



2010 Northeast Regional Social Science Symposium



This report is a summary of the 2010 Northeast Regional Social Science Symposium held at the University of New Hampshire in Durham, New Hampshire, on April 12. The symposium was convened by New Hampshire Sea Grant and the Northeast Consortium as a forum to discuss the status of social science data collection and use in the management of marine fisheries, and how current gaps in social science data might be filled to better manage fisheries. Rather than summarize each talk, poster and discussion session individually, this report organizes outcomes into theme areas to highlight key take-away messages. This document should not, however, be considered a consensus statement of all presenters and attendees.

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Introduction

As complex as marine ecosystems are, perhaps equally or even more complex are the people and communities who study, manage and use them. Although federal law (i.e., the Magnuson-Stevens Act and amendments) stipulates that biological requisites override all other concerns for the management of fisheries, it also recognizes that because people are an integral part of marine ecosystems, social and economic aspects must be considered. A key role of social science has been to examine the tradeoffs between meeting biological objectives and the impacts on or opportunities for fishing communities.

Most stakeholders would agree, however, that the need for social science data and analysis in fisheries management is still greater than the supply, and that we have yet to achieve a scientifically sound understanding of the social and economic components of marine ecosystems.

The path of U.S. fisheries since the Fishery Conservation and Management Act was passed in 1976 has had four phases. The social science being done at each phase has been specific to the management goals of the time. These phases are summarized below:

1970s

The 1970s brought an expansion of domestic fisheries. Social science was rudimentary and reflected the expansion goals.

1980s

The 1980s brought limits; many domestic stocks were fully utilized and some were over-exploited. Social science was driven by the implementation of limits.

1990s

The 1990s brought a contraction of the fisheries and a greater emphasis on the protection of fish stocks. Federal law was amended with much stronger language concerning the needs to prevent overfishing and protect critical habitat and fishing communities. Social science addressed the need to contract, address overcapacity and assess the impacts of regulation on fishing communities.

2000s

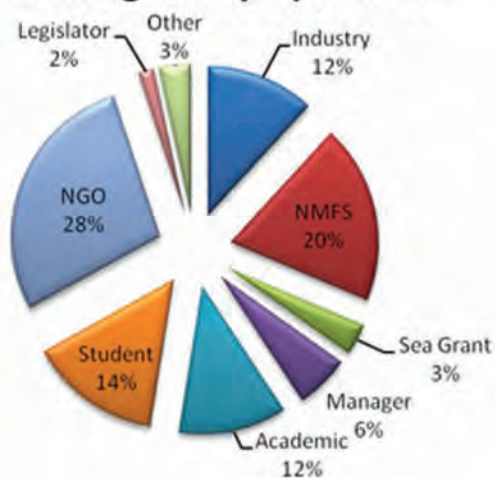
The 2000s brought a broadening of the scope of management to include ecosystems. Social science currently focuses on determining how we include ecosystem approaches and inclusion of fishermen's knowledge into assessment and management.



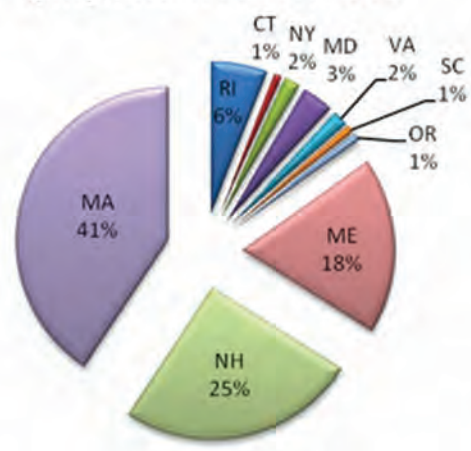
Bringing the diverse marine stakeholder community together to discuss current states of technology, critical management concerns, and emerging issues has been a key element of the Northeast Consortium and New Hampshire Sea Grant. On April 12, the 2010 Northeast Regional Social Science Symposium was convened at the University of New Hampshire to discuss how social science data needs have evolved with the management of marine fisheries, how they have been applied, and the current gaps that exist in social science data.

More than 120 fisheries stakeholders from 10 states attended the one-day symposium. Attendees included commercial fishermen, government and academic scientists, fishery managers, students, representatives of non-governmental organizations and others. Keynote speaker Dr. Susan Hanna, Professor of Marine Economics at Oregon State University, offered meeting participants a national as well as a West Coast perspective of fisheries management and social science through a discussion she titled 'East and West — The Path Ahead for Social Science Data.'

Affiliation of Stakeholders Attending the Symposium



Home State of Symposium Attendees





Symposium objectives:

- Summarize and evaluate the region's existing data collection efforts in fisheries social science.
- Identify data collection gaps that, if filled, could provide more accurate impact assessments of fishing regulations on the fishing industry and fishing communities.
- Identify processes and methods that could be initiated to meet data collection needs.

Through a combination of facilitated discussions and formal presentations, those in attendance identified critical data gaps in social science. Filling these gaps will lead to a more accurate description of the fishing community as a whole and allow better assessment and consideration of the social and economic impact that management actions may have. Ways were offered to strengthen the educational role of social scientists in informing policy, the public, stakeholders and managers, so that management can more effectively engage in "managing people, not fish."

These pages represent key themes from the presentations and discussion, summarizing what was discussed, the data gaps identified and potential solutions for better integration of social science data into fisheries management. It should not, however, be considered a consensus statement of all symposium participants.



Oral Presentations

"An overview of social science, economics and management data related to historical New England fisheries."

Karen Alexander, *Ocean Process Analysis Laboratory, UNH*

"NEFSC and management perspectives."

Dr. Eric Thunberg, *NOAA/NEFSC Social Science Branch*
Steve Correia, *Massachusetts Division of Marine Fisheries*

"Fisheries employment data."

Dr. Daniel Georgianna, *School of Marine Science and Technology, University of Massachusetts Dartmouth*

"Melding ways of knowing: maps and talk about fisheries, communities and the ecosystem."

Dr. Madeleine Hall-Arber, *Massachusetts Institute of Technology Sea Grant*

"East meets West — The path ahead for social science data."

Dr. Susan Hanna, *Coastal Oregon Marine Experiment Station and Oregon Sea Grant, Oregon State University*

"Collaborative social science research: The Gloucester infrastructure project."

Dr. Sarah Robinson, *Critical Inquiries Research*

"Equity and community aspects of catch share/sector programs."

Dr. Seth Macinko, *University of Rhode Island*

"Behind the scenes: Development of a New England groundfish sector."

Jennifer Litteral, *Island Institute & The Port Clyde Community Groundfish Sector*



Data Needs

The National Marine Fisheries Service has developed strategic plans for the development of social science data, research and staffing. However, the implementation of these plans is done within the larger context of the National Oceanic and Atmospheric Administration (NOAA), where support for social science has been generally weak. In 2003 and 2009, external reviews of NOAA's investment in social science concluded that the capacity of the agency to meet its mission and goals was undermined by underrepresentation and underutilization of social science. Budgetary support of social science is low. For example, the FY08 NOAA budget dedicated just 0.6% of the funding towards social science, and the funding has been decreasing since FY05. Rather than having a NOAA-wide programmatic framework to collect comprehensive social and economic data, efforts have been more disjointed, situational and reactive to management needs of the day. How do we move towards a programmatic approach to social science research?

Social science has helped examine the tradeoffs and opportunities within the management alternatives that would meet the biological requirements of federal law. Within the law, there is little specific guidance to direct socioeconomic research, thus social and economic data collection plans have developed in concert with specific fisheries management needs.

The Social Science Branch of the Northeast Fisheries Science Center (NEFSC) has identified five fishery performance measures that it aims to measure: financial viability, distributional outcomes, governance, stewardship and well-being. In addition to the data regularly collected by the branch (see table), two new surveys are being rolled out, one focused on vessel owners and captains and the other for crew members, to better identify who and how many people are employed in fisheries. The branch is also contracting with a non-profit organization to focus on social capital and job satisfaction indicators, both intended to be longer-term projects. The branch also hopes to develop outreach programs related to social science.

“Baseline data is critical. You can’t start a baseline in the middle of a crisis.”

– fisherman

“Our ability to identify social impacts beyond economics is very poor.”

– fishery manager



Data collected by NEFSC Social Science Branch

Source	Data
Permit application	Vessel characteristics Home port/addresses of vessel owner/captain Captain's height/weight
Dealer reports	Pounds/value of species landed Which vessels they work with
Vessel trip reports	Pounds of species kept/discarded Gear type Number of crew Time/location of fishing
Observer logs	Trip costs Captain's years of experience
2007-09 Fixed Cost Survey	Permit fees Industry association dues Communications/travel expenses Office management expenses
Multiple	Port profiles (not exhaustive)

"Once you know how to define your baseline, and you've identified its advantages and disadvantages, you know what kinds of questions to ask of new and historical datasets."

– K. Alexander

"If fisheries management is truly about managing people and not fish, where do we see the investment behind understanding the people that we are managing and all of the human dimensions of fisheries management?"

– S. Hanna

Specific data needs identified by the Symposium

- Fishing businesses
 - Identification all vessel crew members
 - Household income
 - Age and state of residence of all crew
 - Number of vessels on which an individual works
 - Insurance costs
 - Level of debt/bank payment costs
- Fishery-wide
 - Number of fishermen participating in a fishery
 - Percent of fishermen income from a fishery
 - Health, wellbeing and safety
- Related shore-side infrastructure
 - Number and types of businesses
 - Financial health
 - Additional port profiles
 - Use of fish (fresh consumption or processing)
- National health
 - Contribution of seafood to nutrition budgets
- General
 - Time series data
 - Impact assessments of management actions

Recommendations

Improve Employment Information

1.

There are very little data on employment by fishery. Employment by fishery is estimated from total crew size per fishing trip, but that does not factor in how many individuals work part- or full-time, or if individuals work on more than one boat. Vessel log books from the 1800s contain more detailed records of crew employment and income than do today's log books. There are few references to quantitative employment effects of management alternatives included in Environmental Impact Assessments and Stock Assessment and Fishery Evaluation reports. Perhaps creating an identification number for fishermen might help track employment data over time.

2.

Use Community Researchers

Fishermen and community-based organizations have proven effective and cost-efficient participants in collaborative research, particularly related to social and economic topics. Use of collaborative research should be expanded and more fully integrated into management considerations.

3.

Develop Baselines

Social and economic data collected should have a broader basis and be exhaustive enough to be useable irrespective of the management regime in place. Data collection methods and means of summarizing data should be more nationally standardized.

4.

Conduct Management Impact Assessments

Too often, social scientists are utilized only while management alternatives are being developed, but there should be greater emphasis on assessing the impacts of management actions that have been enacted. This will help determine if management plan goals were met and how future plans can improve.



Utilization of Data

The ecological knowledge of the industry provides important context for scientific data, however it is commonly stated that local, traditional knowledge does not fit the strictures of science and therefore cannot be used. Consequently, important context is not considered. Supporters of ecosystem-based management advocate incorporating local or traditional knowledge, which includes social knowledge (goals, visions and norms), in the management plans. Few, however, seem to know how to gather, evaluate or apply it.

As long as fisheries management is seen as primarily a biological problem, social science will remain at the margin. Social scientists have often been underutilized, due to the difficulty that fishery councils have had in articulating measurable social and economic objectives. Rather than contributing to the initial shaping of alternatives and trade-offs to achieve management goals, social scientists are often used in providing multiple analyses of alternatives in an attempt to find an alternative that makes everyone happy.

Management alternatives are often not known until fairly late in program development, which can lead to a mismatch between implementation deadlines and the time needed to collect and analyze data to weigh the alternatives. This points to the importance of having ongoing data collection programs in place. Federal requirements on timeframes for data review often hinder the ability to conduct a timely assessment of specific management alternatives. Long-term federal data collection programs are easier to implement (funding is the largest constraint) than responses to near-term data needs.

"It took the most recent revision of the Magnuson-Stevens Act before we got Congress to allow the collection of economic data. It was banned up until then."

– social scientist

"There has been a "Fire...Aim...Ready" approach to looking at social impacts. Catching up is difficult."

– fisherman

Recommendations

1. *Keep Social Issues in the Conversation*

Social scientists need to have a constant presence on science and statistical committees and plan development teams to keep social issues “on the table.”

2. *Improve Transparency*

Be more transparent about what social and economic information is being used in management. The socioeconomic analysis conducted for a management plan is available, but typically buried in thick documents. There needs to be a standard, succinct way to present data in a manner understandable to the public.

3. *Broaden Data Use*

Community profile and fishery information can help inform consumers and the public in addition to fishery managers. Coastal communities should be much more knowledgeable about their fisheries.

Strengthen the connection between data and management by focusing on improving:

4.

Effectiveness: fit the social/economic context of the fishery into the regulatory mix.

Efficiency: generate more benefits than costs with particular management actions.

Equity: ensure fairness of distribution and full representation.



Fisheries Economics

Ever since the mid-1980s, the groundfishing industry in New England has been in a period of contraction, with limits instituted in order to preserve fish stocks. Consolidation and transfer of fishing pressure to other fisheries (e.g., lobstering) has resulted, as too many fishermen receive a “decreasing piece of a decreasing pie.” How can social and economic information help sustain the industry during tough times? In addition to the work scientists can be doing, many ideas were shared for steps that the industry can take to increase profitability in general.

“It all comes down to dollars. Help us increase the price of product.”

– fisherman



“Most economists would argue that there are too many fishermen employed in fisheries, though fishermen would argue that there are too many economists!”

– D. Georgianna

Recommendations

1.

Prediction and Planning

Economic analysis can predict likely outcomes of different management actions and may help prevent overinvestment by the industry.

2.

Streamline Vessel Costs

Vessel engineering can improve energy efficiency to lessen fuel costs, thus decreasing the carbon footprint of fishing. This would improve the overall sustainability of the industry.

3.

Industry Proaction

Fishermen are stereotyped as individualists who fish alone (or with a small crew), learning their trade by experimentation and cunning. The reality is that they learned how to run a boat and where to fish from others in a network. Industry members need to better utilize their networks to help bolster the industry at large.

4.

Diversity Income and Options

Working together, fishermen can help secure the future of the industry by helping secure waterfront access, forming associations to represent interests, and forming cooperatives and local marketing initiatives.

5.

Maintain Fleet Diversity

Diversity in fisheries helps ensure that the diverse opportunities in the market are being met. Smaller boats are good for bringing in a daily, local food source, whereas larger operations can supply larger markets.



Learning From Previous Examples

The workshop discussed several national examples of how socioeconomic data can help inform management decisions and daily fishing operations.

In Port Orford, Oregon, a small town heavily dependent on fisheries, the industry has been very proactive in using social science to demonstrate the importance of fisheries to their community. They initiated a Marine Economic Recovery Plan, using community profiles and making decisions that will help gain local control over the Port Orford Reef. They formed an Ocean Resources Team to map fishing grounds using fishermen's ecological knowledge and to define fishing gear that is appropriate for the area to reduce bycatch and protect habitat. They are creating a marine stewardship area, for which they propose to be responsible for community-based management.

In New Bedford, Massachusetts, the employment and income of the offshore dragger fleet has been assessed at a few points in time. A series of labor-intensive interviews of about 70% of the fishermen were conducted by community researchers, who also obtained data from settlement houses. It was a complete study in terms of sample size, but there were challenges due to the confidentiality of data. The methods and results are very port-specific. Researchers concluded that this type of study must be conducted by someone in the port whom the industry trusts.

In the mid-1990s, there was fierce competition for Pacific whiting, but resolution of the onshore-offshore allocation of the TAC created the conditions for an offshore sector to form the Pacific Whiting Conservation Cooperative in 1997. The cooperative now uses socioeconomic data to help internal coordination to increase revenues and lower costs. Within the cooperative, real-time bycatch recording has been developed and bycatch-related issues have been sufficiently addressed.



Rather than accept growing reliance on just one fishery (lobster), fishermen from Port Clyde, Maine, sold the development rights of their lobster pier to the state and used the proceeds to build a dock for the groundfish fleet. The groundfish fishermen have worked with the Island Institute to form the Midcoast Fishermen's Cooperative, a fish cooperative focused on direct marketing and branding of Port Clyde Fresh Catch. Fishermen involved with the community supported fishery (CSF) now receive much higher prices for their fish than they would otherwise. The Midcoast Fishermen's Association was formed so that members could have a more active voice in regional management, and all association members have now joined the new Port Clyde Community Groundfish Sector. The fishermen are using social and economic knowledge in their daily decisions, and their experience would be a valuable case study for social science research.

For the Alaskan king crab fishery in the Bering Sea, 2005 marked the first year of rationalization. There were 74 vessels that went fishing for six months, versus 251 fishing for one month in 2004, the last year of the derby fishery. Although the total allowable catch has increased since 2005, social scientists estimated that rationalization resulted in about 1,000 lost jobs. This case highlights a critical difference between theory and reality — conventional fisheries economics teaches that removing boats from an open fishery can, in theory, produce enough benefits to both compensate those who exit the fishery and leave those remaining in the fishery better off. However, compensation is rarely paid and the Alaska case demonstrates that rationalization can bring substantial changes in crew workplace dynamics and income.

A community panel was set up in 2002 in Gloucester, Massachusetts, to develop a community-based process for gathering and assessing social science data relative to the fishing industry. Shore-side support stakeholders participated in the panels, as well as industry organizations, the harbor plan implementation coordinator, and fishermen. Although the goal was to create a broad baseline, the project participants regrouped and focused on providing data, in light of Amendment 13 to the groundfish plan and associated litigation over mandatory cuts in fishing effort. The project was designed to set up a long-term data collection process, but that has not happened, mostly due to resources and time. The data was used extensively in the harbor planning process and Gloucester is now referred to as a regional hub. That did not occur until after this project.



In 2003, the West Coast groundfish trawl fishery implemented an industry-funded vessel buy-back program to address overcapacity. The program removed one-third of the vessels from the fleet. This was followed by the development of a trawl individual tradable quota program, which will be implemented in 2011. Social scientists were engaged in analysis of program design, initial allocation, regulatory alternatives, and the development of community profiles. Social scientists at the NMFS Northwest Fisheries Science Center are conducting a pre-implementation industry survey, which will be followed by post-implementation surveys and program evaluation. This program evaluation is a welcome development for the West Coast, where there have been large-scale management actions, but a poor record of program evaluation.

In general, output controls have not been controversial in West Coast fisheries. When access limitation began to be discussed in the early 1980s, the idea generated controversy, but it is now accepted practice. Rationalization through market-based approaches has had mixed acceptance among different sectors of the industry. Within West Coast fisheries, the access and rationalization questions were addressed at different points of time. In New England, we are faced with the challenge of addressing all these issues at once.

"I searched the grey literature for studies of [commercial fishing] infrastructure needs. Not much turned up. We decided to ask what [infrastructure] is necessary to support commercial fishing."

– S. Robinson

Recommendations

1. *Approach Data Differently*

Learn from social studies and outreach efforts that have been associated with forestry and farming. Community supported fisheries have developed from the concept of community supported agriculture. Preservation of working waterfront access stemmed from the idea of preserving small-scale farms.

2. *Expand Data Applications*

Identify social and economic impacts to fishing communities, not just to individual fishermen.

3. *Look to the Past*

Learn from prior changes in the fishing communities to help inform future decisions.



Roles of People and Organizations

Since fisheries management is largely about regulating human activities, it is highly political. Individuals and organizations can have a large impact, not just on management, but also on what and how social and economic data inform decisions. The NEFSC Social Sciences Branch currently has eight economists and four social scientists. They study economic efficiency, markets, fishery management design, recreational fisheries, regional economics, international trade and social issues. A theme throughout the symposium however was that a broad array of stakeholders is needed to participate in collecting, analyzing, and using social and economic information. Social scientists can work to help develop human capital among fishery stakeholders for more effective participation in fishery council processes. Building participation by building capacity and knowledge will help manage the people, not just the fish.

“There are community members eager to help. Reach out! Use us!”

– fisherman’s wife

“Rather than investing in comprehensive study of the human component of fisheries, stakeholder testimony has often substituted for social science. Imagine if we did stock assessment this way!”

– S. Hanna

“By collaborative, I mean that both parties come to the table with something to offer. ‘I want to listen’ is not a trading of expertise. People must feel it is worthwhile to work with you.”

– S. Robinson

Recommendations

Questions Framed with Industry

1.

Involve fishermen in helping frame research questions and providing data. In other regions, the fishing industry and communities have sometimes been the drivers in management actions and the social science data that have been collected. They are the ones who have demanded the data gaps be filled in by appropriate social science to move away from perceptions to a more empirical base for decisions.

Enhance Literacy

2.

Fishing communities and fishing industry members often lack sufficient awareness about management and how what happens in the regulatory process affects their businesses and communities. Similarly, social scientists cannot be effective without knowing the details of the regulatory process to determine what information is needed and at what point would its introduction be most effective.

3.

Create Regional Data Collection Frameworks

A number of different entities collect data (e.g., towns, industry organizations, academics, agencies), but they need to be better fit into a framework to create synergies.

4.

Establish a Role for Social Science

A role for social science needs to be carved out and protected within NOAA and the fishery council process.

5.

Educate Others Through Engagement

Work with all of the interests to educate about what social science is, why it is valuable, and the data that need to be considered. Promote interdisciplinary communication. Discuss the opportunity costs for not having baseline data.



Sectors

Since the symposium occurred just a few weeks before the implementation of Amendment 16 to the Northeast Multispecies Fishery Management Plan, which will result in a greatly increased number of fishermen participating in sectors, the issues related to catch share management systems were discussed throughout the event. Amendment 16 also lowers groundfish allocations, so it will be difficult for social science to tease out impacts on the industry from multiple, simultaneous changes. Regardless, it was expressed that social science has a distinct role in helping assess the impact of sector management. Outlined below are not only ideas for research on the needs and challenges associated with sectors, but also ideas for increasing the viability of sectors.

“With sectors, fishermen are now one voice in 17, not one in 1,200. There is no reason why management can’t check in with 17 sectors.”

– J. Litteral

“We need to think more broadly than catch share performance measures and provide useful information for managers regardless of the regime in place.”

– E. Thunberg

“The process from thinking as individuals to working as a group is scary for fishermen, but they are moving forward, voting on what is best for all in the sector.”

– J. Litteral

Recommendations

1.

Research Impact of Permit Banks

Determine if permit banks are actually making small fishing communities viable as desired.

2.

Research Impact of “Laissez-faire” Management

Amendment 16 did not have explicit social objectives. For the sector allocation process, it aimed to provide “a mechanism for economics to shape the fleet rather than regulations.” Assess how economics influenced the industry.

3.

Track “ACE” Trading and Selling

The daily trading and selling of Annual Catch Entitlements would help track what is happening in the fishery, between and among sectors.

4.

Stabilize Prices

Explore the feasibility of connecting sector annual catch entitlements to secure price-per-pound arrangements.

5.

Expand Gear Options

Because bycatch counts against fishermen in a sector, they will need access to more selective gear to remain viable.

6.

Support Fledgling Sectors

Sectors provide a new way of doing business. Fishermen are now responsible for enforcement of sector rules. They now make decisions as a group and have committees (e.g., infractions). Fishermen may need support in starting fledgling organizations.

7.

Connect Managers with Sectors

Sectors have an opportunity to increase the voice of fishermen because they now speak as a group, allowing better representation at the management meetings.



Conclusions

The symposium brought together diverse fisheries stakeholders, each offering his or her own point of view on social science and the management process. Discussions of historical fisheries and their management brought a unique perspective to later discussions of current practices. The theme throughout was that the impacts of fisheries management on people, our commercial fishermen and the businesses and communities they support, need to be a higher priority when assessing regulatory alternatives.

The lack of a strong baseline upon which to compare potential and actual impacts was a critical data gap identified by those in attendance. This is a difficult and complex question for the research community to consider. Shifting baselines occur in social science, as with all other aspects of fisheries science. Where do you set a baseline? Do you go back to before sectors, to before the recent collapse of groundfish, or prior to the modern era of regional management? To begin to answer these questions, the science community must first determine what baseline would be the best and most useful to address management needs by considering the drawbacks and advantages of one baseline over another. It may not be possible to choose one time period as the baseline, but rather to ensure that sufficient data is available from each time period to answer ever-evolving management questions.

“We second the plea for baseline data and struggle with what data we can realistically get before programs begin.”

– S. Abbott-Jamieson

“Scientists assume they know what optimal is. We need to do a better job of achieving highest potential.”

– R. Robertson



Many who attended, particularly industry members, expressed frustration with the lack of existing social data. In actuality, the problem may not be lack of data but lack of guidance on how it could and should be used. Social science information becomes, with time, historical data. Managers and researchers must consider what can be learned from these pools of existing information. Perhaps there are ways to tease different kinds of information out of them by linking them to other datasets and examining the resulting patterns in different ways. However, before we begin to consider what can be learned, regulatory agencies must frame social science efforts by identifying research agendas and priorities.

Social science has an important role to play in each part of the fisheries system: from creation of law, to the collection and interpretation of data, to stakeholders' need to be educated and engaged, to the allocation of the catch, to marketing the product. Fisheries management is about managing people, not fish. Although most scientists agree this adage is true, much stronger commitments are needed to more successfully address the human component of fisheries management.



Other Symposium Contributors

Poster Presenters

Feeney, R. G., K. J. La Valley and M. Hall-Arber. "Assessing stakeholder perspectives on the impacts of a decade of collaborative fisheries research in the Gulf of Maine and Georges Bank"

Feldman, L. "Spatially explicit methods of fisheries management"

Keiley, E. F. "A multidisciplinary approach to evaluating the performance of U.S. fisheries management systems: Developing performance indices based on the national standards"

Jekielek, P., and T. R. Johnson. "Social networks and participation in cooperative fisheries research in the northeast U.S."

Lord, F. "Social Impact Assessment – Understanding impacts by using new social variables and processes, as shown in a causal model diagram"

O'Keefe, C., and G. DeCelles. "Achieving optimum yield in the scallop fishery by confronting yellowtail flounder bycatch"

Seara, T., K. Yentes, J. Peros, S. Grimley, J. Moore, R. Pollnac and L. Colburn. "Identification and use of indicators for applying a non-economic social impact assessment model for the management of New England fisheries"

Westwood, A. D., B. Rothschild, S. X. Cadrin, F. Azadivar, Y. Jiao, D. Georgianna. Y. Zhang, A. Wood, E. Keiley, C. O'Keefe and L. Kerr. "A systems approach to informing fishery science and management in New England, USA"

Rapporteurs

Christian Canache, University of New Hampshire

Emily Klein, University of New Hampshire

Jessica Joyce, Gulf of Maine Research Institute

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Carolyn Woodhead, NOAA/Northeast Cooperative Research Partners Program



Closing Remarks

Dr. Rob Robertson, University of New Hampshire

Dr. Susan Abbott-Jamieson, NOAA Office of Science and Technology

Displays

Gloucester Fishermen's Wives Association

Massachusetts Fishermen's Partnership

Sam Murfitt, Photographer

New Hampshire Sea Grant

NOAA/NEFSC/Northeast Cooperative Research Program

NOAA/NMFS/Voices of the Fishery

Northeast Consortium

Northwest Atlantic Marine Alliance

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Sam Murfitt: inside front cover (all photos); top photo on pages 2, 3, 4, 21, 22, 23

Resources

Final Amendment 16 to the Northeast Multispecies Fishery Management Plan
available at: <http://www.nefmc.org/nemulti/index.html>

To view recordings/presentations from the symposium, please visit:
http://extension.unh.edu/Marine/FA_FMGMT.htm



Notes

This publication was supported by the National Sea Grant College Program of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration under NOAA grant NA060AR4170109 and by the Northeast Consortium under grant NA06NMF4720095. The views expressed herein do not necessarily reflect the views of any of those organizations.



