

# Investigating Cooperative Data Gathering

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a report submitted to

the Curtis and Edith Munson Foundation

and

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by

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## 1.0 Executive summary

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The National Fisheries Conservation Center, with funding from the Curtis and Edith Munson Foundation and the National Marine Fisheries Service, organized seminars at the Boston and Seattle Fish Expos focusing on cooperative data gathering that directly involves fishermen. The seminars were structured as panel discussions with active audience involvement. Their goal was to promote dialogue about the usefulness of fisherman-gathered data and to highlight issues to be addressed during a subsequent national evaluation of several case studies of fisherman data gathering.

The panels at each seminar included representatives of a variety of perspectives, including environmental organizations, science, management, and industry. Several major themes emerged throughout the discussion at the two seminars. These included:

- *the value of fishermen's knowledge.* Fishermen have unique knowledge about specific stocks and the ecosystem as a whole. This can help direct new research, check the accuracy of past research, and provide a basis for practical problem solving.
- *the large number of industry-initiated and funded efforts.* Industry has funded many programs to solve bycatch problems, improve the database for stock assessments, and increase ecological knowledge.
- *the emergence of new attitudes.* NMFS is pursuing more direct involvement by fishermen to help it meet increased demands for information. Industry is more motivated to initiate problem solving because of new economic and political pressures stemming from reduced quotas and constraints related to endangered species.
- *the link between management structures and motivation.* The structure of the management system affects fishermen's willingness to participate in data gathering efforts. Resolving allocation issues and establishing a long-term stake in the future of a fishery promotes involvement and the free flow of information.
- *the importance of perception.* Various groups' perceptions of each other strongly influence their communication with and behavior towards each other. New institutional mechanisms are needed that will open and sustain alternative avenues of communication.
- *the importance of scientific credibility and good study design.* The ultimate usefulness of data collected by fishermen depends on its scientific credibility. This is dependent largely on sound study designs that incorporate available knowledge and have a valid statistical basis.
- *the opportunity provided by increased information needs.* The increasing need for information has created a valuable opportunity for fishermen, NMFS managers, scientists, and environmental organizations to cooperate in improving the database for decision making.

## 2.0 Introduction

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Expanded pressures to rebuild damaged stocks, assess socioeconomic impacts of management plans, and develop creative alternatives to existing management approaches have combined to increase demands on the fisheries management system. This has increased the need for a wide range of scientific information to support decisionmaking. Unfortunately, such needs far outstrip the capacity of the National Marine Fisheries Services' existing infrastructure for data collection and interpretation. One response to this situation has been to expand cooperative data gathering efforts that take advantage of the fishing industry's resources and capabilities.

This report summarizes the results of seminars held at the 1998 Fish Expos in Boston and Seattle on October 16 and November 20, respectively. The goals of the seminars were to 1) identify issues that will help focus a subsequent national evaluation of cooperative research efforts, and 2) promote dialog and understanding among scientists and fishers about their differing perspectives on the collection and use of scientific information.

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### **3.0 Seminar structure**

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For each seminar, we recruited a panel with local and regional expertise in the area of cooperative data gathering. Panels included academic and NMFS scientists, fishers, and environmentalists (see Appendix 1 for a list of panel members and short biographical sketches). Both seminars were moderated by Dr. Brock Bernstein, NFCC's President, and followed the following structure:

- welcome and introduction by Dr. Bernstein
- brief (4-6 minute) opening statements from each panelist in response to questions from the moderator
- discussion among the panelists that expanded on the opening statements
- discussion between the audience and the panelists.

### **4.0 Findings and results**

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This section summarizes the discussion at each seminar and then identifies the major themes that arose in the discussions.

#### **4.1 Boston**

##### **4.1.1. Opening statements**

In response to the moderator's question, "What are the issues that need to be addressed in the design of cooperative research, and what are pitfalls to be avoided?" *Ellen Pikitch* stressed the importance of producing information that will change the outcome of management decisions. This requires that the information be perceived as valid by fishers, scientists, and managers. For fishers, this often means having studies conducted on commercial fishing vessels under realistic fishing conditions. For scientists and managers, this means developing a scientifically and statistically valid study design that will enhance the credibility of the study's results. In the examples she described, there were several keys to their successful completion. These included:

- active involvement by fishers, scientists, and managers from conception to completion
- a clearly defined yet flexible research plan
- a scientifically and statistically rigorous experimental design, and fishers' appreciation of its importance
- management flexibility that provided incentives, or ameliorated disincentives, that allowed the projects to be conducted at reasonable cost, under realistic conditions
- neutral scientific advice that was trusted by all parties.

Dr. Pikitch particularly emphasized the importance of mutual respect for the distinctive knowledge that each participant brings to collaborative efforts, as well as an awareness of each party's limitations.

In answer to the moderator's question, "What have you learned working with scientists and what have they learned from you?" **Craig Pendleton** discussed his experience providing his boat as a sampling platform for the GLOBEC program. Craig and his crew were impressed both by the scientists' respect for their expertise in navigation, ship handling, and logistics and by their willingness to explain the purpose of their research. Once they understood the scientists' requirements, it became easier to help them. In particular, the fishers' more detailed knowledge of the area enabled them to suggest better sampling sites. The scientists' respect for the fishers' expertise permitted them to accept this information with an open mind and use it to improve their sampling design. The two groups' interactions were characterized by respect for, and interest in, each other's areas of expertise.

In response to the moderator's question, "What is the unique contribution fishers can make to cooperative research projects?" **Felix Cox** noted that they have spent the time on the water and that this is different than the time scientists spend on the water. Fishers spend time focused on practical tasks under conditions that are quite different than conditions on research vessels. Felix also said he believes that, while fishermen could contribute much more to data gathering, their input has often been disregarded. He believes that the politically charged nature of much fisheries decisionmaking lessens the value of such data, "The best data in the world dumped on deaf ears is useless."

In reply to the moderator's question, "What can we do to address the issues Felix brought up?" **Bill Amaru** responded that these kinds of problems don't surprise him. While he sees nothing wrong with having differing opinions, or coming up with different conclusions based on the same information, he also understands the political nature of decisionmaking. Users are basing their livelihood on the interpretation of available data but managers have a different take. He is most troubled by having to make decisions when information is absent or when the "best available" information is not sufficient to make kinds of decisions we're facing.

Attempts to get the decision making process to work better have been hampered by a "great divide" between the scientific / management community and the fishing community. In particular, fishermen are very concerned about the possibility that data they have had a hand in collecting could be used against them by providing a basis for restricting access. "Most people don't ... shoot themselves in the foot." However, Bill believes that fishermen will cooperate more actively in data gathering when they understand better how improved information will benefit them in the long run. This in turn will come when fishermen get better at communicating and developing rapport with scientists and managers. Bill also expressed his concern about random sampling that doesn't reflect "where the fish are," and wondered if there was a way to use fishermen's knowledge to help develop needed research plans. The moderator described an example of a hybrid sampling design used for sea urchin stock assessment in California. Urchin's very patchy distribution makes strict random sampling very inefficient. Fishermen's knowledge is therefore used to first target areas where urchins congregate and random sampling is then used to assess abundance within these areas.

In answer to the moderator's question about the implications of the "great divide," **Bonnie McCay** made it clear that there are a great many "divides." In addition to differences between fishers, who are concerned about where to get fish, and scientists, who are good at estimating and data analysis, there are important differences among sectors of industry, and between recreational and commercial fishers, various segments of the environmental community, and scientists and managers. For example, serious allocation conflicts between industry segments

reduce their interest in cooperative research. There are also differences among scientists. In general, the people who were most helpful to the success of cooperative research projects were scientists who did hands-on science and people who were open to other points of view and were willing to defer judgment. Tradition, which contributes to cultural inertia, is important on all sides and can make it difficult to try new approaches. It is also necessary to acknowledge the constraints that can affect both industry and management. These stem from existing rules and regulations, insurance issues, and privacy concerns, among others.

In addition, there are always regionally specific history, attitudes, and cultures to account for. These affect people's willingness to cooperate in research and their assumptions about whether such cooperation can be successful. Widely circulated stories help to maintain attitudes and cultures. Such stories capture the essence of a particular perspective or opinion, such as that fishers' input will never be used, and take on a legendary quality. However, there are new stories that can be told, including some of the ones told here today about the fishermen who finally understood about random sampling and the scientists who listened to fishermen about where the best sampling locations were.

The moderator then asked *Steve Murawski* to respond to the other panelists' comments and to assess the chance of success for cooperative research efforts in the region. Steve "agrees with everything that's been said" and stated that NMFS has certainly made its share of contributions to stories about why cooperative research hasn't worked well in the past. He also agrees with Captains Cox and Amaru that is a contentious world and that conflict often breeds disrespect. Parties often use data to make points in front of the Regional Fishery Management Council and such actions drive us apart.

Steve in particular wanted to address the myth that NMFS doesn't use fishermen's data. "Those of us who do this [i.e., assessment and management] can't do it without information from fishermen." The Sustainable Fisheries Act requires more information on stock status and condition and this is taxing traditional data gathering systems. More importantly, the nature of the questions managers are asking us are outside the box in terms of the traditional information scientists produce. Traditional science breaks down around questions of where and when to open or close fisheries and how to make such decisions sensitive to the details of stock structure. There is broad interest in this region in telling managers that they are at the edge of the existing information and in getting together with industry to work on answering the hard questions facing us.

He mentioned complementary areas of expertise that provide a basis for cooperation. Scientists have knowledge of scientific study design and fishermen have tremendous knowledge of the grounds, gear types, and habitats at a fine spatial scale. He stressed the need to base projects on a solid design with pre-established protocols (as in drug testing studies) that reflected realistic expectations of what science can produce. He concluded by expressing a hope that both kinds of knowledge, formal science and fishermen's first-hand experience, could be combined and suggesting that this would require a forum where communication between fishermen and scientists is expanded.

#### **4.1.2 Discussion**

The ensuing discussion, both among the panelists and between the panel and the audience, focused on several core themes.

In response to concerns that data from cooperative research programs might be used to justify reducing access to a fishery, Ellen Pikitch stressed the need to let the data speak for themselves. In the long run, it is impossible to control how data will be used. Attempting to

do so in the short run hurts fishermen in two ways. First, it undermines their credibility by suggesting that they are unwilling to accept and work with the best data available, whatever the implications. Second, if such attempts result in valuable data being excluded from management decisions, it can impede efforts to maintain or rebuild stocks. In fact, past attempts to control the distribution and use of data have created a perception that industry is not interested in the truth, a perception captured in a comment about fishermen quoted by Bonnie McCay, “The truth is not in ‘em.”

Several panelists and audience members spoke of the need to combat this perception. Bill Amaru noted that all groups are made up of individuals, many “with the truth in them.” He stressed the need to work with individuals and to resist the impulse to categorize them as part of a monolithic group with one unchanging point of view. Ellen Pikitch suggested that fishermen’s and managers’ interests might be more similar than they want to believe. Fishermen want a healthy resource they can continue fishing and no manager wants to see a fishery collapse on their watch. Both are intercede in having fish for the future, but may disagree about how to get there and about the actual state of stocks at the moment.

One audience member (a fisherman) talked about his involvement in a cooperative research project that had helped educate him about scientific study design. He commented that “it was impossible to go back” to a suspicion of science and scientists once he understood the role that science can play in improving fishery management decisions. He also described a series of technical workshops in study design and sampling protocols that had been used to train the fishermen involved in this project. As a result of his experience, he suggested that there was a “missing institution” that could improve fishermen’s ability to converse and work with scientists on a more equal footing.

Throughout this discussion, however, many of the panelists and audience members returned to fishermen’s concerns that improved data would be used as a basis for restricting their access to fishing opportunities. They agreed that the typical response to stock problems has been to reduce commercial effort, with often painful effects on fishermen’s livelihood. They also agreed on the need for better mechanisms to share any necessary pain across all segments and to buffer the economic impact of quota reductions. A recurring theme in this part of the discussion was that some sort of ownership stake in the fishery would provide greater incentives for fishermen to bear needed pain in the present in return for the promise of a share in any future payoffs. This discussion revealed a clear link between fishermen’s willingness to participate in cooperative research and the degree of their perceived ownership stake in the fishery. Clearer and more effective ways of linking present pain to future benefits would increase fishermen’s willingness to gather information and live with the management consequences of that information.

Several comments from the audience also highlighted NMFS’ past credibility problems with industry, making it clear that NMFS has hurdles to overcome, with some groups, in order to create effective working partnerships. The few examples that were mentioned showed that some participants in past cooperative efforts felt that their contributions were not valued, that they were not listened to during projects’ planning phases, and/or that the data produced was not used effectively in decision making. This has led to a willingness to believe the worst of each other’s motives. Steve Murawski admitted that NMFS had “done its share to add to the stories” about poor working relationships between fishermen and government scientists. He also said that the realization that “this is the environment we’re in” has encouraged a greater willingness within NMFS to experiment with different data gathering and management approaches. Brock Bernstein noted that NMFS has had a restricted number of kinds of interactions with fishermen in the past. He suggested that efforts to expand the number and kinds of interactions between groups could lead to new experiences and new stories.

There were several comments in response to statements (by Ellen Pikitch and Steve Murawski) about the need for rigorous scientific design of any cooperative studies. Several fishermen argued that random surveys do not necessarily sample “where the fish are,” while Steve Murawski described the difficulties involved in relying only on fishermen’s data, particularly for areas, such as Georges Bank, where fishing has been restricted. He emphasized that fisheries is an empirical science and that they would like to depend on data whenever possible and not on models. This will require developing new kinds of information that haven’t been collected before. One audience member suggested that NMFS should pay more attention to qualitative observational data about anomalous events, stocks’ behavioral reactions to changes in environmental conditions, and other potentially valuable but hard to quantify information. Fishermen are uniquely situated to gather such observations but there are no good mechanisms at present for getting such data into the stock assessment process.

Brock Bernstein mentioned examples from other areas of how the statistical requirements of sampling design have been adapted to better fit real-world conditions and foster stakeholder involvement. In one example, sea urchin surveys in California have used a two-stage sampling procedure. Fishermen’s knowledge about where urchins are most abundant is used to target specific areas within which random sampling is then carried out. In another example, the active interest and involvement of AIDS patients over the last several years has led the National Institutes of Health to modify their long-standing drug testing protocols. AIDS patients are now active participants in drug trials rather than simply passive subjects. These and other examples might provide ideas for encouraging fishermen’s involvement in data gathering without sacrificing scientific rigor.

There was general agreement among the panelists and the audience that the issues that impede cooperative data gathering for stock assessment also impede the collection of socioeconomic data, but to a much greater extent. In addition, there are often unintended socioeconomic disincentives that obstruct the gathering of all sorts of data. Bill Amaru described an instance in which better reporting of discards would improve understanding of the stock structure and indicate a larger stock. However, such data would also document higher-than-expected mortality rates, which could lead to a lower quota. As a result, fishermen underreport discards. Understanding these competing pressures and creating effective incentives for reporting is a real challenge.

One member of the audience noted that a widespread lack of trust underlies most of the problems confronting cooperative research and wondered whether it might be better to create alternative data gathering mechanisms that are outside the current management structure. This echoed Craig Pendleton’s earlier statement that it is asking too much of one institution (NMFS) to fulfill all the roles involved in gathering and interpreting data, performing stock assessments, and establishing and enforcing regulations. It also echoed the earlier call to fill the need for a “missing institution” to promote understanding between fishermen and government scientists.

Finally, Steve Murawski stressed the need for fishermen to be more involved in the larger mission of advising NMFS on the potential impacts of different management scenarios. This is especially important given the tight relationships noted throughout the discussion between the management structure (and its resultant incentives) and the degree of fishermen’s involvement in cooperative data gathering efforts.

## 4.2 Seattle

### 4.2.1 Opening statements

In response to the moderator's question, "Can you describe some previous examples where fishermen worked together with scientists to improve our understanding of the ocean?" **Bob Francis** described several different successful studies. The first did not actually involve fishermen, but is representative of the way in which fairly simple sampling schemes, carried out over large spatial scales, can add greatly to scientific understanding. The continuous plankton recorder, developed in the 1930s by Sir Alistair Hardy, was deployed on a large scale on merchant vessels after World War II. Recorders were towed behind these ships as they steamed across the Atlantic, providing tremendous insight into the relationship between climate and productivity in the North Atlantic. As another example, physical oceanographic data has been collected by bottom trawlers (primarily Russian) with temperature sensors on their trawl gear. This resulted in a very large database, now residing at the IPHC, on subsurface distributions of temperature and water masses and on the relationship between climate and changes in water temperature. As a final example, Bob described a cooperative program between tuna fishermen in the Eastern Tropical Pacific and NMFS. Participating fishermen carried XBTs (expendable bathythermographs) and collected frequent temperature measurements, which they then faxed to NMFS. NMFS used these data and additional satellite information to prepare real-time weather forecasts and to identify the location of oceanographic fronts where fish were more abundant. All three examples illustrate how the consistent collection of spatially extensive data can [improve fundamental understanding, support real-time decisionmaking, even though data types themselves very simple]

The moderator then asked **John Gauvin** for examples of data gathering efforts that were initiated by fishermen. He described a recent situation in which the rock sole fishery was in danger of being shut down completely because of excessive bycatch of red king crab. Despite 100% observer coverage in the rock sole fishery, bycatch data were not being used in a way that was useful in reducing bycatch. The "wake-up call" of impending shutdown spurred industry efforts to make better use of these data. The fishery (with the exception of a single company) began faxing observer data twice a day to a contractor who analyzed it to map the position and individual bycatch rates of each boat in the fleet. Captains used this information to move their fishing locations to avoid areas of high bycatch, resulting in a decrease in the first year of the program from more than 100,000 crabs to 9,000 crabs. The program has since been expanded to include all prohibited species and has helped to extend fishing seasons, increase catches of target species, and avoid prohibited species. For example, the yellowfin sole fishery now fishes year round and almost reached its TAC for the first time.

Because of their access to improved information, industry's capacity for in-season management now exceeds NMFS'; on more than one occasion, industry has notified NMFS that a particular fishery should be shut down immediately because the bycatch cap was in danger of being exceeded. John described some captains' reluctance to revealing their fishing location to the entire fleet. The program was therefore modified so that positions are not disclosed for boats that are below a threshold bycatch rate on all prohibited species. In response to a question from the moderator about NMFS' reaction to this industry program, John stated that NMFS' confidence in industry's intentions grew over time, particularly when industry voluntarily requested shutdowns to avoid exceeding bycatch caps. John also described a joint industry/NMFS program to field test a halibut excluder device placed in flatfish trawls. Industry initiated the development of the excluder and NMFS scientists created a field test design that would produce reliable data on its effectiveness.

The moderator then asked **Bruce Leaman** to discuss barriers that undermine cooperative data gathering efforts. He described pervasive myths that affect each party's perception of their respective roles in such efforts. These include the assumptions that:

- we know more than somebody else because of our experience
- we can get along without the participation of others; we don't need their information
- the observations we collect offer some unique and true picture of the world, when in fact both scientists and fishers have flaws in what they observe
- everything is ultimately knowable, when in fact there are some fundamentally unknowable things and research can only establish bounds around these
- everything will be all right if we follow a cautious approach, when in fact nature has far too many surprises for this to always work
- the right answer now will be the right answer always, when in fact changing conditions mean that we will need to periodically revisit problems.

Bruce emphasized that both scientists and fishermen bring these myths to their interactions.

In response to the moderator's question, "What is industry's responsibility with respect to data gathering and what sorts of things promote or inhibit fishermen's involvement?" **Mark Lundsten** stated that, from his perspective, industry has changed from being clients to caretakers and from frenetic competitors to planners. Because of the change to ITQs in the halibut fishery, they now have the time and opportunity to explore and implement data collection ideas and techniques. Mark believes that fishermen are obliged to show that they deserve to use the resource, can take care of it, and are willing to give something back. He also took issue with the idea that only formal environmental groups are conservation organizations. He sees the halibut fleet, with its strong conservation program, as a conservation organization that, for a variety of reasons, including political pressure, recognizes the need to "step up to the plate." Without such a commitment to protect the resource, fishermen will not maintain or improve their access to the resource.

The moderator referred to both the widespread skepticism about the reliability of fisherman-collected data and the presumption that fishermen will not be truthful about the condition of their fishery. He asked Mark, "How can we trust fishermen to tell the truth? What makes you want to tell the truth?" Mark stressed that the Halibut Commission uses fishermen's data in the stock assessment and that the long-term health of the fishery, and therefore fishermen's livelihood, depends on the validity of the data. Fishermen respond to economics. If the structure of the management system promotes a long-term perspective, then fishermen's economic self-interest will lead them to tell the truth because they want a healthy fishery. John Gauvin interjected that this sort of criticism is off the mark for the North Pacific, where fishermen's own self interest provides a strong incentive to help produce valid information. In the groundfish fishery, industry asked for a comprehensive observer program, and is not afraid of revealing their fishing practices. This industry takes a long-term view and operates on the assumption that the continued health of stocks depends on good management based on accurate data.

The moderator mentioned that Dr. Bonnie McCay had commented, during the Boston seminar, that there are important differences in perspective, not only between fishers and scientists, but also among sectors of industry, recreational and commercial fishers, various segments of the environmental community, and scientists and managers. He then asked **Karen Garrison** to describe, from the perspective of an environmental organization, what makes fishermen collected data trustworthy and useful. Karen responded that this depends partly on what kind of data are being collected. For example, anecdotal evidence can guide

research and later confirm its findings. However, there always needs to be a scientific process to groundtruth information and establish its legitimacy.

The data and insights that fishermen alone have access to are a part of the record that we need. Unfortunately, they often feel their contributions are not respected or valued. It is important to assure the credibility of fisherman-collected data because of its value but also because of the inherent potential for conflict between the need to make a living and providing accurate information. Scientifically credible observations can make the difference between logbooks that are valued or logbooks that are ignored. Therefore, fishermen's data collection efforts must be brought into a process where there is a scientific protocol. Karen referred to the industry financed and managed Canadian black cod research program as a good example of how this might work. Fishermen bid to take their vessels out on research cruises that are financed through the catch. Scientific staff train fishermen in data collection procedures and work with them to identify, measure, and count samples. Karen summarized three characteristics that make this program credible to outsiders:

- it was designed by fishermen and scientists, but independently approved by the Department of Fisheries and Oceans
- the research effort managed by an explicitly non-political industry group
- the program's objectives and research design are frequently reviewed.

The moderator then asked **Bob Mikol** to provide examples of alternative, or non-traditional, ways in which fishermen can contribute data to support management decisions. He described a new effort called FISHER (Fishermen Involved in Scientific, Habitat, and Environmental Research). This group wants to recruit good fishermen who are also excited about doing research. Their goal is to get as many scientists as possible aboard fishing vessels to perform research that will either dovetail with or not interfere with fishing operations. They have created an Internet-based bulletin board to help link fishermen and scientists and have received pledges of support from several university researchers. In addition, Bob described a recent meeting in Anchorage (Alaska) organized by the Center for Marine Conservation, in which equal numbers of scientists, fishermen, and representatives of environmental organizations gathered to discuss key management issues. Over the course of the meeting, participants were able to overcome some of the barriers to communication and understanding created by their assumptions and preconceptions about each other. Brock Bernstein, the moderator, noted that a similar process had occurred during a series of workshops on bycatch in Alaska held in the fall of 1995. One participant in these workshops stated that this was the first time that many parts of the industry had come together outside the Council process, which was dominated by conflicts over allocation issues, to talk about common problems. Brock said that one outcome of the recent seminar at the Boston Fish Expo was a consensus about the need for more avenues of communication outside the normal management structure.

In response to the moderator's question, "How is NMFS trying to combine the various issues mentioned by the other panel members in its cooperative research efforts?" **Cyreis Schmitt** replied that the Northwest Fisheries Science Center is attempting to incorporate energy and ideas from a wide range of sources and to organize themselves to work together with fishermen for the mutual benefit of both groups. Despite the barriers to cooperation that are frequently mentioned, there is a history of varied efforts where fishermen have successfully worked with scientists. An important question for us is to figure out how this can be broadened to look at the most important questions. This involves determining the best role for each sector. We consider the current cooperative efforts in the Pacific Northwest groundfish fishery as a pilot program for accomplishing these goals and blending everyone's efforts to move in one direction. Cyreis listed several elements that are crucial to successful cooperation, including:

- dispelling the myths Bruce Leaman described
- building and defining partnerships, especially in terms of who is involved
- developing a framework to capture key constituencies
- including partners in planning as well as data collection
- making use of the knowledge that people have to ask the right questions
- designing joint analyses (fishermen and scientists) that use the rigor of the scientific method, including peer review.

Cyreis emphasized that the goal of all cooperative programs should be to get the best answers, not to gather ammunition to shoot each other down. In this vein, the use of scientific tools like peer review are intended to lend credibility to the research results and not to discredit fishermen's contributions.

Cyreis ended her opening statement by commenting that an important challenge is deciding what to do with research data once it has been obtained. The management process is where uncertainties come into play and where fears arise about how the information will affect people's interests. She believes that research data will be most useful if everyone understands how and why the data were gathered.

#### **4.2.2 Discussion**

The ensuing discussion, both among the panelists and between the panel and the audience, focused on several core themes.

Mark Lundsten, referring to the preceding discussion about the need to ensure the scientific validity of fisherman-collected data, asked Karen Garrison if she thought similar mechanisms should be established to establish the accuracy of environmental groups' studies. Karen answered that their research should indeed be subject to similar standards and stated that her organization does have its reports peer reviewed. In addition to producing reports, she stressed the need to talk to each other, "If we don't then we will just preserve the myths [that Bruce Leaman listed]." She also stated, however, that it is important for environmental organizations to preserve their independence and that the peer review process should not become a referendum on their publications. John Gauvin, noting that Mark had "fired a shot across Karen's bows," said that an NRDC publication on management in the North Pacific contained information he considered inaccurate and that his phone calls to Karen had not been returned. Karen apologized and said the message must not have reached her; if it had she certainly would have responded because of their past working relationship. Brock Bernstein observed that this is an example of cooperation depending on personal relationships and that John Gauvin's phone call needed to reach the right person at NRDC. There is a lack of institutional mechanisms to ensure that needed communication takes place. An important challenge for developing cooperative research and problem solving is to get beyond the current primary dependence on personal relationships.

A member of the audience referred to the current lose/lose situation with Steller sea lions and noted that this stems from a lack of information about what exactly is happening to the sea lions. He asked the panel whether they thought a combined effort by industry and NMFS could resolve this issue. John Gauvin replied that the core question is whether atka mackerel fishermen are creating forage problems for Stellers by producing localized depletions in sea lion food. In response to fishery closures based on evidence of such depletions, industry has been working with researchers to design a program to answer the question, "What is the density of atka mackerel adjacent to rookeries before and after the fishery?" Industry's contribution to the main design goal of reducing overall sampling variance is its knowledge

about how to catch atka mackerel. While this and other similar projects can be expensive, there is a new paradigm that is pushing industry to fund research, "It's your responsibility to prove you are *not* having an effect on the ecosystem."

Bruce Leaman emphasized the necessity of involving all protagonists in the design stage of such projects or they will end up debating about the study results later.

Bob Francis then described the North Pacific Universities Marine Mammal Research Consortium, paid for by a combination of industry, government, and private foundations. The Consortium was started by industry in order to establish an independent scientific group to tackle the question of what is happening to pinnipeds. While he is not sure if the information it produces is being used, he considers it some of the best research being done. This and other research would not have been done without impetus from industry. It is important to recognize this because there is a great deal of false reasoning being suggested to link the Steller's decline to various aspects of fishing activity.

Another audience member commented that even well designed research will take years to produce results but there is tremendous pressure for immediate decisions. He asked how we know we are asking the correct questions and whether all participants are comfortable that available resources are being used appropriately. Cereis Schmitt responded that programs have to plan for a mix of immediate and long term payoffs and that it is important to hold out for the long-term answers in the face of growing pressures for immediate action. John Gauvin noted that, in some instances, the standard of evidence might be so high that even good long-term research will not be adequate. For example, it may not be possible to meet the requirements of the Endangered Species Act and prove that you are not having an impact. This is unfortunate because the resulting lawsuit scenario puts everyone in a lose/lose situation.

Several panelists and audience members spoke about the link between fishermen's long-term stake in the resource and their willingness to fund research and accept its results, even if these create short-term economic pain for the industry. Mark Lundsten noted that, in the North Pacific, once allocation issues were solved by the IFQ system, information flowed freely. Without the certainty of a share in the future of the resource, "everybody clams up." A Canadian fisherman remarked that, before the introduction of ITQs in the scallop fishery in eastern Canada, fishermen spent most of their time fighting with scientists about the quota and the rest of their time fighting with each other about their respective shares of it. With the allocation issue resolved, they now spend no time fighting among themselves and instead work with scientists to improve research on the stock. The end result of removing politics from the allocation process has been a change in attitude and much better management. Once their shares were secure, industry considered the investment in science to be worthwhile.

Audience members and panelists also emphasized the need for leadership within industry; even after allocation issues are resolved. The concept of greater involvement in cooperative research and management must be sold by visionary fishermen, even though the information produced can hurt industry in the short term. Greater involvement gives fishermen more control over how issues are framed and resolved, "Those who define the issue win it." An important part of such leadership is making it clear that the results of research cannot be guaranteed and that fishermen won't always get the answer they want. "It is a big gamble, but so is fishing." The risk of short-term losses is outweighed by the value of taking action now and providing a better foundation for management decisions. One audience member noted an interesting difference in perception about fishermen's willingness to help produce better information even though that would cause economic distress. In response to a survey question that asked whether they would participate in a study knowing ahead of time that the results would create an economic loss in the short term, 85% of fishermen said they would

participate. In contrast, only 50% of scientists asked the same question thought fishermen would willingly participate in such a study.

Closely related to the need for leadership within industry was the importance of industry funding for cooperative research efforts. As one audience member put it, “If you pay for it, you take it more seriously in terms of input and output.” In addition, industry involvement provides two important opportunities. The first is for creative methods of financing, such as experimental fishing permits. The second is for streamlining the approach to defining and meeting information needs. Mark Lundsten suggested, for example, that observers could be used less for enforcement and more for research. Such a shift in focus could have permitted observers to become involved in research to reduce bird bycatch and thereby forestall the confrontations that have characterized this issue.

In summary, the moderator observed the amount and kind of participation in collaborative data gathering efforts is integrally tied to the incentives produced by the management structure. A key to the success of efforts is therefore to adjust the underlying motivational structure to support the development of a long-term perspective by all parties.

### **4.3 Major themes and next steps**

Several major themes emerged throughout the discussion at the two seminars. These included:

- *the value of fishermen’s knowledge.* Because of their time on the water, fishermen have unique kinds of knowledge and insights about specific stocks and about the ecosystem as a whole. This information can provide starting points for new research programs, act as a check on the accuracy of past research, and furnish a basis for practical problem solving.
- *the large number of industry-initiated and funded efforts.* Industry has funded many programs to solve bycatch problems, improve the database for stock assessments, and increase understanding of the ecosystem.
- *the emergence of new attitudes.* NMFS is actively pursuing more direct involvement by fishermen to help it meet increased demands for information on stocks, ecosystems, and the economics of fishing. Industry is more motivated to take the lead on problem solving, in large part because of new economic and political pressures stemming from reduced quotas and constraints related to endangered species.
- *the link between management structures and motivation.* The structure of the management system affects fishermen’s willingness to participate in data gathering efforts. Resolving allocation issues and establishing a long-term stake in the future of a fishery promotes involvement and the free flow of information.
- *the importance of perception.* Various groups’ perceptions of each other strongly influence their communication with and behavior towards each other. There is a need for new institutional mechanisms that will open and sustain alternative avenues of communication.
- *the importance of scientific credibility and good study design.* The ultimate usefulness of data collected by fishermen depends on its scientific credibility. This is dependent largely on sound study designs that incorporate available knowledge and have a valid statistical basis.
- *the opportunity provided by increased information needs.* The increasing need for information has created a valuable opportunity for fishermen, NMFS managers, scientists, and environmental organizations to cooperate in improving the database for decisionmaking.

These themes have provided helpful guidance in structuring a follow-on comprehensive evaluation of representative case studies of fisherman data gathering efforts. They furnished

the basis for a set of specific questions that will focus the evaluation on issues that are key to the success or failure of such efforts. Finally, the record of the discussion at the two seminars is valuable raw material for those with an active interest in understanding more about fishermen's interest in cooperative data gathering and how this interest can be harnessed to improve the information base for management and research.

## **Appendix 1: Panelists**

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### ***Boston***

#### **Dr. Ellen Pikitch**

Dr. Ellen K. Pikitch is currently Director of marine conservation programs for the Wildlife Conservation Society, headquartered in New York. She is responsible for overseeing the Society's marine research and conservation efforts being pursued at numerous locations around the world. A noted fisheries scientist, Dr. Pikitch has conducted several major field studies focusing on bycatch problems in the U.S., and has also participated in numerous stock assessment projects. In many of these endeavors, she has worked cooperatively with the fishing industry, as well as government agency personnel, and members of the academic and conservation communities. She has authored and edited numerous publications on fisheries science and management topics, including the compendium *Global Trends: Fisheries Management*, recently published by the American Fisheries Society. Prior to her employment with WCS, Dr. Pikitch served as a faculty member of the University of Washington's School of Fisheries, and directed its Fisheries Research Institute from 1992-1996. She currently retains an affiliate faculty appointment at the UW, and continues to serve on graduate student committees.

#### **Craig Pendleton**

Craig Pendleton is the Coordinating Director of NAMA, the North Atlantic Marine Alliance. NAMA is a relatively new organization whose goal is to bring together as wide a range of stakeholders as possible in order to improve decisionmaking about fisheries resources. Craig's responsibilities include helping to establish groundrules for open meetings, identifying potential research projects, and raising money to support these. He has been a commercial groundfish and shrimp fisherman for over 30 years and has a degree from the University of Rhode Island's commercial fishing and marine technology school.

#### **Felix Cox**

Felix Cox is a red snapper fisherman based in Aransas Pass, Texas. He was born in North Carolina and has been fishing since childhood. He shrimped throughout the Gulf of Mexico in the 1960s and entered the red snapper fishery in the late 1970s. Felix became active in management issues after the snapper fishery became a derby fishery in 1990, motivated by his strong belief that the derby fishery is destructive of both snapper stocks and fishermen's livelihoods. In the mid-1990s, Felix was appointed to the Gulf of Mexico Fishery Management Council's reef fish and red snapper advisory panels and has worked through those bodies to promote individual quotas. He has also worked with industry, environmental, and scientific organizations to promote IFQs.

#### **Bill Amaru**

Bill Amaru is a trawler/longliner who works out of Chatham, Massachusetts. In an earlier incarnation he studied music at the State University of New York and the New England Conservatory of Music, but returned to fishing in 1974. By the mid-1980s, "it was obvious to [him] that we were fishing at unsustainable rates" and he began arguing for harvest restrictions at meetings of the New England Fishery Management Council. Bill was appointed to the Council in 1995 and helped develop the Council's response to the Northeast groundfish crisis, which included severe cutbacks in effort. He has also helped create new regulations to promote conservation in the scallop fishery and has worked with NMFS to test

the usefulness of bycatch reduction devices for the silver hake fishery. As a result of these and other efforts, he has a reputation as a leader in the effort to balance commercial fisheries with effective conservation and spoke on this topic at the National Oceans Seminar in June 1998 at Monterey, California.

### **Dr. Bonnie McCay**

Dr. Bonnie McCay is a Professor of Anthropology and Ecology and the Associate Director for Marine and Coastal Issues at the University of New Jersey at Rutgers. She received her Ph.D. in anthropology in 1976 from Columbia University and since then has performed extensive research on the anthropology and human ecology of fishing communities.

### **Dr. Steve Murawski**

No bio available.

## **Seattle**

### **Dr. Robert Francis**

No bio available.

### **John Gauvin**

Mr. Gauvin is the director of the Groundfish Forum, a trade association of flatfish freezer trawlers working to reduce bycatch in flatfish fisheries of the Bering Sea. He has combined commercial fishing experience with his economic and analytical training to create viable solutions to problems of overcapitalization, enforcement, and bycatch. Specific accomplishments include an ITQ system for wreckfish and management/industry experimental fishing permits to test industry-developed bycatch reduction devices. In 1994, Mr. Gauvin launched the Sea State program for the flatfish fisheries of the North Pacific. Sea State is an industry-initiated program based on identifying vessel-specific fishing positions and bycatch rates for prohibited species. The program reduced crab bycatch ten-fold its first year and has been successfully expanded to other prohibited species. These efforts have resulted in the attainment of target catch quotas in fisheries formerly constrained by prohibited species catch quotas. Mr. Gauvin has held economist and management positions for fishery management councils in the U.S. as well as several positions in the fishing industry.

### **Dr. Bruce Leaman**

Dr. Bruce Leaman is the Executive Director of the International Halibut Commission. Prior to that, he spent 21 years at the Pacific Biological Station at Nanaimo, British Columbia, where he was responsible for stock assessments of rockfish, sablefish, and lingcod as well as database development. His primary interest is in the biology of long-lived animals. His work has highlighted the need for bringing evolutionary biology to bear on management and the resultant need for alternative harvest strategies for long-lived fish. At the Commission, Dr. Leaman has promoted the use of experimental management approaches that may be better adapted to the biology of halibut.

### **Mark Lundsten**

Mark Lundsten is the owner-operator of the fishing vessel *Masonic*, a 70-foot longliner in the Gulf of Alaska and the Bering Sea. Mr. Lundsten fishes for halibut and sablefish and was active in the development of the IFQ system for the halibut fishery. He has also promoted conservation through the development of innovative bycatch reduction measures and

responsible management approaches. In addition to his active fishing, Mr. Lundsten has participated in a number of management commissions. He was a member of the Seminar Board of the International Halibut Commission from 1982 - 1986 and again in 1997, and served on the halibut committee of the North Pacific Fisheries Management Council. He has also been an advisor to the International North Pacific Fisheries Commission. Mr. Lundsten graduated from Pomona College with a B.A. in English Literature and completed two years of graduate studies in this area at the University of Washington before taking up commercial fishing.

### **Karen Garrison**

Karen Garrison is a senior policy analyst in the San Francisco office of the Natural Resources Defense Council (NRDC), where she works to protect Pacific salmon, marine life, and the ecosystems on which they depend. Ms. Garrison co-directs NRDC's Ocean Protection Initiative and directs its Northwest Salmon project. She helped found and co-chairs Save Our Wild Salmon, a Northwest coalition of fishing, business, and environmental groups, and is an active member of the Pacific Ocean Conservation Network, a consortium of marine conservation groups. Ms. Garrison co-authored *Hook, Line and Sinking*, a report on global marine fish declines, and other NRDC reports. She has testified often before Congress and the California legislature, and served on a number of boards, including the Urban Creeks Council and the Cadillac Desert Video Advisory Board. She holds an M.S. degree from the Energy and Resources Group at the University of California at Berkeley.

### **Bob Mikol**

No bio available.

### **Dr. Cyreis Schmitt**

Ms. Cyreis Schmitt is the groundfish program manager for the Northwest Fisheries Science Center, National Marine Fisheries Service (NMFS). Although an employee of the Washington Department of Fish and Wildlife (WDFW), she is currently working for NMFS under an interagency agreement. Since 1986, she has held several positions at WDFW: division manager for habitat conservation, legislative liaison, fisheries resource manager, and fisheries biologist. From 1974-1985, she was a fisheries biologist with the International Pacific Halibut Commission. She received a B.S. in Oceanography and Zoology and a M.S. in Fisheries from the University of Washington. During her career, she has authored 15 publications on groundfish research and management.