timber."

On the West Coast, the Pacific Northwest Research Station of the USFS (covering Alaska, Washington, and Oregon) hosts a "Human and Natural Resources Interactions" program. Research areas include determining changes in major land uses, forest cover, and forest investments; studying private landowner behavior and incentives; understanding the social values of rural communities; determining the feasibility of ecosystem restoration activities; developing analytical tools for assessing silvicultural practices and the

joint production of timber and nontimber forest products; projecting timber resources at regional and national scales; analyzing supply and demand trends and reporting market variables; and integrating public concerns, uses, and values into natural resource policies (United States Forest Service Pacific Northwest Research Station 2004). Many of these research areas have potential parallels in fishery management. The program includes teams of researchers focusing on such topics as sociocultural dimensions of resource management, communities and forest environments, and ecologically sustainable production of forest resources.

The Pacific Southwest Research Station, which covers California, Hawaii, and the Pacific islands, focuses less on social science, but does conduct research on such topics as changing recreation patterns, communication in natural resources, social aspects of fire, and behaviors and conflict.

Other Agencies

The Environmental Protection Agency (EPA) uses ethnographic methods to identify community cultural values, beliefs, and behaviors related to the environment. The EPA has worked with the Society for Applied Anthropology to assist with community-based efforts to protect drinking water supplies and understand cultural and social motivations to local community involvement (GAO 2003). The EPA is also cooperating with Columbia River tribes to examine tribal members' consumption of fish and associated exposure to toxins. This research effort combines surveys of tribal members with toxicological studies (Stiffler 2002). In addition, the EPA has worked with the Asian Pacific Environmental Network to study fish consumption patterns in the Laotian community in San Francisco Bay (U.S. Environmental Protection Agency 1999).

Other, non-natural-resource agencies also use social science methods. For example, the Office of National Drug Control and Prevention uses ethnographic methods to study newly emerging problems concerning drugs, drug users, and drug sellers; the Department of Justice uses ethnography to learn about street crime and gang activity; and the Census Bureau uses ethnography to enumerate populations that are difficult to count (GAO 2003). In addition, the Veteran's Administration (VA) has used ethnographic methods to study patient safety in VA hospitals (GAO 2004).

SOCIAL SCIENCE AT THE PACIFIC FISHERY MANAGEMENT COUNCIL

Brief History of Social Science in the Pacific Council Process

The Pacific Council does not have a strong history of involvement in social science. This can be seen by the historical lack of non-economic social scientists serving on the SSC, the body responsible for reviewing the science used in decision making. Just under 16 % of the 69 people serving on the SSC between November 1976 and November 2004 were social scientists. Nine were economists, one was an anthropologist, and one was a combined anthropologist/economist. Most other SSC members were fishery biologists. The primary reason for the lack of non-economic social scientists on the SSC is that there has been very little non-economic social science to review. The Council has occasionally been provided socioeconomic data through contracts or other means, such as the 1977 report "Socio-Economics of the Idaho, Washington, Oregon and California Coho and Chinook Salmon Industry" (OSU 1978). However, for a number of reasons, which will be explored later in this paper, such reports have not been greatly used in decision making. Unless social science research is integrated into the Council process, it is unlikely that the number of anthropologists and sociologists on the SSC will increase.

Since the Council was founded, the small staff of three to four technical positions has usually consisted of one economist and two to three fishery biologists. Starting in 2002, the technical staff has included four fishery biologists, two economists, one NEPA specialist, and one anthropologist working part-time on social science issues.

NEPA has been the main driver of formal social science use in the Council process. Environmental impact statements, which are required for major management actions, require that community impact information be included in descriptions of the environment affected by the management action. NEPA will be discussed in further detail later in this paper.

Limited social science, primarily economic analyses of landings, exvessel value, and income impacts, has also been incorporated into FMPs and SAFE documents. The social science data incorporated into these documents is detailed later in this paper.

Information on community impacts has also been provided to the Council through testimony during Council meetings. While individual testimony does not provide a scientifically-based depiction of community impacts, it can influence Council decision making, particularly when it is communicated effectively. Such public input is important to the decision-making process and is required by law, but it should not take the place of professionally gathered scientific data.

Fishermen sometimes see social scientists as advocates for fishing communities—advocates who will tell the community side of the fisheries management story in a scientifically convincing way. For example, in interviews with the author for two projects funded by Oregon Sea Grant, fishermen indicated they would like the Council to use more social science information. They suggested that if the Council had more information about community impacts, it would be less likely to make decisions that harmed communities. National Standard 8 of the MSA also requires Councils to consider community impacts. However, information about community impacts is not guaranteed to protect communities from difficult decisions. RFMCs must also weigh the requirements of National Standard 1 of the MSA which states, “Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry,” and National Standard 9, which states “Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.” The tension between National Standards 1, 8, and 9 points at the key problem in managing any natural resource—the tension between the health of the resource and the people who depend on harvesting and processing it for their livelihood.

Current Status of Social Science in the Pacific Council Process

Biological data is prioritized ahead of all social science data, including economics, in the current Council process. Although it is generally agreed that fisheries managers don’t manage fish—they manage *people* who fish—the use and collection of community information has been minimal. This is due in part to the MSA’s mandates to meet specific biological goals in contrast to considerably less concrete social goals. Significantly more funding goes to biological data collection than to social science, and the bulk of EISs, FMPs, and SAFE documents is devoted to biological and harvest information rather than to information about the communities affected by fishing regulations. Biological information is needed to set OYs and ABCs and to rebuild overfished groundfish stocks, all of which are required by the MSA and which are needed to manage fisheries. When attention turns to resource allocation, social science data and methods may be used to explore distributive impacts and other social implications of allocation.

As noted above, the Council’s formal use of social information is mainly limited to the “effected environment” sections of EISs, as well as socioeconomic sections of FMPs and SAFE documents. Most of these data are economic in nature. Other documents, such as the Groundfish Strategic Plan and the Research and Data Needs document, refer to the need for social science data. Social science methods are also used to analyze scoping comments (public comments taken as part of the NEPA process) and to improve management communication. The process of developing IFQs will likely call for new social science information, and a social scientist at NMFS Northwest Fisheries Science Center is expected to contribute to that effort.

The Research and Data Needs document, which is meant to be updated every two years, outlines needs for biological, economic, and other social science information. Observers have noted that the list of data needs is relatively constant because so few economic or social research projects are funded. In addition, an SSC member noted that because there are no anthropologists or sociologists on the SSC, non-economic social science is not emphasized when updating the data needs list. However, the SSC lacks social scientists because not enough social science research is used by the Council to justify their membership on the SSC. This results in a Catch-22 situation that discourages the inclusion of social science research in the Council process.

Apart from contracting out to independent or academic social scientists, there are limited social science resources in the Pacific region. Currently, there are five non-economic social scientists working for fisheries management agencies in the Pacific region. Two are at the NMFS Northwest Fisheries Science Center; one is at the Pacific States Marine Fisheries Commission; one anthropologist works part-time on social science projects on the Council staff; and one human geographer works full-time for the Council, mainly focused on the NEPA process.

Current Social Science Projects in the Pacific Council Region

The following table outlines current and recently completed social science projects in the Pacific Council region.

Study	Agency	Investigators	Notes
Socioeconomic dimensions of the directed open access Pacific groundfish fishery	Pacific States Marine Fisheries Commission (NMFS contract)	Dave Colpo, Jennifer Langdon-Pollock (PSMFC)	Ongoing. This project will produce a database of participants in the groundfish live fish fishery and will identify key socioeconomic concerns for future research.
West Coast community descriptions	Pacific States Marine Fisheries Commission	Jennifer Langdon-Pollock	Completed (2004). Presents county-level data for the West Coast.
Pilot project: a study in two West Coast marine fishing communities (Astoria and Newport, Oregon)	Pacific States Marine Fisheries Commission	Jennifer Langdon-Pollock, Geana Tyler	Ongoing. This project discusses approaches on how to collaborate with fishing communities for the collection of socioeconomic data, and includes community profiles of Astoria and Newport, Oregon.
Groundfish buyback analysis	NMFS Northwest Fisheries Science Center	Karma Norman, Heather Lazrus (Northwest Fisheries Science Center Socioeconomics Research Assistant)	Ongoing. A small-scale analysis of the recent groundfish buyback.
Groundfish Fieldwork Methodological Issues Paper	Northwest Fisheries Science Center, jointly with NMFS Alaska Fisheries Science Center	Karma Norman, Heather Lazrus, Courtney Carothers (Alaska Fisheries Science Center Research Assistant),	Ongoing. Adds data from existing fieldwork on Northwest groundfish fishermen to an existing draft by the Alaska Fisheries Service Center.

Study	Agency	Investigators	Notes
Joint Alaska Fisheries Science Center/Northwest Fisheries Science Center West Coast Communities Profiling Project (including Oregon/Washington communities that fish in Alaska)	Northwest Fisheries Science Center; partially contracted out	Karma Norman, Jennifer Sepez (Alaska Fisheries Science Center) Sam Herrick (economist, NMFS Southwest Fisheries Science Center)	Ongoing. Gathers and analyzes data on specific fishing community indicators. Will develop list of West Coast fishing communities and compose narrative profiles of these communities. Expected to be completed in April 2006.
Existing Subsistence Data Organization	Northwest Fisheries Science Center; contracted out	Impact Assessment, Inc.	Project beginning January 2005

Community Information in FMPs and SAFE Documents

In general, the community information included in the Council's SAFE documents and FMPs falls short of the information that NMFS recommends be included in these documents. However, the breadth and depth of community information has improved in recent years, and more recent FMPs, such as the Highly Migratory Species (HMS) FMP, include much more community and social science information than earlier FMPs.

NMFS SIA Guidelines note that baseline community information should be incorporated or included by attachment to SAFE documents. The MSA also requires FMPs to include fishery impact statements that "shall assess, specify, and describe the likely effects, if any, of the conservation and management measures on participants in the fisheries" (16 USC 1853(a)(9)). The Council has included this information in the EISs associated with FMPs and amendments. The socioeconomic information included in each FMP is detailed below.

Groundfish

The Council's groundfish FMP includes six objectives under "social factors." These are listed on page 29. In addition, the FMP includes the following social goals related to groundfish rebuilding programs:

- Minimize, to the extent practicable, the adverse social and economic impacts associated with rebuilding, including adverse impacts on fishing communities.
- Fairly and equitably distribute both the conservation burdens (overfishing restrictions) and recovery benefits among commercial, recreational, and charter fishing sectors.
- Promote widespread public awareness, understanding, and support for the rebuilding program.

The groundfish FMP as amended through Amendment 17 (2004) does not contain baseline community information, although it discusses measures to be taken if the Council needs to take management action due to social or economic factors. An unpublished appendix to the FMP contains limited socioeconomic information last updated in 1988. Amendment 11 to the FMP addressed the 1996 reauthorization of the MSA with its new National Standard 8 by including a new Objective 17 ("Consider the importance of groundfish resources to fishing communities, provide for the sustained participation of fishing communities, and minimize adverse economic impacts on fishing communities to the extent practicable"). Amendment 11 also referenced the development of a baseline description of fishing communities which was being drafted separately by Council staff in 1999. Due to funding and staffing constraints, this baseline communities document was never fully completed for groundfish. However, several sets of

tables with primarily economic data were completed and are available on the Council website^{10/}. Subsequent amendments to the FMP have had limited descriptions of social issues associated with each amendment.

The 2004 groundfish SAFE document contains stock assessments, terms of reference for stock assessments, and rebuilding plans. The document itself does not contain any socioeconomic information. However, the 2002 SAFE document does contain limited socioeconomic information, including a section on the economic status of the Washington, Oregon, and California groundfish fisheries. This section consists of tables with landings, revenue, and exvessel price data, but little contextual or narrative information is provided.

More socioeconomic information is included in EISs on harvest specifications and management measures for groundfish. For example, the EIS for the 2005-2006 groundfish fishery includes detailed information about fishing communities, including harvest sectors, processors, community profiles, dependence and engagement in fishing, social structure, impact on the built environment (docks, jetties, ports), and minority and low income communities (PFMC 2004b).

Salmon

Amendment 14 to the Salmon FMP updates the FMP and includes community information. Section 4.3 includes a one-page overview of socioeconomics. Appendix B to Amendment 14 provides a more detailed look at socioeconomics of the salmon fishery, including markets; access to the fisheries; details about harvesters, processors, and buyers; and a brief description of communities. The community information is further broken down into local-level fishery data (commercial harvest by port area, numbers of vessels landing salmon, total number of vessels landing by county, recreational effort levels, and charter vessel counts) and recreational and commercial income impacts. The majority of community data are economic in character. Appendix B is supplemented by a series of tables providing data about landings, prices, imports/exports, economic value of salmon, consumption, seasons, vessel counts, recreational effort, charter targeting strategies, salmon processors/buyers, angler trips, and income impacts by community. Again, most of the data are quantitative economic data. The data were last updated in 1999.

The annual "Review of Ocean Salmon Fisheries," which serves as a SAFE document for the salmon FMP, contains information on exvessel values, allocation, landings, price trends, vessels, and permits. The document characterizes the different salmon fisheries (commercial, recreational, ceremonial and subsistence, etc.) and discusses income impacts. It does not include community descriptions or other non-economic baseline information.

Coastal Pelagic Species

The Coastal Pelagic Species (CPS) FMP contains eight pages on the socioeconomics of the CPS fishery. Most of the data are at county level and includes minimal information on the commercial and setnet fleets; economic information on the commercial fishery; sources of income for California commercial fishers; recreational fishery data (effort, expenditures, demographics, motivation to fish); resource use conflicts; and community profiles for Los Angeles County, San Pedro, Ventura County, and Monterey County. The community profiles include information on population and housing, demographics, the general economy, earnings, and for San Pedro, history, residential distribution of crew members, and crew demographics. The FMP was last updated in 1998. The August 2003 regulatory amendment for

10/ See <http://www.pcouncil.org/communities/comdoc.html>.

Pacific sardine allocation also includes minimal socioeconomic information, as does Amendment 9 on bycatch in the CPS fishery.

While the CPS SAFE document includes basic economic information about exvessel values and landings, it does not include community descriptions or non-economic baseline information about communities.

Highly Migratory Species

Of all the Council's FMPs, the HMS FMP contains the most detailed information about fisheries and communities. In 123 pages it provides fishery descriptions; characteristics of HMS communities (including fishing activity, demographics, and economic activity); estimation of income impacts; and 16 community profiles. The HMS FMP was published in August 2003.

There is currently no SAFE document for the HMS fishery.

MANDATES FOR SOCIAL SCIENCE DATA

The acts and mandates listed in Table 1 build a case for consideration of communities and social issues. While some of these do not deal directly with fisheries, they set the stage for requiring public input or social impact assessments in natural resource management.

Major Federal Mandates

Other mandates, including the NEPA, Sustainable Fisheries Act (also called the Magnuson-Stevens Act or MSA), EO 12898, and Regulatory Flexibility Act (RFA), have a more direct impact on fisheries management. The requirements of these Acts are summarized in Table 2. The mandates of NEPA and the MSA, in particular, are broad and unspecific; as Gene Buck (1995) notes, "Current references to social factors are open to broad interpretation, and there is no clear objective for how these factors should be incorporated into a fishery management plan."

TABLE 1. Mandates and guidance that build a case for consideration of communities and social issues. (Page 1 of 2)

1946 Administrative Procedures Act	Clarifies the process of making regulations and allows greater accessibility and participation by the public in the rule-making process. In general, the Act requires the publication in the <i>Federal Register</i> of most rules and a period for public comment.
1953 Small Business Act	States that the government should aid, counsel, assist, and protect, insofar as is possible, the interests of small business concerns in order to preserve free competitive enterprise. Buck (1995) notes that this Act had an important underlying influence on the social values incorporated into management plans, especially in regard to allocation.
1960 Multiple Use Sustained Yield Act	Requires consideration of the social, economic, and ecological benefits of non-timber harvest use and services of national forests.
1964 Civil Rights Act (Title VI)	Requires that any program or activity receiving federal financial assistance be free from discriminatory effect on the ground of race, color, or national origin.
1972 National Environmental Policy Act	See text for description of this Act.
1972 Coastal Zone Management Act (P.L. 104-150) (amended by the Coastal Zone Protection Act of 1994)	Requires that the Nation's coastal zones be protected from environmentally harmful development.
1972 Marine Protection, Research and Sanctuaries Act	Provides for assessment of impacts of human activities in environmentally sensitive areas and consideration of social and economic effects of regulation or other federal action.
1974 Forest and Rangeland Renewable Resource Planning Act	Requires social and economic assessments of use alternatives for federal forests and rangelands and their incorporation in planning decisions as part of the forest inventory analyses.
1976 Federal Land Policy and Management Act	Requires protection of the scenic, scientific, historic, and ecological values of federal lands and calls for public involvement in their management.
1976 Magnuson Fishery Conservation and Management Act.	See text for description of this Act.
1978 Outer Continental Shelf Lands Act	States that, "The term 'human environment' means the physical, social, and economic components, conditions and factors which interactively determine the state, condition, and quality of living conditions, employment, and health of those affected directly or indirectly by resource development and extraction activities on the U.S. outer continental shelf."
1980 Comprehensive Environmental Response, Compensation and Liability Act	Calls for working with affected publics through community relations programs and assessment of community and state impacts of Superfund plans.
1982 Nuclear Waste Policy Act	Calls for preparation of an SIA and places specific demographic limits on siting nuclear repositories. Affected Indian tribes must be included in the siting process and impact assessment and mitigation.
1982 Guidelines for Economic and Social Analysis of Programs, Resource Plans, and Projects	Requires the incorporation of social impact assessments in forest management plan development.
1982 Regulatory Flexibility Act	See main document for description of this Act.
1983 Economic and Environmental Guidelines and Principles for Water and Related Land Resources Implementation Studies (U.S. Water Resources Council)	Outlines six planning steps for integrating economic, ecological, and social assessments into water resource studies and actions to ensure compliance with NEPA.
1984 National Social Sciences Manual (USDA Soil Conservation Service)	Describes best practices for U.S. Department of Agriculture actions requiring social and economic impact assessments under NEPA.
1986 (Revised) Regulations Implementing the Procedural Provisions of the National Environmental Policy Act (Council on Environmental Quality)	Clarifies the treatment of incomplete or unavailable information in assessments.
1987 Environmental Impact and Related Procedures (Federal Highway Administration)	Provides administrative guidance for assessments required by NEPA and federal highway mandates.

TABLE 1. Mandates and guidance that build a case for consideration of communities and social issues. (Page 2 of 2)

1987 Civil Rights Restoration Act	Clarifies Title VI of the Civil Rights Act to cover all programs and activities of federal-aid recipients, sub-recipients, and contractors, whether or not the programs and activities are federally funded.
1993 Executive Order 12866 (Regulatory Planning and Review)	Requires agencies to assess the costs and benefits of regulatory alternatives. This assessment should include quantitative measures of costs and benefits, even those that are difficult to quantify, such as distributive impacts and equity.
1994 Executive Order 12898 (Environmental Justice)	See main document for description of this Executive Order.
1995 Paperwork Reduction Act	See main document for description of this Act.
1997 Considering Cumulative Effects Under the National Environmental Policy Act (Council on Environmental Quality)	Not a mandate, this document provides guidance on the assessment of the cumulative effects of related actions on a community or population over time.
2000 Treasury and General Government Appropriations Act for Fiscal Year 2001, Section 515	Requires federal agencies to publish guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by them. These guidelines also include procedures allowing affected persons to seek and obtain correction of information maintained and disseminated by federal agencies.
2001 Data Quality Act	Directs the OMB to ensure that all information disseminated by the federal government is reliable and requires federal agencies to issue guidelines ensuring the quality, utility, objectivity, and integrity of information they disseminate and to provide mechanisms for affected persons to correct such information.
2002 Proper Consideration of Small Entities in Agency Rulemaking (Executive Order 13272)	Requires that the potential impacts of federal agencies' draft rules upon small businesses, small governmental jurisdictions, and small organizations be properly considered during the rulemaking process.

TABLE 2. Summary of major federal acts and mandates. (Page 1 of 2)

<p>MSA</p>	<p>FMPs must take into account the social and economic needs of the states.</p> <p>Consider in-depth the economic and social impacts of the system.</p> <p>Assess, specify, and describe the likely effects of conservation and management measures on participants in the affected fishery and the effects on participants in other fisheries that may be affected directly or indirectly.</p> <p>Take into account the importance of fishery resources to fishing communities in order to provided for the sustained participation of such communities, and, to the extent practicable, minimize adverse economic impacts on such communities.</p> <p>Fishing communities must be considered in the fishery impact statements specified in section 303(a)(9)(A) of the Act. Fishery impact statements must describe the likely effects of an FMP on fishery participants and communities.</p> <p>Fishery impact statements should describe lifestyles; attitudes, beliefs and values; social organization and structure; population demographics; dependence on and participation in the fishery.</p> <p>In case of limited access fisheries, consider historical fishing practices and dependence on, past participation in, and social and cultural framework relevant to the fishery.</p> <p>Describe and consider the commercial, charter, and recreational fishing sectors in FMPs.</p>
<p>NEPA</p>	<p>Requires federal agencies to consider the impacts of major federal actions on the human environment.</p> <p>When economic or social and natural or physical environmental effects are interrelated, the NEPA analysis should discuss them all.</p> <p>The analysis should use "a systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences...in planning and decision-making."</p> <p>Consider unquantified environmental amenities and values (these include such factors as angler satisfaction, job satisfaction, an independent lifestyle for commercial fishermen, opportunity to see species in the wild, etc.)</p> <p>Consider economic and social impacts on the human environment.</p> <p>Address the cumulative effects of past and present fishery management actions (identify and describe the cause and effect relationships between the various actions, and between the actions, fishery resources, habitats, fishermen, and communities involved.)</p>

TABLE 2. Summary of major federal acts and mandates. (Page 2 of 2)

<p>EO 12898 (Environmental Justice)</p>	<p>Analyze environmental effects, including human health, economic, and social effects, of federal actions whenever an analysis is required under NEPA.</p> <p>Address the effects on minority and low-income populations, Indian tribes.</p> <p>Mitigation actions identified under NEPA should address adverse impacts on minority populations, etc.</p> <p>Provide for effective participation of minority, etc., groups in the NEPA process.</p> <p>Collect, maintain, and analyze data on minority, etc. populations, especially when a management action affects subsistence consumption.</p>
<p>Regulatory Flexibility Act</p>	<p>Complete an economic assessment (regulatory impact review) detailing the net benefits and costs of each proposed management action and alternative.</p> <p>Consider economic impacts on small entities (small businesses, organizations, governmental jurisdictions).</p> <p>Complete a regulatory flexibility analysis detailing impacts on small entities and identifying reasonable alternatives to mitigate predicted impacts.</p>

1970 National Environmental Policy Act

NEPA requires federal agencies to evaluate, and disclose to the public, the environmental impacts of any major action they are planning. These impacts are more broadly defined under NEPA than under the MSA. In the Council on Environmental Quality's (CEQ) NEPA guidance, the human environment is defined as "the natural and physical environment and the relationship of people with that environment. ... This means that economic or social effects are not intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared, and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment" (40 CFR Part 1508.14).

Agencies must assess the "aesthetic, historic, cultural, economic, social, or health" impacts on the human environment, "whether direct, indirect, or cumulative" (40 CFR 1508.8). Such an analysis should use "a systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences ... in planning and decision-making" (NEPA 102(2)(A)).

Depending on the action being undertaken, under NEPA RFMCs may be required to prepare an environmental assessment (EA) or an EIS. In principal, an EA is a mechanism to determine whether an EIS is necessary. Either document must provide the Council and the public a clear basis for choice among realistic alternatives for action. They must include the need for the proposal, the objectives of the proposal, the decision that must be made, reasonable alternatives (including mitigation measures), and predicted environmental effects of all alternatives. If an action is expected to significantly affect the quality of the human environment or be highly controversial, an EIS may be required. An EA may be required if the action has less significant and non-controversial impacts.

NMFS' SIA Guidelines (2001) note that NEPA documents must include consideration of "unquantified environmental amenities and values," which include such factors as "angler satisfaction, job satisfaction and an independent life-style for commercial fishermen, and the opportunity to see species, such as salmon, in the wild for the non-consumptive user of marine fishery resources." The guidelines further note:

In times when fishery resources are abundant and all human uses can be satisfied without over-exploiting the resource, the NEPA analysis typically describes impacts on the natural environment. As exploitation of the resource approaches maximum sustainable yield and allocation between users becomes necessary, the NEPA analysis must also consider economic and social impacts on the human environment. The NEPA analysis must also address issues of the cumulative effects of past and present fishery management actions [40 CFR 1508.7] and issues of environmental justice [EO 12898].

The CEQ implementing regulations for NEPA define cumulative effects as "the impact on the environment which results from the incremental impact of the action [proposed] when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" [40 CFR 1508.7]. To determine cumulative effects requires the identification and description of the cause and effect relationships between the various actions, and between the actions, fishery resources, habitats, fishermen, and communities involved in fisheries. The identification and description of the relationships of multiple actions permits the fishery manager to analyze the response of the fishery resource to changes in the human environment and to assess the impacts of alternative management proposals on the human environment.

Along with the MSA, NEPA is the basis for mandated social science needs in the Council process. However, both Council members and others have noted that NEPA documents used in the Council process are often exhaustively comprehensive and difficult to use. The CEQ regulations for preparation of NEPA documents emphasize succinctness (Sec. 1502.15) and the use of plain language (Sec. 1502.8). Council members have recommended that NEPA documents be focused and streamlined in order to be more useful to the decision-making process.

1976 Magnuson Fishery Conservation and Management Act and 1996 Sustainable Fisheries Act

The Magnuson Fishery Conservation and Management Act (later known as the Magnuson-Stevens Fishery Conservation Act, or MSA) is the other primary driver of social science needs in fisheries management. The MSA requires consideration of economic and social impacts whenever a “system for limiting access to the fishery in order to achieve optimum yield” is required (MSA 303(b)(6)). In addition, the MSA requires that FMPs, specify, and describe the likely effects of conservation and management measures on participants in the affected fishery, and the effects on participants in other fisheries that may be affected directly or indirectly [MSA 303(a)(9)].

The Act contains several sections referring to fishing communities:

Section 303(b)(2) calls for a basic description of fisheries covered by FMPs, which must “contain a description of the fishery, including, but not limited to, the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved and their location, the cost likely to be incurred in management, actual and potential revenues from the fishery, any recreational interest in the fishery and the nature and extent of foreign fishing and Indian treaty fishing rights, if any...”

Regarding limited entry fisheries, **Section 303(b)(6)** requires an examination of “(A) present participation in the fishery, (B) historical fishing practices in, and dependence on, the fishery, (C) the economics of the fishery, (D) the capability of fishing vessels used in the fishery to engage in other fisheries, (E) the cultural and social framework relevant to the fishery and any affected fishing communities, and (F) any other relevant considerations.”

The MSA requires preparation of a fishery impact statement to describe likely effects of conservation and management measures on participants in the fishery or fisheries being managed, fishing communities, and participants in neighboring fisheries. (A fishery impact statement is not the same as an EIS, which may be required by NEPA.) **Section 303(a)(9)** of the MSA requires that FMPs and amendments include fishery impact statements that “assess, specify, and describe the likely effects, if any, of the conservation and management measures on (A) participants in the fisheries and fishing communities affected by the plan or amendment; and (B) participants in the fisheries conducted in adjacent areas under the authority of another Council...”

With the reauthorization of the MSA in 1996, three new National Standards were added. **National Standard 8** represents a substantial opening for social science in fisheries management. It states, “Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.”

National Standard 8 has important implications for social science research because the Council is not focused on managing geographic communities. It could be argued that the Council manages occupational

communities (for example, trawlers or squid fishermen) and avocational communities (salmon anglers). Such groups are not limited to one geographic place, but they may be represented as a group in the Council decision-making process, and may be affected as a group by fishery regulations. On the other hand, a single geographic community often represents an uncohesive collection of different gear groups, vessel sizes, and businesses that have little in common in terms of how they interact with the Council. Social scientists argue that it would be helpful for the definition of “community” to include communities of occupation or interest, since this is more relevant to how the Council functions. This expanded notion of community would also reflect the diverse ways community is conceptualized in the social science literature.

There are times when geographic community issues become a high priority in Council deliberations, particularly with regard to allocation issues. The Council has also considered geographic communities when assigning management zones. Usually, however, the Council works at a higher geographic level, focusing on regions or states rather than individual communities.

Despite National Standard 8 and NEPA mandates for considering community impacts, community concerns are secondary to the Council’s function—and, one might argue, secondary to the MSA itself. The seven purposes listed for the MSA, which guides the RFMC process, do not include any explicit mention of communities. They do emphasize sovereignty over fisheries within the Exclusive Economic Zone (EEZ), support of international agreements, promoting the domestic fishing industry, achieving the OY from each fishery, establishing RFMCs that allow for public participation, encouraging fisheries for underutilized resources, and protecting essential fish habitat.

The somewhat vague requirements of National Standard 8 are often superceded, in practice, by the more specific requirements of National Standard 9 (“conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.”) At times, the Council is required by law to take actions that may lead to economic distress in fishing communities. Under these circumstances, community information and dialogues should be used to find ways to soften economic impacts as much as possible.

1982 Regulatory Flexibility Act

The RFA requires agencies to determine whether proposed rules are likely to have a significant economic impact on a substantial number of small entities (businesses, local governments, nongovernmental organizations, etc.). Agencies are required to assess impacts on such small entities to ensure that the proposed actions do not discriminate or impose an undue burden on them. The 1996 Small Business Regulatory Enforcement Act amended the RFA of 1980 to strengthen its analytical and procedural requirements and permit judicial review of agency assessments and actions.

1994 Executive Order 12898 (Environmental Justice)

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (US EPA, 2004). EO 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires that federal agencies identify and address adverse human health or environmental effects of their activities on minority populations and low-income populations, including Indian tribes, when such analysis is required by NEPA. EO 12898 was developed in response to the “not in my backyard” trend of the 1970s and 1980s, where politically adept or powerful groups succeeded in preventing the placement of freeways,

power plants, waste facilities, and other undesirable structures in their communities. As a result, these unwanted facilities were often sited near less powerful minority or low-income communities.

In the context of EO 12898, environmental effects include human health, economic, and social effects. The EO requires that minority, low-income, and Indian tribal members be afforded an opportunity to participate in the NEPA process and requires NMFS and RFMCs to collect, maintain, and analyze data on these populations, particularly when a fishery management action may affect subsistence consumption of fish, vegetation, or wildlife.

1995 Paperwork Reduction Act

The PRA requires that agencies obtain OMB approval before requesting most types of information from the public. The PRA applies to any collection of information from more than 10 people, whether it be through interviews, surveys, questionnaires, web pages, telephone, or other information collection tools. Clearance is required for both voluntary and mandatory information requests; therefore, under the PRA, it would be illegal to query all members of the Council by email without first getting PRA clearance. In order to receive clearance for collecting information, researchers working in federal fisheries management must (1) send the NOAA Clearance Officer the information needed to publish a *Federal Register* notice informing the public about the request for clearance, and soliciting comments for 60 days; (2) after the 60-day comment period has ended, submit a clearance request to the NOAA Clearance Officer; (3) wait for 30 days, during which the NOAA Clearance officer is prohibited from acting on the request, to allow for additional public comment; then (4) wait for approval or disapproval of the request. When a delay in obtaining regular clearance would have adverse affects on the public or natural resources, there is a procedure for emergency clearance, which bypasses the public comment period.

Following the normal schedule for OMB clearance, any information collection effort requires at least four, and usually five, months. This delay places a burden on agencies that are trying to collect timely information and creates a substantial hurdle for federal researchers collecting social data. The NOAA Social Science Advisory Board noted that PRA requirements are cumbersome and are a limiting factor on the use of surveys, creating an impediment to social analysis (NOAA Social Science Review Panel 2003).

Social Impact Assessments

SIA's are designed to address the social requirements of NEPA regulations, although they also address the requirements of the MSA and other mandates. The process of assessing social impacts "provides systematic, science-based information concerning the relative social and cultural benefits and costs of maintaining the status quo regulations and of adopting each reasonable management alternative that the fishery manager or Council might use in selecting a preferred management strategy" (NMFS SIA Guidelines, 2001:7). SIA's have been called "the social equivalent of a stock assessment," in that they assess the human environment (fishing communities, families, businesses, institutions, and values) and project future impacts of fishery management actions on that environment. SIA's can be used by decision makers to weigh the costs and benefits of different management actions.

NEPA calls for considerations of the human environment to use "a systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences ... in planning and decision-making" [NEPA 102(2)(A)]. NMFS notes that "SIA requires the same degree of scientific rigor and effort as the biological and economic elements of environmental impact assessment. Done properly, an SIA is as valuable an assessment tool as a good fisheries stock assessment" (SIA Guidelines, 2001:31). SIA's rely on baseline information, such as community and fishery profiles. As noted above, such profiles are expected to be included in an FMP's SAFE document. NMFS recommends that such profiles be

updated every three to five years to track impacts and provide current baseline information. The prediction of social impacts is the core of the SIAs. SIAs must include projections of future impacts of management measures, as well as projections of community changes without the development of new fishery actions or policies. The SIA must forecast effects for several years beyond the date of the management action.

SIAs are sometimes confused with economic analyses, information received during public comment, and community or fishery profiles. NMFS' SIA guidelines describe the differences between these documents. **Economic analyses** may be one part of a SIA, but focus exclusively on economic considerations, such as return on investment, supply and demand, jobs, and prices. Economic analyses use different methods and ask different questions than SIAs. **Public comment** offers insights into sociocultural values and concerns. Although public comment may be used as data in SIAs, and is valuable in the scoping process required by NEPA, it is not gathered systematically. The data used in SIAs are gathered using proven methods that aim to accurately represent the values and concerns of a community or group. **Community or fishery profiles** are reference documents that describe the current status and history of a community or fishery and may be used as baseline information. They may be used in developing SIAs and EISs, but they do not address the impacts of particular management measures and do not serve the same function as SIAs.

NMFS' SIA guidelines describe in detail the process of undertaking an SIA and the types of data that should be included. This information is included in Appendix A.

Appendix A synthesizes information needs derived from a variety of sources (listed at the end of the table). To create the table, agencies' and organizations' lists of research priorities were summarized from reports, websites, meeting notes, and other sources. Priorities with a social dimension were included in the table, while those that were not relevant to the Council process or that did not have social dimensions were excluded. Some priorities were combined in order to reduce redundancy. The "Source" column lists the source(s) for each research priority.

The table divides non-economic social science research needs into baseline descriptions of geographically-defined communities; baseline descriptions of the commercial and recreational fishing industry; data needed to assess regulatory impacts; data on nonconsumptive values; and research needs for special projects and issues. Information needs identified by Appendix A are summarized on pages 33-37. In general, SIA analyses require the following:

- identifying communities substantially dependent on fishing within the affected area;
- establishing a baseline profile of each community that covers a range of economic and sociocultural variables;
- describing and analyzing community social factors;
- identifying fisheries issues from the community members' perspectives and collecting and analyzing information on them, and
- assessing alternative management actions with respect to these issues and their likely effects on the community (GAO 2003).

NMFS guidelines further state that five categories of social factors should be included in SIAs. The first four pertain to all SIAs, while the fifth is specifically required by the MSA. They include:

- The size and demographic characteristics of the fishery-related workforce residing in the area. These determine demographic, income, and employment effects in relation to the work force as a whole, by community and region.
- The cultural issues of attitudes, beliefs, and values of fishermen, fishery-related workers, other stakeholders and their communities.
- The effects of proposed actions on social structure and organization; that is, on the ability to provide social support and services to families and communities.
- The non-economic social aspects of the proposed action or policy, including lifestyle issues, health and safety issues, and the non-consumptive and recreational uses of living marine resources and their habitats.
- The historical dependence on and participation in the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution, and rights (NOAA Fisheries 2001).

The GAO (2003:15-16) provides the following example of a social impact assessment.

...An SIA using a rapid ethnographic assessment method was conducted with respect to a Multispecies Groundfish Fishery in New England and the Mid-Atlantic region. The ports studied were selected by using a combination of information derived from field visits, licensing data, telephone interviews in the local area, and consultation with national and regional NMFS representatives. Both social and economic aspects of the Multispecies Groundfish Fishery fleet were identified and described, based on information from in-depth interviews, focus groups, and other sources. The assessment report noted each port's dependence on the fishery and the role of available public programs, explained the fisheries issues that fishing communities faced, and contrasted issues fishermen identified with those of fishery managers. This rapid SIA emphasized the importance of understanding the nature and extent of the Multispecies Groundfish Fishery crisis and the unique characteristics and adaptive strategies of its fisher families and communities.

How are SIAs Conducted?

NEPA requires that an interdisciplinary approach be used to assess impacts on the human environment (NEPA 102(2)(a)). Councils are assumed to have established interdisciplinary plan development teams to assess fishery conservation and management issues. In its SIA guidelines, NMFS assumes that such interdisciplinary teams include economists, anthropologists and/or sociologists, fishery managers, and biologists from the beginning of the action identified by the Council or NMFS. However, it is noted in the guidelines that social scientists have rarely been included on plan development teams because they are rarely employed by Councils. In this case, it recommends that the social science representatives of the SSC provide advice to the Councils and plan development teams on these issues. It notes (2001:28):

The importance of early involvement of social scientists in the interdisciplinary fishery plan development cannot be over-emphasized. The early identification of social issues can assist the other members of the team in identifying reasonable policy or management alternatives for analysis. Particularly important is the early identification of alternatives that may minimize social and/or cultural impacts or are likely to be accepted by fishermen as "socially appropriate"; that is, alternatives that recognize the significance of the social and cultural values of fishermen, their communities, and fishing practices.

Although SIAs may be useful to decision making and meet several important mandates, the SIA requirements present a dilemma to social scientists and managers. Fulfilling SIA requirements means devoting a great deal of staff or contractor time and funding to compiling existing research and conducting new research. If SIA mandates are too rigid, SIAs can become lightning rods for litigation, especially when lack of staff precludes Councils from creating comprehensive assessments. Although NMFS provides information about useful datasets and information sources, simply compiling existing community information is a very time-consuming process. Other obstacles to the use of social science research are discussed later in this paper.

USING SOCIAL SCIENCE INFORMATION

Federal mandates for collecting social information were developed because this type of information offers benefits to managers and society. The NMFS *Guidelines and Principles for Social Impact Assessment* (NOAA Fisheries 1994) note that NEPA helped address previously unfocused concerns about the social consequences of projects and regulatory actions:

For example, when construction-related impacts of public works projects were at issue, attention was generally centered on economic considerations. The prevailing view was that money could compensate for any adverse impacts. There was minimal concern for social impacts even if entire neighborhoods had to be displaced so long as comparable housing could be located elsewhere. There was even less concern for the distribution or “equity” of these impacts on different populations. Also lost in this process was the importance people attach to their communities and neighborhoods; and particularly to long-standing social networks that form the basis of support both for daily living and during periods of extreme stress and hardship.

Federal mandates focus on understanding the impacts of fishery management actions on communities. This echoes one of the original purposes of the RFMC system, which was to allow public representation in the fishery management process. Non-economic social science recognizes that communities and fishery participants are multifaceted, and they are affected by management actions in ways that are not solely financial or economic.

Apart from studying community impacts, social science can be used in other ways that benefit management. Understanding human motivations, values, and strategies can help managers develop relevant, effective and enforceable management practices; reduce conflict among user groups; and increase involvement of constituents in decision making. Social science methods can also be effective in capturing local knowledge about biology, resource stewardship, harvest methods, and environmental factors. Collaborative research combines social science with biological or environmental science by involving fishermen in the research process^{11/}. Such research is being used effectively on both coasts. On the West Coast, the Juvenile Rockfish Project is a NMFS-funded collaboration between 12 commercial fishermen and marine scientists in which participants are studying the association between juvenile nearshore fish species and underwater habitats (Fishresearchwest.org 2003b). Another recent example is the use of focus groups and key informants to identify trawled areas for the essential fish habitat EIS. On the East Coast, NMFS is involved in three large-scale collaborative research projects in the Gulf of Maine

11/ According to Fishresearchwest.org, “collaborative fisheries research often means fishermen and scientists working together on any one of several levels, ranging from some participation in an already designed project (such as annual trawl surveys) to designing and developing an entire research project together.” For many people, collaborative and cooperative research are synonyms; however, some feel that true cooperative research involves a higher level of cooperation, shared vision, and trust (Fishresearchwest.org 2003b).

(a cod tagging effort, a fleet study, and an industry-based survey) (Stevens 2003). Efforts are also underway to use social science methods to collect traditional ecological knowledge about Maine fisheries (NOAA Fisheries 2004). Such traditional knowledge may include historic information about weather, the changing status of fishery resources, business strategies, the effectiveness of fishing methods, and other topics. In this way, social science broadens the management information base beyond biology, providing a greater array of information that managers can use to make decisions.

Collaborative research offers an opportunity to increase the public's involvement and investment in fishery management while improving data collection. However, like any research, collaborative projects must meet high standards for research design and data collection. In addition, to be truly cooperative, all parties should be involved in research design, and all parties must benefit from the research.

Social science can also be used to create more stability in fisheries management. This is especially true with stocks that are at risk of being overfished, which can lead to dramatic fluctuations in both fish populations and profits. Management could take a more stable and conservative approach by focusing on the long-term stability of human communities, which could include integrating management with marketing considerations and managing the complexes targeted by fishermen (such as crab/salmon/albacore) for optimum stability and profit.

One important role of social science methods and information is to highlight unforeseen consequences of management actions. Since social scientists use a variety of information sources to "triangulate" around a particular subject, it is not uncommon for them to discover social issues and concerns that might otherwise be overlooked. The GAO (2003:16) provides the following example of how an ethnographic assessment discovered unexpected issues and avoided significant problems:

...In 1990 a social science consulting firm developed community profiles for the North Pacific Fisheries Management Council that concerned the allocation of the catch between various participants. It addressed the critical question of how the fishing catch in the region should be allocated between the mother ship fleet (floating processors), the factory trawler fleet, and the onshore processors. According to a NMFS official, an economic impact statement had also been performed in the area, but its data had stated that there would be little change in the cost of fish to consumers if catch were restricted for any one of these groups. However, the social data showed that if the fisheries management plan did not properly allocate catch between the three groups, there would be significant disruption in the social and cultural lives of the fishers in Alaskan communities. There were also some hidden economic costs, such as welfare payments to the fishers who suffered because their catch allocation was reduced. According to the NMFS official, the community profiles were incorporated into the plan and served as the basis for the Inshore/Offshore Allocation Agreement in 1991.

Finally, social science has been used and will continue to be used to learn about communication between fisheries managers and the public, to enhance constituent involvement and representation, and to find better ways to educate the public about the management process. For example, ethnographic methods were used to explore communication methods in fishery management (Gilden and Conway 2001). The findings of this research are being used to develop a communications plan for the Pacific Council.

Obstacles to the Use of Social Science in the Council Process

As noted above, social science has not had a strong formal role in the Pacific Council process to date. There are several reasons why.

Perceptions of Social Science

As noted in the section above on the MSA, the Council was formed to manage fisheries, not communities. Because of the Council's focus on fisheries resources, it can be argued that mandates for community information on a small geographic scale are irrelevant to the Council process as it is currently structured. Other management systems, such as the Community Development Quotas used in Alaska, do require extensive data on community structure and impacts and make the collection of such information more relevant to the management process. It is possible that the development of IFQs by the Council will also require the use of more community information. However, community information has not proven especially useful to the Council's other tasks—rebuilding overfished stocks and routine maintenance of harvest levels. This is not to say that social science is irrelevant to the Council process, but that mandated community-level data collection and use has not been fully integrated into management decision making as it is currently conducted.

Understanding the Use of Social Science

Another barrier to the use of social science in the Council process is a lack of understanding on the part of both managers and social scientists about how social science information can and should be used.

The Need for Clear Goals and Objectives

In order to produce relevant research findings, social scientists need a clear understanding of the Council's objectives and goals regarding the community impacts of fisheries management. Researchers interviewed for this paper said they did not know what to research because they didn't understand the Council's goals and objectives regarding management. Goals are listed in several of the Council's FMPs, but are not immediately evident to researchers.

The Council's *Statement of Organization, Practices, and Procedures* (PFMC 2004) outlines the broad purpose of the Council (preparing and submitting FMPs, preparing comments on foreign fishing applications, submitting periodic reports to the Secretary of Commerce, reviewing stock assessments and harvest specifications, and conducting other activities required by the MSA).

Some strategic goals are listed in the Council's Groundfish Strategic Plan, *Transition to Sustainability* (PFMC 2000a). The plan lists the following goals, followed by options and recommendations for achieving the goals:

- Strategic Plan Goal for Management Policies: To adopt understandable, enforceable, and stable regulations that, to the greatest extent possible, meet the FMP's goals and objectives and the requirements of the MSA.
- Strategic Plan Goal for Harvest Policies: To establish an allowable level of catch that prevents overfishing while achieving optimum yield based on best available science.
- Strategic Plan Goal for Capacity Reduction: To have a level of harvest capacity in the fishery that is appropriate for a sustainable harvest and low discard rates, and which results in a fishery that is diverse, stable, and profitable. ...
- Strategic Plan Goal for Allocation: To distribute the harvestable surplus among competing interests in a way that resolves allocation issues on a long-term basis.

- Strategic Plan Goal for an Observer Program: To quantify the amount and species of fish caught by the various gears in the groundfish fishery and account for total fishery-related removals.
- Strategic Plan Goal for Marine Reserves: To use marine reserves as a fishery management tool that contributes to groundfish conservation and management goals, has measurable effects, and is integrated with other fishery management approaches.
- Strategic Plan Goal for Pacific Groundfish Habitat: To protect, maintain, and/or recover those habitats necessary for healthy fish populations and the productivity of those habitats.

The Council has also outlined goals pertaining to each managed fishery. Many of these relate to harvesting and conservation, such as the spawner escapement goals and conservation objectives in the salmon FMP. This paper focuses on goals and objectives that are relevant to social science research.

The management, economic, and social goals of the groundfish FMP (PFMC 2004a) are listed in Table 3. Table 4 lists the socially relevant goals of the salmon FMP (PFMC 1999) (pp. 5-1, 5-2). The goals and objectives for the CPS fishery (PFMC 1998) (p. B-7) are listed in their entirety in Table 5. Table 6 lists the socially relevant goals and objectives for the HMS fishery (PFMC 2003) (p. 8-6).

These FMP goals and objectives have some common themes. In general, they focus on:

- preventing overfishing;
- maximizing the economic value of the fishery;
- providing for diverse and traditional uses of the resource;
- promoting efficiency both in management and in fisheries;
- promoting equity in harvest opportunities and management impacts;
- minimizing gear conflicts;
- minimizing disruption to fisheries as much as possible;
- minimizing adverse impacts to communities;
- promoting safety;
- fostering effective enforcement and monitoring;
- cooperating with other entities;
- and recognizing traditional fishing rights.

These commonalities could be used as starting points for those wanting to conduct research relevant to management. These goals are closely related to the MSA National Standards (Table 7).

TABLE 3. Management, economic and social goals of the groundfish fishery management plan.

Management, Economic, and Social Goals of the Groundfish Fishery Management Plan
<ul style="list-style-type: none"> • (Management) Goal 1 - Conservation. Prevent overfishing and rebuild overfished stocks by managing for appropriate harvest levels and prevent, to the extent practicable, any net loss of the habitat of living marine resources. • (Management) Goal 2 - Economics. Maximize the value of the groundfish resource as a whole. • (Management) Goal 3 - Utilization. Achieve the maximum biological yield of the overall groundfish fishery, promote year-round availability of quality seafood to the consumer, and promote recreational fishing opportunities. • (Economic) Objective 6. Attempt to achieve the greatest possible net economic benefit to the nation from the managed fisheries. • (Economic) Objective 7. Identify those sectors of the groundfish fishery for which it is beneficial to promote year-round marketing opportunities and establish management policies that extend those sectors' fishing and marketing opportunities as long as practicable during the fishing year. • (Economic) Objective 8. Gear restrictions to minimize the necessity for other management measures will be used whenever practicable. • (Social) Objective 13. When conservation actions are necessary to protect a stock or stock assemblage, attempt to develop management measures that will affect users equitably. • (Social) Objective 14. Minimize gear conflicts among resource users. • (Social) Objective 15. When considering alternative management measures to resolve an issue, choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and the environment. • (Social) Objective 16. Avoid unnecessary adverse impacts on small entities. • (Social) Objective 17. Consider the importance of groundfish resources to fishing communities, provide for the sustained participation of fishing communities, and minimize adverse economic impacts on fishing communities to the extent practicable. • (Social) Objective 18. Promote the safety of human life at sea.

TABLE 4. Socially relevant goals of the salmon fishery management plan.

Socially Relevant Goals of the Salmon Fishery Management Plan
<ul style="list-style-type: none"> • Fulfill obligations to provide for Indian harvest opportunity ... with regard to federally recognized Indian fishing rights of Klamath River tribes. • Seek to maintain ocean salmon fishing seasons which support the continuance of established recreational and commercial fisheries, while meeting salmon harvest allocation objectives among ocean and inside recreational and commercial fisheries that are fair and equitable, and in which fishing interests shall equitably share the obligations of fulfilling any treaty or other legal requirements for harvest opportunities • Manage and regulate fisheries so that the optimum yield encompasses the quantity and value of food produced, the recreational value, and the social and economic values of the fisheries. • Develop fair and creative approaches to managing fishing effort, and evaluate and apply effort management systems as appropriate to achieve these management objectives. • Support the enhancement of salmon stock abundance in conjunction with fishing effort management programs to facilitate economically viable and socially acceptable commercial, recreational, and tribal seasons. • In recommending seasons, to the extent practicable, promote the safety of human life at sea.

TABLE 5. Goals and objectives of the coastal pelagic species fishery management plan.

Goals and Objectives for the Coastal Pelagic Species Fishery Management Plan	
	<ul style="list-style-type: none"> • Promote efficiency and profitability in the fishery, including stability of catch. • Achieve optimum yield. • Encourage cooperative international and interstate management of CPS. • Accommodate existing fishery segments. • Avoid discard. • Provide adequate forage for dependent species. • Prevent overfishing. • Acquire biological information and develop long-term research program. • Foster effective monitoring and enforcement. • Use resources spent on management of CPS efficiently. • Minimize gear conflicts.

TABLE 6. Socially relevant goals and objectives of the highly migratory species fishery management plan.

Socially Relevant Goals and Objectives for the Highly Migratory Species Fishery Management Plan	
	<ul style="list-style-type: none"> • Promote and actively contribute to international efforts for the long-term conservation and sustainable use of highly migratory species fisheries that are utilized by West Coast-based fishers, while recognizing these fishery resources contribute to the food supply, economy, and health of the Nation. • Minimize economic waste and adverse impacts on fishing communities to the extent practicable when adopting conservation and management measures. • Provide viable and diverse commercial fisheries and recreational fishing opportunity for highly migratory species based in ports in the area of the Pacific Council's jurisdiction, and give due consideration for traditional participants in the fisheries. • Promote effective monitoring and enforcement. • Minimize gear conflicts. • Promote outreach and education efforts to inform the general public about how West Coast HMS fisheries are managed and the importance of these fisheries to fishers, local fishing communities, and consumers. • Allocate harvest fairly and equitably among commercial, recreational, and charter fisheries for HMS, if allocation become necessary.

TABLE 7. National Standards of the Magnuson-Stevens Act.

1	Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.
2	Conservation and management measures shall be based on the best scientific information available.
3	To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.
4	Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.
5	Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.
6	Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.
7	Conservation and management measures shall, where practicable, minimize cost and avoid unnecessary duplication.
8	Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts in such communities. (Added in 1996)
9	Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch. (Added in 1996)
10	Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea. (Added in 1996)

Other, more general management goals have also been suggested. The following were developed by a committee sponsored by the Coastal Oregon Marine Experiment Station (COMES 2003):

- An economically healthy industry.
- Robust coastal community fishing economies (contribution to coastal community economies, maintenance of human infrastructure in catching, processing, and support industries).
- A closer connection between management and markets.
- Improved management effectiveness (incentives for stewardship and improved fishing practices, establishment of performance indicators, and routine monitoring of socioeconomic indicators of the fishing industry, support industries, and coastal economies).
- Operational flexibility (flexibility for the industry and management that promotes diversity, individualization, and equity; a stabilized regulatory framework and economic environment that provides reliable access to resources, stable supply of seafood, and a long-term planning horizon).
- A positive public image (for fishing sectors, products, and management).

Clarifying and publicizing the Council's strategic goals and objectives—both for the Council as a whole and for each fishery—would be helpful both to managers and to those seeking to contribute to management through relevant research.

The Need for Relevant Research

The question of management's goals and objectives highlights the importance of relevant research to the Council. Fisheries management is an ideal setting for applied research. Research that focuses on theoretical questions must be presented in an applied context in order to be useful to management. Similarly, research that may be of interest to anthropologists and sociologists may not be particularly useful to management unless research planning is conducted with management in mind. Social scientists should ask themselves what meaning their research will have to management and focus on the connection between their data and the Council's mandate.

Presentation of Social Science Information

As discussed earlier in this paper, research results must be presented in a useable format. Information is often given in narrative form or as raw data, the relevance of which is not immediately clear to managers. For example, religious preferences and the number of hospitals in a community do not have much relevance to managers unless they are clearly presented within a larger framework. Explaining that church attendance is a measurement of community resilience will have more meaning than providing raw statistics. However, even this amount of detail may be less than useful to managers, who are sometimes overwhelmed by the vast quantities of data they must digest. In this case, a simple index of community resilience would be most useful.

Need for Common Terms

A common vocabulary of social science terms would help researchers conduct relevant social science and would help managers benefit from it. Social scientists have disagreed on such basic concepts as dependence and engagement of communities on fisheries, and definitions of community,

flexibility/resilience, social capital, social problems, and fishery health. These concepts form the foundation of fisheries research. For example, if scientists (and managers) define healthy fisheries in completely different ways, disagreeing on the end goals of management, then research becomes less useful to all. Similarly, social scientists need to agree on indicators of dependence, flexibility, and other factors. Creation of very basic indices, like an index of resilience, would be most helpful to managers. The “Pollnac model” described above uses 23 kinds of data, originally listed in the NMFS *Sociocultural Practitioners Manual*, to create indicators of dependence and engagement. In addition, NMFS is developing guidelines that may help fisheries social scientists find agreement on terms and indicators.

Use of Existing Literature

Managers considering the need for social science may be unaware that a large body of literature on fishing communities and management already exists. Anthropologists, sociologists, geographers, and economists have spent thousands of hours studying coastal communities, community dependence and resilience, alternative management methods, cooperative management, cooperative research, IFQs, and other topics. One annotated bibliography alone (Gilden 1999) contains 215 references to articles, academic papers, and books that are relevant to fisheries. Unfortunately, much of this (and more recent) information never reaches managers, but is instead presented exclusively by academics to largely academic audiences at conferences and in workshops. Finding a way to digest this information so that is useful to management would be a useful task.

Need for Management Education about Social Science

In addition to the need for social scientists to be better informed about management needs, managers need to become better informed about social science and how it can be used. A curriculum for training managers about social science data could include information on the different types of social and cultural information, how such information is gathered and analyzed, the types of social and cultural information that already exist and could be relevant to management, the importance of communicating clear goals and objectives to scientists, mandates for social science use, benefits of social science, and uses of social science in similar natural resource arenas.

Other Obstacles to the Use of Social Science

Because social scientists focus on human beings, behaviors, and communities, their work often requires them to develop rapport with their subjects. This is true even in settings that are less contentious than fisheries management (Scheper-Hughes 1979). The process of developing rapport, which can be time consuming, is an extra step not required of natural science research projects. While developing rapport can be a hurdle for any social scientist, it can be a special problem for fisheries social scientists employed by regulatory agencies. In addition, subjects may try to influence research results and, ultimately, policy decisions. This “observer effect” can be problematic to social scientists working with fishing populations (Bernard 2002).

For this and other reasons, fishermen are not always willing to share socioeconomic information with researchers. An Oregon Sea Grant study of fishermen’s willingness to share information addressed this problem (Gilden and Conway 2002). The study found that the lack of staff trained in the social sciences, the management community’s emphasis on biological and quantitative data, and management’s relationship with the fishing community all presented obstacles to socioeconomic data collection. When researchers employed by management agencies collect information from the fishing community, there can be no guarantee that the data will not eventually be used in decisions that may reduce harvest levels.

The study found that while fishing community members understood the theoretical benefits of sharing data with fisheries management, fear and distrust outweighed any perceived benefits of sharing data. In addition, fishing community members demonstrated confusion about agency roles and had negative opinions of particular agencies that influenced their perceptions of all agencies.

Some fishing community members also felt that managers didn't understand them and wouldn't understand how to use socioeconomic data in the correct context. Others felt that managers made decisions without their input and that the data collection process was an empty exercise designed to meet legal requirements and demonstrate (false) concern to the fishing community. There were also concerns about survey length and the relevance of the information being sought.

The study concluded that reducing distrust was the best long-term solution to the problem of data collection. Educating the public about management and more effectively involving the fishing community in data collection and decision making would help them understand the relevance and need for both biological and socioeconomic data.

Low funding levels create an additional barrier to the use of social science in management. Although funding for social science has increased in recent years, social science remains at a very low level, especially given the considerable federal mandates regarding socioeconomic data. As noted above, there is also little representation of non-economic social science on Council committees or the Council staff. Increasing representation on these bodies would help build momentum for greater inclusion of social science data in the decision-making process.

In addition, legal mandates can stand in the way of efficient social science research. The PRA, discussed above, is a significant barrier to the collection of socioeconomic data from individuals. NOAA's Social Science Review Panel noted that PRA requirements were "cumbersome" (NOAA Social Science Review Panel 2003). In practice, the PRA creates a five-month or longer delay in any effort to gather information from more than ten people. Finally, other mandates regarding the need for confidentiality make it difficult for researchers to obtain information from processors and other entities in small communities.

Social Science Information Needs

There is no shortage of opinions about research needs for fisheries management. Many agencies and organizations, including federal agencies, educational institutions, and nongovernmental organizations, have posted their lists of research needs. Seventeen such lists are compiled in Appendix A. Many of these needs arise from federal mandates. A list of major federal mandates and a summary of information required by each mandate (summarizing pages 19-22) is provided in Table 2. More detail about these mandates is available in the NMFS SIA guidelines.

Information Needs Identified by Agencies and Organizations

As noted above, Appendix A synthesizes research needs identified by a variety of agencies and organizations. The following system was used to prioritize the needs.

One of five codes to each data need listed in Appendix A. Needs coded "1" are basic information that is necessary to identify fishing communities, gear groups, and issues. Needs coded "2" are also important baseline information needed for basic analyses, but are not necessarily needed to identify fishing communities, gear groups, or issues. Needs coded "3" are useful information that contributes to better analyses. Needs coded "4" would provide useful information to management, but are not federally mandated. Needs coded "5" are also useful to management, but are outside the scope of the Council role.

In general, needs coded “1” or “2” are higher priority needs than those coded 3, 4, or 5, although some non-mandated research (coded “4”) would be of great use to the Council. Apart from observing that most of these high-priority needs are required by either the MSA, NEPA, or both, further prioritizing them is best left to the social scientists collecting the information. This is due in part to the fact that social scientists have already discussed at length which information is most needed to assess dependence or engagement and resilience of fishing communities.

Baseline descriptions include data for incorporation into SAFE documents and FMPs. Baseline information is also used for SIAs and to assess or predict changes in communities or fisheries over time. Data needed for **baseline descriptions of geographic communities** listed in Appendix A includes:

- demographic, cultural, and historical data about fishing communities,
- information about vessels, landings, exvessel values, and processing associated with each community,
- information about community infrastructure (physical, social, and fisheries-related),
- demographic and cultural data about fisheries and gear sectors (including subsistence and tribal fisheries),
- data about the economic impacts of commercial, subsistence and recreational fishing and fishing-related businesses in communities,
- economic and sociocultural information about employment in fishing communities,
- large-scale demographic trends that affect fishing communities, as well as regional economic impacts (apart from localized fishery impacts),
- agreed-upon indicators of community flexibility, resilience, and dependence on fishing, and
- assessment of quality of life in fishing communities.

Many researchers have also noted the need for a long-term database of demographic information that includes (when possible) consistent, comparable information about fishing communities.

Baseline descriptions of the fishing industry include:

- data on the cultural value of the fishery to participants,
- descriptions of commercial gear groups and sectors, including vessel characteristics, strategies, involvement, dependence, catch, mobility, and demographics,
- descriptions of fishing and nonfishing employment of crew and skippers,
- information on commercial fishing strategies regarding crew, seasons, and annual rounds,
- descriptions of the geographic range of fisheries, including home ports, moorage ports, and landing ports,
- harvester cost, earnings, expenditure, and employment information,

- data on landings, exvessel prices, and economic impacts of landings,
- processor location, cost, earnings, expenditure, and employment information,
- information on the relationships between processors, buyers, and fishermen,
- effort, gear, and participation data on the charter and recreational fishing sectors,
- marketing strategies of charter fisheries and the range of activities in which they participate, and
- information on subsistence fishing activities and any participation by Native Americans.

Like community demographic data, a continually updated database of this information would be extremely helpful to researchers and managers.

Data on **nonconsumptive values** is also required for NEPA documents. The recommendations listed in Appendix A can be summarized as follows:

- Assess the nonconsumptive value of marine resources (intrinsic, esthetic, recreational, experiential, public benefit value).
- Assess the contributions of marine users (extractive and non-extractive) to the culture of coastal communities.
- Address impacts of regulations on nonconsumptive values.

Information on **regulatory impacts** is primarily used in SIAs or EISs. Data needs for this category can be summarized as follows:

- Identify issues, problems, level of controversy, and populations likely to be affected by proposed actions.
- Consider long-term and cumulative impacts of management actions.
- Consider how to ensure equity among affected populations.
- Describe health and safety concerns associated with management actions.
- Describe the degree of uncertainty, risk, and likelihood of unknown risks of management measures.
- Consider management impacts on:
 - communities (culture, built environment, economy, infrastructure),
 - all fishery sectors (commercial, recreational, charter, tribal, processing, suppliers, other shoreside businesses), and
 - participants in fisheries adjacent to those managed by the Council.

Finally, research needs for **special projects and issues** includes information related to IFQs, marine reserves, and other areas, including adaptive management, communications, constituent involvement, marketing, education, and stewardship. Given the diverse nature of these recommendations, they are not summarized here but can be seen in Appendix A.

Even with this list of research needs—compiled by the Council, NMFS, Sea Grant, the National Academy of Sciences, and other bodies—the question remains: what type of socioeconomic information does the Council need to function, and what is the value of social science in the Council process?

Information Needs Identified by Council Documents

Several Council documents outline recommendations for economic and social information. The Council's Research and Data Needs document (PFMC 2000b) lists socioeconomic data needs that are summarized in Appendix A. Similarly, the West Coast Fisheries Economic Data Plan (PFMC 2000c) lists numerous high-priority economic data needs for West Coast fisheries. Core data socioeconomic data needs are also included in Appendix A.

The Groundfish Strategic Plan makes 11 science recommendations for the groundfish fishery (PFMC 2000c, p. 49). The most relevant for the purposes of this white paper are:

- Promote improved mutual understanding, communication, and credibility between the fishing industry and scientists through increased communication and collaboration, including at-sea ride-alongs.
- Develop methods for incorporating fisher observations into stock assessment and monitoring programs, including employing commercial fishing vessels to conduct cooperative resource surveys and to collect other scientific data.
- Implement the Council's draft West Coast Fisheries Economic Data Plan.
- Ensure that economists and social scientists are adequately included on Council plan teams and ad hoc committees where appropriate, to ensure that all dimensions of management issues, options, and solutions are well reflected in their input to the Council.

The actions and research outlined here, in combination with the Council's needs summarized in Appendix A, provide a useful roadmap for researchers.

Information Needs Identified by Council Members

Council members contacted for this project agreed that there was a lack of understanding about how social science could be used in management decision making, and some were unclear on the definition of social science in general. One member observed that biological information was used to a much greater extent than economic or non-economic social information and felt that there should be a greater role for social science in general.

Regarding NEPA documents and current management measures, Council members made the following observations:

- Good information on communities is being developed, but we need a way to summarize and quantify community impacts if the information can be used by the Council.
- Community sections of EISs need to be made more useful and relevant by (1) enhancing readability and clarity; (2) including summary information; (3) excluding extraneous material that is not useful to decision making; and (4) providing more context to community sections and clarifying the implications of the data.

- The Council needs more information about implications of IFQs to communities.
- The Council needs information about the relationship between community IFQ allocations and processors.

Other suggestions were not related to NEPA or MSA mandates, but to other aspects of the management process:

- Managers need to communicate with fishermen and communities about the implications of management decisions to their livelihoods.
- The Council needs to find ways to learn about public opinion regarding management measures.
- The Council needs to better understand commercial fishermen's behavior – for example, what are the incentives and disincentives for certain fishing behaviors? What makes people more or less likely to switch fisheries or leave fishing?
- The Council needs to better understand recreational fishermen's behavior – how and why do these fisherman choose to go fishing in certain places? What are their motivations for fishing? What type of people make up the universe of anglers? This would help in forecasting and in structuring fishing opportunities.
- The Council needs information about how to structure limited entry fleets – what is the ideal fleet makeup in order to maximize stewardship of the resource?
- Management needs to educate fishermen and community members about how management works, how to get involved, and the roles of the different management agencies.
- Council members need information on new concepts such as community-based management. Terms such as this are used, but there is a lack of understanding about their meanings, implications, and practical use by the Council.
- Management needs to work closely with fishermen on issues, such as commercial/recreational salmon allocation, and to hear their concerns and ideas. This was done successfully in the past and will need to be continued.
- The Council needs to find ways to address negative perceptions of management.

CONCLUSION AND RECOMMENDATIONS

This paper summarizes social science needs from seventeen different sources, including the Council's Research and Data Needs Document and Economic Data Plan. Needs and objectives from the Council's four fishery management plans, and goals outlined by the Groundfish Strategic Plan, have been reviewed. The paper has outlined information needs identified by Council members, and listed overarching considerations for the process of collecting and using social science information.

It is clear that social science could be better integrated into the Council process. However, issues such as lack of funding and staff time, and the perceived lack of a compelling use for social science data, will continue to prevent the integration of community information unless a long-term social science plan is created.

The following framework is an attempt to prioritize issues associated with integrating social science into the management process, improving management's understanding of fishing community issues, meeting federal mandates, addressing ongoing management data needs, and promoting better relations between the Council and its constituents. Data needs and objectives identified in Council and other agency documents, combined with conversations with Council members and researchers, suggest several overarching considerations regarding such integration. These overarching needs are woven into the framework below.

The four goals that the framework addresses are as follows:

1. **Discover where social science can most effectively be integrated into the decision making process.** Integrating both mandated and non-mandated social science would bring an additional perspective to management and would contribute to the effectiveness of the Council process.
2. **Improve management's understanding of fishing communities**—status, issues, and concerns.
3. **Collect information needed to address urgent and ongoing management issues.** Mandates require that social impact assessments be prepared and included in NEPA documents. With current funding levels, addressing these needs may mean hiring contractors or working with NMFS anthropologists to conduct the needed research. Mandates related to environmental justice and equity should be considered when designing the research.
4. **Conduct activities to promote mutual understanding, communication, and credibility in interactions with fishing communities.**

Immediate Efforts to Include Social Science in the Pacific Council Process

1. **Create a social science advisory group.** Such a team would optimally include at least one anthropologist from the NMFS Northwest Fisheries Science Center, academic representatives familiar with fisheries management, a Council staff representative, at least one fishing community representative, and possibly a Sea Grant representative or extension agent. Ideally, such a group would meet in conjunction with Council meetings. Studying the Western Pacific and New England Councils' social science advisory groups could provide valuable lessons in how to create and operate such a group in the Pacific region. The tasks of this group could be as follows:
 - a. advise the Council on the social science implications of management issues,
 - b. help define goals and objectives regarding management in general and social science in particular,
 - c. guide the integration of social science into the evaluation of harvest specifications and FMP amendments (in conjunction with plan development teams),
 - d. contribute to the Research and Data Needs document and other long-term planning efforts (in conjunction with the SSC), and
 - e. identify criteria for Council members to consider when addressing community impacts.
2. **Identify or clarify goals and objectives related to fisheries management.** This would help both management and researchers in the long term. Social scientists need to understand management's objectives in order to carry out relevant research projects. A social science advisory body would be able to help clarify these goals.

3. **Make tangible efforts to educate managers about social science.** Managers need to better understand how social science is used and what it can offer to management. Such efforts could take the form of dialogues between managers and social scientists, written materials, presentations at Council meetings, orientation sessions, or other efforts.
4. **Look further into other Councils' social science programs,** particularly those of the Western Pacific, South Atlantic, and New England councils. How do those councils integrate social science into their decision-making processes?
5. **Conduct dialogues with fishing community members about pressing community needs and concerns related to fisheries.** Explore subjects such as current social issues related to fisheries management actions. The New England Fishery Management Council has conducted similar dialogues and would be a helpful model. Information gathered would contribute to SIAs and other NEPA documents, community descriptions, and effective management decision making.
6. **Make NEPA documents more user-friendly.** Social science and other information contained in NEPA documents tends to get buried and is not fully understood by readers. Find a way to shorten and clarify NEPA documents to make them more useful to management.
7. **Update Council documents,** including FMPs, SAFE documents, and community documents, with current baseline information and data on cumulative effects and unquantified values when it becomes available.
8. **Follow through with Phases II and III of the Council Communications Enhancement Plan** to help address communications and constituent involvement issues.

Long-Term Management Efforts

1. **Encourage additional funding for social science research and staffing.** Funding and staffing for social science, both at NMFS and the Council, need to be increased if social science is to become an integral part of management decision making.
2. **Educate social scientists about management.** Social scientists need to understand how to effectively plan research and communicate results to management. A page on the Council website could be used to outline Council goals and objectives, research needs, and guidelines for presenting social science information to the Council. A social science advisory group would be useful in facilitating this effort.
3. **Address outreach, education, and communication needs.** In addition to following through with the Communications Enhancement Plan, conduct focused communication efforts related to IFQs and other important management efforts, increase efforts to educate the fishing community about management, consider training fishermen about the management process, and work to improve the public image of both management and fisheries.^{12/}

12/ The New England Fishery Management Council has had success with three-day management workshops for fishermen. The workshops are funded by a nonprofit organization working closely with the New England Council. Fishermen are paid for their participation.

4. **Develop a system for formally incorporating industry information** (both socioeconomic and biological) into the management process. This long-term objective could involve cooperative research or other efforts. Incorporating industry information would lead to greater involvement by constituents in the management process, would improve the quality of data (providing that studies are well-designed), and would increase trust in the management and research process.
5. **Encourage changes to the PRA** to make data collection more efficient and timely.
6. **Work with NMFS** to ensure that mandates for SIAs take into consideration the limited resources available to Councils.
7. **Encourage social scientists to develop agreed-upon indices** of community factors, such as dependence and resilience that can be easily communicated to managers. Integrate such efforts into the development of NEPA documents.

Long-Term Research Efforts

1. **Address socioeconomic data issues associated with IFQs.** Some pressing research topics include:
 - a. Analyze different limited access and rights-based management programs in the context of West Coast fisheries; research implications of IFQs in other areas.
 - b. Address impacts of IFQs on processors.
 - c. Collect information on historic diversity of vessel classes and how to preserve it under an IFQ system.
 - d. Collect ownership information related to prevention of absentee/foreign control of fishing enterprises.
 - e. Understand implications of IFQs for displacement of fishers and crew.
2. **Collect baseline information on fishing-involved communities.** Collection of baseline information is a necessary first step for understanding the status quo and changes to the status quo. NMFS social scientists are currently collecting baseline information on West Coast fishing communities.
3. **Collect information on cumulative effects of management.** Describing cumulative effects is required by NEPA. The new community descriptions mentioned above will help with this task.
4. **Collect information on unquantified and nonconsumptive values of resources.** This is also required by NEPA, which describes unquantified environmental amenities and values as “such factors as angler satisfaction, job satisfaction, an independent lifestyle for commercial fishermen, opportunity to see species in the wild, etc.”
5. **Address data issues associated with other pressing issues,** such as bycatch control (incentives for reducing bycatch, social factors in observer program implementation, etc.); allocation (community implications of different allocation strategies); capacity reduction (community impacts); marine reserves (displacement, nonconsumptive values, community impacts); and enforcement (incentives, communication of regulations, compliance).
6. **Address data issues associated with non-pressing issues that would benefit management,** such as incentives for stewardship (COMES 2003), developing a closer connection between management and markets (COMES 2003), routine monitoring of socioeconomic indicators (COMES 2003), and decreasing fragmentation in the fishing community (California Sea Grant).
7. **Coordinate social science efforts** through a website listing ongoing research efforts, contact information, research needs, management objectives, funding opportunities, and other information.

Considerations for Social Scientists Working with Management

1. Data collected for management should be useful to management.
2. Data should be presented to the Council in a useful form (preferably a short, non-narrative form), with a discussion of the data’s context and relevance.
3. To counter any doubts about the validity of social science information, existing guidelines for data quality need to be communicated to managers.
4. Existing (and relevant) social science research should be considered when considering social science needs.

5. Social scientists need to understand Council research needs before they begin collecting information.
6. Social scientists working with management need to agree on common methods, terms, and definitions.
7. Social scientists (including economists) need to develop long-term databases and/or models of community and fishery information that allow consistent, comparable way to produce, analyze, and communicate social research. The “Pollnac model” may offer some progress in this direction.
8. Social scientists need to develop easily understandable community indicators that are useful and relevant to management.
9. Social scientists need to communicate with the Council about how they can contribute to the process.

Social science data is mandated by several federal Acts, and is likely to enhance decision making when integrated into the Council process. However, several obstacles stand in the way of such integration. A first step toward effectively using social science in the Pacific Council arena is to create a social science advisory committee. Educating both managers and researchers about the interface between non-economic social science and management will also contribute to such integration. The steps outlined above suggest both short- and long-term strategies for using social science in an effective and relevant way.

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APPENDIX A. RESEARCH NEEDS IDENTIFIED BY AGENCIES AND ORGANIZATIONS.

1 = Basic information necessary to identify fishing communities, gear groups, and issues

2 = Important baseline information needed for basic analyses

3 = Useful information that contributes to better analyses

4 = Useful to management, but not federally mandated

5 = Useful to management, but outside scope of Council role

Other = General description of need or research tool

Fishing Communities: Baseline Descriptions Of Geographically Defined Communities

Keyword	Type	Research Need	Why information is needed	Source
Culture	1	Perceived importance of fishing to community members (regarding continuity or self-identification of the community).	Addresses major mandates; addresses cultural importance of fishing to communities	SPM
Culture	3	Assess cultural issues (attitudes, beliefs and values of fishermen, fishery-related workers, other stakeholders and their communities).	Addresses major mandates; addresses cultural importance of fishing to communities	SIAG, SIA
Demographics	1	Number of permit holders, crewmembers, vessel owners, and processor workers residing in the community; crew structure (residence, role, gender, age, etc.).	Addresses major mandates; provides needed baseline information about communities	SPM, SIA, PFMC-EDP

Fishing Communities: Baseline Descriptions Of Geographically Defined Communities

Keyword	Type	Research Need	Why information is needed	Source
Demographics	2	Individual demographic data: place of residence, place of work, sex, age, education, ethnicity, marital status, income, level of debt, access to capital, link to fishery/occupation, experience, household composition, attitudes/perceptions (e.g., job satisfaction, happiness, political values).	Addresses major mandates; provides needed baseline information about communities	SIA, PFMC-RDN, PFMC-EDP, SIAG
Demographics	2	Community demographic information: social structure, government, tax base, municipal revenue from fisheries, ethnic characteristics, crime rate, average or median household income, age structure, sex ratio, ethnic composition, occupational structure, aggregate attitudes/perceptions.	Addresses major mandates; provides needed baseline information about communities	SIA, PFMC-RDN, PFMC-EDP, SIAG
Demographics	2	Data on subsistence harvesters: number of households participating in subsistence harvest or consumption.	Addresses major mandates, including Environmental Justice; provides needed baseline information about communities	SPM
Demographics	3	Demographic trends: look at implications of changing coastal demographics and changes in natural resource availability and uses.	Provides information about demographic and economic trends; contributes to mandated analyses	OSG
Economic activity (commercial fishing)	1	Amount of base economic activity generated by fishing or directly related fisheries-dependent services: pounds of fish landed and processed in community, number of vessels landing fish to community, number of vessels homeported in community, commercial harvest opportunities by distance from community port.	Used to identify fishing communities	SPM, SIA, PFMC-EDP
Economic activity (recreational fishing)	1	Amount of base economic activity generated by fishing or directly related fisheries-dependent services: total sport catch, number of sportfishing trips originating in community, number of sportfish for-hire businesses (charter boats, party boats, guide boats, head boats) operating or landing in the community, number of tackle retailers & bait stores, number of sportfish licenses sold, number of sport fish license holders, marine recreational opportunities.	Used to identify fishing communities	SPM, SIA, PFMC-EDP

Fishing Communities: Baseline Descriptions Of Geographically Defined Communities

Keyword	Type	Research Need	Why information is needed	Source
Economic activity (dealers/buyers)	1	Number of dealers and buying stations in community.	Used to identify fishing communities and measure flexibility/resilience	SPM
Economic activity (processing)	1	Processor information: number of processors, employment, wage basis, capacity, products, equipment, markets, recovery rates, etc.	Used to identify fishing communities (degree of dependence on fishing)	SPM, SIA, PFMC-EDP
Economic activity (general)	4	Study how economic diversity stabilizes/destabilizes coastal communities.	Provides contextual information	CSG
Employment	2	Employment opportunities for fishers during the off season, etc.; strategies for making a living; labor markets and opportunities.	Used to identify fishing communities (degree of dependence on fishing)	CSG
Employment (regional)	2	Include general description of population and employment in the region in which the community/communities are located.	Provides context, identifies non-fishing influences on community & economy	SIAG
Employment	3	Consider and record participants' involvement in fisheries other than the one being considered for any particular management measure.	Addresses NEPA cumulative effects mandate; helps identify unforeseen consequences of management actions	SIAG

Fishing Communities: Baseline Descriptions Of Geographically Defined Communities

Keyword	Type	Research Need	Why information is needed	Source
Environmental justice	2	Collect, maintain, and analyze data on minority, etc. populations, especially when a management action affects subsistence consumption.	Addresses EO 12898 (Environmental Justice)	EO 12898
Flexibility/resilience	2	Develop and assess measures of community flexibility and resilience (social capital, interrelationships between fishing sectors, social/business networks, alternative work, vessel characteristics, social safety nets, quality of life, community cohesion).	Helps judge management impacts and community response to change	SIA
General	1	Develop and assess measures of community dependence on fisheries (including historical dependence); this is reflected in structure of fishing practices, income distribution and rights.	Used to identify fishing communities	COMES, SIAG
General	2	Improve understanding of the socioeconomic aspects of fisheries, and socioeconomic data collection and analysis. Examples could include ethnographic baseline data on specific fishing communities; cost-income data; analyses of the socioeconomic impacts of specific management measures in certain fisheries; analyses of factors influencing demand for recreational fishing trips by anglers; and market analyses to determine factors that influence demand and supply of specific seafood products, including imports.	Would help with all socioeconomic analyses	SK, NMFS, PSMFC
General	Other	Need baseline description of the fishing industry and communities (combined with) periodic assessment of "status of the fisheries."	General description of need	PFMC

Fishing Communities: Baseline Descriptions Of Geographically Defined Communities

Keyword	Type	Research Need	Why information is needed	Source
History	1	Past and present participation of communities in fishing industry (history of fishery, past experiences).	Used to identify fishing communities and measure flexibility/resilience	SK, SIA, SIAG, SPM
Infrastructure	1	Identify and describe institutions and structures that support the fishery (for example, fishing-related businesses, seasonal dependence of businesses on fishery; transience of workers; community investment in docks and infrastructure).	Used to identify fishing communities and measure flexibility/resilience	SIAG, PFMC-RDN
Infrastructure	2	Assess current economic/social changes in shoreside infrastructure, human resources.	Provides context, identifies non-fishing influences on community & economy	COMES
Infrastructure	2	Identify social systems associated with support services.	Helps measure community flexibility & resilience	SIAG
Quality of life	3	Assess quality of life in fishing communities (confidence in the future of the fishery, social problems, non-compliance and illegal behavior; desire of community members to stay in community or fishery).	Helps measure cultural & economic importance of fishing, community flexibility and resilience	SIA
Social capital	3	Assess social capital in fishing communities (social resources, demographics, infrastructure, social networks, political capital, etc.).	Helps measure community flexibility & resilience	SIA

Fishing Communities: Baseline Descriptions Of Geographically Defined Communities

Keyword	Type	Research Need	Why information is needed	Source
Social capital	3	Assess human capital (education, training).	Helps measure community flexibility & resilience	SIA
Subsistence	1	Number of subsistence fish landings in the community.	Used to identify fishing communities; helps address environmental justice mandates	SPM
Tools	Other	Build standardized framework for community assessments and associated recommendations/ uncertainty to fishery managers and constituents.	Tool would help with all socioeconomic analyses	NMFS, SIA

Baseline Descriptions Of The Commercial And Recreational Fishing Industry

Keyword	Type	Research Need	Why Data Is Useful	Source
Cultural factors	2	Include data on cultural value of fishery (fishery-related job satisfaction, family and community cultural values related to fishing, religious and other norms satisfied by fishing activities).	Addresses major mandates; measures cultural importance of fishery	SIAG
Economics (general fishery status)	1	Continue to collect information on landings, exvessel prices, exprocessor prices, permit and license prices, etc.	Used for baseline descriptions of fishery and community impacts; addresses mandates	SIA, PFMC-EDP
Economics	2	Analysis of economic [and cultural/social] links between ports and fisheries.	Addresses major mandates; helps describe economic resilience	COMES, SIA
Economics (commercial harvesters)	2	Collect harvester cost, earnings, and expenditure information. Include debt burden of fishing businesses; length of employment opportunities; extent of unemployment coverage; labor opportunity costs; experience of employees by fishery and gear type.	Helps identify regulatory costs/benefits to communities	PFMC-RDN, PFMC-EDP
Economics (recreational)	2	Collect information on charter and recreational sectors: effort and gear data (average number of passengers, trip length, travel time); average angler expenditures per trip; fishing gear and methods used.	Helps weigh economic costs of management decisions, identify costs/benefits to fisheries	COMES, PFMC-EDP
Economic (processors)	2	Collect processor cost, earnings, and expenditure information.	Helps weigh economic costs of management decisions, identify costs/benefits to fisheries	PFMC-RDN, PFMC-EDP
Economics	2	Non-fishing employment of crew and skippers.	Helps define community impacts and community resilience	PFMC-EDP

Baseline Descriptions Of The Commercial And Recreational Fishing Industry

Keyword	Type	Research Need	Why Data Is Useful	Source
Economics	3	Study economic [and social] interactions between commercial and recreational sectors.	Contributes to fishery description	COMES
Fishery demographics	2	Describe gear groups (e.g., trawl, pot, hook and line) and allocative sectors (commercial, recreational, nearshore). Include vessel characteristics, fishing strategies, dependence and involvement in specific fisheries, catch mixes, and vessel mobility for both commercial vessels and recreational charter vessels. Include information on ethnic groups, large and small fishing operations, inshore and offshore fishing operations.	Used for baseline descriptions of fisheries	PFMC-RDN, PFMC-EDP, COMES, CSG, NAS, SIAG, SIA, others
Fishery demographics	2	Include information about vessels: relationships among the crew, number in the community.	Used for baseline descriptions of fisheries	SIA, PFMC-RDN, SIAG
Fishery demographics	2	Identify fishery participants, including those who follow a stock throughout its range and those who fish from local ports when a stock passes through their area.	Used for baseline descriptions of fisheries	SIAG
Fishery demographics	3	Collect and analyze data on the social and economic characteristics of trawl, dredge, and non-mobile gear fisheries to assess the tradeoffs among various management alternatives.	Helps weigh impacts and benefits of management measures	NAS
Fishery demographics	4	Obtain data on distribution of marine recreational fishermen in the general population.	Helps identify constituents, address impacts of recreational management decisions	SIAG

Baseline Descriptions Of The Commercial And Recreational Fishing Industry

Keyword	Type	Research Need	Why Data Is Useful	Source
Fishing business strategies (commercial)	2	Collect information on commercial fishing business strategies: use of hired skippers, method of crew payment (share, wage, piece), annual and season round .	Used to describe commercial fisheries; helps identify management impacts	PFMC-EDP, SIAG, SIA
Fishing business strategies	2	Information on the (economic and business) diversity of fishermen and fishing activities.	Measures resilience of fishing industry	COMES, SIA, PFMC-EDP
Fishing business strategies (recreational)	3	Charter fishery business marketing strategies; range of commercial activities that might be undertaken by recreational charter vessels along the coast.	Used to describe recreational fisheries; helps assess resilience of charter sector and identify management impacts	PFMC-EDP, PFMC-RDN
General	2	Conduct economic and social analysis of groundfish and salmon harvest and management strategies.	Used for baseline descriptions of fisheries; provides information on effectiveness of management	PFMC-RDN
General	Other	Develop better understanding of socioeconomic issues for West Coast groundfish in order to guide development of an economically viable fishery.	Would help in all socioeconomic analyses	NMFS
Geographic range	2	Describe geographic range of fishery. Map and consider home ports of vessels, as well as ports of landing.	Helps identify fishing communities; contributes to baseline description of fishing industry; helps identify management impacts	SIAG

Baseline Descriptions Of The Commercial And Recreational Fishing Industry

Keyword	Type	Research Need	Why Data Is Useful	Source
Infrastructure	2	Identify and map commercial fish processing facilities, ice plants, and vessel services directly involved with the fishery.	Helps identify fishing communities; contributes to baseline description of fishing industry; helps identify management impacts	SIAG
Infrastructure	2	Identify relationships between processors, fish buyers, and fishermen.	Would help in all socioeconomic analyses	Other
Infrastructure	2	Identify points of access (ports or communities) to the recreational fishery for anglers. Identify and map services directly related to the fishery or used by participants.	Helps identify recreational fishing communities; contributes to baseline description; helps identify management impacts	SIAG
Mobility/flexibility	2	Actual and potential mobility of vessels between fisheries.	Used for baseline descriptions of fisheries; provides insight into resilience of fishing industry	SIAG, PFMC-EDP
Mobility/flexibility	3	Collect information about the location of alternative fishing grounds.	Contributes to fishery description; identifies potential future impacts of management measures	PFMC-RDN
Recreational vs. commercial values	3	Gather information of comparative value of recreationally or commercially caught fish.	Helps identify community & fishery impacts	CSG

Baseline Descriptions Of The Commercial And Recreational Fishing Industry

Keyword	Type	Research Need	Why Data Is Useful	Source
Subsistence	2	Identify and include any subsistence fishing activities and any participation by Native Americans or other indigenous peoples in the fishery.	Addresses major mandates, including Environmental Justice; identifies impacts on native populations	SIAG, PFMC-RDN
Tools	Other	Find ways to improve information listed on fish tickets (gear codes, etc.).	Would enable more data to be collected for research efforts	PFMC-EDP
Tools	Other	Improve accuracy of recreational catch data by reviewing statistical design and implementation of MRFSS on West Coast. Seek cost-effective ways to reduce potential bias and improve precision of estimates of recreational catch.	Now obsolete; MRFSS has been replaced by CRFS	NMFS

Nonconsumptive Values

Keyword	Type	Research Need	Why Data Is Useful	Source
Cultural importance	2	Social and cultural importance of the resource (commercial, recreational, tribal).	Addresses major mandates; identifies non-economic impacts on resources & communities	NEPA
Cultural importance	4	What do non-extractive and extractive marine users contribute to the social and cultural structure of coastal communities?	Contributes to community descriptions	CSG
General nonconsumptive values	2	Assess nonconsumptive value of marine resources (intrinsic, esthetic, recreational, experiential, public benefit value).	Addresses major mandates; identifies non-economic importance of resources	CSG, PFMC-RDN, COMES
Regulatory impacts	2	Impacts of regulations/policies on nonconsumptive uses.	Helps identify all regulatory impacts, as opposed to impacts on fisheries and communities only	SIAG
Unquantified benefits	2	During scoping, identify unquantified social and environmental benefits and values associated with the fishery, and non-economic social aspects of the proposed action or policy (lifestyle issues, health and safety issues, nonconsumptive and recreational uses of managed species, habitats).	Addresses major mandates; identifies non-economic importance of resources	SIAG, COMES

Assessing Regulatory Impacts

Keyword	Type	Research Need	Why Data Is Useful	Source
Affected parties	1	During scoping, identify as many as possible of the user groups and communities that may be affected by the action.	Basis requirement for beginning analysis of an action	SIAG, NEPA
Affected parties	2	Consider effects of management measures on participants in fisheries conducted in adjacent areas under the authority of another Council.	Helps identify cumulative and unanticipated effects of policies	MSA
Controversy	1	Describe level of controversy regarding proposed actions.	Required by NEPA; helps identify if action requires EA or EIS	NEPA
Cumulative effects	3	Need to develop baseline data on costs/benefits of management (cumulative effects) and/or develop time series; and/or develop time series study to look at long-term impacts of management.	Tool; contributes to cumulative effects information required by NEPA	CSG, SIA
Duration of effects	3	Consider and describe the duration of effects and the scale of possible changes caused by a management action.	Addresses major mandates; identifies impacts to fisheries and communities	SIAG
Economic impacts	2	Assessment of the economic impacts of regulations on all sectors; e.g., commercial, recreational, charter, processing, suppliers, and other shoreside businesses	Addresses major mandates for regulatory actions	COMES
Economic impacts	2	Economic impacts of regulations on communities	Addresses major mandates for regulatory actions	COMES, SIAG, CSG, NMFS

Assessing Regulatory Impacts

Keyword	Type	Research Need	Why Data Is Useful	Source
Economic impacts	5	Financial institutions need to know impacts of regulation on industry	Helps ensure community resilience & adaptability	COMES
Equity	2	Research ways to ensure equity among different fishing populations	Addresses major mandates, including Environmental Justice	EO12898
Equity	2	Consider economic impacts on small entities (small businesses, organizations, governmental jurisdictions).	Addresses major mandates, including Regulatory Flexibility Act	RFA
General community impacts	4	Better define the longer-term interests of coastal communities, making sure to capture the full range of local interests. One source of useful information that is sometimes overlooked is anecdotal data and oral history. Community interests should then be placed into the perspective of management goals and objectives.	Helps communities adapt to change; helps coordinate regulations with community needs	CSG
General regulatory impacts	2	Consider and describe possible effects of the proposed action on the major categories of human behavior (the way fishermen and fishing communities live; the ways they organize and meet social needs; demographic and sea-use patterns)	Addresses major mandates; identifies impacts to fisheries and communities	SIAG
Health & safety	1	Describe health and safety concerns related to management measures	Addresses NEPA; identifies possible concerns regarding management measures	NEPA
History	2	Consider how the proposed action fits with historical trends.	Addresses major mandates; helps identify cumulative effects	SIAG

Assessing Regulatory Impacts

Keyword	Type	Research Need	Why Data Is Useful	Source
Infrastructure	2	Management impacts on the built environment in fishing communities (including coastal infrastructure, historic and culturally important areas/structures)	Addresses major mandates; helps identify community impacts	NEPA
Infrastructure	2	Impacts of policies on commercial viability of ports and harbors	Addresses major mandates; helps identify community impacts	CSG
Relevant issues	1	During scoping, identify key social and resource availability issues.	Required by NEPA; basic first step in analyses	SIAG
Risk	2	Describe degree of uncertainty, risk and likelihood of unknown risks	Required by NEPA	NEPA
Tools	Other	Develop protocols for industry-supplied information	Would help with all socioeconomic analyses of fisheries	COMES
Tools	Other	How to assess impacts on communities with different local economies and different fisheries? Assess the feasibility of tools and methods we have to carry these out, such as detailed contingent valuation study (expensive). Review the socioeconomic toolbox.	Would help improve socioeconomic analyses	PFMC-RDN

Research Needs For Special Projects And Issues

Keyword	Type	Research Need	Why Data Is Useful	Source
Adaptive management	4	Need to conduct adaptive management experiments in fisheries and determine the socio-economic costs and benefits.	Could lead to more efficient management	CSG
Allocation	3	Study social aspects of allocation issues.	Addresses major mandates; helps identify appropriate allocation schemes, identify impacts	Other; NEPA
Alternate management strategies	2	Conduct economic and social analysis of alternative roundfish and salmon management strategies. For salmon this analysis should include 1) the potential economic and social implications of watershed-based management approaches; 2) the costs and benefits of alternative hatchery practices; 3) the costs and benefits of alternative harvest strategies; and 4) cost-effective analysis to meet objectives stemming from achieving biological objectives (e.g., Endangered Species Act) and treaty rights obligations. For groundfish, this analysis should include the costs and benefits of alternative harvest and management strategies, including capacity reduction.	Would help design more effective management approaches	PFMC- RDN
Communications	4	Improve communications and decrease fragmentation within the fishing community, particularly between gear types and between the industry and agencies.	Helps address constituent needs, improve understanding of regulations, and increase effective constituent involvement	OSG
Communities	3	Study how new regulations affect economic and social behavior patterns. For example, communities are impacted by establishment of marine reserves. Study how effort shifts in fisheries affect coastal communities.	Addresses major mandates; helps create effective regulations; identifies community impacts from marine reserves	CSG

Research Needs For Special Projects And Issues

Keyword	Type	Research Need	Why Data Is Useful	Source
Constituent involvement	4	Find ways to improve constituent involvement in decision making and garner constituent support.	Helps increase effective constituent involvement; improves compliance with regulations; helps develop appropriate regulations	Other
Discards	3	Evaluate benefits and costs of technical discard reduction and utilization methods and possible socioeconomic incentives/ disincentives to discard reduction.	Helps reduce discards	NMFS
Education	5	Develop programs to educate people of all ages about the ocean and its needs through studies and educational materials in marine science, engineering, health issues, and stewardship practices.	Outside Council role, but improves constituent involvement	NMFS, CSG2
Fish consumption	5	Need more knowledge about the fish-consuming public.	Outside Council role, but could help tailor effective management measures and improve constituent involvement/response	CSG
Fishing effort control, social aspects	4	Study social aspects of fishing effort control and motivation to control effort.	Helps develop appropriate effort control mechanisms	Other
General	Other	Based on the provisions of the Magnuson-Stevens Act and NMFS guidelines, determine what information is needed for decision making, then determine data and research needed to produce that information.	Very general; contributes to all analyses	PFMC-RDN
IFQs	2	Collect information on historic diversity of vessel classes, and how to preserve it under an IFQ system.	Addresses major mandates regarding IFQs; helps design effective IFQ programs	Other
IFQs	2	Collect ownership information related to prevention of absentee/foreign control of fishing enterprises.	Helps design effective IFQ programs that avoid undesirable impacts	Other

Research Needs For Special Projects And Issues

Keyword	Type	Research Need	Why Data Is Useful	Source
IFQs	3	Analyze attributes of different property rights systems; research implications of IFQs in other areas; evaluate property rights.	Addresses major mandates regarding IFQs; helps design effective IFQ programs	COMES, CSG
IFQs	3	Understand implications of IFQs for displacement of fishers and crew.	Helps understand community impacts of IFQs	Other
Incentives	3	Understand incentives created by management policies.	Helps tailor effective management policies	CSG
Incentives	4	Analyze attributes of different property rights systems; research implications of IFQs in other areas; evaluate property rights.	Helps tailor effective management policies	COMES
Incentives	4	What are the economic incentives for sustainable fisheries?	Helps tailor effective management policies	COMES
Local knowledge	4	Studies are needed to integrate local knowledge into resource management.	Enhances breadth and depth of data; involves constituents in decision-making	CSG
Management effectiveness	4	Assessing fishery management measures for historical effectiveness: what have been the impacts of management measures in the past? How have past policies affected social and economic patterns?	Helps understand past and future management impacts, and tailor effective management policies	CSG
Marketing	5	Facilitate industry cooperation and outreach to promote and enhance marketability of regional U.S. fishery products.	Outside current Council role, but helps improve economic status of fisheries	SK

Research Needs For Special Projects And Issues

Keyword	Type	Research Need	Why Data Is Useful	Source
MPAs: fishing industry response	5	Study how fishers respond to existing marine reserves.	Outside current Council role (MPA NEPA analyses are conducted by Sanctuaries). Helps identify impacts from marine reserves and tailor appropriate management measures	CSG
MPAs: economic impacts	5	Model the potential impact of Marine Protected Areas on the long-term economic viability of various user groups (consumptive and nonconsumptive).	Outside Council role, but would help with MPA planning and management	CDFG
MPAs: economic impacts	5	Collect information on the socioeconomic impacts/effects of recently established Channel Islands MPAs and its usefulness in evaluating proposed MPAs in other areas.	Outside Council role, but would help with MPA planning and management	CDFG
MPAs: economic impacts	5	If the impacts of a marine reserve on commercial landings to a specific port can be estimated, study whether product is processed locally or shipped to another location for processing or direct sale.	Outside Council role, but would help with MPA planning and management	PFMC-RDN
MPAs: nonconsumptive value	5	Value of reserves to nonusers - surveys of nonusers (of National Marine Sanctuaries) could be combined with surveys of non-consumptive recreational users.	Outside Council role, but would help with MPA planning and management	CINMS
MPAs: charter industry	5	Conduct survey of the for-hire industry passengers in national marine sanctuaries.	Outside Council role, but would help with MPA planning and management	CINMS
MPAs: socioeconomic impacts	5	Socioeconomic studies are needed to determine impacts of marine reserve siting and to develop effective means for community acceptance and enforcement.	Outside Council role, but would help with MPA planning and management	NMFS

Research Needs For Special Projects And Issues

Keyword	Type	Research Need	Why Data Is Useful	Source
MPAs: scientific use	5	Track scientific use of sanctuaries. Look at annual numbers of researchers using the islands and MPAs. Are researchers accessing the islands and MPAs?	Outside Council role, but would help with MPA planning and management	CINMS
MPAs: educational use	5	Track educational use of sanctuaries. Estimate numbers of educators accessing the islands in general and MPAs in particular. Are educators accessing the islands and MPAs?	Outside Council role, but would help with MPA planning and management	CINMS
MPAs: public perceptions	5	Study knowledge, perceptions and attitudes of local user groups and public. Look at public and user group knowledge, attitudes, and perceptions of MPAs. How are knowledge, attitudes, and perceptions regarding the MPAs changing over time?	Outside Council role, but would help with MPA planning and management	CINMS
MPAs: nonconsumptive value	5	Conduct a survey of the non-consumptive charter industry. Look at travel cost study of charter boat users, with additional information on knowledge of MPAs and regulations. What is the value of MPAs to non-consumptive users and are these users accessing the islands because the MPAs are there?	Outside Council role, though information could be useful to management	CINMS
MPAs: public perceptions	5	Conduct regional surveys on public knowledge, attitudes, and perceptions of MPAs.	Outside Council role, though information could be useful to management	CSG, CDFG
Socioeconomic tools	Other	Develop long-term database with baseline data for socio-economic issues.	Tool would help with all socioeconomic analyses	CSG
Socioeconomic tools	Other	How to assess impacts on communities with different local economies and different fisheries? Assess the feasibility of tools and methods we have to carry these out; improve socioeconomic data collection and analysis.	Tool would help with all socioeconomic analyses	CSG, NMFS, PSMFC
Socioeconomic tools	Other	Develop new methodologies for measuring recreational value.	Tool would help with analyses of recreational fisheries	COMES

Research Needs For Special Projects And Issues

Keyword	Type	Research Need	Why Data Is Useful	Source
Socioeconomic tools	Other	Identify types of social analysis that may help fishery management decision-making, and identify data collection programs that should be initiated to support such analyses over the long-term, particularly regarding impacts on coastal communities. Based on the provisions of the Magnuson-Stevens Act and NMFS guidelines, determine what information is needed for decision making, then determine data and research needed to produce that information.	General research goal to help with all socioeconomic analyses	PFMC-RDN
Stewardship	4	Determine ways to create stewardship for coastal and marine resources.	Could improve general marine resource health	CSG
Tool	Other	Develop industry response models to project responses to alternative management regulations, and to predict the effect of management measures on angler effort and harvest in the groundfish fishery and ocean and inriver components of the salmon fishery.	Would help tailor effective management measures for salmon and groundfish	PFMC-RDN, NFCC
Tradeoffs	3	Assess tradeoffs between efficiency and other social objectives (e.g. retaining small boats).	Addresses NEPA, RFA; helps tailor appropriate management measures	COMES

* While each research need here is not specifically identified in NEPA, MSA, SIA, or CEQ regulations, the information may be used in fulfilling these mandates.

CDFG	California Dept. of Fish & Game: Priorities for Sea Grant Marine Life Protection Act Research Proposals (http://www.csgc.ucsd.edu/Proposal/PROP_PDFs/MLPAPriorities.pdf)
CINMS	Channel Islands Marine Protected Areas Monitoring Plan, CDFG 2004. (Summarized).
CSG	California Sea Grant: A Workshop To Identify Needed Socioeconomic Studies Associated with Marine Activities in Central California, February 28 2002, California Sea Grant College Program and UC Cooperative Extension
CSG2	California Sea Grant: Summary of California Ocean Management Research Needs (Jan 2000) http://www.csgc.ucsd.edu/PROPOSAL/PROP_PDFs/RASGAPAnnSum.pdf [did not include priorities regarding aquaculture & seismic activities]
COMES	Revised Final Meeting Notes, Economic Information for Oregon Fisheries, Coastal Oregon Marine Experiment Station and Oregon Sea Grant, August 14 2003
EO12898	Executive Order 12898 (Environmental Justice)
MSA	Magnuson-Stevens Fishery Management and Conservation Act
NAS	National Academy of Sciences. Effects of Trawling and Dredging on Sea Floor Habitat. NAS, 2002. http://books.nap.edu/books/0309083400/html/R1.html#pagetop
NEPA	National Environmental Policy Act
NFCC	National Fisheries Conservation Center: Identifying Fisheries Research Needs. August 1998.
NMFS	NMFS Northwest Fishery Science Center. Research Plan for West Coast Groundfish. http://www.nwfsc.noaa.gov/publications/researchplans/GFSP2002.pdf [focused on areas of improvement; did not list status quo research activities]
OSG	Oregon Sea Grant. Strategic Plan 1998-2003. (Sections on thematic goals for seafood production, coastal economic development, and coastal ecosystem health). http://seagrant.oregonstate.edu/sgpsubs/onlinepubs/q00002.html#fungoals
PFMC-RDN	Pacific Fishery Management Council. Research and Data Needs, 2000-2002. (Did not include detailed recommendations for slope & shelf surveys, or species-specific research need on groundfish; too many to list here).
PFMC-EDP	Pacific Fishery Management Council. West Coast Fisheries Economic Data Plan, 2000-2002. Included core data needs only.
PSMFC	Pacific States Marine Fisheries Commission. Request for proposals: Cooperative research. (High priority areas for cooperative research.) http://www.psmfc.org/rfp/04West_Coast_Coop_Research.doc
RFA	Regulatory Flexibility Act
SIA	NMFS Social Science SIA Modeling Workshop, The Belmont Conference Center, Elkridge, MD, March 11-12, 2004
SIAG	NMFS SIA Guidelines
SK	Saltonstall-Kennedy Program FY 2004 FFO. http://www.fishresearchwest.org/current_opportunities/sk%20app%20FY04.pdf
SPM	NMFS Sociocultural Practitioners Manual (draft)