



Proceedings of a Conference on Fisheries Management in the United States
held in Washington, D.C. • March 24-26, 2005

David Witherell, Editor

The conference was sponsored by the Regional Fishery Management Councils, the Fisheries Commissions, and NOAA Fisheries.



Witherell, D., editor. 2005. Managing our nation's fisheries II: focus on the future.
Proceedings of a conference on fisheries management in the United States held in Washington, D.C., March 24-26, 2005.
Printed in the United States of America

Cover photo: *F/V Kristen Gail* in the Bering Sea. ©Dan Parrett/AlaskaStock.com • Conference photography by Photographics, Washington, D.C.
Photo opposite page: Dipnetting for sockeye salmon on the Kenai River, Alaska. Courtesy Bill Wilson.



TABLE OF CONTENTS

Preface ... 7

Section I. Opening Remarks and Keynote Speeches

Capt. Paul Howard ... 10
Dr. Bill Hogarth ... 12
Senator Ted Stevens ... 15
Representative Wayne Gilchrest ... 17
Vice Admiral Conrad Lautenbacher, Jr. ... 22

Section II. Reports from Councils and Commissions

1. North Pacific Fishery Management Council ... 34
2. Western Pacific Fishery Management Council ... 40
3. Gulf of Mexico Fishery Management Council ... 44
4. Mid-Atlantic Fishery Management Council ... 49
5. New England Fishery Management Council ... 54
6. Caribbean Fishery Management Council ... 59
7. South Atlantic Fishery Management Council ... 63
8. Gulf States Marine Fisheries Commission ... 70
9. Atlantic States Marine Fisheries Commission ... 77

Section III. Panel Reports and Workshop Summaries

Main Conference Panel Summary Report ... 82
Scientific and Statistical Committee Report ... 94
Advisory Panel Reports
1. Developing an Ecosystem Approach to Fisheries ... 100
2. Strengthening Scientific Advice for Management ... 106
3. Establishing Criteria for IFQ Programs ... 112
Workshop Summaries
1. Defining Marine Protected Areas and Protecting Deep-water Corals ... 119
2. Addressing Overfishing and Stock Rebuilding ... 123
3. Fisheries Governance ... 129
4. Reconciling Conflicting Statutes ... 133
Summary Findings Tables ... 137

Section IV. Invited Papers

1. Ecosystem-based Management: To Amend or Not Amend (The Magnuson-Stevens Act), That is the Question + *Gregg T. Waugh* ... 148
2. Overfishing Scorecard + *Roger Rufe* ... 158
3. Strategies for Incorporating Ecosystem Considerations in Fisheries Management + *Steve Murawski* ... 163
4. Use of Scientific Review by the Regional Fishery Management Councils + *David Witherell* ... 172
5. Improving the Scientific Basis for Management by Separating Conservation and Management Decisions + *Lee Crockett* ... 190
6. Practical Recommendations for Improving the Use of Science in Marine Fishery Management + *Paul A. Sandifer and Andrew A. Rosenberg* ... 197
7. How Legislated Criteria for Individual Transferable Quotas Could Defeat the Purpose of Transforming Fishermen from the Fox Raiding the Henhouse into the Farmer Guarding the Henhouse + *Richard B. Allen* ... 211
8. Balancing Flexibility and Safeguards in IFQ Programs: A Plan for Action + *Dorothy M. Lowman* ... 226
9. In Search of Transition, Community and a New Federalism: Six Questions to Confront on the Road Towards a National Policy on Dedicated Access Privileges + *Seth Macinko* ... 236

Section V. Poster Abstracts ... 245



SECTION I



MANAGING OUR NATION'S FISHERIES II

Focus on the Future



PREFACE

Managing our Nation's Fisheries II: Focus on the Future is the second conference in a series designed to improve the management of marine fisheries in the United States. The first conference, held in November 2003, focused on regional fishery management programs, their successes, and remaining challenges for managing our marine fisheries resources. The goal of the 2005 conference was to focus on those challenges, as well as on key issues for reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act and on recommendations from the U.S. Commission on Ocean Policy.

PREFACE

The conference was held March 24-26, 2005, at the Omni-Shoreham Hotel and Conference Center in Washington, D.C. The conference was open to the public, and about 600 people attended, including commercial and recreational fishermen and other fishing industry participants, fisheries managers, scientists, academics, environmental organizations, Congressional staffs, media, community leaders, regional Council members and staff, federal and state fisheries agency staff, and other interested members of the public.

The conference format was designed to reflect the open and deliberative process used by the regional fisheries management councils, and to obtain diverse perspectives on major issues and challenges. A main conference panel composed of Council representatives from each region, NOAA Fisheries officials, and representatives from the Interstate Fisheries Commissions, U.S. Coast Guard, NOAA General Counsel, State Department, and the U.S. Fish and Wildlife Service, deliberated the recommendations from three advisory panels, a scientific and statistical committee, and four workshop groups. The recommendations from these advisory bodies were developed from presentations by invited experts, public comment, panel presentations, and thoughtful deliberations by panelists and committee members.

The three advisory panels focused on developing ecosystem-based approaches to fisheries, strengthening scientific advice for management, and developing guidelines for IFQ programs or other forms of dedicated access privileges. The scientific and statistical committee also addressed these major issues from a scientific perspective. The four conference workshops explored the contemporary issues of defining marine protected areas and conserving deep-water corals, reconciling conflicting fisheries statutes, improving fisheries governance, and addressing overfishing and stock rebuilding.

The conference agenda also included several keynote addresses by high level policy makers, presentations from each of the eight councils and the three marine fisheries commissions, and a poster session. Welcoming remarks were made by Paul Howard, Executive Director of the New England Fishery Management Council, and by Bill Hogarth, NOAA Assistant Administrator for Fisheries. Keynote speakers included U.S. Senator Ted Stevens from Alaska, U.S. Congressman Wayne Gilchrest from Maryland, and Under Secretary Vice Admiral Conrad Lautenbacher.

By all accounts, the conference was a huge success. Contributing to this success were the planning, cooperation, perseverance, and dedication by a number of individuals. Chris Oliver, Executive Director of the North Pacific Fishery Management Council, took the lead in organizing the conference, with the assistance of a Conference Organizing Committee (Stephanie Madsen, David Witherell, Kitty Simonds, Gregg Waugh, Rebecca Lent, Jim Balsiger, Sue Salvesson, Don McIsaac, and Vince O'Shea), and with the input of many others. Gail Bendixen handled many of the logistical details and worked with the hotel staff to ensure a smoothly run conference and banquet. A communications subcommittee, led by Pat Fiorelli, and consisting of Council and NOAA Fisheries public relations staff (Pat Fiorelli, Marla Trollan, Susan Buchanan, Kim Iverson, Jennifer Gilden, Wende Goo, and Sheela McLean) prepared and produced a glossy conference information brochure that generated media interest and outreach. Marla Trollan served as webmaster for the conference website www.managingfisheries.org. Many other people, too numerous to name individually, also assisted with preparations for the conference. And of course, the conference success relied on the excellent contributions of the keynote speakers, presenters, panel moderators, panel participants, poster authors, public participants, and staff.

These proceedings were prepared based on presentations and discussions from the conference. The keynote speeches were transcribed from the presentations. The regional papers were provided by staff from each Council office, and formatted for consistency. The panel and workshop summaries were prepared to be a synopsis of each issue, with information drawn from the background papers, panel presentations and discussion, and issues raised in public comment. The summaries were drafted by the rapporteur and/or staff assistant of each panel or workshop, and were edited for style and content. The nine invited papers were prepared in advance of the conference, and were revised or edited slightly following the conference for inclusion here. The poster abstracts are as submitted by the authors. Contact information for each poster author is provided for readers interested in obtaining more information.

The findings from the main conference panel, and the other information provided in these proceedings, should prove to be very useful and informative as Congress works to reauthorize the Magnuson-Stevens Act, and the administration works to implement the U.S. Ocean Action Plan. These findings, if implemented, would result in substantial improvement of our nation's fisheries and health of ocean ecosystems.

Once again, it was my pleasure to serve as editor for these proceedings.

David Witherell
Deputy Director, NPFMC
Editor





CAPT. Paul J. Howard, USCG (Retired)

Executive Director

New England Fishery Management Council

On behalf of the eight Councils, NOAA Fisheries and the Interstate Fisheries Commissions, it is my great pleasure to welcome you to our second national conference. When we first met 16 months ago, it was to showcase our successes, identify areas for improvement and discuss the future.

The future is now here and we are here today to squarely face our challenges. A lot has happened since our last conference in November of 2003. The New England Patriots have now won the Super Bowl twice, the Red Sox reversed the curse and won the World Series, the Pew and U.S. Oceans Commissions published their final reports, and numerous amendments to our fishery management plans were put in place to further enhance the conservation and management of our valuable fishery resources. I like the course we have set. But like every good seaman, we must constantly look ahead to avoid potential mishaps.

The conference organizing committee has done an excellent job of laying out the very complex issues we will address over the next three days: embarking on ecosystems-based fisheries management, improving the science that forms the basis of our fishery management plans, and building flexibility and safeguards into share-based management programs. With the collective expertise and experience in this room, we will explore a range of innovative solutions to long and short-term problems.

With the Magnuson-Stevens Act up for reauthorization, it is our goal during this conference to find common ground and develop sound rationale for our positions on these issues, and clarify to our legislators our concerns and needs in order improve our effectiveness. But before we begin, I would like to take just a moment to remind ourselves of the basics. They strike at the heart of why we are here.

- It goes without saying that conservation is our top priority, but there are a number of ways to accomplish that goal. No matter which management strategy is pursued, whether it is a single species or ecosystem based approach, we need sound science, a range of management tools, adequate resources, and effective legislation to help us develop effective alternatives that maintain healthy fish stocks while keeping fishermen in business. Above all, we need to match legal requirements with the necessary support and resources to accomplish those mandates.
- We know more must be done, but very importantly, we should be proud of the significant progress made to date to address overfishing, excess capacity, habitat protection and bycatch reduction in our fisheries. Several Councils are leading the way on these issues. In reality, however, we manage people and their businesses, not fish. And fishing is a business — a very dangerous one at that — but otherwise not unlike most others, so let's keep that in mind.

In 1976, the authors of the Magnuson Act crafted a system in which those most affected by management policies would have a voice in decision-making. They also wanted an act that was not just about the fish, but also about fishermen and their communities. That system made sense then and still makes sense today.

- Up there right next to conservation is safety at sea. As one of our members said at a recent Council meeting, the captain has ultimate responsibility for his or her vessel. For our part, we must take care to remember, when we get caught up in the details of our management actions, they affect fishermen's lives and not just their livelihoods.
- Lastly, we have a unique public process in which we strive to balance the competing interests of all our stakeholders. We must work to maintain that process, and improve our effectiveness by capitalizing on our strengths and minimizing our weaknesses. Achieving this complex balance is difficult and often painstaking. In 1976, the authors of the Magnuson Act crafted a system in which those most affected by management policies would have a voice in decision-making. They also wanted an act that was not just about the fish, but also about fishermen and their communities. That system made sense then and still makes sense today.

This is a meeting of our nation's foremost fisheries experts — scientists, fishermen, policy-makers, environmentalists and other stakeholders, representing a wide range of interests. As the experts, no one is better equipped to work toward integrating ecosystem-based approaches into our management plans, refining our science and management tools, improving our governance structures and devising more innovative mechanisms to allow sustainable fish harvesting.

I have confidence that during our time here we will do an outstanding job to accomplish these objectives. We have a lot of work to do over the next three days so I'll end with this thought. Let's be innovative over the next few days. Let's not get caught up in evaluations and report cards which look to the past, do not reflect improvements, or only address one of many considerations in fisheries management legislation. And lastly, let's look beyond overfishing.

Our nation is leading the way in fisheries management. We continue to enjoy remarkable successes. However, many believe the biggest threat to the health of our marine ecosystems is overfishing. I disagree. While overfishing continues to be a major concern, in my opinion, the biggest threats to the health of our marine fisheries and ecosystems are degradation of water quality, loss of inshore habitat, and the introduction of invasive species. It's time we pay attention to these issues and explore ways to enable the Councils and NOAA Fisheries to have a stronger voice and increased jurisdiction over these activities.

Thank you everybody. We appreciate the time you have taken to come to Washington, D.C., and look forward to a productive meeting.



Dr. Bill Hogarth

Assistant Administrator for Fisheries, NOAA

It is with great pleasure that I welcome everyone to *Managing Our Nation's Fisheries II: Focus on the Future*. This conference provides another opportunity to meet, share ideas and concerns, and look ahead to improving the management of our valuable marine fisheries resources.

Much has happened since the first *Managing Our Nation's Fisheries* conference in November 2003. The Regional Fishery Management Councils continue to take steps to ensure the stocks under their jurisdiction are well managed. I congratulate all the councils on their hard work.

New management programs have been developed and implemented, and we continue our progress in using an ecosystem approach to fisheries management. A crab rationalization program is in the final stages of being implemented in the North Pacific. A comprehensive program to manage the sea scallop fishery in the Mid-Atlantic and Northeast through an area rotation program will maximize the scallop yield. A new fishery management plan for West Coast highly migratory species has established conservation measures. Four councils (New England, Mid-Atlantic, South Atlantic, and Gulf of Mexico) have received funds to advance ecosystem approaches to management in their areas by exploring goals and objectives and laying the groundwork for fisheries ecosystem plans.

Measures to end overfishing and rebuild stocks continue to be implemented to ensure sustainable fisheries. A red grouper rebuilding plan is in place in the Gulf of Mexico. New measures to rebuild the groundfish resource in New England have been implemented. Important yellowfin grouper spawning areas are protected in the Caribbean to reduce overfishing.

We've implemented a new National Bycatch Strategy. Collaborative industry partnerships have resulted in new methods and gear. The pelagic longline fishery for swordfish is once again open in the western Pacific and the Northeast distant waters of the Atlantic due to innovative methods to reduce interactions with sea turtles.

We are working to make the regulatory process more efficient and effective for the agency and our constituents. We are revising the Operational Guidelines for fisheries management; instituting advanced technology for e-rulemaking of notices, constituent comments and Federal Register filings; and delegating authority to our regional managers. Improving our processes and implementation of the National Environmental Policy Act has helped improve the agency's litigation record from past years while reducing vulnerabilities. While the rate of lawsuits filed against us has remained fairly consistent, the number of cases defended successfully has increased markedly.

All of this hard work is showing results for the resource. The approximately 1,000 fish stocks managed under the Magnuson-Stevens Act support a \$60 billion contribution to the U.S. economy through recreational and commercial fisheries and provide employment for more than 520,000 individuals. And I see an even more productive future for our fisheries. In our 2003 Status of the Stocks Report, four previously overfished fish stocks were declared fully rebuilt: Georges Bank winter flounder, Atlantic blacktip shark, and South Atlantic and Gulf of Mexico stocks of

As we move toward reauthorization of the Magnuson-Stevens Act as well as implementation of the U.S. Oceans Action Plan, this conference truly provides a needed focus on the future.

yellowtail snapper. This is the most stocks declared rebuilt in a single year. At the same time, the number of stocks overfished or subject to overfishing continues to decline. Since 1997, 30 stocks have increased in population size to a level above their overfished thresholds, while 17 stocks were newly declared as overfished. We have already implemented rebuilding plans for well over 90 percent of overfished stocks to bring them back to their long-term sustainable levels.

September 2004 saw the release of the U.S. Commission on Ocean Policy's final report *An Ocean Blueprint for the 21st Century*. This report outlined numerous challenges for our community and provided an equal number of recommendations regarding fisheries governance and science for us to consider. The Administration's U.S. Ocean Action Plan released in December 2004 responds to the Commission report. The Action Plan identifies immediate and long-term actions for the future relative to over-arching ocean policy — establishment of a new Cabinet-Level Committee on Ocean Policy and passage of a NOAA Organic Act — as well as fisheries management — promoting greater use of market-based systems and expanding the NOAA fisheries survey fleet.

In October 2004, we held the first meeting of all regional council members since 1976. This workshop was attended by over 200 participants and facilitated a continuing dialog on several key issues — such as ecosystem approaches to fisheries management and best available science — that will continue during this conference. More importantly, the workshop offered a unique opportunity for council members from each corner of the Nation to hear, discuss, and yes, debate the best way to meet our goal of sustainable fisheries.

It is clear: the attention to the oceans in general, and fisheries management and research specifically, over the past year and a half has set the stage for this conference. I look forward to our discussions, both formal and informal. The agenda addresses the major issues facing us today — development of ecosystem approaches to fisheries management, stronger science, better management, improved individual fishing quota programs, reducing overfishing, rebuilding overfished stocks, and fisheries governance. As we move toward reauthorization of the Magnuson-Stevens Act as well as implementation of the U.S. Oceans Action Plan, this conference truly provides a needed focus on the future.

Let me close by posing some questions about where will fisheries be a decade from now:

- Will we have eliminated overfishing and ensured sustainability of the public's living marine resources?
- Will dedicated access privileges have eliminated the "race to fish"?
- Will fishing capacity be managed to economically efficient levels?

- Will protected resource, habitat, climate and environmental interactions with fisheries be routinely modeled and resolved?
- Will coastal fishing communities be stabilized, and will fishing as a way of life be a viable career opportunity?
- Will we have maintained economic, social and cultural access to our living marine resources for other consumptive and non-consumptive uses?
- Will we have adequately conserved biodiversity of our ecosystems?
- Will we have adequately derived policies that evaluate and capture the greatest value to the nation from all sectors, not just fisheries, competing for some use or non-use of our oceans?

Since I can't predict the future, I don't have the answers. But, what happens in this conference over the next three days will strongly influence the answers to these questions, and I'm both excited and ready to be a part of it. I hope you are too. Thank you all for coming to help shape the future of fisheries.

Senator Ted Stevens

U.S. Senator from Alaska
(videotaped speech)

Thank you for coming to Washington, D.C. I'm not with you today, because after 25 years of marriage, Catherine and I have finally taken our honeymoon. Since this is a conference of fishermen, I know you'll understand that I just can't pass up this trip with the best catch of my life.

I took on the challenge as Chair of the Senate Commerce Committee in January. I co-chair this committee with a man I consider my brother, Senator Daniel Inouye of Hawaii. Issues related to management of our nation's fisheries are at the top of our committee agenda. Earlier this year we restructured the Commerce Committee to provide a greater focus on oceanic policy and fisheries issues. We revised the National Ocean Policy Study, which was created in 1974 but disbanded in 1994 due to budget cuts it received. It will serve as the forum for oceans issues and work on many of the recommendations from the U.S. Commission on Ocean Policy's final report. The National Ocean Policy Study will be a subcommittee chaired by Senator John Sununu of New Hampshire with Senator Boxer as the senior Democrat.

Daniel and I also created new subcommittees that will hopefully contribute to the discussion on the health of our oceans. A subcommittee on Global Climate Change and Impact chaired by Senator Vitter of Louisiana with Senator Lautenberg from New Jersey, and the Disaster Prevention and Prediction Subcommittee chaired by Senator DeMint from South Carolina with Senator Nelson from Nebraska as the senior Democrat. The subcommittee on Fisheries and Coast Guard will continue to be chaired by Senator Snowe of Maine with Senator Cantwell of Washington as the new senior Democrat.

Not since the 1966 Stratton Commission, which recommended the creation of the National Oceanic and Atmospheric Administration, has there been such an intense interest and momentum for addressing ocean management issues. This is an important time for the participants of this conference. We want to join you to closely explore the issues facing fisheries management. Please share your insights with those of us on the Senate Commerce Committee. We will seriously consider your recommendations on ocean policy and management.

The reauthorization of the Magnuson-Stevens Act will be the jumping off point for our ocean policy efforts where there will be informal listening sessions with various groups concerned about sustainable fisheries.



Not since the 1966 Stratton Commission, which recommended the creation of the National Oceanic and Atmospheric Administration, has there been such an intense interest and momentum for addressing ocean management issues.

We recently held a listening session with the Chairmen and Executive Directors of the eight Regional Fisheries Management Councils and learned a great deal about the issues facing all of the regional councils. These issues will have the full attention of the full Commerce subcommittees and our full committee.

At the last Nation's Fishery Management Conference in November of 2003, I encouraged the regional councils to show their relevancy in marine resource management so those of us in Congress could defend the work you do and argue for your continued management of our nation's fisheries. We have accomplished that goal, and we will continue to work to ensure the regional council system is maintained under the Magnuson-Stevens Act. Thank you for all you do. Have a nice conference.

Representative Wayne Gilchrest

U.S. Congressman from Maryland

Admiral, thank you very much for the introduction. It is a pleasure to work with Admiral Lautenbacher, and I want to thank the staff of NOAA, wherever you are in the room. I want to thank the Council members and the staff of the Council members. I want to thank my staff for staying on task with a sense of enthusiasm for the future. And I want to thank other people that are in the room here this evening because of your interest in the oceans and in fisheries.

I also want to thank Bill Hogarth and compliment him and congratulate him on the unexpected award that he received here tonight. Bill and I have worked together since Bill came in with the Administration a number of years ago. He's a gracious host at our meetings, he's knowledgeable, he's reasonable, and he helps the process because of his keen interest in restoring the prodigious bounty of the world's oceans. That's his goal, and he does his job very well.

It is nice to be in front of a crowd where the main topic is not private accounts and Social Security; or as we Republicans say, personal accounts.

What I would like to do tonight is to give you some indication of the direction that we are going to take in Congress in this session, the 109th Congress, as far as ocean issues are concerned, the problems with intercommittee jurisdictions and difficulties, where we are and where we want to go with Magnuson, and a few other issues.

This is a great nation, and we face enormous challenges. As we go through the issue of fisheries of the world's oceans, of whether or not there is climate change and global warming, our international relationships are becoming ever more vital. As we in the House work with the Senate to deal with a number of issues, whether it's Magnuson, an organic act for NOAA, we need to understand that NOAA may be more important than NASA. Mars is going to be there for centuries to come. The oceans need some attention right now.

I'm not taking anything away from my colleagues on the Committee of Science of which I am a member, and we appropriate and authorize a number of wonderful things for NASA, and NASA is a critical program for the United States. But I just think the world's oceans are once again at the forefront of America's preeminence as a nation in the world. Through my world travels, the world wants us, depends upon us, looks at us as the preeminent leader of the world. When the U.S. begins to dip below that radar screen in a number of issues around the world, people become concerned.



...we need to understand that NOAA may be more important than NASA. Mars is going to be there for centuries to come. The oceans need some attention right now.

They have various views about us as Americans, but wherever you go, whether it's to Europe or Asia or Latin America or Africa or the devastation of the tsunami regions of the world in the Gulf of India, the Indian Ocean, people look to us not only for a few dollars, not only for bringing in our Navy and the Marine Corps, but they look to America for our intellect. We are not by accident, but by the way we happen to govern ourselves, the leaders of the world. And so when it comes to the world's oceans, when it comes to that huge economic engine, when it comes to the fact that we get the very air we breathe because we have oceans, we have the climate we have because we have oceans, the U.S. is and must continue to be a preeminent leader.

There are problems. Now, I want to make one more point about that issue before I talk about Magnuson and ocean issues and things like that. In the House every day you see what we do. Oceans are not always on the front burner. Baghdad is always on the front burner. Afghanistan is on the front burner. This takes up enormous amounts of our time in our dialogue, in our investigations, in our critical understanding about our policies. North Korea is on the front burner. Russia has not found its soul yet. The continent of Africa is in disarray. It has no economy, it is rampant with disease, and the poverty is beyond description. China and Taiwan are still struggling.

So, when we talk about oceans here tonight, many of us in the House realize those other issues are important. There's a sense of urgency, and they're vital. But many of us in the House working with Admiral Lautenbacher, working with Bill Hogarth, working with you as a group, working with our staff, are pushing forward the issue that oceans are not only important, they are vital. And there is a huge sense of urgency to deal with those oceans.

For the past year, many of us have been pushing to get a standing ocean committee in Washington, a standing committee. I deal with oceans on a subcommittee. There are about 32 other committees that have similar jurisdiction when you deal with the oceans, and deal with the fisheries and the whole array of issues that surround the world's oceans. And so I think because we've been pushing this, there is more interest now among the rank and file members about these kinds of issues.

There is a group that helped raise that to the forefront, and what I did bring up here is an ocean blueprint by the Ocean Commission led by Admiral Watkins. Not everyone agrees with the issues, such as the governance issues that is contained in this document. But what this document does is raise the level of awareness that oceans are important. And when you raise a level of awareness that oceans are important, when you start talking about the Magnuson Act, people have a better understanding of that particular issue.

The debate will take place over the next year and a half about what we are going to do, and the Administration is a part of this with its preliminary U.S. Ocean Action Plan. The debate will be ongoing. The debate will be volatile. The debate will be strong. But there's several key important fundamentals to this debate, as we go through Magnuson, as we go through the various Ocean Commission issues, as we go through the Marine Mammal Protection Act, and the list goes on.

The key element is that we need — all of us in this room, all of us in Washington — to exchange information, which is what you're doing here in these few days. Have a sense of tolerance for somebody else's opinion. And the way your opinion wins the vote in this environment, the way we deal in the House of Representatives, believe it or not, the most bold, imaginative, forefront-thinking visionary conclusion, will be the one who has the most know about that particular issue.

How do we resolve it in Congress? We exchange information, we have a sense of tolerance for somebody else's opinion, and then we vote. And the way ocean issues are going to be preeminent in Washington, the way we're going to resolve the issues of Essential Fish Habitat, ecosystem management plans, bycatch, seabirds, gear, all of those other things, is if the people in this room exchange information, communicate that information. It will likely be Senator Stevens, myself with my partner Don Young, who will push these issues.

There are a large number of recommendations that come out of Oceans 21. They are huge. And the way we will deal with the issues in this session of Congress, so that you can follow that from the far-flung reaches of this vast country — from New England to the South Atlantic to the Gulf to the Caribbean to the Pacific to the North Pacific to the West Pacific—the way we will deal with these issues is we are going to look at Oceans 21.

We are going to look at this separate from Magnuson. We will have a draft bill for Oceans 21 in about a month's time frame, a draft bill. And we would be interested in your input in that draft bill. Sometime around the end of May, the beginning of June — and I forgot to tell Dave Whaley this — sometime the end of May, the beginning of June, we want to hold a hearing on a draft Oceans 21 bill, whatever you want to call it. Last year they called it BOB, Big Ocean Bill. It took me three months to figure out what BOB was.

But we do want to have an Oceans 21 bill. We will hold a hearing for the whole piece of legislation, a gigantic hearing that might have seven or eight or nine panels, take from 10:00 in the morning to 10:00 in the evening, and take a look at the issues in their totality.

To get something like this through in one piece of legislation is usually extremely difficult. With everything else that there is going on in the world, to pass a large ocean bill is not going to be an easy task. As we go through that process, we would hope that all of you — and we will make an effort to create an opportunity for each of you to be a part of that process, because it is only when the collective ingenuity of individuals and your diversity and your experience becomes a part of the process will the process really work.

So, we will work on this big ocean bill, Ocean 21, whatever you want to call it, starting in the next few weeks, and this will take us through the rest of the 109th Congress, so you'll be hearing about that.

We also want to have a bill that deals with Magnuson. We want it to be innovative. We want it to be the next logical step for Magnuson to take. We want to have your diversity of thought, ingenuity, initiative, intellect, experience, be a part of that legislation. We will probably come up with a Magnuson bill sometime in the same time frame.

A Magnuson bill will come out as a draft in about a month or two. We will hold hearings on that draft. We hope that sometime this summer, maybe September, we'll have a bill that we can understand, and I hope all be proud of. Likely in the late winter, early spring time frame, that bill will come out of the House.

We hope to a certain extent that the Senate side, which we will try to work hand in glove, will be in sync with that particular policy, as well. Before the 109th Congress is out, we want a Magnuson Act that you are a part of. We want a Magnuson Act that is flexible. We want a Magnuson Act that reflects your effort, your experience, your ingenuity, and your intellect.

We feel pretty optimistic, based on what we've done over the last several years, that we can come up with a Magnuson Act, a Magnuson bill, that will deal in an effective way with overcapacity, buyout programs, bycatch, gear research, data collection, and ecosystem-based fishery management plans. I can still remember the first time I uttered that word in the Republican majority of the House of Representatives. There was stunning silence. There is no such word. It's not in the dictionary. It doesn't exist.

I think that we know now that an ecosystem is nature's infrastructure, and we know a little bit more now about how that works. We know it's difficult, we know it's complex, we know there are virtually an infinite number of variables in nature's infrastructure. But we also know that we are on the cusp of understanding how it does work in all its myriad fanciful forms. And we do know something else, that unless human beings base their infrastructure so that it is compatible with nature's infrastructure, then the ecology of future generations will be extremely difficult.

I think we now are at the threshold, the beginning of understanding the science for an ecosystem approach to these kinds of issues. Let's deal with that together, and get each of the Councils talking about it. If you disagree with it, let's hear why. Let's not get angry. Let's not get frustrated. I can tell you right now if you're a member of the House of Representatives and you choose to be frustrated, no work will be done. If you bypass frustration to become a little more clever, a little more ingenious, you can get things to happen.

Believe me, there still are back rooms in the House of Representatives where they still smoke cigars and they eat Chinese food. I don't know when that came in, but there are smoke-filled rooms in Washington with Chinese food where a lot of deals take place. And so if I'm in those smoke-filled rooms, I smoke Havatampa, by the way. My colleagues can't believe I smoke a cheap cigar, but it's a pretty good cigar. In order for me to be effective, whether it's in a smoke-filled room with Chinese food, whether it's at a hearing, or whether it's debating my colleagues or convincing Denny Hastert that this is a good thing — you and I, you and members of the House, especially people interested in fisheries, have to keep an open dialogue.

There are other issues. There's IFQs, there's processor shares, you know what they are. Once we begin to tackle them, things are going to become interesting. Very interesting.

But there is one overriding feature. And that is this generation, you and I in this room, we have done some wonderful things. Number one, you've accepted the responsibility of your particular position, and it's not an easy position. You have worked hard, you have gained experience. You know the issues from inside and out. And don't stop talking about those issues to people that you come in contact with, whether it's NOAA, whether it's members of Congress, whether it's environmental groups. I think we're at a stage now where the Ocean Conservancy, Greenpeace, the Fisheries Councils, NOAA, all of us can begin to stand on the same platform.

We do have to deal with the nuts and bolts, and the devil is in the details. So, when we're talking about an ecosystem fisheries management plan or whether we're talking about seabirds as bycatch, or whether we're talking about gear, these things have to be done.

But if we keep in the back of our mind, the forefront of our mind, that the issue is the world's oceans and future generations that will take our place. How will they look back on the decisions that we've made? Did we use our initiative? Did we use our ingenuity? Did we use our intellect? Did we use our passion? Did we accumulate as much knowledge as we possibly could?

...the issue is the world's oceans and future generations that will take our place. How will they look back on the decisions that we've made? Did we use our initiative? Did we use our ingenuity? Did we use our intellect?

Did we know we didn't have all the answers? In groups like this we can spread our word, but did we listen to their information? See the big picture. Always see the big picture, while we develop those common grounds, for the devil is in the details.

I want to close with somebody that may not have been a fisherman, and I don't even know if he was ever on a boat, but it's a philosopher that lived in America, homegrown, about 150 years ago, Ralph Waldo Emerson. And he did have an analogy that is something related to a fisheries analogy. And I forgot the book, so I don't know the exact quote. I'm not even sure which essay it comes from. He's written many, many different essays. It could be one on an essay about the intellect, or it could be an essay about character, or it could be an essay about heroism. But I think it's appropriate at this time, especially as we move forward and we hit the controversial issues, we hit the threshold of frustration, we're being pressured by people to do this or to do that.

Emerson has a bit of an answer. He said: Everyone lives their life with a degree of melancholy, like a ship wrecked on a coastal shore, battered by the waves and storm, the future looking grim. You there in the boat with a sense of despair, what separates that destiny from a better world, from a better future? Emerson says the intellect. It is our mind.

When we approach an ecosystem fisheries management plan, we know the difficulty of it is the infinite number of variables between the zooplankton, the current, the warmth of the water, the prey/predator relationship, the atmosphere, you name it. The range of fluctuation occurs not only over the years or the decades, but the centuries. How do we deal with that? Our intellect is the same. Our intellect is infinite. Our capacity for understanding, for accumulating knowledge, is enormous.

This nation and this world could face a grim future. Pakistan is one bullet away from chaos. Pakistan has deployable nuclear weapons. North Korea probably has deployable nuclear weapons. Russia hasn't found its soul. Iran wants to enrich uranium for what purpose? A number of Latin American countries want to enrich uranium. There is issue after issue after issue.

How do we solve these problems in a ship that's stuck on a rocky coast with wind and storm? We solve it by exchanging information, being as knowledgeable as possible on the issues, having a sense of tolerance for somebody else's opinion next to us, and then in a democratic society, of which most of the world is, we vote. We have the capacity. We have the intellect. We have the future in the palm of our hand.



Vice Admiral Conrad Lautenbacher, Jr.

U.S. Navy (Retired)

Undersecretary of Commerce for Oceans and Atmosphere

NOAA Administrator

I'm delighted to be here with you today and have a chance to talk to you about some of the things that I think are very important to all of us as we go forward. As I mentioned last night, this type of national gathering is extremely critical in our ability together to work together to develop an agenda that's a national agenda, that emphasizes the things that we can all agree on, versus what I consider a small amount of things that we may disagree on. But that number will get smaller as we work together. We need to be able to move ahead with a socially responsible economic and environmental policy with managing our fisheries and the ecosystems that occur along our coasts.

I think this is an important national goal. And quite frankly, it's the people in this room and the associations that are here, the Councils and NGOs, managers from around the country, that will make this happen. This is where it starts. So, thank you for coming to this meeting and we look forward to continuing this in the future. I think it's a great development in our ability to improve our management of healthy coasts and oceans.

I particularly am grateful to the Councils and to Chris Oliver for doing the hard heavy work and heavy lifting and getting everything together here. I certainly am grateful to Bill Hogarth and all of the good folks in the fisheries part of NOAA, the Fisheries Service, that have helped bring everyone together and to create the agenda and all of the logistics that makes this makes this conference successful.

I encourage everyone to take advantage of this opportunity. We certainly would like to do it at least once a year, but hopefully it will spawn other ideas for meetings, for partnerships, for ways to work together, for ways to bring our voices into concord so that we can build what we think is right for the future.

You will talk about a lot of other things today, but I want to talk to you about the Ocean Action Plan, because I think that's an opportunity that all of us have today here to move forward. I also want to deal a little bit with this idea of ecosystem approach to management. I think there are probably some misconceptions out there of what this is and what we're trying to do, and its value to everyone. And observation means talking about not just my observations on everything, but it's observations on living marine systems, observations on global observations, national

We need to be able to move ahead with a socially responsible economic and environmental policy with managing our fisheries and the ecosystems that occur along our coasts.

observations, data basically. And then a few comments on fisheries management, Magnuson-Stevens and the things that we are working on or looking forward to within NOAA that may help you in your deliberations.

Ocean Action Plan

Let's start with the Ocean Action Plan. You listened to Chairman Gilchrest talk last night, very enthusiastically, about the Commission report, the U.S. Commission on Ocean Policy report, and a little bit about the U.S. Ocean Action Plan. I want to put the emphasis on the U.S. Ocean Action Plan this morning, because that's our window of opportunity.

I hope that everybody got to see this picture, because this is historic. This is President Bush signing an Executive Order setting up a governance system for oceans that has never, ever existed in the United States. This is a landmark achievement, and it is the enactment essentially of what I would call the centerpiece of the Commission on Ocean Policy Report. You see in the picture Admiral Watkins, who is the Chairman of the Policy Commission; Lynn Scarlett, representing Gale Norton, the Secretary of Interior; Jim Connaughton, who is now designated as the single presidential advisor for oceans for the United States for ocean policies. He is the Chairman of the Council on Environmental Quality. And of course on your left there you see Don Evans. And I was also fortunate enough to get in on this conversation.

This was not just a signing. This was over a half hour of personal time with the president talking about the Ocean Action Plan, and I will tell you that the biggest topic of conversation was fisheries and fisheries management during that conversation. The President is a recreational fisherman. The President was the governor of Texas and had to worry about all of the issues that our Gulf Council worries about in that part of the world, and is very interested in having sustainable, economically viable fisheries for both recreational and commercial. We talked about the various techniques of doing that. We talked about dedicated access privileges. We talked about having reasonable plans for managing fisheries that supported the environment and supported the need for commercial and sustainable economic development. And it was a very, very pleasing conversation, and I can tell you he is interested. So, this is our opportunity in the next few years as we work through this Ocean Action Plan.

The Ocean Policy Commission delivered a report to the President and to Congress with 212 recommendations in it. I understand the stack of materials weighs 25 pounds. Now, they expected the President and federal government to come out with a report in 90 days. Now, let's be realistic, folks. You think that's possible? And not only that, guess when the deadline was for bringing out that report? December the 22nd. Can you imagine trying to get this all done at Christmas time?

Well, we did it, and thanks to a lot of work by folks in our fisheries area, as well as our ocean area, working with other departments. We were able to get something out, which is called the Ocean Action Plan, and get the President to sign it on the 17th of December, even before the deadline.

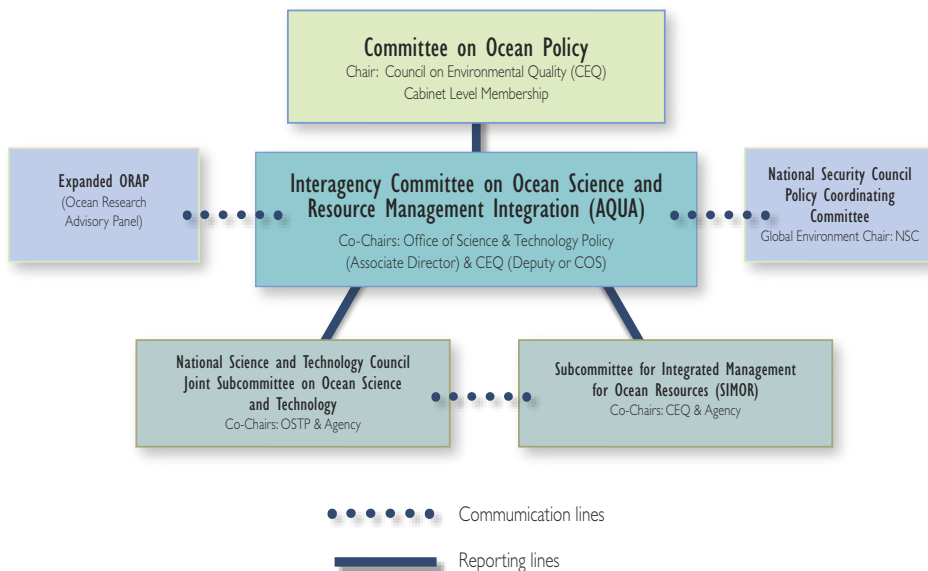
So, while it doesn't solve everyone's problem (we didn't take on every one of the 212 recommendations), I submit to you that that would be a very difficult task. It took the Ocean Commission almost three years to do that work. In 90 days it's impossible to get the federal government to agree, and particularly when you have one that says double the funding for ocean research. That's

not an easy thing to do, folks, without a coherent plan. So, the Ocean Action Plan says we're going to develop a research plan and then try to get the funding we need to deal with it.

In setting up this hierarchy, this new governance system, we have the opportunity to work together to solve some of the big problems that we have in this area. I encourage all of you to think about and read this Ocean Action Plan, which has some concrete items in it that I think are very important to us, and to then look at the future and be able to express to a national cabinet-level council what our issues are and how we need to deal with them to improve the future.

Committee on Ocean Policy

will advise President and agency heads on policies concerning ocean-related matters.



Now, I hate organizational charts, but I want to make sure that you understand what was set up here, because these are the national level interagency bodies that will work on some of these issues that go across the whole federal government. You have at the top there the Committee on Ocean Policy, which is the cabinet-level group, and it's chaired by a direct advisor to the President in the White House, Jim Connaughton. Under that you have an interagency Committee on Ocean Science and Resource Management Integration. And since that doesn't lend itself to a finely tuned acronym, we just call that the aqua box. So, if you hear the aqua box, that's what that is, and that is the Deputy Secretary and agency head level. I am a member of that particular box. So, it's a high-level group that does the heavy lifting and does the mud-wrestling, as we say, in terms of trying to get things to happen inside of our agencies.

Then to do some of the specific work, we have a National Science and Technology Council, NSTC, chartered joint subcommittee on ocean science, which now becomes part of this organization, Ocean Science and Technology. That's called JOST for J-O-S-T, is the short name for that. NOAA has a co-chair of that group. Rick Spinrad is the co-chair of that group. We are represented in the body, as well, by Colleen Hartman. And that is the group that will work on the details of policies and programs that are needed to solve some of our problems.

On the other side, you see the Subcommittee for Integrated Management for Ocean Resources. We fortunately got in the beginning of that, so we were able to create a name which has an acronym you can pronounce, SIMOR, which is kind of nice. And we have a co-chair there, as well, Mary Glackin, who is the Assistant Administrator on Bill Hogarth's level for planning, programming and integration in NOAA, and covers all of the issues that NOAA has to deal with in this area, as well as Rebecca Lent, the Deputy in Fisheries who works in this group, as well, with other agencies.

Those two little blue boxes expanded ORAP, the Ocean Research Advisory Panel, that is left over from the National Ocean Partnership Program Act or NOPP Act, and it is the FACA body. It is the public advisory body of non-government officials who will be selected by the President and the cabinet to advise the President and to advise this directly attached to this interagency committee for integration. Right now it consists just of scientists, but it will be expanded to cover everything. It will be expanded to cover industry. It will be expanded to cover representatives of the groups that are out here today. So, it will roll across the whole spectrum of ocean issues with experts in the civilian world and the private sector who will advise the ocean policy structure that you've set up here.

And on the other side you see the connection with the international group. This is the National Security Policy Coordinating Committee, PCC, which has been going on for awhile. It is the Committee for Global Environment, and includes the oceans. It is chaired inside of the National Security Council and it now will be connected to this structure, as well. So, this is our window to the outside world at the highest levels with the State Department and our ability to reach other governments where we need to do that for our kinds of issues.

This is an important structure and I urge you to take advantage of it. In fact, the last meeting of the aqua box, we had representatives in from the National Governors Association and from the Coastal States Organization come to tell us what the issues are and how to deal with it. That's never existed before, folks. There is a window of opportunity here to get a message on what we need to the highest levels of government in a steady and consistent manner. So, please don't underestimate the value of being able to do this.

I put this quote in there just so you would see there's high level attention. There's a nice set of articles that were written and publicized by the MTS, Marine Technology Society. I'm not necessarily up here pushing any one particular organization, but that last edition has a number of articles which gives you the perspective from Congressional leaders, from industry leaders and from government leaders on what the Commission on Ocean Policy and the Ocean Action Plan means, and it has some good thoughts in it. I encourage you to look at it.

Our oceans sustain an abundance of natural wonders, enable the transportation of vital goods, and provide food and recreation for millions of Americans. My Administration is working with every level of government, the private sector, and other non-governmental organizations to advance the next generation of ocean policy.

President George W. Bush

Ecosystem Approach to Management

Let me move now from the Ocean Action Plan, and I would like to spend a lot more time on that, but we have a great variety of things to do here that are more important than listening to me drone on. Let's talk about ecosystem approaches to management.

These are NOAA's mission goals. Every dollar in NOAA's budget is allocated to one of these four goals, and of course obviously the biggest one of these is the ecosystem-based approaches to management goal. As you see, it's listed Number 1, but I would tell you that we do well in all of them. The support goal is not listed there. I'll have to admit there are five, and there is money allocated to support issues. But in terms of our mission outputs, this is how we have organized ourselves to try to deal with the many disparate programs that we have in these areas, and to

bring them to bear on an issue that I think will bring all of us together and not drive us apart. So, it is something that we should embrace and not be scared of.

I think the first scary thing is that everybody has a different idea of what ecosystem means. All of a sudden it's new management, it's a new regime, it's a whole new set of dicta, it's a whole new process, — but it's not. It is not that at all. It's a very simple concept. It's been around for years. It is something we are involved in, at least in an evolutionary sense. It's not the tablets being delivered from on high, and all of a sudden the world's going to change and everything we did goes out the window. So, please do not get that perspective. And I hope I will convince you that we are already doing ecosystem management.

An ecosystem is a geographically specified system of organisms (including humans), the environment, and the processes that control its dynamics.

Ecosystem approach to management:

- *Adaptive.*
- *Regionally directed.*
- *Takes account of ecosystem knowledge.*
- *Takes account of uncertainty.*
- *Considers multiple external influences.*
- *Strives to balance diverse societal objectives.*

The first thing is to have a common definition. Now, I believe that NOAA is the only place where we can really center that conversation. You can't expect one university in the country or one professional society to develop it. We need to focus to deal with what we think this definition is. And this is — this is our cut that we have thrown out. We have a definition that is very consistent with what I think the body of thought is across the country. But we need a definition so that we're not debating on something where we don't have a firm foundation.

This is a very short summary of our definition. First of all, it's geographically specified. And the next part I want to make sure everybody understands: it includes humans. So, it's a definition of a system that includes the human species. We are, after all, the most invasive species on the planet in terms of how we affect it. And I will tell you, despite whatever you may think, we are not about to go away. And I don't think we're going to disappear from any of the ecosystems that are out there. We are here and we have to deal with that. That's first of all very important. So, it's the organisms, it's the environment and the processes, the controls, dynamics, and you can embellish that in any way you want, but that's the concept. It is nothing more than a definition of a collective system process that we're looking at here.

Now, what is an ecosystem approach to management? First of all, it has to be adaptive because you're learning, you're continually learning, and we do that today. Our fishery management plans are adaptive. Our conservation plans are adaptive. So, adaptive shouldn't be scary. When we get new information, we change things. We're rational individuals and I like Chairman Gilchrest's reflection on our intellect. How is the human species going to survive? We're going to survive on our intellect, nothing else. We adapt.

It has to be regionally directed because it's geographical kind of things, so you have to decide where these geographical boundaries are, how they fit, how our human organizations can fit to look at regional issues. It has to take account of all the knowledge that we have. We do that today. It has to take account of uncertainty. You do that today; that is nothing new. You have to consider multiple external influences. You're doing that today, and I'll give you a couple of examples.

Chairman Gilchrest approached it last night by saying well, an ecosystem is really complex and it has an infinite number of variables. And that's a daunting statement to make. We're not dealing with an infinite number of variables. You've got to work through this piece by piece, just like we do for every other scientific system.

Let's talk about another system, let's talk about the laws of gravity and the attraction of bodies in the universe. Now, when you look at the universe, you say my goodness, every body that's out there can force an attraction on some other body in the universe. How are we ever going to figure

that out? Well, we figured it out and we understand how the earth goes around the sun, but there are only a few factors that really determine that. How about the tides? They are affected by the gravity of the whole solar system. But again, there are several parts of it that are more influential than others and there are many parts of it that don't really have a direct effect.

So, you've got to think about this. Don't get daunted and overloaded with this issue that ecosystems are complex. They are complex, but we're smart people, we can take this apart piece by piece. We can abstract from it. We can look at tests, we can look at data, we can look at relationships. We can build this piece by piece. We're not all of a sudden going to develop and throw on the table a model with an infinite number of variables and say poof, that's it, that's the answer. That's not going to happen. What is going to happen is our continual march and inclusion of knowledge that you in this audience are going to gain and be able to use intelligently to make proper decisions and hopefully better decisions that will bring the country together.

We are all here today because there are different societal objectives by many of you that are in this audience. But talking together can help us deal with that, and it's not going to go away, and it exists today. It exists in our management system today. So, I am hoping that people do not get frightened of this term of ecosystem approaches to management.

Here are a couple of fishery management plans that are really ecosystem-based approaches. In the driftnet fishery for — I forget the species, but you can tell me — off the California coast, we have it closed from August to November. Why is that? Very simply, observers on those fishing vessels that are engaged in this fishery found out that at that particular time there's a peak in September and October of leatherback sea turtles in that area. They may not know why exactly, but know they're all there, and 60 percent of the bycatch takes occur in that month. By taking a small moratorium for the year, we can reduce sea turtle bycatch by 80 percent and therefore have an open fishery and a reasonable rate of balanced conservation objectives with fishing objectives. That's just an example of looking at something other than just the population of fish.

The loggerhead closed area. There is a shark fishery that goes on in southern California that's a little area at the bottom there. It is actually closed now during El Niño years. El Niño has to do with the warming and cooling of the Pacific Ocean, particularly at the Equator, and the effects — the ripples that it sends out, the Kelvin waves that it sends out up and down the coast in North America and South America, causing changes in the way the fish food chains work and where fish and other creatures of the sea are found. When there's an El Niño year, we have found that if the temperature heats up in May and June, all of a sudden there's a huge number of loggerheads that come up into this area, and by closing that during El Niño years, we can produce a fishery which is at a reasonable level of takes and preserves the system and the economic viability of the fishery.

These are very simple examples, but they're already here, and there are many others that you can think of as each of the Councils has already done this in many cases.

I also wanted to mention an example right here in Chesapeake Bay: the issue of the food web and the chain of food that supports the life cycle in the waters. In the Chesapeake Bay you have an interesting balance. You have oysters, blue crab, striped bass and humans. And you need oysters because the oysters do a nice job in filtering the water, keeping the water clean enough so that everything else can live, including the crabs, the striped bass and humans. However, crabs eat oysters. Striped bass, the juvenile striped bass, dine on the larva from the crustaceans, the crabs and the oysters. And of course we humans like to eat them all.

So, it only makes sense to look at this food balance that is in there, because by going at just one of these without looking at how it affects the rest of the chain, you're really going to end up suboptimizing how we interact with that ecosystem and produce the best social and economic benefit for the country.

And of course the Chesapeake Bay is a very interesting one because we have a number of states that are working on this. We have the EPA involved in that area and NOAA has an advisory role, but we don't do any of the heavy lifting on the management plans per se.

But that that exists everywhere. I bet every Council here can come up and tell me of a similar issue that they have on how to take account of this food chain in the structure that they have in their regions and deal with it. And we are going in that direction. We have many multispecies plans out there today, and there are going to be more as we move along.

Observations

Let me switch from the discussion of ecosystem-based management to the value of observations. I have had this question: What good is it to observe things? I think that's kind of a softball question. I think that we wouldn't know anything about science at all if we didn't have any observations.

Science is based on observations, on taking data, on getting real facts and information. And earth observations can benefit the living chain, the chain of life in the oceans, as well as it can benefit the weather forecasters. And in fact, this initiative that we're pushing around the world, building global earth observing system of systems, is designed to support life on earth. It's not designed just to gather data for the sake of being able to tell you when the clouds are coming over top. This is an issue about trying to figure out what supports life and the best way to do it.

We just signed a ten-year agreement, 60 nations, 40 international and intergovernmental organizations in Brussels, Earth Observing Summit III, for a ten-year plan to build a global earth observing system of systems. These are the nine benefit areas, and people are not enamored essentially with having space toys and buoys in the water. What they are interested in, what politicians are interested in, and I think what you all are interested in, is our ability to sustain life and to have a quality of life and economic level that can be sustainable and improved in the future.

And these are the benefits, and you can see over on your right-hand side there, terrestrial, coastal and marine ecosystems. That is one of the nine benefit areas that the world has agreed to set up observing systems to provide information that will help improve the economy and improve the environment in that area. And at the bottom you see biodiversity, another important issue for us, as well as energy, human health, natural and human disasters.

How about the tsunami in the Indian Ocean? If we had had a global earth observing system in place at that time we could have saved at least 200,000 lives. I mean here's a simple investment that could be made that would be enormously helpful to the entire world. And it's a way to get people's attention.

But let's take it to the issues that we have today when we talk about worrying about healthy coasts and oceans and supporting the life in the water column. Why is it important? I want you to think of everything that we do in the fisheries management and conservation world as based on observations. Commercial and recreational catch statistics are important. And we don't do

enough of those. We don't do them rapidly enough. There are many more improvements that can be made in observations in this area. But those statistics are observations. And when we talk about a global earth observation system, we are talking about these kinds of things. So, it should be something that everyone in this room ought to support because with better and improved statistics and observations on the food chain and other biological observations, we will be able to have a better foundation for determining the rules under which we have to live to maintain our life on this earth.

Stock assessments. Stock assessments are issues that are observations. And we put things out there to observe. We send out ships. We send out some remote vehicles. We do it by acoustics now. We do it by trawl surveys. We use cooperative observers. Those are how we get a stock assessment, and that's an observation program. It needs to be more complete.

Observers. I don't want to discount the eyeball. We're not about to invent the perfect sensor that can be set out there in the ocean that will detect everything we need to know about everything that's going on. Observer programs are an important part of it.

Standardized sampling gear is another issue. We need to deal with that. That's part of an observing system. And then you start looking at the oceanographic and lower trophic level data. That data is extremely important for us to be able to not only tell what's going on now, but be able to try to get ahead of the problem like we do with the El Niño issue with the leatherback turtles that we are able to predict ahead of time, so we don't get ourselves in this business where we set quotas which are too high for the year or quotas which are too low for that year, because we have changed circumstances out there.

This kind of information is extremely important to us, and I encourage you to think about where observations are needed, because we have an opportunity. Remember that the Ocean Action Plan tells the country to build an ocean observing system, to build a coastal ocean observing system, and the folks that are in this room here today ought to have their piece of that. And it ought to be the reason why we have a coastal observing system, because it's to support life and the quality of life in our coastal areas.

Improving Fisheries Management

Let me go for a couple of minutes to management issues. You heard the good Chairman of the Fisheries Subcommittee yesterday talk about his interest in trying to reauthorize Magnuson-Stevens. Senator Stevens interest in it, as you all know, is very strong.

I believe in this Congress, maybe not this year, but in this Congress, we have a good opportunity to see a reauthorization of Magnuson-Stevens and to hopefully make some improvements and to voice what we think we ought to do to improve the system. So, I think that there's an opportunity here. I encourage you in the segments you've had to work on this, and I know there are some more coming up, to talk about what we can do to improve the system.

Inside of NOAA, we are looking at some changes to Magnuson-Stevens. You'll remember we submitted a bill in 2003. We are looking at changes. Again, I can't talk about the specific changes because it's still going under interagency and OMB review. But I think you can generally figure out where we're going with this from the conversations that you have with us.

I want to give a great deal of credit to the people that have pioneered the fishery management council system and have brought it to the state it is today. I think it is an example of how we can build rational, participative management systems that in the end provide us with the kinds of things we need to give us hope for the future.

We see a need to provide improvements in some areas. We need to figure out how to rationally include this ecosystem approach to management in a way that's non-threatening, in a way that makes sense, in a way that's evolutionary. These are some of the issues that the Ocean Policy Commission brought up, such as Council representation. We also support having balanced Council representation. I think it's important that the Fisheries Councils represent the regions in which they work.

I'm a big supporter of the regional system. I don't think this is something that can be dictated from Washington in any sense. There has to be federal, state, regional partnerships. I want to give a great deal of credit to the people that have pioneered the fishery management council system and have brought it to the state it is today. I think it is an example of how we can build rational, participative management systems that in the end provide us with the kinds of things we need to give us hope for the future. So, I'm supportive of this kind of governance. I do not think that one person sitting in Washington should make a decision for every part of the country.

Reducing overcapacity is extremely important. We need to work on how to deal with that. In many cases, NOAA doesn't have within its own charters and its own resource allocations the ability to be able to look at that issue other than just talk about it. The Ocean Council will let us do more work in that area, I believe, because we have other parts and other agencies of the federal government involved, where we can talk about how to do that reasonably.

You all know that we do support some types of dedicated access privileges and IFQs. I know there's varying degrees of support for IFQs around the regions. But I encourage everyone to look at it. We do have a number of fisheries today that are being managed with these dedicated access privilege kinds of things, and we are in the process of transitioning to some new ones. The value of looking at that is to end the race for fish, to improve the safety record and to ensure quality of life and a reasonable approach to using these resources. I think it's very worthwhile to work towards that direction.

The last *opilio* crab fishery derby just happened this year, and they caught their entire quota in five days. Five days. Now, were those five good days to be at sea? No, they weren't five good days to be at sea. We lost people. People died in this fishery. Boats were lost, people died. It's not a good way to do business.

I know it's hard to change a system, and many of you are under great pressures to keep what we have, but we must look at better ways to do this. Transition is hard. It's really hard, because you have to be careful about winners and losers. Every time you change, you've got winners and losers. And that's a difficult issue. But we have a number of examples where we have done it, and there are ones going on now. I encourage a strong look at it.

I don't believe in this great conflict of interest issue. Although it's been a point that's been brought up in debate, I don't think we have that on our Fishery Management Councils. It's not been a problem, anyway.

I'm going to talk to you in a minute about regional management, but I think we can make some adjustments to the system which you can provide. You all out there work on these systems, whether you're NGOs or whether the Councils themselves that have to make these decisions, and managers — state managers, regional managers, federal managers. I think together we can improve the system. It's a good system. It's working. And I think it can work better if we collaborate.

Internally, NOAA took a look at all of the kinds of ecosystem classifications that are out there, and there has been in place for quite a while a classification called LME, or Large Marine Ecosystems, and they're fairly reasonable on a large scale. And we've been looking at them in terms of how to bring together the systems that we have today for management, the Councils and our Regions and the geographic and political really boundaries that we have in the United States. So, we're at the front end of this, and we need your input and your ideas on how we do this.

I think it's possible to bring into effect some large-scale boundaries like we have here, or descriptions of systems, and then look at the visions that are logical in terms of management, in terms of regional issues that affect parts of each one of these larger systems. Remember that ecosystems can be nested from very small (small areas, small numbers of organisms) up to large areas.

The other point I want to make on this is that we are not locked into this. I've gotten comments that NOAA is moving ahead without anyone else being involved, and that's not true. We have done some internal work and had some workshops just to see what's out there. This is an issue that has to be settled and has to be agreed upon by the community of people and the interests that are represented here today, and we are going to work with you to ensure that the way we go forward on this ecosystem nesting and classifications are part of the general dialogue. So, we want and we will appreciate your inputs.

There was a recommendation from the U.S. Commission on Ocean Policy that talked about setting up Regional Ecosystem Councils. The original paper was fairly strong. It said thou shalt do it, thou shalt set up these regional, state, federal kinds of local partnerships for total ecosystem management, not just "fisheries management on an ecosystem basis". That recommendation was modified in the final report to talk about looking at it in terms of setting up pilots, looking at pilot programs, looking at ways to bring in a wider range of people in a larger ecosystem sense within the region. That is something that will be going on through this governance program that's been set up, and we need to get ideas on how to deal with this. This is not designed to replace the fishery management council. This is a higher level concept.

The issue is how do we work in the fishery management council system, what kind of role do they play, how do we build this so that we ensure that the system is set up to benefit everyone and not marginalize some parts of the ecosystem players, so to speak, in each region.

There are a couple of things going on. First of all, the President signed something called the Great Lakes Region Collaboration Executive Order. It set up essentially federal, state, local, tribal government congress. There has been a few meetings of this group. We have people that are involved. It's looking at regional environmental priorities. The group includes the mayors, it includes industry, it includes the state governments. And this is in the Great Lakes area, so it's kind of outside of what many of you here worry about. It's taking on things like the carp barrier, which are important to fishermen. They are taking on a rapid response for snakeheads. We are looking at better observation systems in the Great Lakes so that the kinds of information that

will help them restore fisheries in that area will be of benefit. So, it will be interesting I think for you to watch this, see what you like about it and what you don't like about it.

The next one that we're seriously engaged in or looking at now is a collaboration that was set up by the State of Florida in the south region. There you see Florida, Alabama, Mississippi, Louisiana, Texas, working with the federal government. It has some very strong interest from Jim Connaughton, who is, as I mentioned, the President's ocean advisor at this point. And they're looking at building a plan of action to do the following major things: Reducing nutrient loading, looking how to build water quality observation systems to look at water quality, health of beaches, shellfish beds, wetland restoration, education, habitat. But in the end, that's a system that will help us do a better job in managing fisheries and in managing our coasts and oceans.

We're trying to get involved in that and see where that's going. I encourage you again to think about these things, too, as to how we can ensure that as these develop around the country. There are other regional collaborations that may not be as large as this one with five states, but there are area collaborations that have been set up. Some of them are more effective than others.

But this would be a process that we need to weigh in and you need to weigh in. We need to ensure that as it develops, it is balanced in terms of presenting all of the impacts and value that can be gained from such a setup. But that will be going on and it's an opportunity to influence the future, and I encourage you to do it.

I would like to close with a few summary points:

Ocean Action Plan. This is an opportunity that presents itself once every 30 or 40 years. Let's use it.

Ecosystem approach to management. It's evolutionary, it's incremental, you're already doing it today, you're participating in it. It is not starting all over again. It's moving ahead as we are today.

Observations are critical. We need to have observational systems that give us the kinds of data that all of us can use to be better managers and make better decisions on conservation and the economy for the future.

Fisheries management. I think we're on a good track, with the balance of people in here. If you look at many of the species, we've turned the corner and they are coming back. We still have issues in some areas where we are not doing as well as we could perhaps. But in general, the system is working on the basis of self-improvement. All of us in this room participate on that. And I really appreciate the work of everybody in this room. So, thank you for that, and particularly to everyone who has given up kind of Easter week to come and do this. I really do appreciate it.

Partnerships. In the end it's partnerships. It's working together. It's building a strong national voice for these kinds of issues, not done regionally or locally or by district by district. It's a national voice that's going to help us with that.

Again, thank you very much for listening to me today and I look forward to continuing to work with all of you.



Barbara Kofis/CFMPC

SECTION II

Reports from Councils and Commissions

1. North Pacific Fishery Management Council ... 34
2. Western Pacific Fishery Management Council ... 40
3. Gulf of Mexico Fishery Management Council ... 44
4. Mid-Atlantic Fishery Management Council ... 49
5. New England Fishery Management Council ... 54
6. Caribbean Fishery Management Council ... 59
7. South Atlantic Fishery Management Council ... 63
8. Gulf States Marine Fisheries Commission ... 70
9. Atlantic States Marine Fisheries Commission ... 77



Bill Wilson



NURGUNCV



NOAA Fisheries



Mark Fina



Bill Wilson

North Pacific Fishery Management Council

MANAGEMENT UPDATE – MARCH 2005



NORTH PACIFIC FISHERY
MANAGEMENT COUNCIL
605 West 4th Ave., Suite 306
Anchorage, Alaska 99501-2252
Tel: 907-271-2809
Fax: 907-271-2817
www.fakr.noaa.gov/npfmc

Ecosystem Management Approach

The North Pacific Fishery Management Council has a long track record of incorporating ecosystem considerations into fishery management decisions. The precautionary ecosystem-based approach involves public participation, reliance on scientific research and advice, conservative catch quotas, comprehensive monitoring and enforcement, limits on bycatch of non-target species, marine protected areas, measures to protect marine mammals and seabirds, and other measures.

In June 2004, the Council and NOAA Fisheries completed a comprehensive (~7,000 pages) programmatic review of the groundfish fishery management plans. Based on this detailed examination of the fisheries with respect to the ecosystems in which they operate, the Council updated the FMP policy goals and objectives to more explicitly include the precautionary approach in decision making.

The Council's precautionary management approach is to apply judicious and responsible fisheries management practices, based on sound scientific research and analysis, proactively rather than reactively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future, as well as current generations. The productivity of the North Pacific ecosystem is acknowledged to be among the highest in the world. Recognizing that potential changes in productivity may be caused by fluctuations in natural oceanographic conditions, fisheries, and other, non-fishing activities, the Council intends to continue to take appropriate measures to insure the continued sustainability of the managed species. The goal is to provide sound conservation of the living marine resources; provide socially and economically viable fisheries for the well-being of fishing communities; minimize human-caused threats to protected species; maintain a healthy marine resource habitat; and incorporate ecosystem-based considerations into management decisions.

The Council recently re-activated and reconstituted its Ecosystem Committee with new membership. The committee's mission statement is to discuss current ecosystem-related initiatives and assist in shaping Council positions relative to: (1) defining ecosystem-based management; (2) structure and Council role in potential regional ecosystem councils; (3) implications of NOAA strategic plan; (4) draft guidelines for ecosystem-based approaches to management; (5) draft MSA provisions or requirements relative to ecosystem-based management; and (6) generally coordinating with NOAA and other initiatives regarding ecosystem-based management. Staff is preparing a discussion paper suggesting ways for the Council to be involved in the development of NOAA's proposed ecosystem approach to management of the Alaska large marine ecosystems, including how current Council structure might be utilized to create a voluntary regional ecosystem governance structure.

The Council is exploring the possibility of preparing a separate fishery ecosystem plan for the Aleutian Islands area, or in some way designating the Aleutian Islands as a special management area. A discussion paper has been prepared by staff to examine how various potential management options correspond with national ecosystem-based management initiatives being developed by NOAA, which the Council will be reviewing next month and determining next steps in that process.

New IFQs & Rights-based Limited Access Programs

BSAI Crab Rationalization

In June 2004, the Council completed its action on rationalizing the Bering Sea and Aleutian Islands crab fisheries to alleviate overcapacity and safety issues associated with the race for fish. Under this program, harvest quota shares (QS) will be issued to vessel owners and captains, and processors will receive processing quota shares (PQS). The final rule implementing the Council's program for rationalizing the BSAI fisheries was published March 2, 2005, and the QS/PQS application process will begin April 4, 2005. Initial allocation is scheduled to be completed in early August 2005, with fishing beginning in the Aleutian Islands golden king crab fishery August 15. The Council also has initiated an analysis of alternatives for making two separate allocations of Tanner crab QS and PQS to support State management of that species as two stocks.

Gulf Rationalization

The Council has continued to develop and refine its alternatives for rationalization of the Gulf of Alaska groundfish fisheries. The Council has expressed its interest in developing a program that is coordinated with State management of fisheries in State waters (inside three nautical miles). The Council alternatives include IFQ and cooperative programs with components that could include possible allocations of harvest shares to processors, community groups, captains, and crew. Cooperative program alternatives also include processor protections and provisions intended to protect interests of communities and crews.

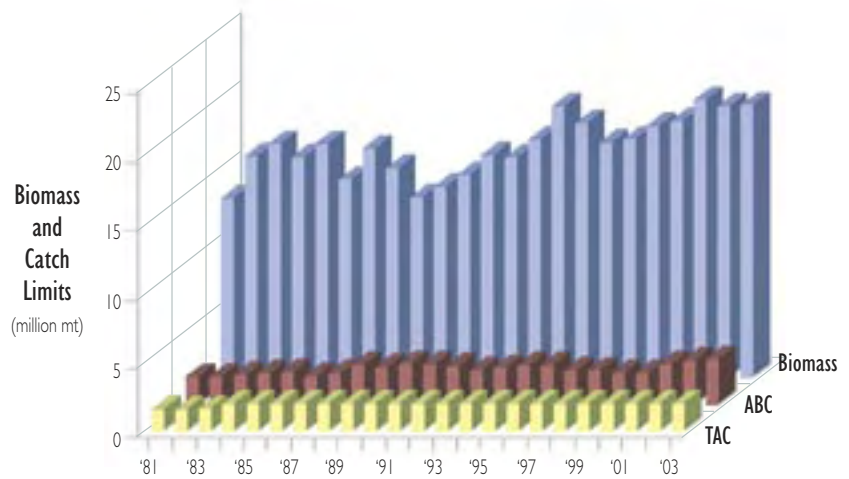


Figure 1.
Bering Sea - Aleutian Islands
Groundfish Harvest Limits
1981-2003

Figure 2.
Bering Sea and Aleutian Islands Groundfish - 2005

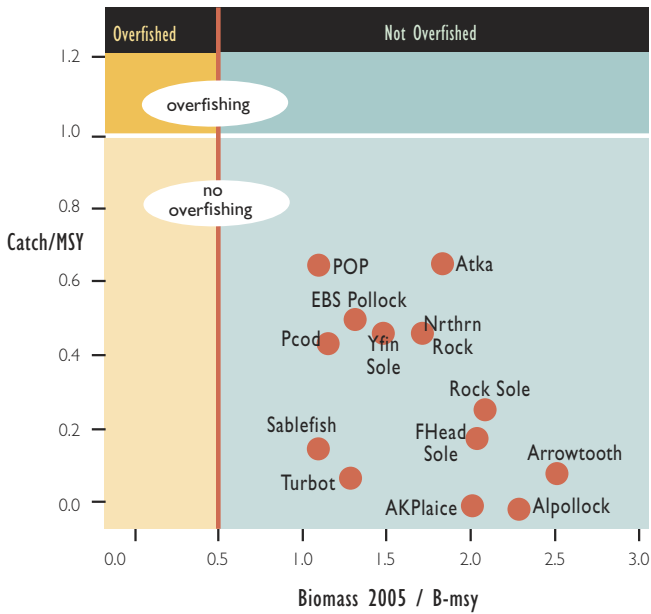
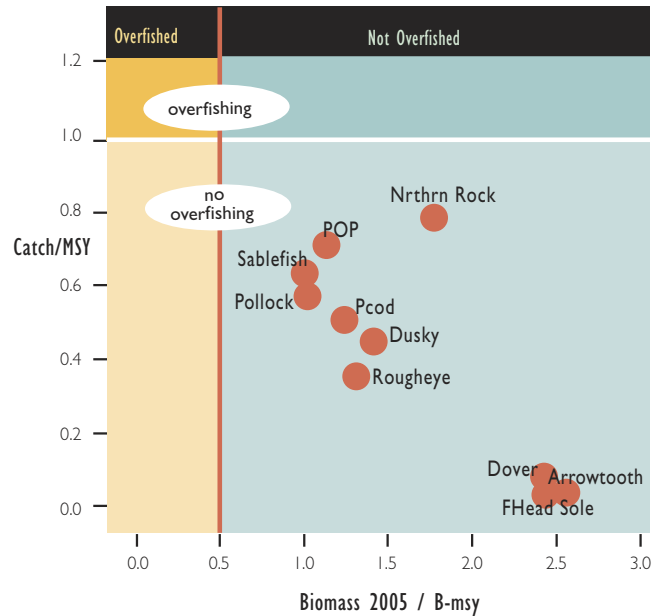


Figure 3.
Gulf of Alaska Groundfish - 2005



Rockfish Demonstration Program

The Council is scheduled to conduct an initial review of the analysis of alternatives for the pilot rationalization program for the Central Gulf rockfish fisheries at its April meeting, with possible final action in June. The catcher vessel alternatives under analysis include a cooperative program with limited entry for processors and a cooperative program with processor associations. A set aside of 5% of the TAC would be divided 50/50 between trawl and non-trawl vessels in entry level fisheries.

Halibut IFQ

The Council has continued to refine its halibut and sablefish IFQ program, which has been in place since 1995. Specifically, the Council liberalized rules concerning QS of certain types that have historically gone unharvested. These rule changes affect the block program rules, vessel length restrictions, and use of QS outside their management area. The Council also tightened the hired skipper rules. In addition, the Council's program to expand the IFQ program to include charter vessel caught halibut is undergoing review by NOAA Fisheries. If approved, this program will be the first known recreational IFQ fishery.

Improved Scientific Review

The Council has an active Scientific and Statistical Committee (SSC) that reviews all analytical documents prepared for each management change. The SSC consists of biologists, economists, and social scientists from academia and federal and state agencies. The SSC meets five times per year, concurrent with and at the same location as the Council meetings.

In addition to providing comments to analysts, the SSC makes recommendations to the Council on the adequacy of analytical documents relative to the best available scientific information. The SSC also reviews development of models and other analytical approaches for understanding impacts of fishery measures. Further, the SSC provides recommendations on priority areas for research.

The scientific review process used by the Council is multi-tiered and robust. For example, stock assessments and acceptable biological catch limits undergo a thorough internal review by the Alaska Fisheries Science Center. Each year, a couple of these assessment models are further reviewed by the Center for Independent Experts. Once completed by NOAA Fisheries

The Council's precautionary management approach is to apply judicious and responsible fisheries management practices, based on sound scientific research and analysis, proactively rather than reactively, to ensure the sustainability of fishery resources and associated ecosystems for the benefit of future, as well as current generations.

scientists, the assessments are scientifically reviewed by the Plan Teams, consisting of federal, state, and university scientists. The SSC has final scientific review authority for the assessments. The Council then approves the Stock Assessment and Fishery Evaluation Report for public distribution, and adopts the SSC's recommendations for Acceptable Biological Catch limits (ABCs). Because this process has worked so successfully, we have not made any additional changes to the existing scientific review process.

Related to the issue of scientific information in the management process, the Council and NOAA Fisheries are in the process of restructuring the funding and deployment process supporting our comprehensive on-board groundfish observer program. Primarily funded by industry, the observer program in the North Pacific deploys over 35,000 observer days annually, and information gathered by observers represents a critical underpinning to our science base and management process. The new program structure will allow for greater flexibility in placing observer coverage on fisheries and vessels where additional information is most needed.

Stock Rebuilding Progress

The Council has rebuilding plans for the few stocks that are at low biomass levels. Specifically, rebuilding plans are in place for four Bering Sea crab stocks: Tanner crab, Snow crab, Pribilof Islands blue king crab, and St. Matthew blue king crab. In all of these cases, stock size fell below threshold levels not because of overfishing, but because environmental conditions had resulted in sequential years of poor recruitment.

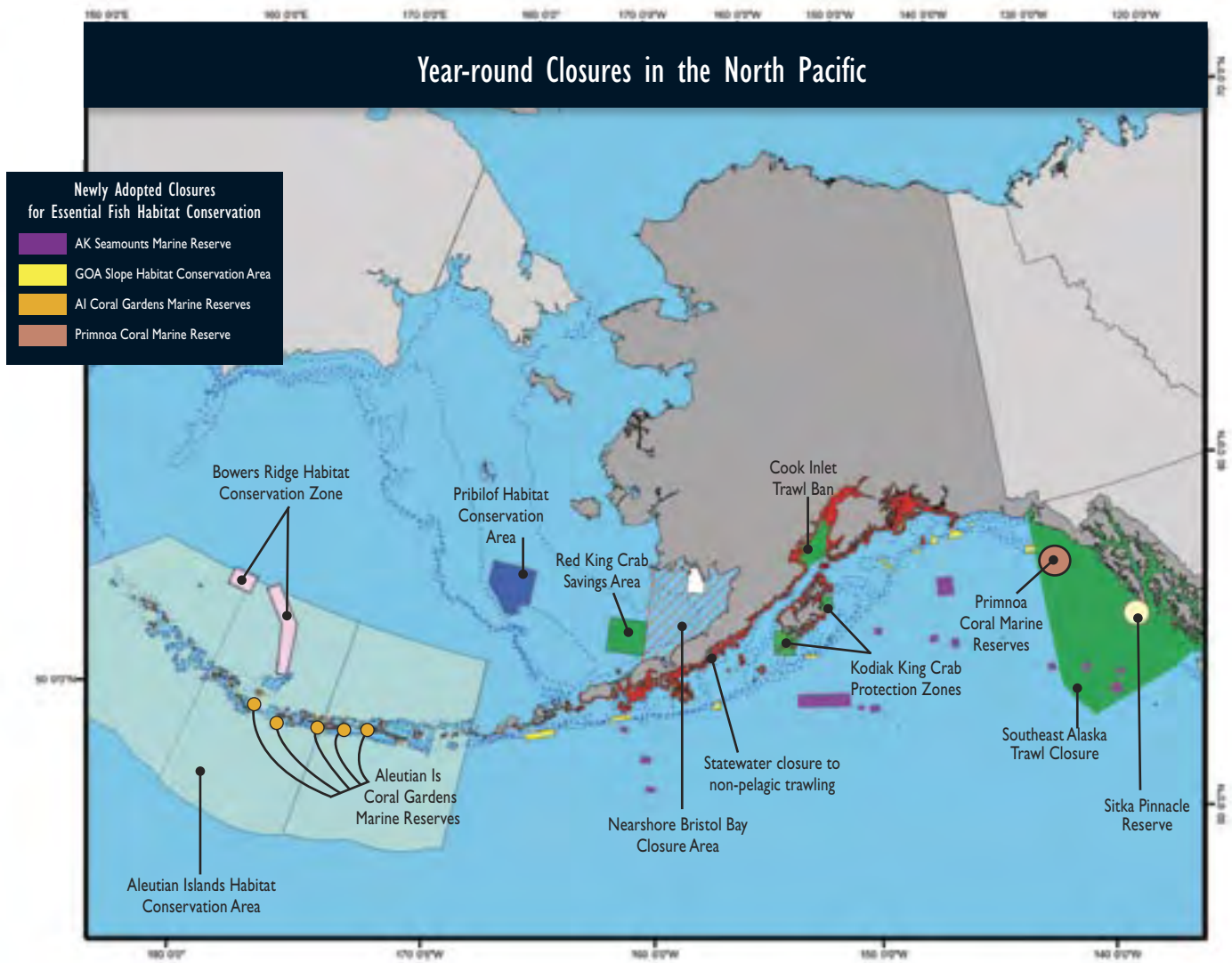
The rebuilding plans are very aggressive, in that they reduce catch limits or close the fishery entirely until the stock increases to sustainable levels. However, because crab abundance is generally dependent on environmental conditions, rather than fishery management measures, the progress for rebuilding these stocks depends on factors largely out of the control of the Council or NOAA Fisheries. An example of this conundrum is the Pribilof Islands blue king crab rebuilding plan. The stock is not subject to any directed fishing mortality (the fishery has been closed since the early 1990s), bycatch mortality or habitat impacts (all trawling has been prohibited where the crabs are distributed since the mid 1990s). Yet the stock has continued to decline as a result of successive year-class failures. There is nothing else a rebuilding plan can do to bring back this stock; all we can do is wait for environmental changes to favor reproduction and survival.

New MPAs and Coral Protection

In February 2005, the Council took significant action to identify and conserve essential fish habitat (EFH) from potential adverse effects of fishing. EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

A 2,500+ page scientific analysis was prepared to evaluate the total impacts of fishing on EFH, and evaluate alternatives to describe and conserve EFH from fishing impacts. Although the





analysis concluded that fisheries do have long term effects on habitat, these impacts were considered minimal and would not have detrimental effects on fish populations or their habitats. Nevertheless, continuing with its long history of precautionary, ecosystem-based management policy, the Council adopted several new and significant measures to conserve EFH.

The first action the Council took was to revise existing descriptions of EFH by incorporating the most recent scientific information and improved mapping. As such, EFH is now described as habitats within a general distribution for a life state of a species based on GIS data analysis. The second action taken by the Council was to formally adopt a new approach for identifying Habitat Areas of Particular Concern (HAPCs). The new approach will allow HAPC to be designated as specific sites within EFH, thereby focusing conservation efforts in particular areas.

To minimize the effects of fishing of EFH, the Council's preferred alternative will provide significant, additional habitat conservation in the Aleutian Islands, and the Gulf of Alaska. To address concerns about the impacts of bottom trawling on benthic habitat (particularly on coral communities) in the Aleutian Islands, the Council took action to prohibit all bottom trawling, except in small discrete "open" areas. Over 95% of the Aleutian Islands management area will be closed to bottom trawling (277,100 nm²) and about 4% (12,423 nm²) will remain open. Additionally, six areas with especially high density coral and sponge habitat will be closed to all bottom contact fishing gear (longlines, pots, trawls, etc.). These "coral garden" areas, which total 110 nm², are thus essentially considered marine reserves. To improve monitoring and enforcement

of the Aleutian Island closures, a vessel monitoring system (VMS) will be required for all fishing vessels. Additionally a comprehensive plan for research and monitoring will be developed to improve scientific information about this area, and improve and evaluate effectiveness of these fishery management measures.

Within the Gulf of Alaska, the Council voted to prohibit bottom trawling for all groundfish species in 10 designated areas along the continental shelf. These areas, which are thought to contain high relief bottom and coral communities, total 2,086 nm². At the time of the Council's five-year review on EFH, the Council will review available research information regarding two of the closed areas (Sanak and Albatross) to determine efficacy of continued closure.

The Council also took action to initiate an expanded analysis for alternatives to minimize the effects of fishing on EFH in the Bering Sea. The analysis will include an assessment of gear modifications, additional closed areas, as well as other alternatives to be developed.

In addition to mitigating potential effects of fishing on EFH, the Council took final action to designate and protect HAPC off Alaska. Identification of HAPCs provides focus for additional conservation efforts for those habitat sites that are ecologically important, sensitive to disturbance, exposed to development activities, or rare.

Twenty HAPC areas, consisting of seamounts and high density coral areas, were identified as HAPC. To protect these areas, the Council took action to eliminate virtually all environmental impacts due to fishing by prohibiting any gear type that contacts the bottom. As a result, these areas will essentially be considered "marine reserves". While pelagic fishing would be allowed in these areas, none is anticipated, so resource extraction will be nil in the areas.

Specifically, the Council action includes all 16 seamounts in the EEZ off Alaska, named on NOAA charts (Bowers, Brown, Chirikof, Marchand, Dall, Denson, Derickson, Dickins, Giacomini, Kodiak, Odessey, Patton, Quinn, Sirius, Unimak, and Welker). All bottom contact fishing by Council-managed fisheries will be prohibited on these seamounts which total 5,329 nm².

In Southeast Alaska, several recently discovered areas containing large aggregations ("thickets") of long-lived *Primnoa* coral, were also identified as HAPC. These areas, in the vicinity of Cape Ommaney and Fairweather grounds, total 67 nm². All Council managed bottom-contact gear (longlines, trawls, pots, dinglebar gear, etc.) will be prohibited in five zones within these HAPC areas where submersible observations have been made. The area where bottom fishing will be prohibited totals 13.5 nm².

In the Aleutian Islands region, the relatively unexplored Bowers Ridge, was also identified as HAPC, and as a precautionary measure, the Council acted to prohibit mobile fishing gear that contacts the bottom within this 5,286 nm² area.

In total, when combined with existing marine protected areas, bottom trawling will be prohibited year round in over 388,600 nm². This enormous area equates to the combined land area encompassed by the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Hawaii. Additionally, there are now 28 areas that have been essentially designated as "marine reserves", where virtually all resource extraction of demersal species is prohibited. In total, the area encompassed by quasi "marine reserves" off Alaska totals 5,456 nm².



Bill Wilson



Robert Wakeford/MRAG

Robert Wakeford/MRAG

Western Pacific Fishery Management Council

MANAGEMENT UPDATE – MARCH 2005



WESTERN PACIFIC FISHERY
MANAGEMENT COUNCIL
1164 Bishop Street, Suite 1400
Honolulu, Hawaii 96813
Tel: 808-522-8220
Fax: 808-522-8226
www.wpcouncil.org

Protected Species Conservation

In 2004, the Western Pacific Fishery Management Council continued to implement management changes to reduce and mitigate interactions between Hawaii-based longline vessels and protected species such as sea turtles and seabirds. Based on cooperative research conducted with Hawaii's longline fishery, the Western Pacific Council strengthened protection for seabirds by extending and increasing current measures to include either the use of bird scaring streamer lines (tori lines), or the use of a fishing technique termed side-setting, which appears to virtually eliminate these seabird interactions. This requirement is anticipated to virtually eliminate seabird interactions with this fishery.

As a result of similar cooperative research in the Atlantic longline fishery conducted on sea turtles, the Western Pacific Council now requires Hawaii-based longline vessels to use circle hooks and mackerel-type bait when targeting swordfish. This gear combination was found to significantly reduce sea turtle interactions in the Atlantic and is now being used in a model Hawaii swordfish fishery. Through these efforts, swordfish landings in Honolulu resumed in early 2005. This model fishery is limited to only half the annual number of longline sets as previously used in the fishery. However, as these new techniques are proven effective, the Council will work to export the new methods to the international fishing community.

In 2004, the Western Pacific Council also expanded its sea turtle management and conservation efforts in the Pacific. Working closely with the National Marine Fisheries Service's (NMFS, also known as NOAA Fisheries) Pacific Islands Regional Office and Science Center, numerous sea turtle conservation and management projects were implemented as recommended at the Western Pacific Council's 2002 Sea Turtle Cooperative Research and Management Workshop and subsequent meetings of its Sea Turtle Advisory Committee. These early efforts have allowed the Western Pacific Council to create and foster critical linkages with key international organizations. Today, the Western Pacific Council and NMFS directly support "on the beach" sea turtle conservation projects, the export of environmentally responsible fishing practices to

The Council's Coral Reef Ecosystems Fishery Management Plan was the Nation's first such plan and was implemented in 2004. The Western Pacific Council is now transforming its remaining existing multi-species Fishery Management Plans into archipelago-based fishery ecosystem plans.

other fishing nations, and continued networking between international agencies, organizations and industry. As a result, Hawaii has emerged as a recognized center of excellence in protected species research and conservation.

Fishery interactions with marine mammals are the most recent issue to be addressed by the Western Pacific Council. In 2004 the Hawaii-based longline fleet was reclassified under the Marine Mammal Protection Act as a Category 1 fishery believed to significantly interact with marine mammals (it was previously classified as a Category 3 fishery with a remote likelihood of interactions). The reclassification was based on 10 interactions with false killer whales between 1994 to 2002, and a population assessment for this species based on a NMFS line survey around the Hawaiian Archipelago. NMFS considers the Hawaii sub-population a strategic stock and has estimated there are 268 false killer whales in this population. In 2004 the Western Pacific Council formed a Marine Mammal Advisory Committee to advise the Council on measures that could be implemented to minimize further fishery interactions with false killer whales.

Ecosystem Management

During 2004 the Western Pacific Council and its partners continued working to implement ecosystem-based fishery management plans for the region's fisheries. The Council's Coral Reef Ecosystems Fishery Management Plan was the Nation's first such plan and was implemented in 2004. The Western Pacific Council is now transforming its remaining existing multi-species Fishery Management Plans into archipelago-based fishery ecosystem plans.

As a part of this process, strategies are being assessed for developing and implementing archipelagic-based demersal fishery ecosystem plans for each of the Council's major island areas (the Samoa Archipelago, the Mariana Archipelago, and the Hawaii Archipelago). A pilot project is underway in the Mariana Archipelago that is anticipated to lay the groundwork for the implementation of each of the archipelagic-based demersal fishery ecosystem plans. A presentation of this project will be made at the 2005 Conference.

Also being evaluated are means by which to integrate ecosystem-based principles into the existing multi-species pelagic fishery management plan to establish a Pelagic Fishery Ecosystem Plan that considers the full range of these highly migratory species. The Council is also convening two workshops in April 2005 concerned with ecosystem-based (EB) approaches to fishery management. The first is a coastal fishery management workshop, co-hosted by the Council, Secretariat of the Pacific Community and FAO, for fishery managers from the Pacific Islands, which includes EB approaches to fishery management as one of its major themes. The second meeting is a workshop on the development of EB approaches to marine resource management. The overarching workshop objective is the identification of the science requirements to support ecosystem-based (EB) approaches to marine resource management and the development of EB approaches in the Western Pacific Region.



NOAA Fisheries/PIFSC

International Management Issues

The Western Pacific Council is intimately involved with the process of international fishery management across the Pacific. Successful management of pelagic tunas, billfish and other migratory species, such as mahimahi and ono, requires extensive data sharing and cooperation between fishing nations. International management arrangements have become the engine driving pelagic resource management in the Pacific. Tuna stocks in the Eastern Tropical Pacific Ocean, to the west of 150 deg W have been managed for over half a century by the Inter-American Tropical Tuna Commission (IATTC). More recently during 2004, a new international fishery management authority, the Western & Central Pacific Fishery Commission came into force and held its first meeting in Pohnpei, Micronesia with active participation by the Western Pacific Council. This Commission is anticipated to play an important role in the international management and conservation of pelagic fish stocks.

An immediate international and domestic issue is to address overfishing of bigeye tuna stocks in the Pacific. The Secretary of Commerce has determined that overfishing of Pacific bigeye tuna is occurring Pacific-wide and, as required by the Magnuson-Stevens Act, the Council must take action to address overfishing within one year. Recent stock assessments for bigeye tuna in the Eastern and Western Pacific suggest that this stock is being fished at unsustainably high levels. The stock itself is not yet overfished, but could become so if fishing mortality is not reduced. This will likely require scaling back of the longline fishing effort directed at catching bigeye tuna, and reducing catches of juvenile bigeye by purse seine vessels. Bigeye catches by fisheries under the Council's jurisdiction in 2003 amounted to 4000 mt, or about 2% of the Pacific-wide total of 189,000 mt. To effectively reduce fishing mortality on bigeye tuna will require management action at the international level, and any unilateral action by U.S. fisheries will have little effect on the stock as a whole.

Other international mechanisms have also been implemented to address the conservation of sea turtles, including the Inter-American Convention for the Protection and Conservation of Sea Turtles, and the Indian Ocean and Southeast Asia Memorandum of Understanding for Turtle Conservation. Over the next year the Council, Regional Office and Science Center will stay fully engaged in the deliberations of these commissions.

Recreational Fishery Monitoring

Four years ago the Western Pacific Council evaluated existing fishery monitoring programs throughout its region. The evaluation confirmed that most of the fishery monitoring programs in place are fishery dependent, meaning that they rely on data collected from fishing operations. In addition, there is a data gap regarding the recreational fishing sector, especially in Hawaii. After a twenty-year hiatus, the Marine Recreational Fishing Statistics Survey was reestablished in Hawaii, through a collaboration between NMFS and the Hawaii Division of Aquatic Resources, and in 2004 provided preliminary recreational fishery statistics for some fisheries. Recreational bottomfish fishery in Hawaii remains a significant data gap and limits a fishery manager's ability to fully monitor the status of these important fishery resources. The Western Pacific Council has focused its efforts at improving existing information collection programs for this fishery. After a series of public fishers forums centered on the recreational bottomfish fishery, the Council now developing targeted surveys of the known 1,600 recreational bottomfish fishers in Hawaii. The Council is working to improve the information base and programs through which biological, economic, social and ecological information is collected on all fisheries within its jurisdiction. This information will greatly improve evaluations of the status of fisheries, and will assist the



Robert Wakeford/PRAC

Council in both developing appropriate management measures and assessing the impacts of those measures on the environment.

Interagency Coordination

Are NMFS and the Councils truly charged with the management and conservation of fisheries as indicated in the Magnuson-Stevens Fishery Conservation and Management Act (MSA)? This simple question has arisen as a result of the designation of National Marine Sanctuaries throughout the Nation. The Western Pacific and other Regional Fishery Management Councils have been assisting the National Marine Sanctuary Program in their efforts to establish these sanctuaries. The Western Pacific Council sees the Sanctuary designation process as an opportunity to establish a coordinated process to better manage the Nation's marine resources. Although many feel that policy development for fisheries is an open public process that is well established and should continue under the MSA, the National Marine Sanctuary Program and its Sanctuary Advisory Councils can provide management responsibilities for non-fishery management issues and thus provide a comprehensive resource management regime. Supporting Under-Secretary Admiral Lautenbacher's vision of building a "Corporate NOAA," the Western Pacific Council has proposed that a Memorandum of Agreement be created with NOAA (including the National Marine Sanctuary Program) and the Councils to provide a formal, open, participatory and science-based process for cooperatively developing and promulgating fishing regulations for all sanctuaries. Such a process has been shown to facilitate the exchange and use of information, advice, technical assistance, and expertise between agency partners and the public.

Over the past two years, the Western Pacific Council has also been actively participating in planning the continued development of NOAA's newly formed Pacific Islands Region. Coordinated efforts between the Pacific Islands Regional Office, Pacific Islands Fisheries Science Center, Office of Law Enforcement and Western Pacific Council have produced a joint Pacific Islands Region Strategic Plan Summary that was released in March 2004. That document summarized the Region's major programmatic and administrative goals as well as providing associated budgets and is available on the Council's website (www.wpcouncil.org). Staff are now finalizing the complete Strategic Plan that will be released by May 2005. The complete plan will provide additional details on the Region's mission, goals and major work elements and will include input from partner agencies as well as external stakeholders.



Robert Wastler/MPAC



Jeff Reiter/GSMFC



Jeff Reiter/GSMFC



Jeff Reiter/GSMFC

Gulf of Mexico Fishery Management Council

MANAGEMENT UPDATE – MARCH 2005



GULF OF MEXICO FISHERY
MANAGEMENT COUNCIL

The Commons at Rivergate
3018 North U.S. Highway 301
Suite 1000

Tampa, Florida 33619-2272

Tel: 813-228-2815

(toll-free 888-833-1844)

Fax: 813-225-7015

www.gulfcouncil.org

Ecosystem Management

The Gulf Council's approach to an ecosystem approach to management is to work collaboratively with its Ecosystem SSC and with the public to evolve from the current species-based approach by building upon its Essential Fish Habitat amendment and those elements of its current fishery management plans that encompass ecosystem aspects of fishery management.

The Gulf Council recently formed an Ecosystem SSC, composed of government, university and private scientists who are knowledgeable about fisheries ecology. The Council is working with NOAA Fisheries and the other east coast Councils to develop a socioeconomic survey instrument and to develop ecosystem-based decision support tools. Later in 2005, the Council is planning to hold a series of facilitated workshops to involve the public in the development of an ecosystem approach to management, and to solicit public input as to what such an approach should include.

The Council's five-year budget provides for development of one Fisheries Ecosystem Plan (FEP) for the ecosystem made up by the West Florida shelf. This area is characterized by a very broad shelf (250 km) with extensive hard bottom area populated by emergent flora and fauna. The grouper fishery complex makes up the dominant part of the finfish biomass. This fishery complex had been managed as an ecosystem in the past. The development of the FEP is expected take three years. Under the same budget, the Council proposes to initiate work on a FEP for the Florida Coral Reef Tract that is also anticipated to take three years to complete.

New IFQs & Rights-based Limited Access Programs

The Gulf Council began developing limited access programs for its commercial fisheries beginning in the early 1990's. These initially took a temporary form of a moratorium on issuance of additional permits and by allowing the permits to be transferable between persons. These temporary systems were applied to all the commercial vessels harvesting reef fish and king mackerel. The

The Gulf Council has always used its Scientific and Statistical Committee (SSC) for its final peer-review of all scientific information and analyses used by the Council.

State of Florida, and Gulf and South Atlantic Councils established a permanent trap limitation program for spiny lobster (1992) and subsequently (2002) for stone crabs.

In 2005 the Council established permanent license limitation programs for commercial vessels in the reef fish fishery and, jointly with the SAFMC, for commercial vessels in the king mackerel fishery. The Gulf Council (in 2002) had established a moratorium on the issuance of any additional permits for charter vessels and headboats in the Gulf EEZ fisheries for reef fish and coastal migratory pelagic fisheries. This capped the number of vessels at approximately 1,600. In 2005, the Council is working on a permanent limited access program which allows additional vessel owners the opportunity to demonstrate their vessel meets the eligibility criteria. The Council will take final action on this amendment in July 2005. The Council has also developed a shrimp amendment/EIS that establishes a moratorium on the issuance of additional shrimp permits, and allows transfer of permits between persons. This program essentially will cap the number of vessels at approximately 2,800, which is about 500 less than previously estimated by NMFS to be operating in the Gulf EEZ fishery.

The Gulf Council will complete an IFQ program for the commercial red snapper fishery in 2005. Approximately 600 fishermen would meet the qualifications for initial eligibility. The program will likely alleviate most problems associated with the current derby fishery which results because the entire annual quota is currently taken in about 77 days. Hopefully this will result in a higher ex-vessel value paid to the fishermen. The Council has instructed staff to develop an IFQ for the grouper fishery during 2006.

The Gulf reef fish industry has gained Congressional funding for a buy-back program to remove vessels from the bottom longline fishery for grouper. The industry anticipates this program will be implemented by Congressional action, rather than by NOAA and the Council. Buying these vessels should benefit all commercial grouper fishermen and result in the fishery remaining open all year each year.

Improved Scientific Review

The Gulf Council has always used its Scientific and Statistical Committee (SSC) for its final peer-review of all scientific information and analyses used by the Council. The SSC was structured for this purpose by having a 14-member standing committee with the following expertise: population dynamics (3), biology (3), economics (3), anthropology (3), marine law (1), and state fishery regulation (1). This standing committee meets with a special SSC for each fishery consisting of 3 to 5 members, particularly knowledgeable of that fishery.

Beginning in 2002, the NMFS Southeast Fishery Science Center (SEFSC) and the Southeast Councils (GMFMC, SAFMC, CFMC) adopted an improved process for developing peer-reviewed stock assessments, called SEDAR (for Southeast Data, Assessment and Review). The SEDAR process not only results in a peer-reviewed stock assessment, but it also provides greater opportunity for the user-groups and public to participate in the stock assessment process.

The SEDAR process involves holding the following public workshops: Data where the scientists, fishers and public participate in submitting and evaluating the data that will be used for the stock assessment; Assessment where the scientists, fishers and public are involved with completing and evaluating the stock assessment for a stock; and Review where independent scientists, fishers and public participate in evaluating the stock assessment and certifying that it is based on the best available scientific data.

In 2003, the three Southeast Councils and NMFS began jointly drafting the FMP amendments and NEPA documents under the NMFS “streamlining process”. Under this process interdisciplinary project teams (IPTs) were formed of persons from each of the NMFS divisions, NOAA general counsel and Council staff (typically 12 to 16 persons). The intent of the streamlining process was to produce more legally defensible amendments and EIS documents. This goal was achieved partly by more intensive review of and dependence on better scientific information.

Stock Rebuilding Progress

By 2004 the Gulf Council completed rebuilding programs for all the Gulf stocks that were classified as overfished. In the 1988-1993 period the Council implemented rules prohibiting harvest or possession from the Gulf EEZ of red drum, goliath grouper, and Nassau grouper. These prohibitions remain in place. Harvest of red drum occurs only in the state jurisdictions and each of the states implemented rules that allow at least 30 percent of each year class (cohort) to escape from the state estuarine waters to the offshore spawning stock.

The harvest prohibition is resulting in good progress in restoring the goliath grouper stock which is being evaluated by NMFS biennially. Nassau grouper are a Pan-Caribbean stock that rarely occurs in the Gulf and only in the Florida coral reef tract. The GMFMC, SAFMC, CFMC, and state of Florida all prohibit harvest and possession, and many Caribbean island nations are implementing rules to restore Nassau grouper.

In 2004 the Council implemented amendments for rebuilding Gulf stocks of red grouper, red snapper, and vermilion snapper by applying fishery restrictions to recreational and commercial fisheries for those stocks. Rebuilding is anticipated to be completed within 10 years for red grouper and vermilion snapper; and within 30 years for red snapper, which is a long-lived stock with some fish living more than 50 years. The Council implemented a rebuilding program for greater amberjack in 2002. That program is meeting the rebuilding goals.

New MPAs and Coral Protection

The Gulf Council has routinely used marine protected areas (MPAs) to manage its fisheries by regulating use of fishing gear. Each of the Gulf states also has extensive areas (MPAs) where certain gear is prohibited either temporarily or permanently.

The Gulf Council has two MPAs that include portions of the nearshore waters across the Gulf from the Florida Keys to the Mexican border. The “Stressed Area” where fish traps, rock-hopper trawls, and powerheads are prohibited lies inshore of the “Longline and Buoy Gear Prohibition Area,” which encompasses more than 70,000 square nautical miles. Gulf MPAs also include shrimp nursery areas off Texas and Florida, 2 extensive zones regulating shrimp and stone crab gear, 2 habitat areas of particular concern (HAPCs), and 4 marine reserves where fishing or bottom fishing is prohibited. These additional MPAs total more than 14,000 square nautical miles of ocean.



William B. Folsom, NMFS

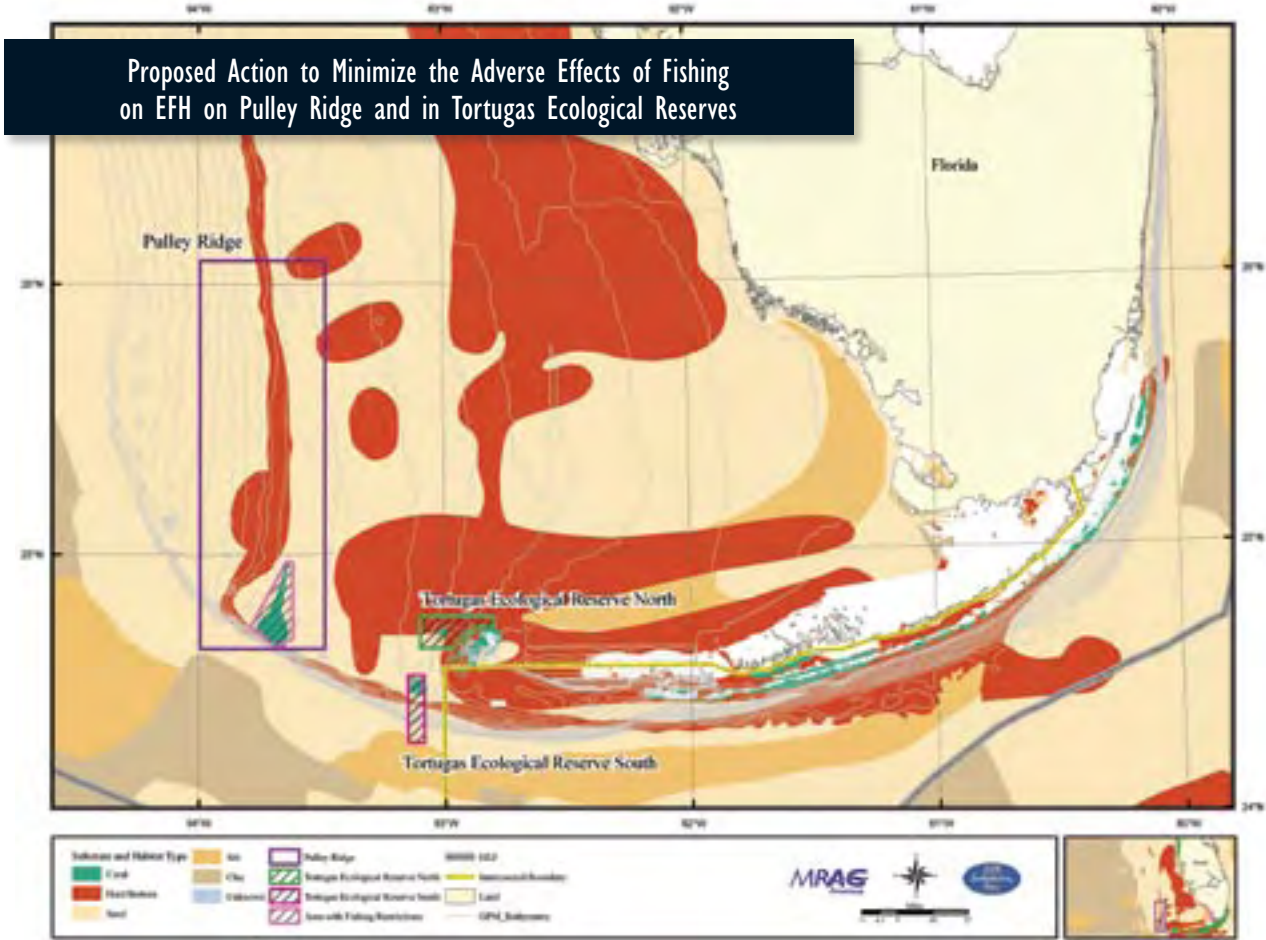


Figure 1.

The Council through its Generic Amendment (3) for Essential Fish Habitat (EFH), approved in January 2005, is implementing new HAPCs with several coral reef areas protected from gear interfacing with the bottom. Off Florida, the Council is creating an approximately 100 nm² area of coral reef withing the HAPC on Pulley's Ridge (see figure). This is the northernmost and deepest pristine area with hermatypic coral characteristic of the Caribbean Sea. Its proximity to the Loop Current results in the water being clear enough to allow sunlight to penetrate to those deeper depths (240 feet) and support the algae components of the reef complex. It is certainly a unique area. The HAPC will encompass about 2,300 square nautical miles with bottom impacting gear being prohibited on approximately 104 square nautical miles therein

Off the Texas/Louisiana shelf the amendment established HAPCs for 13 reefs and banks, and identified McGrail Bank and the East and West Flower Garden Banks as having living coral reefs, and Stetson Bank as having significant coral resources, making all of these areas worthy of protection from anchoring and bottom-tending fishing gears (see figures). These areas contain unique coral and hard bottom resources including deep-water pinnacles along the the shelf edge that extend well above the bottom. They are the northern-most extent of coral reefs in the Gulf of Mexico. The other nine reefs and banks depicted in the figure do not have coral reefs.

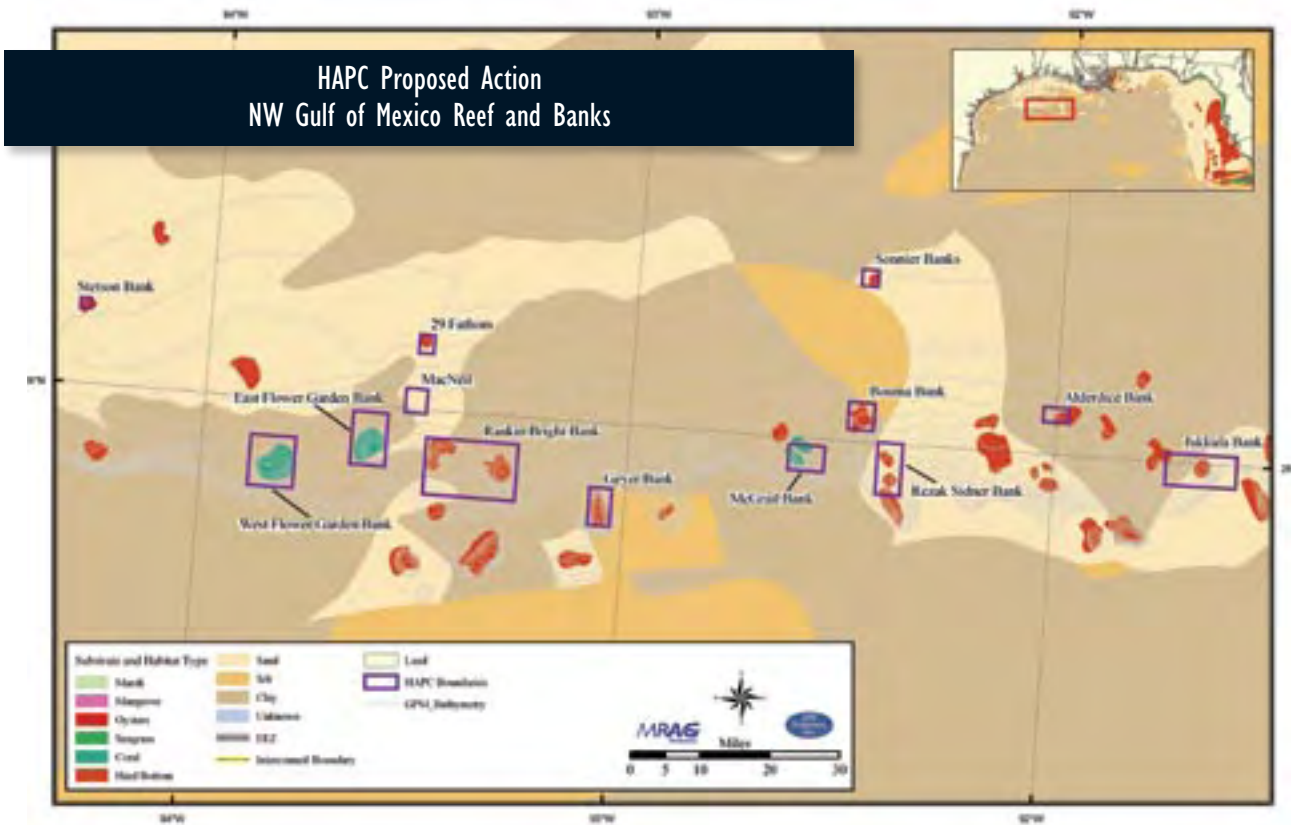


Figure 2.

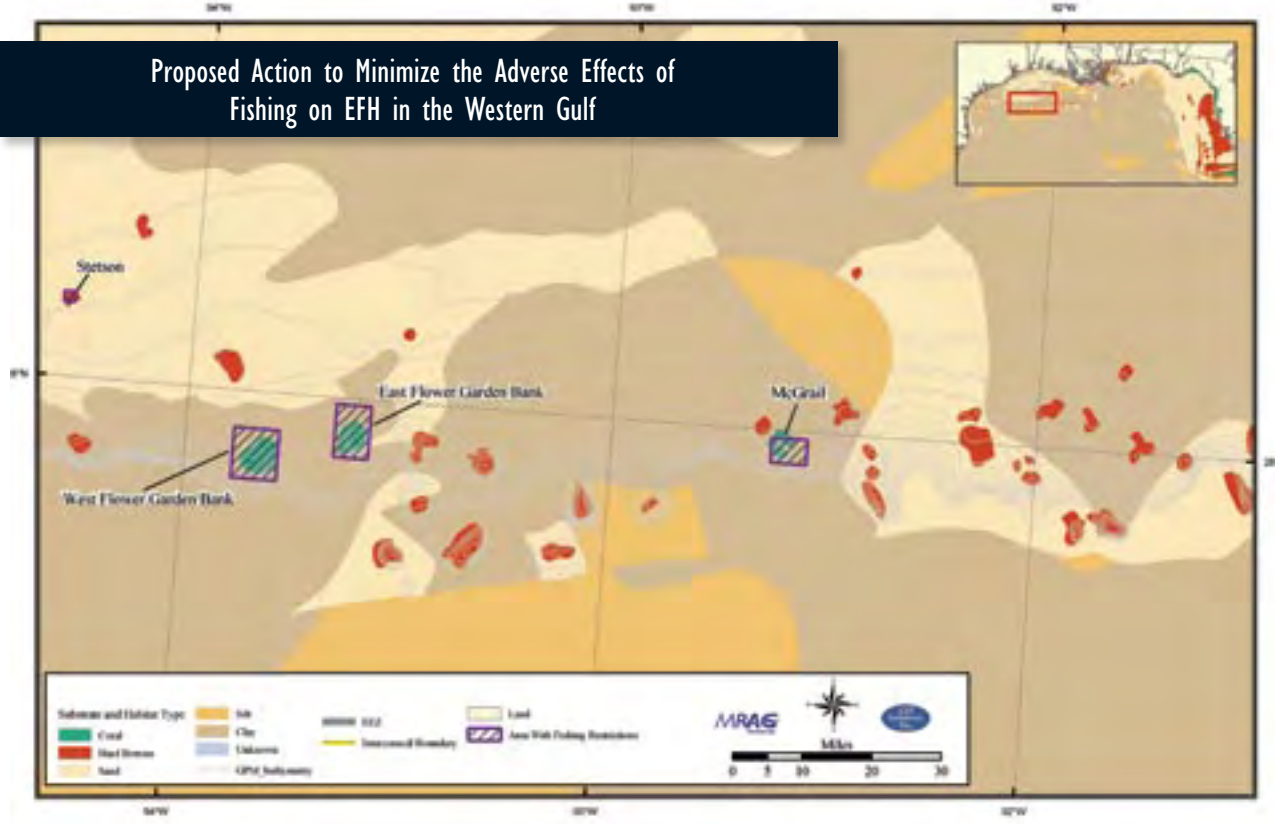


Figure 3.



Kim Iverson/SAPMC



Edward Pasuda, NMFS



Dr. Peter J. Auster/NMFS

Mid-Atlantic Fishery Management Council

MANAGEMENT UPDATE – MARCH 2005



MID-ATLANTIC FISHERY
MANAGEMENT COUNCIL
Room 2115 Federal Building
300 S. New Street
Dover, Delaware 19904
Tel: 302-674-2331
www.mafmc.org

Ecosystem-based Approach to Fisheries Management

Since June 2004, the Mid-Atlantic Fishery Management Council has been actively engaged in developing an improved ecosystems based approach to fisheries management. This effort has been a two-pronged approach. One prong relates to the establishment of a Council Ecosystems Committee. This committee was established in June 2004 and has convened a meeting at every Council meeting (four in number) since its inception. The seven-member committee has addressed defining what ecosystems management is, has invited experts to provide testimony related to Geographic Information Systems (GIS) capabilities and their applications for fishery management, and has reviewed National Marine Fisheries Service's (NMFS) ecosystems efforts regarding the development of a science-based approach to fishery management. The committee will continue to function as an integral part of the Council's efforts to establish an improved ecosystems-based approach to fisheries management.

The second prong of the program relates to the designation of a staff member as project leader for the ecosystems based approach to fisheries management program. Dr. Thomas Hoff was relieved of his fishery management plan responsibilities, and as the Council's senior ecologist, he has participated in a number of meetings with NMFS. These meetings include a GIS (Geographic Information Systems) workshop held during September 2004 in Charleston, South Carolina. At this workshop, Tom identified the Council's GIS needs related to Essential Fish Habitat (EFH) and the temporal/spatial distribution of Council managed fish stocks. In addition, Tom has participated in a NMFS sponsored meeting related to developing a survey instrument to solicit from experts and the general public their perceptions of what ecosystems means and how an ecosystems based approach to fisheries management should operate. This meeting was also attended by other Council staff and one Council member. Later this month Tom will be participating in a NMFS sponsored meeting related to identifying the management tools that are available for Councils, as well as the Agency, in adopting an ecosystems based approach to fisheries management. When Tom was released of his Council plan responsibilities, we used the lapse associated with his position to hire a social anthropologist on a temporary appointment to

help with the development of survey instruments to assess the public's perception and understanding of fisheries management based on ecosystems principles.

We have worked with other east coast Councils to help form this Council's approach to an ecosystems based approach to fisheries management. During this process we have discovered that the Council's single species management approach, and its related quota management of fish stocks, can be construed to be driven by ecosystems based considerations and principles. Hence, as we continue to recover stocks for which this Council is responsible, we will continue to build on our current ecosystems based successes.

New IFQs or Other Rights-based Programs

The MAFMC was the first of the eight Regional Fishery Management Councils to implement an Individual Transferable Quota (ITQ) Fishery Management Plan (FMP). In 1990, Amendment 8 to the Surfclam and Ocean Quahog FMP was implemented through federal rule and many of the reasons for its implementation have been actualized. The principal reasons or needs that caused consideration and eventual adoption of an ITQ-based fishery included:

- Conservation of the resource;
- Creation of a limited entry system;
- Improved economic benefits for harvesters;
- Reduction in excess harvesting capacity; and
- Establishment of a vessel allocation system.

In addition to these specific surfclam and ocean quahog reasons, other reasons for adoption of such programs include:

- Greater sustainability of fishery;
- Minimization of gear impacts to EFH;
- Minimization of bycatch;
- Stability of access to fish and/or income;
- Stability of markets and prices;
- Creation of an asset for fishermen;
- Rationalization of investment;
- Stable business environment and opportunity;
- Improved productivity and efficiency of fishing industry; and
- Decreased cost for fishery management and enforcement of regulations.

With the recent expiration of the moratorium on individual fishing quotas, the MAFMC is now considering an amendment to its Tilefish FMP. Amendment 1 would consider adoption of an ITQ system for various categories of tilefish fishing vessels. To this end, the Council will address one or more of the following issues:

Allocation: Since the implementation of the tilefish limited entry program stakeholders have expressed a desire for the Council to assess the implementation of an ITQ system to further refine the existing management program.

Information collection: Since the implementation of the original FMP stakeholders have recommended that the Council assess measures to improve collection of landings information.



Edward Pastula, NMFIS

Minimum hook size: Stakeholders have recommended that the Council assess the potential for implementing hook size measures in the commercial tilefish fishery.

Recreational management measures: Some Council members have indicated that tilefish recreational landings have increased in recent years and have suggested that these landings be accounted for in the FMP.

New entrants into the commercial fishery: As the stock recovers other methods to allow access to the rebuilt tilefish fishery many need to be evaluated.

The MAFMC is also considering developing a controlled access system for the mackerel fishery that is governed by the Council's Atlantic Mackerel, Squid, and Butterfish FMP. As regards Amendment 9 to this FMP (the Amendment addressing, among other things, a controlled access system for the mackerel fishery), the Council will address the following considerations for the Atlantic mackerel fishery:

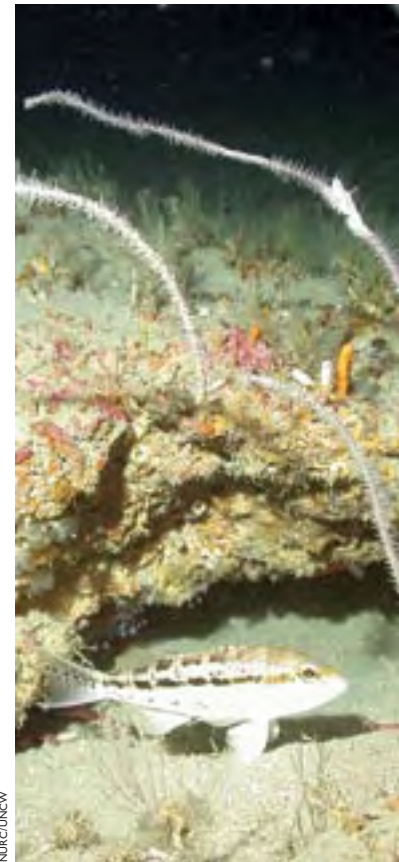
- Is limited access to the Atlantic mackerel fishery warranted or should no action be taken?
- If limited access in the mackerel fishery is warranted, then what type of system is appropriate?
- What criteria should the Council consider to qualify vessels for limited access to the mackerel fishery?
- What is the appropriate qualifying period and should the control date be used in the definition of the qualifying period?
- Should the Council consider the implementation of a trigger which would initiate controlled access at a future date?
- What provisions for vessel upgrades, if any, should the Council consider if limited access is implemented in the mackerel fishery?
- Under limited access conditions, should rules governing at sea processing and transfers at sea in the mackerel fishery be established?
- To what extent does the lack of joint management of the Atlantic mackerel resource with Canada affect the development of a limited access program in the portion of the fishery under U.S. jurisdiction?

At this time, the Council neither supports nor rejects any of these plan considerations. These lists are not meant to be the all-inclusive lists of considerations for tilefish and mackerel. The Council, like all other Councils, will entertain and consider any comments or suggestions regarding Amendment 1 to its Tilefish FMP, and Amendment 9 to its Atlantic Mackerel, Squid, and Butterfish FMP.

Improvements in Scientific Review Process

The Mid-Atlantic Fishery Management Council has not made any significant change to its scientific review process. The Council uses several sources of scientific review in its decision making. For the majority of its stock assessment advice, the Mid-Atlantic Council relies on the NMFS' Northeast Fishery Science Center's Stock Assessment Review Committee (SARC) process. The SARC meets twice a year to review stock assessments, and is comprised of independent experts from inside and outside the United States.

In addition to the SARC, the Council has Monitoring Committees for most of its fishery management plans (FMPs) that meet once or twice a year to provide management advice to the Council.



INJRCUNCV

Together with the Atlantic States Marine Fisheries Commission, coastal states, NMFS, and the commercial and recreational fisherman, the Council has been successful in recovering and rebuilding the twelve stocks for which the Council has lead or exclusive management responsibility.

The Monitoring Committees review the SARC's advice, as well as additional information provided by state scientists and managers on the committee, to develop management recommendations for Council consideration. Because the Council has both a SARC and Monitoring Committee, it generally does not use the SSC for general scientific or management advice. In effect, these Monitoring Committees serve a role that is similar to the SSCs. The Council has an SSC and it meets on occasion to address specific concerns related to stock assessments. These meetings occur only when requested by the Council.

Recent Stock Rebuilding Success Stories

The Mid-Atlantic Fishery Management Council continues to improve its conservation and management of the marine resources under its jurisdiction. Together with the Atlantic States Marine Fisheries Commission, coastal states, NMFS, and the commercial and recreational fisherman, the Council has been successful in recovering and rebuilding the twelve stocks for which the Council has lead or exclusive management responsibility.

Based on the *Status of Fisheries of the United States 2003* report issued by the National Marine Fisheries Service both summer flounder and spiny dogfish are now no longer experiencing overfishing. In fact, only two of the 12 species directly governed by this council are experiencing overfishing, i.e., tilefish and black sea bass, although one other species (scup) is also categorized as experiencing overfishing since a quantitative estimate of the current F is not available.

Three of the 12 stocks are overfished, i.e., tilefish, dogfish, and bluefish. However, it should be noted that both tilefish and dogfish have been under Council management for fewer than five years. The status of the bluefish resource is unknown, but a stock assessment is currently underway.

In the major fisheries where the resource is shared between commercial and recreational fisheries, i.e., summer flounder, scup, black sea bass, bluefish, and mackerel, only bluefish is overfished. Given the state of these stocks and based on the most recent summer flounder stock assessment that indicated an increase in biomass, the Council and Commission adopted a total allowable landing (TAL) level of 30.3 million pounds for 2005, and 33.0 million pounds for 2006, the highest summer flounder TALs ever. The new TALs have a 75 percent probability of achieving the target F of 0.26 in 2005 and 2006. The scup total allowable catch (TAC) for 2005 was set at the same level as 2004, i.e., 18.65 million pounds with an associated TAL of 16.5 million pounds — the highest level in recent history. The stock biomass of black sea bass stock has continued to increase. As a result of this increase, the Council and Board adopted a TAL for 2005 of 8.20 million pounds. In the bluefish fishery, the Council and Board approved a TAL of 30.86 million pounds with 10.5 million pounds allocated to the commercial fishery as a quota, and 20.36 million pounds allocated to the recreational fishery as a recreational harvest limit. For mackerel, the NMFS recently proposed that 15,000 metric tons be made available to the recreational sector and 100,000 metric tons be made available to the commercial sector.

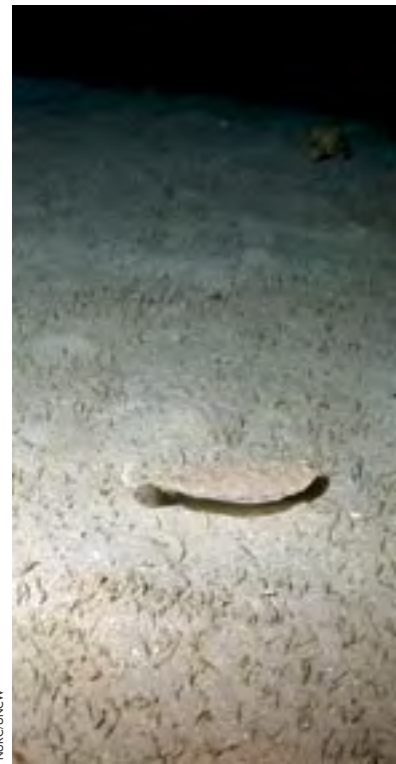


ASMFC

New MPAs

The Mid-Atlantic Fishery Management Council has not initiated any formal Marine Protected Area (MPA) actions as contemplated by Executive Order 13158. Nonetheless, the Council is in compliance with Magnuson-Stevens Fishery Conservation and Management Act requirements arising from the Sustainable Fisheries Act of 1996. The Council has identified and described Essential Fish Habitat (EFH) for all thirteen of its managed species, and but for two of its Fishery Management Plans has approved plans that minimize to the extent practicable the adverse effects of fishing on EFH. The Council, through its consultation authorities has taken numerous actions to encourage the conservation and enhancement of EFH. In meeting National Standard 1 of the MSA, all Council plans are structured to create conservation and management measures designed to prevent overfishing yet achieve, on a continuing basis, the optimum yield from each of our fisheries. In doing this, EFH is always considered so as to minimize any adverse impact on such habitat arising from fishing practices.

The Mid-Atlantic Council's Exclusive Economic Zone jurisdiction is approximately 140,000 square miles. Over 90% of this is sand bottom. There is one MPA located in our jurisdiction, i.e., the Monitor National Marine Sanctuary (3.14 square miles). There is also a horseshoe crab reserve of approximately 1,500 square miles off Delaware Bay extending from Ocean City, NJ on the north to the Delaware-Maryland state line on the south. Together with the New England Fishery Management Council, the MAFMC recently closed Lydonia and Oceanographer Canyons to monkfish fishing to protect deep-water corals. Habitat areas of particular concern have been identified in the Council's Tilefish FMP. Time and area closures are used as fishery management measures to stop fishing when authorized quotas have been landed in quota-managed species. Closures, regardless of duration, have an ameliorating effect on bottom EFH.



NIJ/CUNEW



New England Fishery Management Council

MANAGEMENT UPDATE – MARCH 2005



NEW ENGLAND FISHERY
MANAGEMENT COUNCIL

50 Water Street, Mill 2
Newburyport, MA 01950
Tel: 978-465-0492
Fax: 978-465-3116
www.nefmc.org

Ecosystem-based Fishery Management Plans

Pilot Project Underway

The New England Council is in the initial stages of embarking on the development of an ecosystem-based approach to fisheries in the Northeast. A NOAA Fisheries Service grant to the Council is supporting a one-year pilot project that is focused on three primary objectives. These include efforts to:

- Identify issues relevant to ecosystem approaches to management through stakeholder interaction;
- Identify data and technical needs related to the relevant issues; and
- Develop a blueprint for creating a Fishery Ecosystem Plan for New England fisheries.

As a first step, the project is focusing on education at the both Council and public levels. Concurrently, work is proceeding with NOAA's National Ocean Service on eco-GIS tools to help managers by providing visual representations of fisheries and ecosystems data. The emphasis is on spatial representation of fishing effort data and improved habitat mapping. Armed with these and other management tools, the Council will build on baseline information already contained in its management programs and actively integrate existing elements into a cohesive and overarching approach to management.

As fish stocks in New England continue to rebound, the difficulties in maintaining a "single-species" approach to management will likely be compounded as the lines between the management of individual fisheries blur. Ecosystem approaches to fisheries management, ideally, will allow the New England Council to integrate all of these considerations, and many others, into fishery management plans.

IFQs and Other Rights-based Programs

Sector Allocation

Individual Fishing Quotas and other share-based management systems still spark debate in New England. In the midst of discussions about input versus output controls, the Council

As fish stocks in New England continue to rebound, the difficulties in maintaining a “single-species” approach to management will likely be compounded as the lines between the management of individual fisheries blur.

adopted a grass roots cooperative program based on fishing history, rather than develop a full-ledged quota allocation system.

Working with hook fishermen from Cape Cod, the NEFMC’s innovative approach allows the formation of self-defined harvesting sectors. Implemented recently as part of a major amendment to the Council’s Multispecies Fishery Management Plan, sector rules promote flexibility as members allocate the catch of fish among sector participants and within the confines of overall conservation restrictions on amount of catch, method of fishing and fishing areas. If successful, the formation of sectors will provide strong incentives to rationalize fishing effort and a more direct role in the responsible management of fishery resources.

Under the rules developed by the Council, groups must apply to NOAA Fisheries to be considered a sector. NOAA reviews the specifics of a charter that must address the internal allocation of fish among members. The Council determines how the sector will operate in terms of its impact on the fishery and allocates a quota share to the sector. Once fish have been allocated to a sector, members may, in turn, allocate the fish among themselves in any way they choose. Sector membership is not restricted, but as a practical matter such programs will likely work best for fishermen who fish in the same area with similar gear. About 60 longline fishermen currently participate in the existing sector program.

Improvements in the Scientific Review Process

SAW Process Changes

The Northeast region uses a formal scientific peer-review process for evaluating and presenting stock assessment results to managers. The Stock Assessment Workshop, or SAW, uses an established protocol to prepare and review assessments for fish stocks off the New England and Mid-Atlantic coasts. Assessments are prepared by SAW working groups (federally led assessments) or Atlantic States Marine Fisheries Commission technical assessment committees (state led assessments) and are reviewed by a panel of stock assessment experts called the Stock Assessment Review Committee or SARC. Advice is provided to partner management bodies including the New England and Mid-Atlantic Fishery Management Councils and the Atlantic States Marine Fisheries Commission.

The overall SAW process is steered by the Northeast Regional Coordinating Council (NRCC), a group made up of the region’s executives — the New England and Mid-Atlantic Council chairs, vice-chairs and executive directors; the Atlantic States Marine Fisheries Commission executive director; and NOAA Fisheries Service Regional Administrator and Science and Research Director. Collectively, the group chooses the stocks to be reviewed, terms of reference for those assessments and the overall process and protocol used by the SAW.

Over the last year the NRCC evaluated the SAW process and made revisions to clarify that ownership of the final step of the process — development of management advice consistent with the accepted assessment — is the responsibility of the Regional Council or Commission



Ed Lyman/MA DHF

that manages the stock, rather than the peer review panel. As a result, the traditional model used over the course of the last 20 years was revised in 2004 to implement this very important change. Effects of the change will be evaluated over the next year to determine if it achieves the desired outcome.

Peer Review and Best Available Data for Essential Fish Habitat (EFH)

In order to complete a comprehensive amendment that garners public support and uses the best available scientific information, the Council is working with NOAA Fisheries to incorporate new scientific peer review components into the EFH designation process. The initiative is intended to facilitate efforts to: (1) review of the current designation methodology and investigate alternatives for identifying important habitats and their characteristics for Northeast managed species; and (2) evaluate the potential effects of fishing gear on EFH.

To date, the Council has worked with the Northeast Regional Coordinating Council to establish a Habitat Evaluation Working Group. This group is charged with investigating new and innovative methods and tools for designating EFH and is operating under the guidance of a regional steering committee with broad representation from both regional science and management partners.

The Council also will establish a Gear Effects Working Group in late 2005 to evaluate the effects of fishing gear on EFH, and present their findings to a peer review workshop. It is expected that this working group will include fishing industry and other outside participants.

MPA and Cold Water Coral Initiatives

MPAs

The Council is developing a policy on Marine Protected Areas not only to guide the implementation of the Executive Order on MPAs, but also to more effectively address the issue in the development of its Habitat Omnibus Amendment. Through a grant from the MPA Center, the Council has scheduled several MPA/EFH Education and Outreach Workshops. Information compiled at those events will directly assist the Council in the developing its policy and will further longer-range goals by providing general education on basic ecology, the role of habitat in fisheries and the science of marine protected areas.

The New England and the Mid-Atlantic Fishery Management Councils also have proposed to close Oceanographer and Lydonia Canyons to minimize the potential impacts of the directed monkfish fishery on deep-sea canyon habitats under Amendment 2 to the Monkfish Fishery Management Plan. Within these canyon habitats, a variety of species, including cold water corals, have been found and are known to provide structured habitat and shelter for some species of demersal fish and invertebrates.

Cold Water Coral Protection

Cold water corals are known to exist in some of the submarine canyons in the area that is identified for increased offshore fishing under the monkfish amendment. Corals are not currently included in the EFH descriptions for any species in the Northeast region, but grow on hard substrates and are particularly vulnerable to damage or loss by mobile bottom trawl gear and gillnets.

The possible expansion of the offshore monkfish fishery, either spatially into new areas or in terms of increased fishing intensity in existing areas, increases the probability of adverse impacts to EFH, canyon habitats, and, accordingly, cold water corals. The proposed closures are intended



Ed Lyman/MA DMF

as a precautionary measure to prevent any potential adverse impacts of an expanded offshore monkfish fishery on EFH and offshore canyon habitats. These additional deep-sea canyon habitat closures will add 116 square nautical miles to the network of habitat closed areas, totaling over 2,800 square nautical miles.

Stock Rebuilding Success Stories

Northeast Multispecies Programs

One of the most noteworthy developments over the past year was the approval and implementation of a major management action known as Amendment 13 to the Council's Northeast Multispecies (Groundfish) Fishery Management Plan. Providing for the management of 19 stocks, the program calls for further reductions in fishing effort through a number of innovative programs to help mitigate the economic impacts of the effort reductions. While there have been growing pains associated with implementation, the Council is cautiously optimistic that the program will achieve its biological objectives, even as it remains concerned about the economic and social impacts on the fishery.

For those who criticize effort controls as ineffective, preliminary landing statistics suggest that Amendment 13 may help blunt that criticism. With data available for five months (41 percent) of the fishing year, preliminary landings for all stocks are less than 41 percent of the target Total Allowable Catches (TACs). This is a significant improvement from earlier years when target TACs were often exceeded within the first half of the fishing year. With seven months remaining, it is too early to declare victory, but the initial data is promising.

- A special access program into a closed area returned the highest landings of Georges Bank yellowtail flounder in recent history. For the first time in three years it appears the yellowtail flounder TAC will be harvested. The Council already has submitted changes to this program to improve the economic returns.
- A second special access program using longline gear harvested over one million pounds of haddock while catching about 20,000 pounds of cod. This sector allocation program — the result of an industry-led experiment — demonstrated that fishermen can benefit from selective fishing techniques that target healthy stocks while avoiding those that are at much lower levels of abundance. The program has led to increased interest in longline fishing on Georges Bank.
- A program that allows vessels to lease fishing time (days-at-sea) was adopted to help reduce the negative economic impacts effort reduction measures. The program has proven popular for vessels of all sizes, with over 10 percent of the allocated days-at-sea

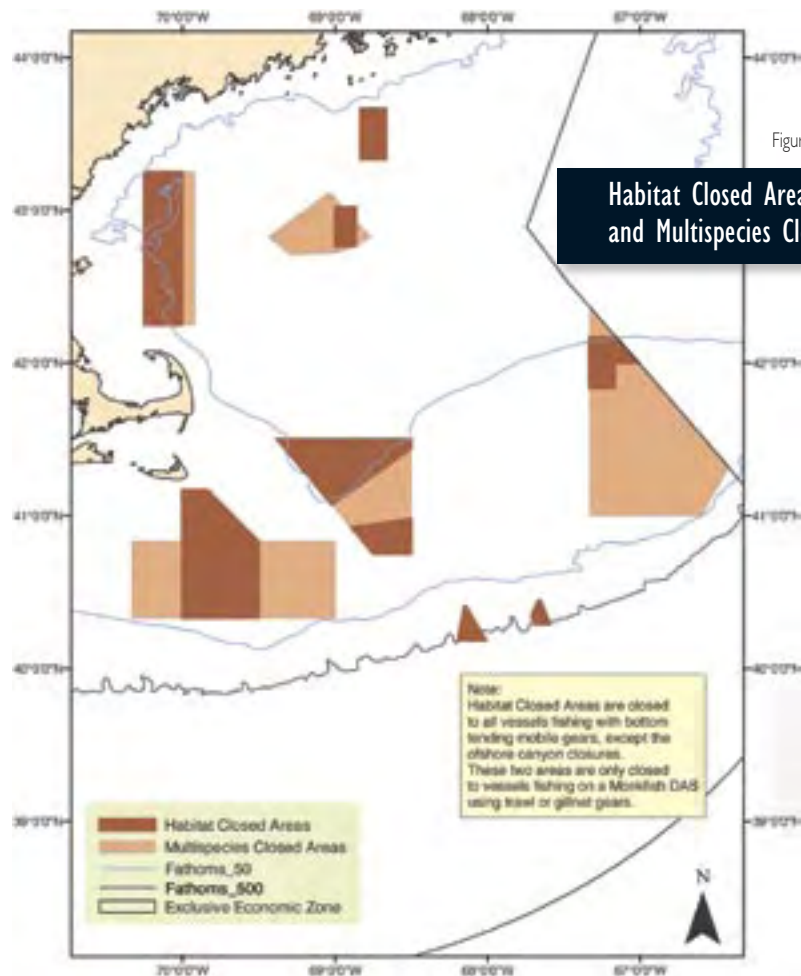
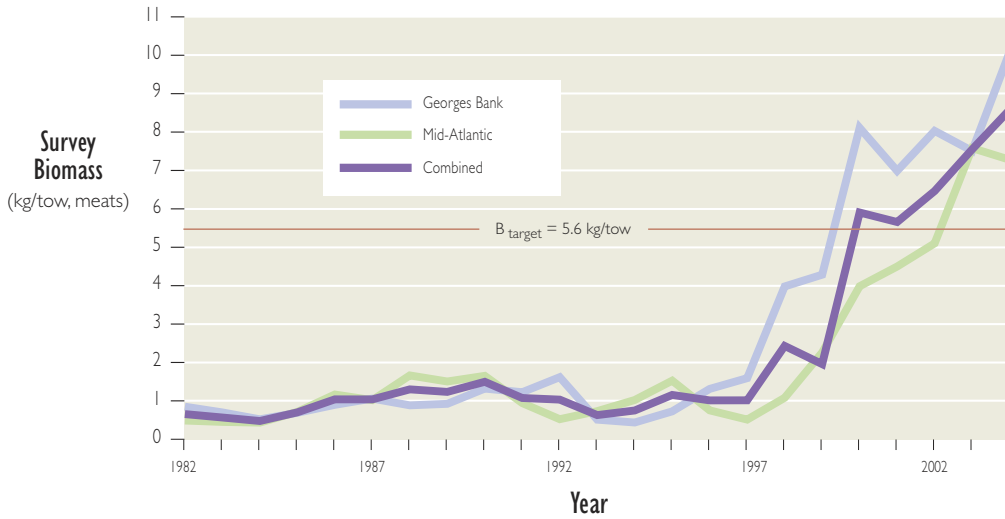


Figure 1.

Figure 2.

Trends in Scallop Biomass 1982 - 2004



entering the leasing market. The Council will review this program carefully to ensure it does not threaten mortality objectives.

- Fishing for trans-boundary stocks of cod, haddock, and yellowtail flounder on Georges Bank is closely coordinated with Canada's Department of Fisheries and Oceans. Quotas have been adopted for these stocks, although implementation has proven difficult. For example, while it appears the U.S. will catch its quota of yellowtail flounder, the catches of cod and haddock are likely to fall far short. This situation provides biological benefits, but the fishing industry is critical because the haddock quota was expected to provide opportunities for large offshore vessels to mitigate the economic consequences of effort reductions.
- Groundfish assessment updates will be completed in August, 2005. The Council will consider adjustments to the management program based on these assessments.

Georges Bank haddock continues to prove that effective fishing mortality controls can lead to rapid rebuilding of New England groundfish stocks. Recent trawl surveys indicate that the 2003-year class of haddock may be the largest ever observed. Both stock size and allowable harvests are expected to increase rapidly over the next few years as these haddock enter the fishery. The Council had begun to address concerns that this rapid growth will lead to increased discards before the fish reach legal size.

Successful Innovations in Scallop Management

The Council adopted a major change in its sea scallop management strategy in 2004 by moving to an area rotation system. Given that measures became effective beginning in July 2004, it is too early to definitively measure effects on the scallop resource and the environment, but preliminary information shows positive results.

The management program has reduced effort by about 40 percent while reducing scallop mortality and associated environmental effects by as much as 80 percent. Over time, there has been a fivefold increase in total biomass, and although fully rebuilt, overfishing was occurring in 2003. The new program is expected to eliminate this situation.



Caribbean Fishery Management Council

MANAGEMENT UPDATE – MARCH 2005



CARIBBEAN FISHERY
MANAGEMENT COUNCIL
268 Muñoz Rivera Avenue
Suite 1108
San Juan, Puerto Rico 00918-1920
Tel: 787-766-5926
Fax: 787-766-6239
www.caribbeanfmc.com

Essential Fish Habitat Amendment

The CFMC has approved the EIS for the “Generic Essential Fish Habitat Amendment to: Spiny Lobster Fishery Management Plan, Queen Conch Fishery Management Plan, Reef Fish Fishery Management Plan, and Coral Fishery Management Plan for the U.S. Caribbean” (Generic EFH). The Generic EFH Amendment describes and identifies essential fish habitat (EFH) and habitat areas of particular concern, and minimizes to the extent practicable the adverse effects on fishing on EFH. The EFH alternatives were developed and evaluated in the FEIS for the Generic EFH Amendment and the notice of availability of the Record of Decision associated with the Generic EFH FEIS was published in the *Federal Register* on May 25, 2004 (69 FR 29693).

The Generic EFH includes regulations to protect essential fish habitat that will go into effect when the “Draft Amendment to the Fishery Management Plans (FMPs) of the U.S. Caribbean to Address Required Provisions of the Magnuson-Stevens Fishery Conservation and Management Act” (SFA DEIS) is approved and the fishery management plans are amended. The SFA DEIS includes the following new regulations to protect essential fish habitat:

- Requires a new anchoring technique for sand anchors to allow the anchor to be removed with minimal damage to habitat.
- Prohibits the use of certain recreational and commercial fishing gears (i.e., pots/traps, gill/trammel nets, and bottom long lines) year round in seasonal area closures. These gears are known to have at least some adverse impact on coral reefs.
- Requires buoys on every individual trap or buoys at the beginning and end of strings of traps. Buoys reduce the need to use a grapple hook to find traps.

Sustainable Fisheries Act Amendment

NOAA Fisheries Southeast Regional Office prepared a “Draft Amendment to the Fishery Management Plans (FMPs) of the U.S. Caribbean to Address Required Provisions of the Magnuson-Stevens Fishery Conservation and Management Act” (SFA Amendment) for the CFMC



Barbara Kojic/CFMC

and has revised it several times based on recommendations of the Council and public comment. This Amendment with accompanying SEIS will amend the four CFMC FMPs. These include the FMPs for Spiny Lobster, Queen Conch, Reef Fish Fishery, and Corals and Reef Associated Invertebrates of Puerto Rico and the U.S. Virgin Islands. Also incorporated in this amendment are the preferred alternatives previously adopted by the Council in the Generic EFH Amendment.

A number of recent activities have been carried out by the CFMC in relation to the SFA Amendment. Six workshops for fishers and the general public were held in Puerto Rico and the U.S. Virgin Islands (USVI) in late September and early October 2004 to explain and discuss the management measures being considered under the Draft SFA Amendment as a preamble to public hearings held in November 2004. The workshops were well attended. Fishers expressed concern over the “draconian” management measures being proposed. They were especially concerned in both Puerto Rico and the U.S. Virgin Islands about the proposed year-round area closures. Puerto Ricans fishers felt hard hit because the Government of Puerto Rico had recently approved revised commercial and recreational fishing rules and regulations that incorporated a number of new far reaching regulations including seasonal closures for certain species, size limits for certain species and bag limits for recreational fishers. USVI fishers were concerned because they felt that they were being doubly hit. Closures of traditional fishing grounds had occurred recently with the implementation of the regulations allowing only very limited fishing in the Coral Reef National Monument south of St. John and no fishing in the expanded Buck Island National Monument. In addition the USVI established the East End Marine Park in St. Croix, which has some proposed areas closures. Now further closures that were particularly extensive on the shelf surrounding St. Thomas and St. John were also being proposed. Fishers felt they were losing their traditional fishing grounds and potentially a traditional way of life

The extent of the concern among commercial fishers in the USVI was so great that fishers in St. Thomas established the St. Thomas Fisherman’s Association. This was the first organized commercial fisherman’s association in St. Thomas for many years. The association lobbied the Governor, the Delegate to Congress, local Senators, and the Commissioner of the Department of Planning and Natural Resources and asked them to come out against the year-round area closures being proposed in the SFA Amendment. As a result of the lobbying efforts of commercial fishers on both St. Thomas and St. Croix, the public hearings were very well attended and extensively reported in the media. Government officials or their representatives came out and spoke against the area closures, as did fishers and the general public.

A joint meeting of the Scientific and Statistical Committee and the Habitat Advisory Panel was held on December 17, 2004, in San Juan, Puerto Rico. One of the purposes of the meeting was to review the scientific basis for the management recommendations in the SFA Amendment as determined at the SFA Working Group meetings held Miami and San Juan. The lack of a quorum at the meeting was brought up by a NOAA representative and discussed. Because of the lack of a quorum it was decided that this would be an informal meeting with members expressing their personal opinions. It was determined that the status of the various Fisheries Management Unit (FMU) subunits (fish species or species groups) was derived from a vote of SFA Working Group participants based on their knowledge of and personal opinion about U.S. Caribbean fish stocks. It was not derived from the commercial fisheries data that had been collected over the years in Puerto Rico and the U.S. Virgin Islands. Members of the SSC/HAP indicated that there was no scientific evidence that yellowtail snapper was at risk. While members had no major objections to the proposed seasonal closures, they felt that the proposed area closures

were not appropriate because of the lack of knowledge of what habitat, fish stocks, and spawning aggregations existed within the proposed closed areas.

The Council also received extensive written comment from the public and from government officials from Puerto Rico and the USVI. A CFMC meeting was held January 26-27, 2005 to consider the public comment and to modify the preferred alternatives if information provided by the public and local governments justified this. The outcome of this meeting was major changes to the preferred alternatives. The changes took into consideration the information submitted to the Council from the public regarding the socio-economic impacts of the year-round closures. They also took into consideration the Puerto Rico government's request to implement compatible regulations and comments by fishers and the public at the meeting. The changes are contingent upon the USVI adopting compatible regulations. It was determined that compatible regulations would cause less confusion among fishers and would improve enforcement because the regulations could be enforced on the shoreline.

The new preferred alternatives include (not all inclusive):

1. Prohibit the possession of red grouper, tiger grouper, yellowedge grouper, black grouper, and yellowfin grouper from February 1 through April 30 of each year.
2. Prohibit the possession of black, blackfin, vermillion and silk snapper from October 1 to December 31 of each year.
3. Prohibit the possession of mutton and lane snapper from April 1 to June 30 of each year.
4. Prohibit gill and trammel nets in the U.S. EEZ except for nets used for catching ballyhoo, gar and flying fish. Nets used for harvesting these species must be tended at all times.
5. Prohibit the filleting of fish in Federal waters of the U.S. Caribbean. Require that fish captured or possessed in territorial waters be landed with heads and fins intact.
6. Close the Grammanik Bank to all fishing except HMS species from February 1 to April 30 of each year. The Grammanik Bank is the site of spawning aggregations of yellowfin grouper and other grouper and snapper species.
7. Prohibit the commercial and recreational catch and possession of queen conch in Federal waters of the U.S. Caribbean with the exception of Lang Bank near St. Croix, USVI.
8. Prohibit the possession of Nassau grouper and Goliath grouper year round for specific periods of time or until these species have recovered.

Compatible regulations incorporating the new preferred alternatives are being pursued in the U.S. Virgin Islands. The USVI fishers attending the CFMC meeting in January felt that they made a lot of concessions so that no year-round closures would be established. The St. Thomas Fisherman's Association is strongly promoting these alternatives so that the territorial regulations can be quickly adopted. They realize that approval of these new preferred alternatives is contingent upon the adoption of compatible USVI territorial regulations.

The Puerto Rican government representative objected to some of the preferred alternatives proposed such as moving aquarium trade fish species from management to monitoring only. The Puerto Rico government representative stated that her government wanted these species to be managed because they had territorial regulations for many of these species. Dr. Crabtree, NOAA



The CFMC will continue working with the fishers, scientists, government officials and the general public to develop and implement sound management measures that will conserve the marine fishery resources while achieving optimum use of these resources....

Fisheries Regional Administrator for the South East area explained that if the Council managed these species, then NOAA Fisheries would be required to establish stock parameters (MSY, OY, etc.) for these species and that they did not have sufficient information to do so. He further stated that states and territories already have authority to manage any species in the EEZ that does not have conflicting federal regulations in federal water. Any vessel registered in Puerto Rican waters must follow the Puerto Rican Regulations in the EEZ if there are no applicable federal regulations. Similarly, any vessel registered in USVI waters must adhere to USVI regulations. There would be a problem only if there were U.S. vessels that fished for aquarium species that were not registered in either Puerto Rico or the USVI. However, in the U.S. Caribbean, as far as anyone knew, this was not a problem. Council members requested that this information was to be included in the SFA Amendment in order to ensure that local government enforcement understood their authority in federal waters.

The CFMC also approved a motion to have a baseline assessment of queen conch and Nassau and Goliath grouper in the U.S. Caribbean and reassessments of these species at least every five years.

The above summary is offered as an example of the open process the CFMC (and other councils) has to follow to fulfill the mandate of the Magnuson-Stevens Act. The CFMC will continue working with the fishers, scientists, government officials and the general public to develop and implement sound management measures that will conserve the marine fishery resources while achieving optimum use of these resources for the benefit of the people that depend on them for their livelihood, including commercial and recreational fishers, and the tourist industry, among others.



Barbara Kojiri/CFMC



South Atlantic Fishery Management Council

MANAGEMENT UPDATE – MARCH 2005



SOUTH ATLANTIC FISHERY
MANAGEMENT COUNCIL

One Southpark Circle, Suite 306

Charleston, SC 29407-4699

Tel: 843-571-4366

Fax: 843-769-4520

Toll Free: 1-866-Safmc-10

Email: Safmc@Safmc.Net

www.Safmc.Net

Moving Towards Ecosystem Management

From deepwater canyons off the Carolinas to the shallow tropical waters surrounding the Florida Keys, marine habitats of the South Atlantic are as diverse as the species that inhabit them. To address this diversity, the South Atlantic Council is pioneering an ecosystem approach to fisheries management with the development of a Fishery Ecosystem Plan (FEP) and Comprehensive Ecosystem Amendment that will amend all the Council Fishery Management Plans. The Council completed and approved its "Action Plan for Ecosystem-based Management" during 2004.

The Fishery Ecosystem Plan will evolve from the Council's Habitat Plan. This effort will provide the Council with a foundation from which to attain a more comprehensive understanding of habitat and species' biology, fishery information, social and economic impacts of management and ecological consequences of conservation and management. The FEP and Comprehensive Ecosystem Amendment will build on recommendations outlined in the 1999 Ecosystem Report to Congress.

The South Atlantic Council has jurisdiction over the Exclusive Economic Zone extending from the North Carolina/Virginia border through the Florida Keys. The area of the Atlantic Ocean between Cape Hatteras, NC, and the Florida Keys is considered to be a Large Marine Ecosystem (LME). Large Marine Ecosystems are regions of ocean space from river basins and estuaries to the seaward margins of continental shelves and the outer boundaries of the major current systems. They exhibit distinct bathymetry, hydrography, productivity and trophically dependent populations. Hence the Council's area of jurisdiction essentially comprises a single ecosystem.

Workshops to expand efforts initiated during the habitat and issue-based workshops (held in 2003) will be held during 2005 on topics such as artificial reefs, deepwater habitat/coral, marine zoning and impacts of fishing on habitat. In addition, a regional workshop to identify research and monitoring needs to support ecosystem-based management and further development of the FEP in the South Atlantic region will be held in 2005. Internationally recognized experts

...the South Atlantic Council is pioneering an ecosystem approach to fisheries management with the development of a Fishery Ecosystem Plan (FEP) and Comprehensive Ecosystem Amendment that will amend all the Council Fishery Management Plans.



Kim Nertson/SAFMC

in ecosystem characterization will be invited to participate to provide guidance to managers and researchers in determining the most significant needs to be addressed in development of an ecosystem-based management approach.

A preliminary South Atlantic Bight Ecopath model was developed cooperatively between the University of British Columbia and South Atlantic Council staff as part of the Sea Around Us project funded through the PEW Charitable Trust Foundation. This model is being expanded and refined with help from a broad range of experts to be incorporated into the Council's Fishery Ecosystem Plan. It will help the Council and other decision makers identify information gaps and direct future research while providing insight into ecosystem level effects of fisheries. The model will cover the area between the NC/VA border through the Florida Keys and will extend from the upper wetlands to the 300-meter depth-contour.

Also, the South Atlantic Council and the Florida Fish and Wildlife Research Institute (FWRI) have partnered to develop a comprehensive Essential Fish Habitat/Ecosystem website to support the FEP development process. The site hosts an Internet Map Server (IMS) application comprising downloadable spatial data, associated metadata, imagery and videography. The IMS is intended to serve as a repository and dissemination tool of spatial information on corals and bottom habitats and associated ecosystem information for the South Atlantic region.

Protecting Coral Resources

The shelf-edge *Oculina* coral reef, located off the central east coast of Florida, is unique among coral reefs and exists nowhere else on earth. The area takes its name after the slow-growing ivory-tree coral, *Oculina varicosa*, which forms massive thickets supporting dense and diverse communities of finfish and invertebrates over a 90-mile strip of reefs.

In 1984, the Council established the 92 square-mile *Oculina* Bank Habitat Area of Particular Concern (HAPC) through implementation of the Coral and Coral Reefs Fishery Management Plan in order to protect the fragile coral. Within the *Oculina* Bank HAPC use of bottom-tending fishing gear including bottom trawls, bottom longlines, dredges, fish traps and fish pots was prohibited. Subsequent amendments to the Snapper/Grouper, Coral and Coral Reefs and Shrimp FMPs, provided further protection to the *Oculina* HAPC through prohibitions on anchoring of fishing vessels, trawling for rock shrimp and by requiring the use of vessel monitoring systems (VMS) in the rock shrimp fishery. Expanded in 2000, the HAPC now encompasses 300 square miles.

In 1994, the Council designated the original 92-square mile *Oculina* Bank HAPC the *Oculina* Experimental Closed Area and closed it to all bottom fishing for 10 years. Thus, the *Oculina* Experimental Closed Area is located within the expanded *Oculina* Bank HAPC. All restrictions within the larger HAPC apply. In addition, no person may fish for snapper-grouper species in the area or retain snapper-grouper in or from the area. The area was closed in order to evaluate the effectiveness of the reserve for the management and conservation of reef fish, namely the recovery of their populations and grouper spawning aggregations. Amendment 13A to the

Snapper Grouper FMP, which extended the closure indefinitely with periodic review for further protection and research, was approved by the Secretary on February 4, 2004 and regulations became effective on April 12, 2004.

The Council understands the importance of mapping and documenting habitats that are poorly known. To this effect, the Council has partnered with the National Undersea Research Center at the University of North Carolina at Wilmington (NURC/UNCW) to begin high resolution multi-beam sonar mapping of the outer continental shelf and upper continental slope using an Autonomous Underwater Vehicle (AUV). This region of the Exclusive Economic Zone (EEZ) from just north of Cape Hatteras, NC, to Cape Canaveral, FL, includes important habitat for valuable species (e.g., groupers, wreckfish, crabs, tilefish, etc.). It also includes ecologically important features such as “The Point” canyon system and the “Charleston Bump” known to be productive fishery areas. Throughout the region, and toward the deeper end, are scattered but extensive reef systems composed of slow-growing deepwater corals. All of these habitats are poorly mapped. In addition, the Council is considering deepwater MPAs that fall in the same depth range and necessitate high-resolution mapping. The AUV will be operated by NURC/UNCW; initial testing of the unit will involve mapping areas of interest to the South Atlantic Council.

Improving Stock Assessments in the Southeast Region

Overview

The SouthEast Data, Assessment, and Review (SEDAR) process is a Council process initiated to improve the quality and reliability of stock assessments for fishery resources in the southeastern United States, including the South Atlantic, Gulf of Mexico, and Caribbean. SEDAR oversight is provided by the three regional Councils in close coordination with NOAA Fisheries’ Southeast Regional Office and Science Center (SERO and SEFSC) and the Interstate Fishery Commissions (ASMFC and GSMFC). The South Atlantic Council has administrative and managerial responsibility for the SEDAR process.

Each of the three regional Councils has developed a SEDAR Advisory Panel composed of (1) scientists from their Scientific & Statistical Committees (SSCs), Assessment Panels, and other committees/panels; (2) individuals from their Advisory Panels; (3) individuals from the environmental community active in each Council area; and (4) invited individuals (e.g., state, university, and Commission scientists). The product of the SEDAR process is a stock assessment report to the Council. The final assessment report must specify management parameters required under the Magnuson-Stevens Act, Council FMPs, or framework procedures. Specific parameters to be provided by an assessment are listed in the Terms of Reference developed for each SEDAR Workshop.

The process of generating a stock assessment through SEDAR is termed a “cycle”. Each SEDAR cycle is comprised of three workshops that are conducted sequentially: (1) The Data Workshop — involves the assembly and review of all available fishery data and life history information, resulting in consensus databases to be used in stock assessments. Analytical techniques and models appropriate for the available data are also suggested; (2) The Assessment Workshop — data sets from the Data Workshop are used with population dynamics modeling techniques to determine the status of stocks; and (3) Review Workshop — an independent peer review of the stock assessment by Center for Independent Experts (CIE) scientists is conducted. SEDAR workshop reports, along with the review of these reports by specific Council/Commission committees and panels are then provided to the Council for their consideration in determining appropriate fishery management measures.



NURC/UNCW

Planning

Policy decisions, negotiation of SEDAR guidelines and species to be assessed, and cycle timing are established by the SEDAR Steering Committee. The Steering Committee is composed of the NOAA Fisheries Southeast Science Center Director; NOAA Fisheries Southeast Regional Administrator; Executive Directors of the South Atlantic, Gulf of Mexico and Caribbean Fishery Management Councils; Chairs of the South Atlantic, Gulf of Mexico and Caribbean Fishery Management Councils; and the Executive Directors of the Atlantic and Gulf States Marine Fisheries Commissions. Designees may attend Steering Committee meetings in place of these individuals. The Steering Committee elects a chair from the membership.

The SEDAR Steering Committee meets at least twice annually to schedule the specific assessments that will go through the SEDAR process. Assessments are scheduled up to five years in advance. Advanced planning allows researchers to develop updated inputs and assess appropriate techniques and models for use in assessments. The committee also reviews progress on SEDAR assessments and recommends modifications of the SEDAR Process.

The South Atlantic Council is funded by the SEFSC to administer the SEDAR process for the southeast region. The South Atlantic Council hired a SEDAR Coordinator and provides administrative support. The SEDAR Coordinator chairs the data and assessment workshops and supports the review workshops. Scheduling of SEDAR workshops, developing attendee lists, and making arrangements for workshops are done collaboratively by SEDAR staff and the SEDAR Steering Committee. All workshops are open to the public, noticed in the Federal Register, and recorded. SEDAR staff is responsible for submitting Federal Register Notices. Each Council may provide further notice through any means deemed appropriate, such as press releases, newsletters, or website notices.

Data Workshops

Data Workshop participants assemble and review all available fishery data, monitoring programs, and life history information, producing consensus databases used to conduct stock assessments. Analytical techniques appropriate for the available datasets are recommended for the Assessment Workshop. Data Workshop decisions and recommendations are documented in the SEDAR Assessment Report. Data formats and documentation guidelines are distributed in advance, and some preliminary analyses of the data are conducted prior to the workshop.

The SEDAR Coordinator serves as the Data Workshop Chairperson and leads discussions to (1) reach consensus on the best available data for use in assessing stocks under consideration and (2) provide recommendations on possible modeling and analytical techniques given the data sets reviewed. The NMFS Technical Guidance Document is used for assessing the status of data poor species. Data Workshops are structured around smaller working groups dedicated to particular data issues, such as commercial statistics, recreational statistics, life history, and abundance indices. Specific groups are determined based on the needs of the candidate species.

The first segment of the Data Workshop involves brief presentations of submitted working papers and data sources. Presentations focus on data coverage, analytical methods, and identification of issues needing resolution by the panel. The second segment involves a mixture of breakout sessions in which work groups identify potential solutions to data issues and plenary sessions where the panel convenes to decide appropriate solutions to each issue. The final segment involves drafting and reviewing the workshop report.



Kim Heerson/SAPNC

The charge to the Data Workshop is guided by the following Terms of Reference (the Councils, Commissions, States, and NOAA Fisheries may also develop specific Terms of Reference to be addressed during the Data Workshop):

1. Determine quality and appropriateness of life-history information (stock structure, aging, size at age, sex ratio including transition, maturity, fecundity, and generation time, age protocols and determination, catch aging methods).
2. Determine quality and appropriateness of abundance indices (MARMAP, SEAMAP, headboat CPUE, commercial logbook CPUE, etc.).
3. Determine quality and appropriateness of fishery-dependent data (landings, discards, release mortality, and length characterization).
4. Determine quality and appropriateness of available data for estimating impacts from proposed or existing management measures.
5. Provide recommendations on possible assessment methods and appropriate models given the quality and scope of the data sets reviewed.
6. Provide recommendations for future research (field and assessment).

In general, the Data Workshop should occur at least two months prior to the Stock Assessment Workshop to allow time for the team of lead assessment analysts to develop the initial model runs and sensitivity evaluations.

Assessment Workshop

Participants at the Assessment Workshop conduct stock assessments, prepare stock rebuilding analyses, and estimate population benchmarks. Specific assessment methods vary and are based on the level of available data. The NMFS Technical Guidance Document is used for assessing the status of data poor species.

The SEDAR Coordinator serves as Chairperson. Assessment Workshop products are based on the Sustainable Fisheries Act and the National Standards. The charge to the Assessment Workshop is guided by the following Terms of Reference (the Councils, Commissions, States, and NOAA Fisheries may also develop specific Terms of Reference to be addressed during the Assessment Workshop):

1. Identify modeling approaches appropriate to the available data and management questions ranging from simple trends analyses (e.g., trends in catches, average size, CPUE, etc.) to more complex modeling (e.g., production models, age-structured models, size-structured models, hybrids, etc.).
2. Determine suitability of current proxies for SFA benchmarks and suitable approaches for estimating actual SFA benchmarks.
3. Estimate stock status (biomass) and fishery status (fishing mortality rate) relative to appropriate SFA benchmarks. Is the stock overfished; is overfishing occurring?
4. Identify and conduct rebuilding analyses comparing management options from existing or proposed actions for stocks that are overfished.
5. Provide recommendations for future research and data collection (field and assessment).

The Assessment Workshop Panel is responsible for drafting Section III of the SEDAR Stock Assessment Report. The Workshop Rapporteur is charged with editing and compiling the



Kim Peterson/SAPNC



document section, and submitting it to the SEDAR Coordinator by the deadline specified by the SEDAR Steering Committee. A written draft report, providing an overview of the analyses, general findings, and recommendations of the workshop, is available by conclusion of the workshop. This report may be expanded following the workshop and finalized after the Review Workshop.

Review Workshop

The Review Workshop is an independent peer review of the stock assessment. The Review Workshop Panel consists of a minimum of three scientists from the Center for Independent Experts (CIE representatives are contracted by and paid for by NOAA Fisheries). Assessment scientists, industry/Advisory Panel representatives, and NGO representatives are invited to serve as observers and are available to answer questions if required. Other individuals that may attend include scientists from NOAA Fisheries and Council SEDAR Advisory Panels.

The Review Workshop Panel is strictly independent. Those who participate as panelists at the Data or Assessment Workshop of the assessment under review, those with any direct involvement in developing an assessment presented to a particular workshop as part of the assessment under review, or those with any direct involvement in the decision process for the species of concern are not eligible to serve as Review Workshop Panelists.

Review Workshop Panelists receive the Assessment Report, including sections prepared by the Data and Assessment workshops; supplemental analytical materials including working papers and reference documents; and consensus data sets for their review at least two weeks prior to the review meeting. The charge to the Review Workshop is guided by the following Terms of Reference (the Councils, Commissions, States, and NOAA Fisheries may also develop specific Terms of Reference to be addressed during the Review Workshop):

1. Evaluate the adequacy and appropriateness of fishery-dependent and fishery-independent data used in the assessment (i.e., was the best available data used in the assessment?).
2. Evaluate the adequacy, appropriateness, and application of models used to assess the stock and to estimate population benchmarks (MSY, F_{msy} , B_{msy} , MSST, MFMT, etc.).
3. Evaluate the adequacy, appropriateness, and application of models used for rebuilding analyses where appropriate. Probability of rebuilding (to MSST and MSY) over time under the following fishing mortality scenarios are to be included: (a) F under current management regulations, (b) $F=150\% F_{current}$, (c) $F=125\% F_{current}$, (d) $F=75\% F_{current}$, (e) $F=50\% F_{current}$, (f) $F=25\% F_{current}$, (g) $F=0$, and (h) $F=99\% F_{msy}$.
4. Develop recommendations for improving data collection, assessment, and future research (both field and assessment).

The Review Panel develops two reports: (1) A Consensus Stock Assessment Report that summarizes the peer review panel's evaluation of the stock assessment resulting from the assessment workshop and (2) An Advisory Report including a summary of stock status and forecast for the upcoming year.

The Review Panel Chair is responsible for compiling and editing the report, and submitting it to the SEDAR Coordinator by a deadline specified by the SEDAR Steering Committee. The Chair and SEDAR Coordinator may appoint a Panel Leader for each assessment under review from among the Review Panelists to assist in drafting the report and documenting panel decisions. The Councils and SEFSC are encouraged to provide a rapporteur from outside the Review Panel membership to take notes on the discussions so that Panelists are not distracted during discussions and to further assist in drafting the report sections.

The Review Panel does not provide specific management advice. Such advice is provided following completion of the review and through existing Council Committees, such as the Science and Statistical Committee.

Public Participation

SEDAR is a Council process, and as such, public participation is encouraged. SEDAR meetings are open to the public and advertised by the Councils and through the Federal Register. Public participation during SEDAR workshops is handled similar to current Council technical and committee meetings, in that no formal period of public testimony is scheduled. Instead, the Chair is free to call on the public for comment as necessary and appropriate during workshop deliberations. During all workshops, interested parties are permitted to comment on discussion items as the meeting proceeds. Written comments are handled in accordance with guidelines established by each Council.

By completing the SEDAR process and reviewing SEDAR Reports through Council Committees and Advisory Panels, the Councils, Commissions, States, and NOAA Fisheries ensure the relevance and scientific credibility of the data, analyses, reports, and summary findings for species and stocks assessed.





Gulf States Marine Fisheries Commission

MANAGEMENT UPDATE – MARCH 2005



GULF STATES MARINE
FISHERIES COMMISSION

2404 Government Street
Ocean Springs, MS 39564
Tel: 228-875-5912
Fax: 228-875-6604
www.gsmfc.org

The Gulf States Marine Fisheries Commission (GSMFC) was formed in 1949 through individual acts of the state legislatures of Texas, Louisiana, Mississippi, Alabama, and Florida and the consent of the U.S. Congress. The purpose of the GSMFC is to provide a forum and administrative mechanism to address interjurisdictional fisheries issues and programs. The GSMFC is, however, much more than the sum of its individual state members.

In the past 15 years, the GSMFC has proven its relevance to fisheries governance by significant increases in the scope and number of programs we manage. Our quasi-governmental status provides us an opportunity to serve our member states and federal agency partners in ways that reduce both overall program costs and bureaucratic, administrative burden. The unique position of the interstate marine fisheries commissions afford us the opportunity to work closely with state legislatures, state agencies, federal agencies, the U.S. Congress, and the myriad of constituency groups to achieve consensus on issues that are complicated and often contentious. We have a proven track record of success in fulfilling multi-state, state-federal program coordination needs, as evidenced by the program narratives included in this report.

Fisheries Information Network (FIN)

The Fisheries Information Network (FIN) is a state-federal cooperative program to collect, manage, and disseminate statistical data and information on the marine commercial and recreational fisheries of the Southeast Region. The FIN consists of two components: Commercial Fisheries Information Network (ComFIN) and the Southeast Recreational Fisheries Information Network [RecFIN(SE)]. The program was established in the mid-1990s and began operational activities in 1997. Following is a description of these activities as well as some accomplishments.

Recreational Data Collection

Since 1997, the states of Louisiana, Mississippi, Alabama, and Florida and the GSMFC have provided coordination of the survey, the field intercept survey of shore, for-hire and private boat anglers to estimate angler catch using the existing MRFSS methodology, and entry of the data.

Our quasi-governmental status provides us an opportunity to serve our member states and federal agency partners in ways that reduce both overall program costs and bureaucratic, administrative burden.

These data are combined with the NMFS effort estimate telephone survey to produce expanded estimates of catch and effort by wave using the existing MRFSS methodology. In addition, the states have conducted increased sampling of the intercept portion for the MRFSS for charter boats in Louisiana, Mississippi, Alabama, and Florida as well as increasing charter boat sampling in Texas by TPW personnel. The states also have conducted weekly telephone calls to a 10% random sample of the Texas, Louisiana, Mississippi, Alabama, and Florida charter boat captains to obtain estimates of charter boat fishing effort, which has led to more precise estimates of for-hire fishing effort. In 2004, the state collected over 56,000 interviews from recreational anglers and exceeded the quota for all modes by 35% Gulf-wide. For shore mode, all of the states conducted 1.3X sampling; for charter mode, they conducted 5.5X sampling; and for private/rental mode, they conducted 1.4X sampling. That works out to over a third more available data for fisheries management.

Regarding head boat sampling, personnel from Louisiana and Texas have compiling logbook data from head boats since 1998. The samplers sample catches and collect catch reports from head boat personnel, as well as gather effort data on head boats which operate primarily in the Exclusive Economic Zone from ports along the coasts of Texas and Florida utilizing the existing NMFS head boat logbook methodology. Beginning in 2004, Alabama personnel conducted an at-sea sampling survey of 10% of the trips made by Alabama head boats operators. The field personnel will sample head boat anglers while actively fishing in order to collect biological and disposition data on discards and, when fishing is completed, conduct an intercept survey of these fishermen using the Marine Recreational Fisheries Statistics Survey (MRFSS) protocols. These data will be used to produce expanded estimates of catch and discards by wave for head boats. During 2004, Alabama samplers rode on 30 vessels, which resulted in almost 800 interviews with head boat anglers. In 2005, Florida will also be conducting at-sea sampling for head boats operating in their state.

Commercial Data Collection

Beginning in 1999, Texas, Louisiana, Mississippi and Alabama have been in the process of developing, implementing and operating commercial trip ticket systems. Florida, Louisiana and Alabama have fully implemented programs while Texas will be implementing a program for a limited number of dealers (~60) in 2005. Mississippi has implemented trip-level reporting for oysters and finfish and is working towards including their other fisheries. One of the innovations from trip tickets in the electronic report system, developed by Louisiana. This system allows for the electronic submission of data and is a more efficient and less time consuming process for the dealers, which has led to its success. Currently, there are 283 dealers from Louisiana to Florida utilizing this system. Those dealers represent about 25% of the commercial landings (excluding menhaden) reported to those states. The breakdown (by state) of dealers reporting electronically is as follows: Florida: 26%; Alabama: 27%; and Louisiana: 22%. As the Texas dealers come on-line with trip tickets, the electronic system will be an option for them as well.



NURCUNGW

Biological Sampling

Starting in 2002, samplers from Florida, Alabama, Mississippi, Louisiana and Texas conducted interviews of recreational and commercial fishermen to collect biological data from their catches. The samplers identify the fish to the species level and collect length measurements, trip and gear characteristics, and hard parts (otoliths), and make comparisons of interview data to trip ticket data for quality assurance purposes. The FIN has identified 29 species that need additional biological data to accurately conduct stock assessments. Unfortunately, due to funding shortfalls, samplers are currently targeting red snapper, king mackerel, greater amberjack, gulf and southern flounder. In 2004, samplers collected almost 24,000 otoliths from almost 90 species. For the targeted species, samplers collected approximately 5,100 otoliths and 9,200 lengths for red snappers; 4,100 otoliths and 4,800 lengths for the flounders; 2,000 otoliths and 2,300 lengths for king mackerel; and 230 otoliths and 280 lengths for greater amberjack. These data will be used by stock assessment scientists to determine the status of the fisheries stocks and allow managers to make more informed management decisions.

FIN Data Management System

Although it is important to collect the necessary data, it is equally important to provide access to those data so they can be easily used in the management process. The FIN has developed and implemented a data management system, which has been on-line since July 2002. This system provides data to both confidential and non-confidential data users and contains a multitude of fishery-dependent data. The data that are currently loaded in system include: (1) Trip ticket data from Florida (1984-2004), Alabama (2002-2004), Mississippi (2002-2003 for oyster and finfish only) and Louisiana (1999-2004); in addition, historical data from NMFS (19854-2004) is available for those areas not covered by trip ticket systems; (2) Recreational catch estimates (1981-2003); (3) Menhaden catch and effort data (1987-1990 and 1993-1999); and (4) Biological data (2002-2003). There are currently almost 17 million records in the system. To get access to the system, please visit our website at <http://www.gsmfc.org/data.html>.

Conclusions

All of the activities listed above will be conducted in 2005 in addition to the initial development of marine recreational fishing license sampling frame. The states will provide the GSMFC with their recreational fishing license databases as a first step in developing a sampling frame for estimating recreational fishing effort. The states and GSMFC will develop a database that incorporates all the states' data elements and they can identify where gaps in the required fields exist and work to fill those gaps. In addition, GSMFC will analyze the percent complete rates for the required elements.

Interjurisdictional Fisheries (IJF) Program

The Fishery Management Plan (FMP) development and review program of the Gulf States Marine Fisheries Commission (GSMFC) continues to provide the Gulf States with quality information and recommendations for interstate management of fisheries. Additionally, this information is continually being used by the states in their respective programs. The GSMFC IJF Program staff continued to review previously developed FMPs and to monitor each state's progress in implementing management recommendations. This is accomplished through activities that are described as follows for individual fisheries under IJF FMP development, revision, and review:



Kim Iverson/GSMFC

Sheepshead Technical Task Force (TTF)

The Sheepshead TTF is nearing completion of the Sheepshead Profile and we anticipate providing the draft to the State-Federal Fisheries Management Committee (SFFMC) by the March 2005 GSMFC meeting. Once it begins review, the process should take until the winter or early spring of 2006 to complete.

Striped Bass TTF

The Striped Bass TTF continues to review the final draft of the FMP and plans to present it to the Technical Coordinating Committee (TCC) in March at the GSMFC meeting. Once it begins review, the process should take until the winter or early spring of 2006 to complete.

Otolith Work Group

The otolith manual, which was approved by the Commission last year was presented at the Third International Symposium on Fish Otolith Research and Application, held in July 2004. Two hundred CD copies and 20 hardcopies of *A Practical Handbook for Determining the Ages of Gulf of Mexico Fishes* were distributed to meeting participants and several more copies were requested after. The first edition of the manual is available on the Commission website in a PDF format or by request. There continues to be great interest at the ASMFC to incorporate the Gulf standards outlined in the manual with their own. The Otolith Workgroup has been reactivated to begin the revision of the manual to add new species and techniques. Participants at that meeting included a representative of the ASMFC and several biologists from the Georgia DNR who are interested in participating in the revision process.

Gulf Menhaden

The IJF Program has completed the data-entry of the NMFS's historic menhaden logs (Captain's Daily Fishing Reports) for the Gulf of Mexico. This effort was being conducted as time and money permitted using temporary personnel to computerize historic data housed in Beaufort, North Carolina. All the CDFRs from 1982 to current have been entered and will be searchable on the GSMFC website. The IJF Coordinator has directed supervision of the temporary personnel on this project. Close to 30 temporary employees were utilized from 2000 to 2004 on this project. Approximately 6,727 man-hours were achieved resulting in 87,081 individual forms spanning 10 years (1982-1991) to be key-entered into the database. In addition, 3 years (1979-1981) of less reliable forms were scanned and provided to NOAA as digital records along with 5 years of Atlantic menhaden CDFR forms (1979-1984).

Literature Database

In addition to the regular maintenance and scanning of reprints housed in the GSMFC office, the IJF staff utilized the availability of a temporary employee to scan the entire collection of GSMFC publications to PDF files. The 700 Fishery Impacts bibliographic database reprints has also been scanned and made available as PDFs. All publications in a PDF format will be available on the GSMFC website.

Currently 2,072 references and abstracts have been entered into the IJF ProCite database. The bibliographic collection represents all the citations used in the last several FMPs and include spotted seatrout, flounder, menhaden, blue crab, and numerous miscellaneous publications. The database is searchable from the GSMFC website and provides keywords and complete abstracts when available. All reprints are housed at the GSMFC office and copies are available upon request. The IJF ProCite database is currently being scanned and converted to electronic copies for storage on DVD.



NRJRCJNCW



Kim Iverson/SAPRC

Sportfish Restoration Administrative Program

The Gulf States Marine Fisheries Commission has provided interstate and state-federal coordination of marine artificial reef development and management activities for the past 18 years. While there is still debate regarding the function of artificial reefs, there can be no doubt as to the value of the state programs to the creation of marine fisheries habitat and opportunities for anglers and divers to enjoy our important marine resources. Of significance was the development of the *Coastal Artificial Reef Planning Guide*, designed to provide standard guidelines for artificial reef development. This document was adopted by all three interstate marine fisheries commissions in 1998, and as such is national in scope. More recently, the Gulf States Marine Fisheries Commission, in partnership with the Atlantic States Marine Fisheries Commission and input from representatives from the Pacific Coast and the Caribbean region, finalized and published the second edition of the *Guidelines for Marine Artificial Reef Materials*, designed to provide artificial reef developers and managers with the information they need to make wise and intelligent decisions about the type of materials they use to create artificial reefs. Together, these two documents provide artificial reef planning, development, and management guidance that is national in scope.

Aquatic Invasive Species Program

The issue of aquatic invasive species consistently appears as one of the top five most critical issues affecting the ecological integrity of our Nation's waters. In general, the mechanisms of invasiveness are not well understood or well documented; however, much progress has been made in recent years to manage known pathways for non-native species transport, including ballast water, the pet and aquarium trade, aquaculture operations, state and federal stocking programs, among others. In addition, there is a greater understanding of what makes a species invasive, allowing natural resource managers to devise better methods of managing and controlling spread. The Gulf States Marine Fisheries Commission is integrally involved in this issue, providing administrative support to a regional coordinating body known as the Gulf and South Atlantic Regional Panel on Aquatic Invasive Species. In addition, the Gulf States Marine Fisheries Commission had designed and launched a website for invasive species for the Gulf and South Atlantic regions, including a database of non-native species occurrences in the Gulf of Mexico. The website and database can be found at www.gsmfc.org and then click the Invasive Species button.

Atlantic Billfish Research Program

In 2004, the Gulf States Marine Fisheries Commission undertook administration of the Atlantic Billfish Research Program, which is providing \$1.8 million to researchers to conduct important research projects to better understand billfish populations and provide information to assist in the national and international management of billfish resources. As of January of 2005, the Gulf States Marine Fisheries Commission awarded 11 grants averaging about \$164,000.00 to address population, distribution, post-release survival, and stock identification issues, among others. These grants will run through December 2006, after which the resulting information will be available to managers.

Habitat Program

The Joint Habitat Program between the Gulf States Marine Fisheries Commission and Gulf of Mexico Fishery Management Council has been reviewing applications for liquefied natural gas (LNG) facilities. Use of an open loop system using seawater as the heat source for vaporizing the LNG back into gas has the potential to impact billions of fish eggs and larvae each year. The seven LNG facilities proposing to use open loop systems in the Gulf of Mexico will use approximately 100-200 million gallons of seawater a day. Once the seawater has passed through

the system it will be approximately 20° F colder than when it entered the system. It will also contain sodium hypochlorite as an antibiofouling agent. It is expected that any fish eggs, fish larvae, or zooplankton passing through the system will be killed. An alternative technology to heat LNG exists that would not kill any eggs or larvae. This technology is a closed loop system that uses the burning of natural gas to heat the LNG back into a gas. The Commission and Council have both stated that an open loop system will have unacceptable impacts on marine fish populations, and that the Commission and Council support the use of closed loop systems for heating the LNG.

The Commission's Derelict Trap Task Force recently completed work on a grant from the NOAA Community-based Restoration Program for removing derelict crab traps from the coastal waters of Texas, Louisiana, Mississippi, and Alabama. Working with the state agencies, over 750 volunteers representing a multitude of organizations came together in early 2004 to remove 11,478 derelict traps from the coastal waters of Alabama, Mississippi, Louisiana, and Texas. The success of this project was based on innovative partnerships among governmental, environmental, educational, industrial, and recreational and commercial fishing groups. The 2004 efforts were a major step towards removing the thousands of derelict traps that litter the coastal waters of the Gulf of Mexico and continue to catch and kill crabs, fish, and other species. The Derelict Trap Task Force won a second place Gulf Guardian Award sponsored by the Gulf of Mexico Program for the project in the Government Category. Texas and Louisiana will again hold trap removals in 2005.

The Commission's Habitat Subcommittee was recently awarded a MARFIN grant to map bottom habitats throughout the Gulf of Mexico. The objective of this project is to create and distribute a digital spatial database of bottom habitats on the continental shelf and slope from the Texas/Mexico border to the southern tip of Florida. The database will be created from the recovery, interpretation, and integration of existing data for this region. This project will help focus protection of coral and hardbottom areas in the Gulf of Mexico and also allow for better EFH descriptions.

Southeast Area Monitoring and Assessment Program (SEAMAP)

The Southeast Area Monitoring and Assessment Program (SEAMAP) has Gulf of Mexico from 1982 to the present. One of the ways SEAMAP is looking to improve access is through an Internet based mapping site that displays catch rate, environmental, and location information for all SEAMAP shrimp/groundfish surveys. The site allows users to query the SEAMAP data and produce maps depicting their query results. Another product that SEAMAP will soon be distributing is a standardized database containing catch per unit effort information for each trawl record. This will free users from having to standardize the data themselves if they would like to compare trawl records from different areas in the Gulf of Mexico or between different time periods. The database will be standardized on a 40-foot trawl and 60-minute tow time. The standardized data will soon be available on the Commission's website. Researchers will still be able to access the raw data if requested.

Website Info

The Gulf States Marine Fisheries Commission website, www.gsmfc.org, has been on-line since May 22, 1997. The site contains an overview of the Gulf States Marine Fisheries Commission, summary and detailed information on each of our programs, listings of publications produced by the Commission, some of which are downloadable, listings of upcoming meetings by program, federal and state links to boating and fishing regulations, links and information on toxic blooms,



Kim Iverson/SAPRC

links to sites related to marine fisheries, a photo archive of past meetings and events, and a search area giving users the ability to search our website, bibliography databases, portcode database, species cross reference database, and even finding the weight of a fish based on it's length.

There are two sub-sites within the Gulf States Marine Fisheries Commission website — the Gulf Menhaden site (www.gsmfc.org/menhaden) and the Non-Native Aquatic Species in the Gulf of Mexico and South Atlantic Regions site (nis.gsmfc.org).

The Gulf Menhaden site is dedicated to providing the most complete source for scientific information on the Gulf menhaden population. The information included reflects the most current scientific data available on both the fish and the fishery. The Gulf States Marine Fisheries Commission has worked hand-in-hand with the National Marine Fisheries Service, the five Gulf States (Florida, Alabama, Mississippi, Louisiana, and Texas), and the menhaden industry for many years to monitor the Gulf menhaden stocks and is confident in the assessments provided.

The Non-Native Aquatic Species in the Gulf of Mexico and South Atlantic Regions site provides a Gulf-wide inventory of biological data on non-native species, including fishes and invertebrates. It also addresses microorganisms with disease potential within the Gulf of Mexico and near-coastal habitats. The longer-term goal of the website is to improve tracking of the effects of non-native species. The website is designed to permit data and information to be shared between the GSMFC non-native species site, the USGS Aquatic Species database, and other sites with which agreements have been made.



Kim Iverson/SAPMC



Atlantic States Marine Fisheries Commission

MANAGEMENT UPDATE – MARCH 2005

Working towards healthy, self-sustaining populations for all Atlantic coast fish species, or successful restoration well in progress, by 2015.



ATLANTIC STATES
MARINE FISHERIES
COMMISSION

1444 Eye Street, NW, Sixth Floor
Washington, D.C. 20005
Tel: 202-289-6400
Fax: 202-289-6051
www.asmf.org

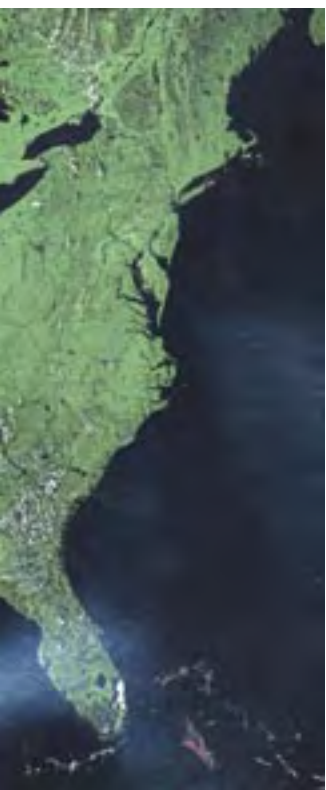
The Atlantic States Marine Fisheries Commission (Commission) was created by the 15 Atlantic coastal states through a Compact approved by Congress in 1942 for the purpose of better managing shared marine fishery resources. Members are those coastal states from Maine to Florida, including Pennsylvania. Through the Commission, the states cooperate in a broad range of programs that include interstate fisheries management, fisheries science, habitat conservation, and law enforcement.

The Atlantic Coastal Fisheries Cooperative Management Act of 1993 (ACFCMA) provides the policy basis for the Commission's fisheries management program. It charges the states with developing fisheries management plans and provides funding authorization to support such efforts. The Act further empowers the Commission management process by providing a mechanism for the Secretary of Commerce to close those state fisheries not in compliance with Commission fishery management plans.

The Commission actively manages some 22 species of fish and shellfish, a function not performed by its Gulf or Pacific states counterparts. The Commission provides a forum for member states to examine emerging issues and develop response strategies. Typically the Commission sets management goals and objectives, allowing individual states to craft regulations that take into account regional concerns and circumstances. The Commission process, where the political will exists to act, allows swift action, usually measured in months, compared to years for similar federal actions.

This brief overview is intended to give context to the following report of high profile issues faced by the Commission in the past year.

The Commission provides a forum for member states to exam emerging issues and develop response strategies. Typically the Commission sets management goals and objectives, allowing individual states to craft regulations that take into account regional concerns and circumstances.



NOAA

American Lobster

The most valuable commercial fishery in New England is American Lobster (more than \$300M ex-vessel). Maine landings account for more than 80% of the total harvest, and reached near record levels in 2004. Since a massive die-off in 1999, lobster landings continue to decline in Long Island Sound (CT–NY). Results of a joint science task force indicate a combination of warm water, anoxia, and reduced salinity likely caused the die off. State managers have engaged industry members to consider strategies to protect the remaining brood stock. The Commission is constructing a response to the 2003 severe stock decline in Area 2, (includes Rhode Island and Massachusetts waters south of Cape Cod). Commission response has been complicated by Area 2 fishermen strongly opposed to measures to limit effort or cap harvest. Scientists continue to refine a population model and a landings database to support a coast-wide benchmark stock assessment scheduled for completion in Spring 2005. The last assessment in 2000 indicated over-fishing was occurring but the status of the stock was unknown.

Atlantic Menhaden

The Commission completed a peer-reviewed stock assessment indicating the coast wide stock is not over-fished and over-fishing is not occurring. In response, the Commission approved Addendum 1 setting new biological reference points, decreasing the frequency of stock assessments, and updating habitat requirements. In response to concerns from environmental and recreational fishing groups the Commission initiated science-based efforts to exam the ecological role of menhaden and the extent of, if any, localized depletion in the Chesapeake Bay. A plan addendum has been initiated to consider a range of responses while additional data are collected.

Atlantic Croaker

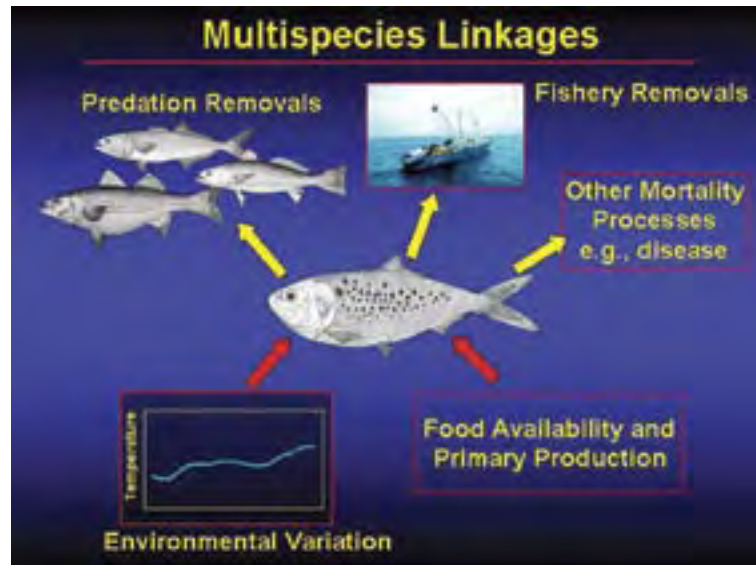
Scientists have completed a peer-reviewed stock assessment indicating the Mid-Atlantic stock is not over-fished and over-fishing is not occurring. The Commission drafting a Plan Amendment to establish biological reference points and provide a range of responses to future changes in stock status.

Atlantic Striped Bass

Nearly depleted in the early 80's this stock was declared fully recovered in 1995. Amendment 6 was developed over four years to reflect shift in management strategy from a recovery to maintenance. 2004 was first year of implementation with a standard coast-wide size and bag limit. Chesapeake Bay authorized different regulations provided fishery maintains a lower F. 2004 assessment update indicates significant increase in F for the coast-wide stock. Technical committee will continue to refine assessment to reduce uncertainty.

Winter Flounder

Winter flounder is managed as two stock units. Gulf of Maine stock is not overfished, overfishing not occurring. Southern New England and Mid-Atlantic stocks are overfished, with overfishing occurring. The Commission approved Amendment 1 to establish biological reference points and reduce F in the SNE/MA stock through restrictions on the recreational fishery. The Commission



Lance Garrison/SEFMC

is anticipating significant reduction in off shore harvest through implementation of New England Fishery Management Council's Amendment 13 to the Ground Fish Fishery Management Plan. Some research suggests sub-units of populations with little intermixing. This could explain why recovery of Gulf of Maine stock has not been reflected in the near shore recreational fishery.

Summer Flounder

Sumer flounder is managed through a joint plan with the Mid-Atlantic Fishery Management Council. The stock is rebuilding and is expected to reach its target level in 2010. The Commission continued to work on management strategies to achieve state by state harvest targets for the recreational fisheries. The Commission has adjusted commercial state allocations in response to industry perceived bycatch problems and inequities in state by state quotas. The Commission is working with the Mid-Atlantic Council to take a comprehensive look at the management of summer flounder through the development of Amendment 14.

Black Sea Bass

Black sea bass is managed through a joint plan with the Mid-Atlantic Fishery Management Council. This stock continues to recover. Council and Commission set annual TAC, Commission completed an addendum to continue state by state commercial quotas for 2005–2007.

Multi-species Modeling Effort

This on-going project is expected to better quantify the prey-predator relationship between menhaden a forage fish, and striped bass, weakfish, and bluefish. The model has been completed and is scheduled for peer review in late 2005. It has the potential to be a useful tool in confirming that current harvest strategies for menhaden allow ample forage supplies for rebuilding and rebuilt stocks of predators, and that the resultant total mortality on menhaden is sustainable.

Weakfish

Although reported as a healthy stock in the last benchmark stock assessment, scientists are facing confounding data signals. Survey abundance indices are stable or increasing, while commercial



NOAA Restoration Center, Chris Doley

and recreational landings have plummeted. Scientists continue to work on completing a new stock assessment. The Commission is likely to face difficult decisions in reacting to the outcome of the new assessment, especially if stock levels are in fact, low.

Leadership

Preston Pate, Director of Marine Fisheries for North Carolina has been elected Chairman, and George LaPointe, Commissioner of Marine Resources for Maine has been elected Vice Chairman. Both terms are for two years.

Please visit our website, www.asafc.org for a complete description of past and current Commission activities as well as copies of all fishery management plans.



Robert Wakeford/MRAG

SECTION III

Panel Reports and Workshop Summaries

Main Conference Panel Summary Report ... 82

Scientific and Statistical Committee Report ... 94

Advisory Panel Reports

1. Developing an Ecosystem Approach to Fisheries ... 100
2. Strengthening Scientific Advice for Management ... 106
3. Establishing Criteria for IFQ Programs ... 112

Workshop Summaries

1. Defining Marine Protected Areas and Protecting Deep-water Corals ... 119
2. Addressing Overfishing and Stock Rebuilding ... 123
3. Fisheries Governance ... 129
4. Reconciling Conflicting Statutes ... 133

Summary Findings Tables ... 137



Ed Lyman/MA DMF





SUMMARY REPORT

Main Conference Panel

SYNOPSIS WRITTEN BY CHRIS OLIVER

The following is a synopsis of panel discussions, and does not necessarily represent the views of individual panelists.

Chair:

STEPHANIE MADSEN
North Pacific Fishery
Management Council

Panelists:

DR. WILLIAM HOGARTH
NOAA Fisheries

ROY MORIOKA
Western Pacific Fishery
Management Council

PHIL ANDERSON
Pacific Fishery Management Council

JULIE MORRIS
Gulf of Mexico Fishery
Management Council

DR. LOUIS DANIEL
South Atlantic Fishery
Management Council

RONAL SMITH
Mid-Atlantic Fishery
Management Council

FRANK BLOUNT
New England Fishery
Management Council

EUGENIO PINEIRO-SOLER
Caribbean Fishery
Management Council

DR. DAVID HANSON
Pacific States Marine
Fisheries Commission

VINCE O'SHEA
Atlantic States Marine
Fisheries Commission

LARRY SIMPSON
Gulf States Marine
Fisheries Commission

ADAM ISSENBERG
NOAA General Counsel

TOM BUSHIAN
U.S. Fish and Wildlife Service

STETSON TINKHAM
U.S. State Department

RADM JAMES UNDERWOOD
U.S. Coast Guard

Rapporteur:

CHRIS OLIVER
North Pacific Fishery
Management Council

The conference format allowed for the various Advisory Panels, Workshops, and Scientific and Statistical Committee (SSC) to meet prior to the main conference panel and forward their discussions and recommendations for consideration by that panel. The three primary conference topics (ecosystem approaches to management, strengthening scientific advice, and criteria for IFQ programs) were each addressed by a separate Advisory Panel as well as the SSC, and their recommendations were considered by the main conference panel. The summary discussions from four workshops (reconciling statutes, overfishing and rebuilding, marine protected areas and deep-water corals, and overall fisheries governance) were also forwarded for consideration by the main conference panel.

The main conference panel considered each conference topic separately, starting with presentations from the Advisory Panel (or Workshop) Chair and the SSC Chair. The panel then engaged in open discussion of each issue, focusing on recommendations from the Advisory Panels, Workshops, and SSC. Based on these discussions, the panel arrived at consensus findings for each conference topic, in many cases agreeing with and adopting primary recommendations from the Advisory Panels, Workshops, and SSC. These findings do not represent formal regulatory actions, or formal recommendations to governmental agencies by any Council, Commission, or NOAA Fisheries as provisions of the Federal Advisory Committee Act (FACA) preclude the conference findings from being presented as such. However, they do reflect the positions of the 15 participants on the main conference panel who cover a broad range of expertise and geographic representation. As such, the conference organizers hope that these findings will be very informative to the ongoing national dialogue centered around reauthorization of the Magnuson-Stevens Act and the recommendations of the U.S. Commission on Ocean Policy.

The 'Findings' Table at the end of this section provides an overall summary of the issues associated with each topic, the Advisory Panel, Workshop, and SSC recommendations, and the resulting findings of the main conference panel. A summary of the main conference panel discussions and findings, for each topic, follows. In most cases these findings reflect unanimous consensus of the main conference panel participants; where there was not unanimous consensus on a particular panel finding, it is so noted in the Summary 'Findings' Table.

Developing an Ecosystem Approach to Fisheries

Technical Requirements for an Ecosystem Approach to Fisheries

Under the subheading of technical requirements, the panel adopted a combination of Advisory Panel and SSC recommendations, including (1) that the Councils and NOAA Fisheries should work collaboratively to pursue an ecosystem approach to fisheries involving all stakeholders, managers, and scientists; (2) the Councils and NOAA Fisheries should identify, prioritize, and develop weighting for ecosystem characteristics per SSC comments (including human characteristics and reference points and performance indicators to measure progress, future monitoring, and research); (3) we should inventory current ecosystem projects (and management approaches) in every region; and, (4) that an ecosystem approach should be evolutionary and iterative (rather than revolutionary in nature), progressing from the present.

First and foremost the panel endorses the concept of an ecosystem approach to fisheries management, recognizing that such an approach has to build on our current knowledge base and be an iterative, evolutionary process which expands in parallel with that knowledge base. That process needs to be collaborative and include input (in a bottom-up approach) from all stakeholder, scientists, and managers, rather than in the form of prescriptive, top-down directives. An inventory of current ecosystem projects, including a description of ecosystem oriented management approaches used in each region, is fundamental to understanding our present context and subsequent direction.

Regarding the finding to identify, prioritize, and develop weighting for ecosystem characteristics, there was some discussion as to the feasibility of this exercise, as well as the utility of it if focused only on fisheries-related characteristics. The panel discussion reiterated the necessity of moving forward, even in the face of limited information on some ecosystem characteristics, and recognizing the evolutionary context of this approach and a need to at least get the fishery aspects nailed down to the extent possible. Other aspects of the ecosystem, including those which extend beyond the immediate fisheries elements, can be incorporated as appropriate in that iterative process. Weighting of the various characteristics is seen as necessary given that tradeoffs among various ecosystem elements will be an inevitable challenge for fisheries managers.

Science Limitations

The panel was unanimous in agreeing that available science will impact the speed and direction at which we develop more specific ecosystem approaches, but that a lack of data should not limit our ability to adopt an ecosystem approach. In the short term, there is information available that can be utilized to make improvements in fisheries management. We need to maximize the mining of existing data sets and knowledge, and focus on improvements that can realistically be made in the short-term. In that context, the panel supports continuing to use and improve on current tools, recognizing that models and available data will differ by region. While the initial and primary focus needs to be on building on existing tools and information, the panel members fully support seeking additional funding to enhance ecosystem data collection and model development, and to match goals and objectives to the reality of available information and the reality of budget limitations. We must recognize the evolutionary nature of the process in this context.

The SSC particularly stressed the point (and the panel concurred) that the policy makers must be realistic in scope, and focus energies on what is feasible in the near term rather what might be desirable in theory. Time series data on relevant ecosystem characteristics will be necessary over the longer term. If expectations are not kept to a realistic, practical level, the ecosystem approach runs the unnecessary risk of failure in perception.



BILL HOGARTH:

I don't think we can continue to manage fisheries in this country with just the Councils managing fisheries and not addressing other issues.

VINCE O'SHEA:

We should be wary of strict regulations and guidelines that will require Council to produce new FMP amendments across the board, rather than building an ecosystem approach into existing management practices.



CHRIS OLIVER:

It's not appropriate to compare Councils across regions in the report card, but rather to compare each region to its own goals and objectives based on the peculiarities and the specifics of its region.

Regional Planning and Role of Regional Ecosystem Councils

The panel had extensive discussions on the need and nature of a forum to resolve fishery and non-fishery issues within an ecosystem concept. Some members of the panel argued for establishment of a formalized regional coordinating body (perhaps an inter-agency ecosystem council model), pointing out that existing processes, unless formalized, may not be sufficient to bring to the table all of the non-fishery issues which may require attention. Such an explicit organization would also provide a focal point for coordinating and funding the process necessary to bring the relevant parties to the table. Other panel members argued that existing processes do not require the creation of a separate, additional bureaucratic structure; rather, it is a matter of coordinating the existing bodies, and not creating a new “Council”. It was agreed that either approach is essentially getting to the same point — that is, some type of voluntary, regional forum needs to be developed where fisheries and non-fisheries aspects of ecosystem management can be coordinated. The panel then agreed that no separate ecosystem councils should be established, but the panel supports establishment of regional (voluntary) coordinating bodies comprised of regional authorities/jurisdictions and public expertise to address non-fisheries management issues.

Type of Ecosystem Planning Document

In terms of the vehicle for moving forward with the ecosystem-based fisheries management concept within the current governance system, the panel agreed that regional fishery management Councils should develop ecosystem-based management documents for fisheries. In this context, the panel also agreed that ecosystem-based fishery management plans (FMPs) should be a fundamental, first order goal for each Council or region, and that if an overarching Fishery Ecosystem Plan (FEP) is developed, it should be to provide a general guidance to FMP development. To put this recommendation in clear context, some panel members did express potential merit of *requiring* overarching FEPs, and including specific management requirements within those FEPs. However, the panel position clarified that while FEPs may have merit as a strategic planning document, they should not be required, and that specific measures would be contained in individual FMPs.

Process for Developing Ecosystem-based Goals, Objectives, and Guidelines

While the panel initially discussed the issues of Goals and Objectives separately from the issue of Guidelines, it became apparent from that discussion, and from the advice of the SSC, that these issues are closely linked. Therefore, this summary combines those discussions under a single subheading. The panel agreed that an appropriate approach in this regard is to strive for broadly defined national level objectives followed by regionally defined goals and objectives. Consistent with the SSC advice, broader national objectives would include traditional objectives such as optimum yield, sustainability, bycatch reduction, habitat protection, but should be expanded to address larger issues such as water quality and marine biodiversity. Rather than a diffuse goal or objective statement, the SSC noted the need for some specificity of context; i.e., to manage sustainability and productivity.

The concept of more specific regional goals and objectives reflects the fact that strong regional differences exist in ecosystem makeup and function, and that there are varying degrees of information across regions and varying degrees of progress within current FMPs across regions. Further, regionally defined goals and objectives would allow for each region to appropriately measure its progress against those goals and objectives, rather than against some broader, national objectives that may not be an appropriate yardstick for every region. The panel agreed (with one objection)

that each region, or large marine ecosystem, should develop a NOAA/Council steering committee to develop more specific regional goals and objectives, and that such process should be “bottom-up” in nature, including a broad cross-section of stakeholders.

In terms of more specific guidelines, the panel agreed that guidelines would be useful to help move the ecosystem approach forward, but that such guidelines should not be technical (regulatory) in nature, pointing out the difficulties associated with regulatory guidelines established for the essential fish habitat (EFH) process stemming from the 1996 Sustainable Fisheries Act (SFA). Such guidelines would need to be general and flexible enough to recognize regional differences and should be couched so that they allow the Councils and NOAA to use the tools currently available under the Magnuson-Stevens Act and other mandates. However, one panel member argued that more stringent guidelines may be necessary to “set the goalposts...and avoid litigated interpretations”.

Elements to be Codified in Magnuson-Stevens Act Reauthorization

The panel discussed whether and how the Magnuson-Stevens Act should be amended to more specifically incorporate the ecosystem approach to fisheries management, and agreed that we should be cautious about amending that Act (or passing other legislation) with specific requirements. The panel discussion related back to findings regarding scientific limitations, and reiterated the concern that specific provisions could potentially outstrip available information and create fodder for additional litigation. The panel is wary of strict regulations and guidelines that will require Councils to produce new FMP amendments across the board (e.g., SFA), rather than building an ecosystem approach into existing management practices, noting that the current Magnuson-Stevens Act allows for ecosystem-based management, and that national guidance and subsequent regional guidance can help Councils to move forward incrementally.

Other Issues

One of the presentations to the Advisory Panel for ecosystem approaches included a region-by-region overfishing report card. The SSC also spent considerable time discussing this issue, urging caution in the development and presentation of simple numerical summaries of individual performance indicators as an indication of overall ecosystem health. While the main conference panel recognizes the importance of addressing overfishing, including objective measures of fish stock health, the panel agreed that this parameter alone is not an appropriate measure of ecosystem health or meeting broader ecosystem objectives (though reducing or eliminating overfishing should be a primary goal of each region, and is currently required by law).

Overall Conclusions

The main conference panel reviewed a set of overall conclusions recommended by the ecosystem approaches Advisory Panel, and concurred with those findings as follows: the panel endorses the finding of many other science and management boards, that ecosystem-based management is an important tool for enhancing fisheries and the ecosystems on which they depend. The panel expressed a preference for the use of currently available tools in that regard, and the resources and funding necessary to better engage those tools. Councils and regions need to retain the flexibility to manage their regional fisheries, and the concept of “standardization” is incompatible with the need for ecosystem approaches to reflect regional differences. Finally, the panel agreed that a holistic approach is a realistic approach only with collaboration among Councils and NOAA Fisheries, partner agencies, and stakeholders.

LARRY SIMPSON:

It's my understanding that we are trying to get at a cure, not treat the symptoms. If we are going to deal with fertilizer use for Midwestern farmers, it's going to take a lot more than the Council's ability. It would have to be elevated up to a higher level.



NOAA



NURCUNCV

LOUIS DANIEL:

I suggest that we start looking more towards basing our management decisions on sound science, rather than the best available science. In some instances, the best available science is inappropriate for making management decisions.

Strengthening Scientific Advice for Management

Best Scientific Information Available

Under the subheading of best scientific information available, a number of interrelated issues were addressed. As expected, the conference SSC spent significant time and attention on these issues and the findings of the main conference panel reflect a combination of the discussion points from that SSC and the recommendations of the Advisory Panel for this issue. The first panel finding is that scientific determinations of necessary fishery parameters should be made within the regional fishery management council process, consistent with Magnuson-Stevens Act. This statement is an affirmation of the current process, which relies on scientific information and advice from Council SSCs and other scientific bodies, but provides the regional councils the final authority (subject to Secretary of Commerce approval) to interpret that science in developing policy and regulatory actions.

Regarding the role and process of SSCs, the panel adopted a number of specific findings, including (1) councils should retain appointment authority for SSC; (2) SSC members should not be subject to term limits; (3) SSCs should meet concurrently with Council meetings, and at the same locale, when possible; (4) each Council's SSC shall provide peer review of all fundamental analyses and make the determination that best available scientific information is provided prior to Council decision making; (5) best scientific information available includes the social and economic sciences as well as the physical and biological sciences; and (6) opportunity should be provided for regional or national SSC meetings, where members from different regions could discuss best practices and seek to identify analytical and research needs.

On the first two points there was consensus among the panelists, though one panel member expressed concern that there not be term limits on SSC membership, due to the potential for "vesting" SSC members with Council interests, particularly if combined with compensation for SSC members. However, the panel agreed that imposing term limits could very well be counterproductive, by automatically removing critical, long-standing regional expertise given limited availability of such expertise. The panel agreed that Councils should maintain authority to appoint their SSCs and that the lack of specific term limits does not guarantee that members are reappointed each year. Regarding potential compensation, the panel recognized the tremendous commitment of time and resources devoted by SSC members, but was reluctant to endorse compensation that could create a perception of conflict, and could strengthen an argument for SSCs to be appointed by some national authority.

Regarding the fourth point, there was not full panel consensus, with three members expressing concern that a requirement for SSCs to review all information could be redundant to existing processes, that there are scientific bodies other than SSCs that supply scientific information and review in some regions, and that the costs of such a requirement could be prohibitive. However, the majority of the panel agreed that SSCs are required by the Magnuson-Stevens Act, that there is scientific information other than stock assessment that requires review (socioeconomic analyses and others), and that such a requirement for SSC review does not preclude or moot other scientific review processes. Hence the finding that each Council's SSC should provide peer review of all fundamental analyses prior to Council decisions based on that information.

Conservation Versus Allocation

Because most of the extensive national dialogue on this issue has focused on the issue of setting catch quotas, and there have been recommendations to remove this basic function from the

Councils to a specific scientific body, the panel had a lengthy discussion to arrive at their basic finding on this issue. The basic finding of the panel is that Councils shall adopt ABCs within limits determined by their SSCs (or appropriate scientific body) and shall set TACs (or control efforts) such that catch would be at or below ABC, unless fully justified by the Council.

To provide some context for this finding, the panel discussion clarified some important points. First, it was clarified that in some regions there are processes other than the SSC (SEDAR for example) that provide the primary stock assessment information. Secondly, the finding reflects a strong belief by the panel that Councils should follow the scientific advice provided to them and put measures in place, either catch or effort limits, to ensure that ABCs are not exceeded. However, the panel believed that some flexibility is necessary in the event of uncertainty on ABC ranges or where there are other critical considerations. The panel discussion clarified that the intent is not to provide an “out” for Councils to contrive some justification for exceeding ABCs, but to stress that there must be compelling justification to do so and that such justification be clearly stated.

Independent Peer Review

The need for independent peer review has been another subject of national dialogue, and appears among the recommendations of the U.S. Commission on Ocean Policy. Peer review requirements under the Data (Information) Quality Act may also impact fisheries management actions by the Councils and NOAA Fisheries. While previous discussions affirm the panel’s belief in the SSC as an appropriate peer review process in most cases, the panel believes that certain circumstances of information could benefit from separate, or additional, scientific peer review. Therefore, the panel finds that there should be an independent peer review of scientific information and processes used by each Council, at appropriate intervals determined by the Council. In circumstances where an issue has unusual repercussions or is particularly controversial, outside review (involving, for instance, the Center for Independent Experts) may be warranted. Such reviews should not be limited to stock assessments but could also extend to socioeconomic and other types of models and analyses used by the Council.

Other Issues

A few additional issues were addressed by the Advisory Panel and SSC, and were discussed by the main conference panel. One of these was the issue of whether there should be explicit default measures in place, to help end an overfishing situation for example, where Councils cannot implement final regulatory measures in a timely manner. The panel agreed that the current process for amending FMPs often cannot provide timely response to critical, emerging conditions, and that being able to extend the emergency rule actions can allow for appropriate measures to be in place while the Council develops well thought out, long term solutions that take into account social and economic factors. Therefore the panel supports the finding that emergency rules may be extended as necessary to address potential violations of National Standard 1.

The panel also adopted two general findings relevant to research priorities, data needs, and funding resources, including that SSCs should develop research priorities and identify data and model needs for effective management (as is currently done in some regions), and that there is a need for more resources to be dedicated to stock assessments and socio-economic impacts.



JULIE MORRIS:

Our SSC reviews every FMP before final adoption and tells us whether the FMP is based on best scientific information. It's not just stock assessments, it's the social and economic analyses that we are talking about here.

Provisions of IFQ Programs

As with the previous issues, the main conference panel findings reflect a combination of the Advisory Panel's recommendations, SSC discussions, and the main conference panel's own discussions. There was overwhelming consensus that IFQ-type programs (share-based management programs) are a necessary tool in the overall box, and most of the discussion focused on the need and nature of national guidelines, the need for regional flexibility within established guidelines, and allocation criteria. In order to recognize the necessity for some over-arching guidelines, but also for retaining regional flexibility, and to recognize that share-based programs other than IFQs may be desirable (fishery cooperatives, community quotas, etc.), the panel adopted the following general position (followed by more specific findings which would be addressed under regional goals and objectives):

RADM JIM UNDERWOOD:

The Coast Guard is very supportive of IFQs. We have found that the safety it provides for the fisher is greatly enhanced.

Regional fishery interests require that share-based management programs (could include other forms than IFQs) be considered to satisfy specific needs by fishery and locale. To accomplish this, the regional councils require liberal authority to develop share-based programs within specified guidelines. The Secretary of Commerce in consultation with Regional Fishery Management Councils should develop national guidelines consistent with the recommendations of this conference panel, for the establishment of market-based systems (including, but not limited to, IFQs, community quotas, coops, etc.). Consistent with these guidelines, the councils shall enumerate goals and objectives for the program and consistent with those goals and objectives.

Allocation Criteria

The panel discussed a number of issues associated with initial allocation, taking into account some divergent views from the Advisory Panel as well as the views of the SSC. There was particular discussion on the issue of processing shares, including that the current Administration does not support processing shares. Other perspectives noted that in order to be fair and equitable, a program must at least consider impacts to processors (as well as all other stakeholders), and options for addressing processor participation in the overall fisheries. There was consensus among the panel that these types of specific allocation issues should be addressed on a regional, fishery-specific basis. Overall, the panel developed the following position with regard to initial allocation:

The initial allocation of interests under the program shall be fair and equitable. In developing the initial allocation, the Council *shall* consider the interests of those that rely on the fishery, including vessel owners, processors, communities, captains, and crew. A program *may* include provisions to protect these interests including the allocation of shares to any of these interests, license requirements on the harvest of shares, or limitation on landings of harvests from the fisheries (including processing shares or regional community landing requirements).

Conservation

The regional councils require liberal authority to develop share-based programs within specified guidelines, including conservation. This finding refers back to the overall program design, recognizing that guidelines may require conservation oriented components, and that regional flexibility in program design may also address conservation issues.

Program Duration, Sunsets, and Program Review

Shares under the program must have tenure sufficient to support and facilitate reasonable capital investment in the fishery; however, any shares allocated under the program will be a privilege,

DAVE HANSON:

It's not a one size fits all type of thing when you are dealing with something as complex as IFQs.



Robert Wasko for HRKAG

which may be revoked without compensation to the holder. Program duration shall be at the Council's discretion without required sunset. This position represents a balancing of concerns over public trust and the desire to have stability within the program, under which capital investments are protected and the economic and capacity reduction benefits of the program can be realized. The SSC noted that the overall program duration is different from the duration of the individual share-based privilege, and that Councils could consider fixed "entitlements" within a permanent program.

While the panel does not support mandatory sunsets for IFQ type programs, they do agree that shares allocated are a privilege and may be revoked without compensation, and the panel was unanimous in its support of a requirement for program review. The panel supports required, periodic, comprehensive review of each program, including the mandatory collection of social and economic data from beneficiaries to assess the extent to which the program is meeting the goals and objectives.

Transferability and Excessive Shares

The panel supports appropriate provisions governing transferability, which may include permanent and temporary transfers subject to limitations consistent with the social objectives of the program. Transferability is a critical program element, and the economic, capacity reduction, and efficiency benefits of IFQ type programs depend on some level of transferability. Specific provisions or limitations may be necessary however, to balance particular social objectives on a regional or fishery-specific basis. Capping the amount of shares that can be owned by a particular person or entity is also a concept supported by the panel. The panel agreed to support limits on shares, including caps on holdings of a person or use of shares by a person or a single vessel. The appropriate level of an excessive share cap can vary widely by fishery (for example some fisheries may have less than 10 active participants, where others may have thousands), and should be left to the discretion of each Council to develop, consistent with the relevant fishery conditions.

Referenda

The Advisory Panel, the SSC, and the main conference panel discussion identified several concerns with regard to possible requirements for referenda (vote of permit holders to approve a program). Among the concerns are (1) until the details of a program are developed, it is unlikely that stakeholders would know whether to support a program, and (2) given the range of possible interests to be allocated shares, it will be very difficult to define the appropriate field of voters (for example, only permit holders? Crewmembers? Which residents of particular communities? Shareholders in corporate fishing businesses? etc.). On the other hand it was pointed out that referenda could conserve Council time and resources prior to program development, which can be a lengthy process. In that regard referenda might be more practical after development of the program details and approval by the Council. The SSC noted that the current Council process, with extensive committee processes and public feedback, accomplishes largely the same point as a referendum. The main conference panel finding is that referenda shall not be required to approve a program. Referenda will, by necessity, exclude some interested persons and have the potential to substitute the interests of referenda voters for the interests of the Nation. National interests are better advanced by providing Council authority for program development and approval. Councils may however establish their own requirements for referenda.

Other Issues

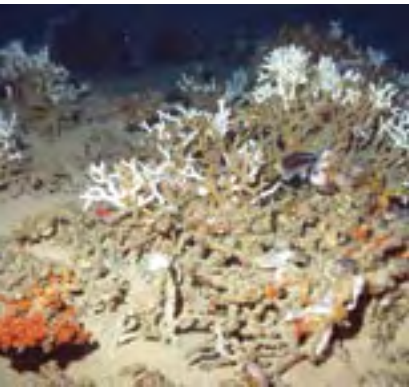
The panel discussed the issue of mandatory fees to cover costs of administering IFQ type programs, to be collected from program beneficiaries. As noted by the SSC, fees can be viewed



STEPHANIE MADSEN:

Even the perception of unfairness can derail the process, so I think it is incumbent upon the Council to justify why it is moving in a direction on certain aspects of an IFQ program.

as a means of recovering program costs, and/or may represent payment for access to a public resource. The panel agreed that collection of fees to cover the cost of management and monitoring or collection of a portion of the value of the resource to offset management and monitoring costs, including state costs, is appropriate. The panel also agreed that any program should include provisions for effective monitoring and enforcement relative to the goals and objectives under the program.



NUR/UNCW

ROY MORIOKA:

With respect to MPAs, clear objectives and goals are key to this process. We need to properly identify the problem, and then develop specific solutions.

Marine Protected Areas and Deep-water Corals

In addition to the three primary conference panel topics described above, the conference included four workshops, one of which was focused on the issue of marine protected areas (MPAs) and management issues associated with deep-water corals. The concept of MPAs is consistent with many management actions currently utilized in the Council process, but it is often unclear whether particular closed areas meet the MPA definition. The process by which MPAs are implemented is also a critical issue discussed during the conference. The Workshop participants agreed that MPAs are one tool in the management tool box, and should be established within an overall fisheries management regime, and that Councils need to have a clear role in developing MPAs. Based on input from the workshop discussions, and through their own further discussions, the main conference panel determined that it would be appropriate to base MPA formulation on:

- Clear objectives and goals;
- Transparent process;
- Sound science;
- Consideration of human dimension and socioeconomic issues;
- Stakeholder participation;
- Monitoring and evaluation; and
- Adaptive management.

The panel further finds (consistent with Workshop findings) the following with regard to MPA development: (1) Clearly define and inform stakeholders of terms such as MPAs, marine reserves, etc. This is to create a standard playing field in terms of knowledge, process, and expectations; (2) Use MPAs as a component of management and not as a standalone solution. This finding recognizes the potential benefits of MPAs while also recognizing their relevance and juxtaposition to other management measures; (3) Address pollution and habitat loss impacts on marine resources. This finding is in the context of addressing non-fisheries impacts relative to MPA creation; (4) Acquire better information (e.g., fisher input) and science (e.g., mapping); (6) acquire more funding. This finding underscores the need for the resources to acquire mapping and other information necessary for appropriate MPA development.

With regard to the more specific issue of deep-water corals, the panel also relied heavily on the discussions of the Workshop participants to arrive at their findings, which are that it would be appropriate to: (1) Address differential gear impacts in areas with deep-water corals. This finding recognizes that some gear impacts may be more substantial than others, but that all potential impacts need to be considered; (2) Improve mapping and comprehensive planning supported by science. Much of the Workshop discussion and main conference panel discussion underscored the paucity of information relative to type, location, and abundance of various cold water corals; (3) Include protection through ecosystem (based) management plans; and, (4) Clearly define types of cold water corals and sponges and their vulnerability. Similar to mapping and other science, this finding notes inconsistencies in defining cold water corals and associated species,

and notes the lack of specific scientific information regarding relative degree of vulnerability to disturbance across types and substrates.

Reconciling Statutes

The main conference panel heard a report from the moderator of the Workshop on reconciling statutes, where he summarized a wide range of viewpoints from the Workshop participants. For example, the issue of the application of the National Environmental Policy Act (NEPA) to promulgation of fisheries plans and regulations was a focal point of this conference issue. Some Workshop participants argued the NEPA was a necessary part of the process to fully protect environmental interests, while others felt that analytical and process provisions of the Magnuson-Stevens Act (MSA) satisfy the underlying conservation intent of NEPA, and do so in a more straightforward, public-friendly manner. These participants felt that minor changes could be made during MSA reauthorization to more explicitly incorporate some of the basic NEPA provisions into MSA (such as requirements to examine a range of alternatives and assess cumulative impacts), and thereby streamline the regulatory process in a meaningful way. Examples were noted as to how the process requirements of NEPA impede timely implementation of fisheries programs, and result in the use of scientific information that is not the most currently available (due to timelines associated with NEPA processes). The main conference panel, with one objection, supported the latter perspective, and developed the following finding: Following the addition of critical NEPA provisions to MSA, thereby making MSA fully compliant with NEPA's intent, the panel finds that legislation should be developed specifying MSA as the functional equivalent of NEPA.

The second area of focus under this conference issue was that of access to data under the Freedom of Information Act (FOIA), and access to vessel monitoring system (VMS) data. There was considerable discussion at the main conference panel regarding the availability of proprietary information, including information collected by observers, through FOIA, and discussion of the use of VMS information by state as well as federal law enforcement officials. Finally, the use of VMS data by the U.S. Coast Guard, for purposes of Homeland Security or Maritime Domain Awareness, was discussed, recognizing that VMS data is currently available to the USCG for fisheries related purposes, but that a broader application may be appropriate. Based on these discussions, the main conference panel arrived at the following findings: (1) that MSA should be amended to provide for mechanisms to better shield proprietary data from FOIA; (2) that State law enforcement officials should be provided access to information and data gathered by VMS operated by the Office of Law Enforcement of NMFS; and, (3) that the U.S. Coast Guard should be provided access to VMS data for homeland security purposes/Maritime Domain Awareness.

The final area of focus under this issue was the relationship of Council process and authorities (under MSA) to the authorities under the National Marine Sanctuary Act (NMSA). Some regions of the country are experiencing confusion and conflicts with regard to the establishment of sanctuaries, including the development of regulations that pertain to fishing activities. The main conference panel discussion reflected general support for the belief that fishing activities are appropriately under the regulatory authority of the Councils, and the panel finds that fishery management authority in national marine sanctuaries should be clarified within NOAA and Federal Law.

Overfishing and Stock Rebuilding

The Workshop on overfishing and stock rebuilding focused on three primary issues: mixed stock management, rebuilding plans, and ecosystem considerations. The main conference panel



RONAL SMITH:

The addition of critical NEPA provisions to MSA will make MSA fully compliant with NEPA's intent.

received the detailed report from the Workshop moderator, and formulated several findings based on the workshop discussions.

Mixed Stock Management

Considerable discussion by the workshop surrounded the issue of single-species management versus mixed stock management, with a general consensus that good single-species management is a necessary first step, while recognizing that mixed stocks provide management challenges that are not fully addressed by a single-species approach. Smaller stocks, including those bycaught in major, target fisheries often do not have the same level of stock assessment information or other biological parameters (“unknown” status for example), and care needs to be taken not to overfish one or more species in a mixed stock assemblage in the interest of achieving overall OY. To that end, the main conference panel encourages improved species-specific data collection and increased management measures to control bycatch, understanding that it is a necessary step in rebuilding minor stocks in mixed-stock fisheries. The panel also supports the use of fishing mortality rates as the primary tool in managing fish stocks, but also recognizes that we need more data to provide assessments for more stocks. The intent of this latter panel finding is that, while recognizing that factors other than fishing mortality will affect the status of a particular stock, we have direct control over fishing mortality and need to exercise that control where necessary.

Rebuilding Plans

Hand in glove with the intent expressed above, the main conference panel was unanimous in agreeing that control of fishing mortality is a first line of defense. One of the Workshop discussions revolved around the point that a precautionary approach would institute harvest control rules that would automatically reduce fishing mortality when biomass drops below some specified target level, and that the specific timeline is less important than simply beginning to reduce mortality. Another discussion point raised was that current status of stocks depictions generally focus on the negative, ignoring many successes and the generally healthy status of most major fisheries. The first, general finding from the main conference panel is that, with respect to overfishing definitions and rebuilding plans, the MSA does not need major changes, however we recognize that improved communication of fishery successes and problems may provide a more accurate portrayal of the status of our fisheries.

With regard to the relevant terminologies contained in the MSA, the panel endorses the use of “depleted”, where the cause is unknown or is not fishing related, while keeping focus on the need to rebuild these stocks. Because there are often variable impacts that include fishing as well as other factors, including environmental conditions, the panel felt that it is more appropriate to use terminologies that reflect the actual conditions. If fishing is known to be the primary factor, for example, then “overfished” is an appropriate term; if not, the term “depleted” is more appropriate. Regardless of the case, the panel affirms the need to rebuild the stock in question.

The panel also discussed aspects of overfishing and rebuilding that relate to difficulties associated with multiple jurisdictions, and particularly where international stocks are involved. The panel notes the difficulty in rebuilding multiple jurisdictional international stocks, and encourages participation and action by international bodies.

Ecosystem Considerations

One of the primary findings from the Workshop was that good single-species management is a first step in mixed stock management, and is a cornerstone of a broader ecosystem approach. The

PHIL ANDERSON:

We don't want to make the environment a scapegoat and shift blame for depletion to environmental factors and then say “we're off the hook.” Regardless of the cause for stock depletion, we need to get fishing mortality under control.



NURCUNCV

discussion also recognized the relative role of fishing (i.e., in many cases there are factors beyond the control of managers), but cautioned against using environmental factors as a scapegoat for inaction. Workshop discussions also addressed the evolving technical and conceptual challenges, and the need to prepare for long-term changes through risk modeling. The panel agreed that we need the scientific wherewithal to bring environmental conditions and variables into the management equation more explicitly, and encourages the incorporation of environmental variability as much as possible in stock status determinations.

Fisheries Governance

The final issue discussed by the main conference panel was the general issue of fisheries governance. This issue could cover a number of broad concepts, and a number of more specific questions and concerns, but the Workshop and panel discussion focused on a few overarching themes, including the concept of Regional Ocean (or Ecosystem) Councils; the concept of separating science and allocation; and, the issue of Council appointments and conflict of interest. Some of these discussions necessarily overlap with previous discussions held to address other conference issues, namely the Ecosystem Approaches to Management and the Strengthening Science issues.

As a general finding, the panel finds that Councils should look to the U.S. Ocean Action Plan for guidance in developing governance systems. It was clarified that the Action Plan, while setting the stage for dialogue on broader coordination, does not call for the establishment of Regional Ocean Councils, and previous panel findings (under Ecosystem Approaches) reflect a consensus that separate Regional Ocean Councils are not supported by this conference panel, though voluntary efforts to engage and address non-fishing impacts are supported. Caution was expressed that if fishing impacts are more easily identified and quantified, there could be a lack of focus on other, non-fishing impacts associated with a broader ecosystem approach. Also consistent with previous discussions under “Strengthening Science”, the main conference panel generally supports the findings of this Workshop with regard to separating science and allocation, that strong science is imperative to good management, that the majority of the panel believes that separation of science from allocation is infeasible and illogical, and that science contributions need to be transparent, inclusive, and understandable to the public.

There was considerable discussion regarding the Council appointment process, and differences of opinion among the Workshop participants and the main conference panel. Two members of the main conference panel argued that the selection process for Council member appointments needs to be broadened, to more explicitly include non-fishing interests. These panel members felt that the current process may not provide the Secretary of Commerce a broad enough range to select from. However, the majority of the main conference panel felt that the current process appropriately places the burden on Governors of respective States to provide a range of nominees, that the process allows for a very wide range of nominees, and that the Secretary can pressure those Governors if the range of nominees is somehow deficient. Therefore the panel did not adopt any recommendation to change the current process. Regarding the more specific conflict of interest issue, the panel supports the current conflict of interest guidelines and recommends that member training include specific reference to these guidelines. In arriving at this finding, the panel discussions noted that conflict of interest and recusal regulations currently exist.



FRANK BLOUNT:

I feel that the current guidelines explain conflict of interest very well. I just think that Council members have to be reminded of them from time to time.

COMMITTEE REPORT

Scientific and Statistical Committee

SYNOPSIS WRITTEN BY LAURA OREMLAND, NICOLE KIMBALL, AND RICH MARASCO

The following is a synopsis of committee discussions, and does not necessarily represent the views of individual committee members.

NURCUNCEV



Chair:

DR. RICH MARASCO
NOAA Fisheries (retired)

Members:

DR. LEE ANDERSON
University of Delaware

DR. JAMES BERKSON
NOAA Fisheries

DR. CHRIS BOGGS
NOAA Fisheries

DR. KEITH CRIDDLE
Utah State University

DR. MICHAEL DALTON
California State University

DR. ILENE KAPLAN
Union College

DR. WALTER KEITHLY
Louisiana State University

DR. GORDON KRUSE
University of Alaska

DR. PAT SULLIVAN
Cornell University

CYNTHIA THOMSON
NOAA Fisheries

Rapporteur:

LAURA OREMLAND
NOAA Fisheries

Staff Assistant:

NICOLE KIMBALL
North Pacific Fishery
Management Council

As part of the *Managing Our Nation's Fisheries II* conference, the Science and Statistical Committee (SSC) met on March 24-26, 2005 at the Omni-Shoreham Hotel in Washington, D.C. The SSC members included: Rich Marasco (Chair), Lee Anderson, James Berkson, Chris Boggs, Keith Criddle, Michael Dalton, Ilene Kaplan, Walter Keithly, Gordon Kruse, Cynthia Thomson, and Pat Sullivan. Nicole Kimball served as staff assistant and Laura Oremland served as rapporteur. The panel met to deliberate and provide recommendations to the Conference Committee on three issues: (1) developing ecosystem approaches to management; (2) strengthening scientific advice for management; and (3) criteria for IFQ programs or other forms of dedicated access privileges.

Ecosystem Approaches to Management

Three speakers addressed the SSC on ecosystem approaches to management: Gregg Waugh (South Atlantic Fishery Management Council); Roger Rufe (The Ocean Conservancy); and Steve Murawski (NOAA Fisheries). The panel discussed the technical requirements for an ecosystem approach to fisheries; science limitations; the process for developing ecosystem-based goals and objectives; the development of national guidelines for an ecosystem approach to fisheries; and an overfishing scorecard, a proposed metric for fisheries management.

Technical Requirements for an Ecosystem Approach to Fisheries

First, the SSC recommended that all fishery stakeholders need to be involved very early in the process. Active collaboration among scientists, managers and stakeholders is a prerequisite for successful development of an ecosystem approach to fisheries that includes humans as part of the ecosystem.

Second, the SSC noted that the scale of particular marine ecosystems may not match political boundaries in particular cases, thus, technical requirements for the development of ecosystem approaches may require the implementation of a process that crosses customary jurisdictional boundaries. The SSC also noted that just as successful attainment of biological conservation objectives in a single-species context can be judged by comparing performance indicators against a set of biological reference points, technical requirements for an ecosystem approach to fisheries must include the development of a set of ecosystem characteristics deemed important, definition of management objectives concerning those characteristics, and development of reference points and performance indicators by which to measure progress. The performance measures themselves may require alternative proxies owing to imperfect knowledge within and between ecosystems. Having defined a set of desirable ecosystem characteristics and objectives, weights should be developed

for each characteristic. Weights are necessary because ecosystems are inherently dynamic and it will be impossible to achieve all desired characteristics simultaneously. The prescription of these metrics should be robust to the role of natural variability (e.g., decadal-scale climate regimes) in structuring marine ecosystems and should recognize that alternative natural states (e.g., warm-versus cold-water species assemblages) of the ecosystem are neither “good” nor “bad.”

Finally, technical requirements must include the development of analytical procedures for ecosystem evaluation and plans for future monitoring and research. As a first step, the SSC recommends identifying and prioritizing the set of desirable ecosystem characteristics.

Science Limitations

The SSC stressed the importance of maintaining realistic expectations when implementing ecosystem approaches to fisheries management. Ecosystem approaches should be instituted incrementally, and the SSC recommended focusing on currently feasible ecosystem research projects and attainable short-term management goals, while acknowledging limitations in current data sets. Examples of currently feasible projects are predator-prey studies, bycatch estimation, basic ecosystem modeling, and habitat mapping.

The SSC also recognized the limitations of our current funding and staff resources. Future increases are unlikely to be orders of magnitude higher than they are today, and a modest increase in funding will not lead to a dramatic increase in existing capabilities.

Process for Developing Ecosystem-based Goals and Objectives and Development of National Guidelines for an Ecosystem Approach to Fisheries

The SSC recommended that goals and objectives for an ecosystem approach should be developed at the national level and include consideration of traditional single-species objectives (e.g., optimal yield) but should be expanded to include protection of ecosystem function, safeguarding water quality, and protection of marine biodiversity. Goals and objectives also need to include social dimensions and safeguards.

The SSC also recognized that strong regional differences exist in ecosystem makeup and function; these differences are most pronounced between temperate and tropical regions. Thus, ultimately, guidelines will need to be refined at the regional, or eco-regional, level. Guidelines should include identification of metrics that can be used to characterize ecosystem health biologically, ecologically, socio-economically, and managerially. Broad stakeholder input should be solicited during guideline development.

Overfishing Scorecard

The SSC did not support the use of the overfishing scorecard in order to advance ecosystem approaches to fishery management. In addition, the SSC urges caution in the development and presentation of simple numerical summaries of regional performance in meeting ecosystem objectives. While potentially appealing due to their simplicity, the systems these summaries purport to represent are complex and the management objectives are multi-dimensional. The relative importance of single species exploitation rates, exploitation rates across species assemblages, status of non-target stocks, biodiversity, etc., may differ across regions. Because the relative importance of management objectives may differ across regions, one dimensional performance measures may not be appropriate representations of the degree to which regions have successfully implemented



NURC/UNCW



ecosystem management. In addition, a simple summary score to represent the number of overfished stocks within a region may not reflect the level of concern about the status of particular stocks, such as keystone species, ESA candidates, or listed species.

Strengthening Scientific Advice for Management

Three speakers addressed the SSC on the theme of strengthening scientific advice for management: David Witherell (North Pacific Fishery Management Council); Lee Crockett (Marine Fish Conservation Network); and Paul Sandifer (National Ocean Service). The SSC panel discussed and made recommendations on the following topic areas related to strengthening scientific advice for management: (1) best scientific information available; (2) conservation versus allocation; (3) need for independent review; (4) using default measures to ensure progress; and (5) making research relevant.

Best Scientific Information Available

In general, the SSC stressed that the best scientific information available includes social and economic science, as well as physical and biological science. To help ensure that the best available science is provided to and used by the regional Councils, the SSC suggested that it might be necessary to strengthen the current decision review process (through the Secretary of Commerce), and require the Councils to provide justification for management decisions made contrary to the best available science. The SSC agreed that the regional SSCs should serve as the primary entities to review and provide advice on scientific matters for the Councils and should meet in conjunction with regular Council meetings.

The SSC also discussed and provided recommendations on SSC appointment issues, such as conflict of interest, external certification, term limits, cross-regional SSC meetings, and compensation. To address concerns regarding conflict of interest, the SSC recommended adopting conflict of interest review processes and procedures used by the National Academies and National Research Council to take place at the first SSC meeting each year. Under the National Academies procedures, committee members prepare background/information/conflict of interest disclosure documents that are reviewed for potential conflict of interest concerns. The SSC conceded a potential difficulty in identifying an external body with the qualifications to judge the expertise of all of the diverse areas represented by the existing SSCs and, ultimately, recommended self-evaluating new members. The SSC did not recommend implementing term limits for SSC appointments, as there is an extremely finite pool of individuals who are qualified and willing to serve the public in this role. Regarding compensation, the SSC noted that SSC academic members incur a large opportunity cost and that compensation might be warranted to non-governmental appointments. However, if compensation was implemented, the SSC



recommended that appointment authority may need to be moved above the Council level to avoid potential conflict of interest issues. The SSC further recommended an annual meeting of all SSC members.

Conservation Versus Allocation

While computation of allowable biological catches (ABCs) is a scientific process, their derivation is based on policy. The SSC suggested that designating the SSC as the ultimate arbiter of ABCs blurs the line between science and policy. Alternatively, the SSC recommended strengthening the process by which Council recommendations are reviewed by the Secretary of Commerce. The SSC did not support a proposed requirement to subdivide SSC functions with issues relegated to biological, ecological, economic and socio-cultural categories, as there is considerable variation in the structure of SSCs across regions. Some regions operate under a single SSC that meets as a whole to review all information and analyses prepared in support of Council decision-making. Other regions have chosen to create multiple committees, science advisory panels, or subcommittees, each tasked with responsibility for the review of a subset of the information and analyses prepared in support of Council decision-making. These differences have arisen for historical reasons and as a reflection of the types of management issues being addressed by the various regional Councils.

The SSC also noted that many of the issues that arise in fisheries management are inherently interdisciplinary, that Council actions are often interdependent, and that many SSC members have multiple areas of expertise. Given these issues, the SSC concluded it would not be desirable to mandate subdivision of SSC functions (e.g., forming separate committees for biological, ecological, economic, or sociological issues).

Need for Independent Review

The SSC indicated that external review, by the Center for Independent Experts or a similar entity, may be needed for periodic review of stock assessments or particularly controversial issues. Should a more intensive review be required, the National Research Council or independent contract scientists should be used. Moreover, other non-stock assessment models (e.g., socioeconomic analyses) may on occasion require external review.

Making Research Relevant

The SSC recommended that regional SSCs should play an active role in identifying data and models that are needed for ecosystem approaches to management. The SSC agreed that these bodies should convey research and data needs to NOAA Fisheries and other relevant resource managers.



Criteria for IFQ Programs or Other Forms of Dedicated Access Privileges

Three speakers provided presentations to the SSC on criteria for IFQ or dedicated access privilege programs: Richard Allen (commercial fisherman and fisheries consultant); Dorothy Lowman (fishery consultant), and Seth Macinko (University of Rhode Island). The SSC discussed and made recommendations on the following topic areas related to IFQ Programs: (1) allocation criteria; (2) conservation; (3) limitation of interests in IFQs and the duration of an IFQ program; (4) program review; (5) quota transfers; (6) excessive shares; (7) referenda of IFQ programs; (8) fees; (9) enforcement, monitoring, and data collection; and (10) other related issues.

Allocation Criteria

The SSC considered resource allocation based on market mechanisms, considerations of deservedness or fairness, taking by force, and random allocation (e.g., lottery). The SSC believes that market mechanisms (e.g., auctions) currently prohibited by the MSA should be reconsidered. The SSC did not endorse making allocations by force or lottery, but recommended that individual Councils retain the authority to adopt a particular resource allocation process depending on the conservation and management objectives to be met. The SSC stressed the importance of allocation criteria to the success of IFQ systems, recognizing that it is critical to ensure transparency when assigning resource allocation rights.

The SSC also recognized that deservedness criteria may encompass a broader population than current participants, depending on the objective of the fishery program. Bringing user groups together to develop allocation mechanisms might facilitate a better process. In addition, providing analyses of social and economic consequences of alternatives is dependent on the availability of many kinds of information beyond those usually available, specifically cost data and processor information. The SSCs should be responsible for defining such data requirements and Councils should make broader reporting a condition of limited access programs.

Limitation of Interests in IFQs and the Duration of an IFQ Program

The MSA allows the individual entitlements associated with an IFQ Program to be removed at any time, but the Act does not currently require the IFQ program to be terminated after any particular interval. The SSC stressed the idea that the duration of a program is a separate policy question than the debate surrounding the duration of an individual's share-based privilege. The SSC encourages Councils to consider fixed-term entitlements to comprise a permanent program (e.g., Australia's drop through program, pollution discharge program in Midwest), at the same time recognizing that longer-term entitlements tend to foster the benefits of an IFQ Program.

Program Review

The SSC discussed the review process for IFQ programs, who should conduct periodic reviews, and the appropriate criteria to be used. The most significant factor inhibiting the ability to perform a sufficient program review is the lack of baseline data. This problem could be lessened by requiring the submission of specific economic data as a condition of participating in the program.

Quota Transfers

The SSC debated to what extent quota should be transferable within an IFQ program, and whether transferability is a characteristic that should be strictly regulated. The SSC considered transferability a favorable characteristic of a quota share program, recognizing that adjusting or restricting transferability may be necessary to account for other objectives or considerations.

Excessive Shares

The SSC agreed that there is a need to clearly identify the concerns before one can make the determination that excessive shares need to be regulated as a potential solution to the problem. In general, if market power is the overall concern, the industrial structure of most fisheries is such that it should not be a problem. If excessive shares by one entity are a concern, it is the responsibility of the SSC and analysts to identify the implications of the alternatives under consideration to address those concerns.

Referenda of IFQ Program

The Committee debated whether a referendum should be required prior to considering or upon approval of an IFQ program, who should be allowed to participate, and what percentage should be required for approval. Overall, the SSC did not consider referenda to be an effective mechanism to decide whether a Council should consider developing an IFQ or share-based program for a particular fishery or fisheries, as the public would likely disapprove any program that did not contain sufficient detail regarding implementation. Referenda were considered a more practical tool subsequent to Council approval of a specific share-based program, effectively allowing the public to vote on whether the specific plan should be implemented. The SSC noted that if the Council process is working as intended, with extensive committee and public feedback, it should serve the same purpose as a referendum.

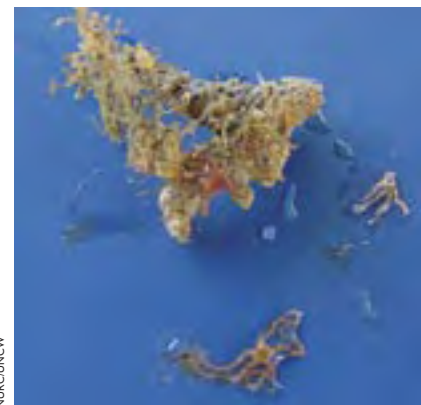
If there is a decision to undertake a referendum, the SSC agreed that care must be taken to identify who should be entitled to vote. This equates to defining a set of stakeholders and the weights assigned to each stakeholder. Scientists could likely assist in the design of referenda and in identifying mechanisms for balanced representation. Scientists could also identify and evaluate the alternatives for which information is being sought.

Fees

The SSC discussed the purpose of cost recovery fees associated with an IFQ program. While fees are typically viewed as a means of recovering management costs associated with the administration of a share-based program, they may alternatively represent payment by individuals for access to and use of a public resource. When considering the applicability of fees, the SSC noted it is preferable to use the incremental cost of setting up an IFQ system, as opposed to the average cost.

Alternative Allocation Mechanisms

The SSC also recognized there are other allocation mechanisms and dedicated access privilege programs that can be developed other than IFQ programs, and recommended that Councils should be authorized to consider other types of allocations (e.g., community allocations, cooperatives) and select across the range of dedicated access privilege tools to achieve various program objectives.



NURCUNEW



NOAA Fisheries/PIFSC

ADVISORY PANEL REPORT

Developing an Ecosystem Approach to Fisheries

SYNOPSIS WRITTEN BY THOMAS B. HOFF, DIANA K. EVANS, AND ROBERT L. SHIPP

The following is a synopsis of the panel presentations and discussions, and does not necessarily represent the views of individual panelists.

Chair:

DR. ROBERT SHIPP
University of South Alabama

Panelists:

RUSSELL SHERMAN
Commercial fisherman

DR. ED HOUDE
University of Maryland

DR. DOUG RADER
Environmental Defense

RALPH BROWN
Pacific Fishery
Management Council

PAUL BARTRAM
Fisheries Consultant

JACK DUNNIGAN
NOAA Fisheries

JOHN IANI
Van Ness Feldman PC

DR. BARBARA KOJIS
Caribbean Fishery
Management Council

DR. RUSSELL NELSON
Fisheries Consultant

Rapporteur:

DR. TOM HOFF
Mid-Atlantic Fishery
Management Council

Staff Assistant:

DIANA EVANS
North Pacific Fishery
Management Council

Presenters:

GREGG WAUGH
South Atlantic Fishery
Management Council

VADM ROGER RUFÉ
The Ocean Conservancy

DR. STEVE MURAWSKI
NOAA Fisheries

An ecosystem approach to fishery management is one of the most popular, hotly-debated topics in fishery management today. There is a growing awareness that an ecosystem approach to fisheries (EAF) is important to the way we rethink fisheries management into the future. It represents a new paradigm of management that builds on existing processes, emerging technology, and research; however, defining an EAF is still in the early evolutionary stages. The Advisory Panel broadly acknowledged that ending overfishing and getting fleet overcapacity under control would be an effective first step towards ecosystem management.

The U.S. Commission on Ocean Policy (2004) defined the principle of ecosystem-based management as follows:

U.S. ocean and coastal resources should be managed to reflect the relationships among all ecosystem components, including humans and nonhuman species and the environments in which they live. Applying this principle will require defining relevant geographic management areas based on ecosystem, rather than political, boundaries.

An EAF is adaptive management that considers interactions between physical, biological, and human components of the ecosystem, while ensuring the overall health, sustainability, and productivity of each component. When Congress last reauthorized the Magnuson-Stevens Act (1996) it required the eight regional Fishery Management Councils and National Marine Fisheries Service (also referred to as NOAA Fisheries) to account for bycatch, protect habitat, and improve monitoring and research. Also established in 1996 by Congress was an Ecosystems Principles Advisory Panel. This panel was charged to review the extent to which ecosystem principles are incorporated in fishery management and research, and recommend management and research activities that would integrate ecosystem principles (EPAP 1999). In addition to proposing comprehensive principles, goals, and policies for fishery management, the panel recommended the development of Fishery Ecosystem Plans and research to support them.

During the past half dozen years, the recommendations resulting from high-level U.S. and international policy commissions, as well as those from other science, management, and stakeholder groups have identified ecosystems perspectives as both an organizing theme for science, and as a basis for balancing societal needs for continuing production of goods and delivery of services resulting from healthy ecosystems. While there are numerous differences between our traditional approach to fisheries management and the overall eventual goal of ecosystem management it should be emphasized that an EAF is not incompatible with single species management (EPAP 1999 and FAO 2003). The regional Fishery Management Councils and NOAA Fisheries are

increasingly evolving towards more explicit accounting for the health and productivity of ecosystem interactions in fisheries management.

The Advisory Panel was chaired by Dr. Robert Shipp and was comprised of well-known individuals from academia, Fishery Management Councils, environmentalists, and fishermen. Three papers were presented to the Advisory Panel. Discussions that occurred after the presentations are incorporated into the remainder of this paper under seven identified issues. Greg Waugh, SAFMC, was the initial presenter with a paper entitled: *Ecosystem-based Management—To amend or not amend (the Magnuson-Stevens Act) that is the question?* Roger Rufe, The Ocean Conservancy, presented a paper entitled: *Overfishing Scorecard*. Dr. Steven Murawski, NOAA, presented the third paper entitled: *Strategies for Incorporating Ecosystem Considerations in Fisheries Management*. The papers are included elsewhere in these proceedings.

Technical Requirements for an Ecosystem Approach to Fisheries

The panel concurred that regional Fishery Management Councils and NOAA Fisheries must work collaboratively in their pursuit of an ecosystem approach to fisheries. Technical requirements may involve participation by and collaboration with a broader cross-section of managers and stakeholders than are generally included in fisheries management presently. An ecosystem approach requires consideration of the linkages between fishing and other ongoing activities in the ecosystem area, which in turn requires coordinating with other managers. Collaboration among numerous entities will also increase the understanding of ecosystem functions as knowledge is shared.

The panel also discussed whether new funding would become available to support the needs of ecosystem-based fishery management. A robust research and science program is recommended by both the U.S. Commission on Ocean Policy (2004) and the Pew Oceans Commission (2003), and has been echoed in the Ocean Action Plan, the Bush Administration's response to the U.S. Commission on Ocean Policy's report. However, acknowledging limited funds for research and staff, and indeed limited availability of human capital with fisheries expertise, the prioritization of EAF needs becomes an absolute requirement.

Any ecosystem approach needs to be iterative and evolutionary — not revolutionary. An EAF should aspire towards a systematic understanding of the ecosystem structure and function through understanding the: (a) natural system (population dynamics, habitat utilization, and basic trophic dynamics), (b) human dimension (social and economic), and (c) governance structure (Magnuson-Stevens Act, Environmental Protection Act, Marine Mammal Protection Act, etc.). Significant ecosystem knowledge does exist currently that may not be used in all fishery management areas, but it is important to recognize that progress with EAF will be made in steps from the present and not through initiating a new and different process.

Science Limitations

The consensus of the panel, the recent scientific literature, and both of the ocean reports makes it abundantly clear that an incomplete understanding of the ecosystem is no excuse for inaction. Fishery managers must account for ecosystem interaction to the best of their ability. There is recognition that it is unlikely that the fiscal resources needed for full implementation of ecosystem management of the oceans will be available over the next decade. Thus, while we should strive to avoid under-funded mandates, there was the recognition that management decisions certainly will continue to be made on less than perfect information.



BOB SHIPP:

I think what we need to do when we look at ecosystem management is ask the question: What do we want our ecosystems to do?

GREGG WAUGH:

What we need is funding to have an annual meeting within each large marine ecosystem, so that existing agencies can share information and plan on better ways to address ecosystem-based management.

ROGER RUFÉ:

You can't have an ecosystem that's healthy if overfishing is going on within that ecosystem or if there are overfished stocks within the system.

JOHN IANI:

We ought to start with some sort of guidelines that refocus Councils' attention on the bigger picture of what the ecosystems are and what effects are happening.

STEVE MURAWSKI:

What we want to accomplish is to develop streamlined approaches that can help management evolve towards EAF and participate in ecosystem approaches to management. What we want to avoid is ambiguous requirements that are underfunded and a potential source of litigation.

PAUL BARTRAM:

The Western Pacific Council's ecosystem-based approach is a shift from species orientation to place orientation type of management. Who knows more about small places than the local fishermen?

BARBARA KOJIS:

One of the things that scares me about a fisheries ecosystem plan is the lack of knowledge that we have right now.



NURJUNICY

The panel noted that additional funding would greatly enhance ecosystem data collection and model development. There are often unintended consequences and surprises involving any fisheries management action with nearly every decision having ecosystem impacts, and the problem is that these impacts are what are generally understudied. Scientific limitations are not restricted to the physical and biological data. Economic and socioeconomic data are also required for effective and realistic decision making. Although needs differ by region, improved data collection is critical to the development of reliable multispecies and ecosystem models to assist fishery managers in their assessment of the effect of alternative management actions on directly and indirectly connected components of the ecosystem. Fiscal investment in the system and process is important to make it work. For example, Congress recently funded ecosystem management pilot programs for four east coast fishery management regions. A central element of these programs is to develop quantitative decision support tools, such as models and GIS tools (Waugh et al. 2004).

Panel participants also supported continuing use and improvement of the current tools available to fishery managers. Multispecies and ecosystem models are recent tools that are being further developed and can assist in an EAF. New models can serve to address bycatch and fishery interactions, the indirect effects of fishing, uncertainty, biological and physical interactions, or contribute ecological information for single-species stock assessments. Models can also assist in evaluating the trade-offs necessary for the prioritization of critical research needs. However, data collection is critical for models and GIS tools to be effective.

More data and a better understanding of ecosystem relationships will be needed for successful consideration of all ecosystem effects from a certain action. However some of this information may already be available but be underutilized, for example because it has not been input into an accessible database. The panel agrees that the “mining” of existing data sets and ecological knowledge is imperative. An EAF needs to evolve from our current state, and the compilation and synthesis of existing knowledge will assist that goal.

Regional Ecosystem Councils?

The Advisory Panel, in general, did not support the creation of new regional ecosystem councils. Members of the panel expressed discomfort and skepticism about the utility of adding another layer of governance and bureaucracy to the already complex Fishery Management Council and NOAA Fisheries process. The panel’s position conflicts with both the Pew Oceans Commission (2003) and the U.S. Commission on Ocean Policy (2004) reports. Also, NOAA has affirmed the use of regional ecosystem councils in its strategic plan for FY2005-FY2010 (NOAA 2004) as a means to collaborate and coordinate with partners to achieve regional ecosystem objectives.

The panel did, however, recognize the need for a forum to resolve fishery and non-fishery issues within an ecosystem. The more people that use the ocean, the more problems there will be with competing uses. Although the panel did not specifically endorse the recommendation, in his presentation, Mr. Waugh suggested an annual meeting of the ecosystem constituents could accomplish this intent. The regional Fishery Management Councils have argued that the existing council process could effectively be used as a basis for establishing further collaboration with other agencies. As highlighted by the U.S. Commission on Ocean Policy (2004), many of the key elements of a regional process are already embodied in the Fishery Management Councils: regional councils based loosely on ecosystem boundaries, incorporation of science in management plans, and an emphasis on local public participation. The panel, however, felt that Fishery Management Councils should not become ecosystem councils, with responsibility for the entire marine ecosystem and all its associated activities.

Fishery Ecosystem Plans?

The panel felt that in order for regional Fishery Management Councils to feel ownership in ecosystem-based management documents for their fisheries, the initiative for their development should be from the Council and stakeholder level, rather than as a response to a national-level dictate. Both the U.S. Commission on Ocean Policy and the Pew Oceans Commission recommended that comprehensive management plans need to be developed that consider impacts on the ecosystem as a whole. Yet ecosystem plans can be targeted to different activity scales, and the Commissions were not specific in their recommendations.

Despite differences of scale, there are common elements of all ecosystem plans. The first is a description of the ecosystem boundary. Although the extents of ecosystems are not sharply defined, for management purposes, a geographic delineation is important. NOAA Fisheries has adopted the Large Marine Ecosystem concept, which identifies ten marine ecosystems in the U.S. (Lent 2004). In some instances, sub-regions may be more appropriate for planning, however, the U.S. Commission on Ocean Policy (2004) cautions that geographic scale and scope of ecosystem plans “will need to be broad to enable them to realize their potential.”

There was some Advisory Panel support for Fishery Ecosystem Plans (FEPs), but several members were seriously concerned that data limitations would prevent some regions from being able to develop a FEP. The Ecosystems Principles Advisory Panel (1999) recommended the development of FEPs for each ecosystem under regional Fishery Management Council jurisdiction. The FEP would not supplant existing fishery management plans (FMPs), but would provide an overarching ecosystem context to all FMPs overlapping with the geographically delineated ecosystem. Some members of the panel were nonetheless concerned about the issue of fishery management actions being delayed or prevented because of lack of an approved FEP.

The panel did agree that a FEP should be a strategic guidance document that looks at what we currently know, where the gaps in our knowledge are, and recommends ways to fill the research needs. The FEP would describe the ecological system in which fishing takes place, discuss the role of fishing in cumulatively impacting ecosystem components, and include a plan for monitoring and evaluation. The FEP should discuss the food webs, predator/prey interactions, interactions with protected, endangered, or threatened species, and other issues that should be considered by fisheries managers in specific FMPs. The FEP would guide the development of FMP management options.

The consensus of the Advisory Panel is that FEPs should reflect regional flexibility and the different interests in each region. This requires collaboration and consensus amongst a potentially wide-reaching group of managers and stakeholders. For example, funding for the ecosystem management pilot projects recently authorized by Congress is being used to identify and develop ecosystem-based management objectives, threats, and alternatives at a regional level.

Process for Goals and Objectives

The Advisory Panel clearly stated that the overall ecosystem goal should be to manage for sustainability *and* productivity. A healthy and sustainable ecosystem is resilient and generally has a high buffering capacity to adapt to stress; it supports abundant and diverse populations. A productive ecosystem supports human activities, including resource extraction, as part of the natural balance.



JACK DUNNIGAN:

We need to emphasize the need to move forward with using an ecosystem approach to the things that we are doing today. I'm reluctant to consider placing more burdens on the Councils to produce more products, given the demands they've got right now.

DOUG RADER:

The mythology that ecosystem-based management is something that no one understands is wrong.

RUSS NELSON:

There has to be a clear understanding amongst the stakeholders that the real goal of ecosystem management is not going to be to restore the world to some primeval luxurious state, but it's going to be to make responsible decisions, to try to understand how our impacts are going to change those systems, what impacts we can live with, what impacts we can't live with.

RUSS SHERMAN:

The cooperative research program has reduced a lot of tension between the scientific community and the fishing community.

RALPH BROWN:

I think the concept of MSY is incompatible with the idea of ecosystem management.

ED HOUDE:

A revised SFA could promote ecosystem-based fishery management for better fisheries and better, more productive ecosystems with better language and firmer guidance.

DAVID GOETHEL:

I think a lot of our problems go way beyond fishing and we need to be able to not only address them, but to have some ability to have some teeth when we address them.



Development of goals and objectives should be a regional, bottom-up process that should engage a broad cross-section of stakeholders (fisheries and others). It was suggested that the initial step to engaging stakeholders and building the first partnership should be with a NOAA Fisheries/ Fishery Management Council Steering Committee for ecosystem goals and objectives. The process of developing goals and objectives for an ecosystem plan begins with an understanding of the national and regional context, statutory mandates, regional activity management and protection plans, and generic principles of ecosystem-based management. There are multiple uses for ocean space, and competition for resources (e.g., houses on wetlands versus habitat) but the process for developing the goals and objectives must prioritize getting the appropriate stakeholders together to articulate how society wants the ecosystem to be managed.

When multiple jurisdictions intersect, it is most productive to identify the relevant players and engage them in partnerships. Regional ecosystem plans, as described in the recent ocean commission reports, require coordination and participation by all governmental authorities, federal, state, local, and tribal, with jurisdiction within the ecosystem under consideration. To the extent that the goals and objectives for the ecosystem impact other agencies, either because fishing impacts other managed resources, or other activities impact fishery resources, partnership and coordination is critical.

National Guidance for an Ecosystem Approach to Fisheries

The Advisory Panel recommended that general guidance be developed and provided, and that it not be in the form of formal national technical guidelines or regulations that might limit the flexibility for regions to develop different strategies appropriate to their circumstances. Critics point to the essential fish habitat guidelines as an example of binding national guidelines that have changed the fishery management focus from habitat protection to the avoidance of legal challenge. Implementation of an EAF will be a long-term venture. As more funding is devoted to ecosystem research, and our knowledge base increases, fishery management will evolve. Additionally, ecosystems and the combination of activities that occur in them vary greatly from region to region.

Guidance should help Fishery Management Councils and regions to use all the tools available under the Magnuson-Stevens Act and other mandates to evaluate the potential for EAF in each region. Currently, the Magnuson-Stevens Act, the National Environmental Policy Act, the Regulatory Flexibility Act, and Executive Order 12866 provide tools to address issues of diverse stakeholders' views and multiple opinions about ecosystems and cumulative impacts. There is, however, a need for all regions to improve their consideration of ecosystem components in fishery management. The two recent ocean reports have criticized some regional Fishery Management Councils for purportedly prioritizing short-term economic concerns over the sustainability of target species and their ecosystems. Raising the standards with national guidance would address uneven progress among Councils and regions and could help to ameliorate this perception.

Whether to Codify an Ecosystem Approach to Fisheries in the Magnuson-Stevens Act

The Advisory Panel is cautious about amending the Magnuson-Stevens Act at this time. They are wary of strict regulations and required guidelines that will mandate regional Fishery Management Councils to produce new FMP amendments across the board (similar to the 1996 essential fish habitat requirements which allowed only a two-year timeline). Acknowledging all the items NOAA Fisheries and the Fishery Management Councils must address currently, they



were reluctant to burden the system with more products, or requirements to produce new FMPs. Rather, the panel favors building an ecosystem approach into existing management practices. An EAF could explicitly promote conservation and management measures for the protection and maintenance of a healthy ecosystem, as well as the productivity of managed species, using existing tools.

The panel also reinforced that the Magnuson-Stevens Act allows for ecosystem-based management. Although the Magnuson-Stevens Act in 1976 was originally written as a vehicle for single species fishery management, revisions to the Act, in 1996, incorporated a wide variety of ecologically friendly requirements. These included bycatch, habitat, and multi-species considerations, and increased focus on the human component of ecosystems through the explicit mitigation of fishing community impacts. With the ten national standards and essential fish habitat, the Magnuson-Stevens Act provides most of the tools necessary for EAF, given the current understanding of ecosystem structure and function. The current system does not necessarily prescribe the degree of proactive management action required for non-targeted species, noncommercial species, bycatch and waste, biodiversity or managing trade-offs among competing uses for the resources; nonetheless, many Fishery Management Councils and regions have made efforts in this regard. The Advisory Panel did, however, recognize the need for all Councils and regions to move towards ecosystem management, and that national guidance may assist in this progress.

Panel Conclusions

The Advisory Panel came to consensus on some overarching issues regarding an ecosystem approach to fisheries. They endorsed the finding of many other science and management boards that ecosystem-based management is an important tool for enhancing fisheries and the ecosystems on which they depend. In that regard, they endorsed a preference for the use of currently available tools and the resources and funding necessary to better engage those tools. Rather than endorsing wholly new mandates, the panel favored an incremental approach that would allow managers to learn lessons from pilot programs, and incorporate ecosystem considerations consonant with the activities of each region.

To that end, the panel was insistent that Fishery Management Councils and regions need to retain the flexibility to be able to manage their regional fisheries. The concept of “standardization” is incompatible with the need for ecosystem approaches to reflect regional differences. Regional management has been the cornerstone of the Federal fishery management system since the inception of the Magnuson-Stevens Act in 1976.

Finally, the panel reinforced its commitment to a collaborative and participatory process. A holistic approach is a realistic approach, only with collaboration among Fishery Management Councils, NOAA Fisheries, partner agencies, and stakeholders.

References

- ECOSYSTEMS PRINCIPLES ADVISORY PANEL. 1999. Ecosystem-based Fishery Management: A Report to Congress by the Ecosystems Principles Advisory Panel. April. 1999. U.S. DOC, NOAA, NMFS.
- FOOD AND AGRICULTURE ORGANIZATION. 2003. Fisheries Management: 2. The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries. Vol 4, Suppl 2. Rome.
- LENT, R. 2004. Presentation on the Evolution toward an Ecosystem Approach to U.S. Fishery Management. November 9, 2004.
- NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION. 2004. New Priorities for the 21st Century — NOAA's Strategic Plan Updated for FY 2005-FY 2010.
- PEW OCEANS COMMISSION. 2003. America's Living Oceans: Charting a Course for Sea Change. A Report to the Nation. Recommendations for a New Ocean Policy.
- U.S. COMMISSION ON OCEAN POLICY. 2004. An Ocean Blueprint for the 21st Century Final Report of the U.S. Commission on Ocean Policy. Washington, D.C.
- WAUGH, G., COUNCIL STAFFS. 2004. Presentation on South Atlantic, Mid-Atlantic, New England & Gulf of Mexico Fishery Management Councils: Ecosystem Pilot Programs. October 2004.

ADVISORY PANEL REPORT

Strengthening Scientific Advice for Management

SYNOPSIS WRITTEN BY JANE DICOSIMO AND MARCIA HAMILTON

The following is a synopsis of the panel presentations and discussions, and does not necessarily represent the views of individual panelists.



Chair:

VIRDIN BROWN
Caribbean Fishery
Management Council

Panelists:

RUSSELL BROWN
NOAA Fisheries

JOHN CARMICHAEL
Southeast Data Assessment
and Review

DR. MICHAEL SISENWIENE
NOAA Fisheries

JIM COOK
Commercial fisherman/processor

BOB JONES
Southeastern Fisheries Association

DONALD HANSEN
Pacific Fishery Management Council

KATE WING
National Resources Defense Council

DR. CLARENCE PAUTZKE
North Pacific Research Board

DAVID BENTON
Marine Conservation Alliance

DR. DONALD MCISAAC
Pacific Fishery Management Council

Rapporteur:

MARCIA HAMILTON
Western Pacific Fishery
Management Council

Staff Assistant:

JANE DICOSIMO
North Pacific Fishery
Management Council

Presenters:

DR. PAUL SANDIFER
NOAA National Ocean Service

LEE CROCKETT
Marine Fish Conservation Network

DAVID WITHERELL
North Pacific Fishery
Management Council

It is widely agreed that reliable science is essential for successful fishery management. Several reports have recommended improvements to science-based policy making, and previous legislation drafted for the reauthorization of the Magnuson-Stevens Act (MSA) also addressed many of the same issues. These issues include: (1) best scientific information available; (2) separating science and management; (3) independent reviews; (4) default management measures; and (5) research.

Three papers were presented to the Strengthening Science Advisory Panel. Dr. Paul Sandifer presented a paper entitled, *Practical Recommendations for Improving the Use of Science in Marine Fisheries Management*, which summarized the recommendations of the U.S. Commission on Ocean Policy. Lee Crockett presented a paper entitled, *Separating Conservation and Management Decisions: Improving the Scientific Basis for Management*. David Witherell presented a paper entitled, *Use of Scientific Review by Fishery Management Councils: The Existing Process and Recommendations for Improvement*. Discussions of the presentations are incorporated into the remainder of this paper.

Best Scientific Information Available

The Magnuson-Stevens Act requires each Council to establish a Scientific and Statistical Committee (SSC) to assist it with developing and evaluating scientific information for fishery management plans (FMPs). All Councils have prestigious SSCs and additional scientific review panels to provide scientific advice. Yet, there is a public perception that scientific advice is sometimes ignored in favor of social or economic considerations. While the MSA requires each Council to establish an SSC, it does not define “best scientific information” or require the Councils to follow its advice. The U.S. Commission on Ocean Policy (2004) reported that “social, economic, and political considerations may have led some Councils to downplay the best available scientific information at times, resulting in continued overfishing and slow recovery of overfished stocks.” The Commission made numerous recommendations to strengthen scientific advice in the regional fishery management council process and address this perception, and some of these changes could be made during reauthorization of the Magnuson-Stevens Act.

National Standard 2 is also under scrutiny as Congress develops legislation for reauthorizing the Magnuson-Stevens Act. Several lawsuits have challenged whether National Standard 2 has been met in fishery management plans and other federal actions and because federal courts also have not defined “best scientific information available.” Clarification through legislation may improve the application of scientific information in conservation and management decisions and reduce costly and time-consuming litigation (USCOP 2004).

Councils' Role

To increase the public's understanding of the role of science in fisheries management, the panel discussed various ways to document how scientific information was incorporated into Council recommendations. Suggestions ranged from providing individual statements from each Council member (generally seen as unwieldy) to providing one written summary in the final analysis. The panel recommended that the Councils provide written rationale for their decisions, including how scientific information was incorporated.

Training sessions for newly appointed council members currently focus on regulations, process, and conflict of interest issues, but not on fisheries science. The Councils have stated support for additional training to address stock assessments and the use of other scientific data, but not as a requirement for voting because training may not be offered in time to ensure that all new members are trained prior to their first meetings. The panel recommended that a formal but brief training course should be provided to new Council members within six months of appointment. NOAA and Councils should collaborate with an external organization to offer a course in several locations around the United States as a condition of voting. After six months, a new member who has not completed the training should continue to participate in Council meetings, but should not be allowed to vote.

Councils often are confronted with a lack of information regarding stock status, and in some cases this has led to suboptimal management decisions. Although most Councils use their SSCs for scientific advice, some Councils rely on alternative appointed committees for scientific advice, particularly for stock assessment reviews. Regardless of the scientific review structure, the panel felt that scientific determinations of necessary fishery parameters should be made within the regional fishery management council process, consistent with the MSA, and other findings of this panel.

Scientific and Statistical Committees

The U.S. Commission on Ocean Policy noted that "there is no process to ensure that SSC members, who are appointed by the Councils, have the proper scientific credentials and are free from conflicts of interest. Although some Councils assemble highly respected SSCs and follow their advice, the public and the fishing community should be confident that this is the case in all regions."

The panel discussed whether SSC members should continue to be appointed by Councils or whether that authority should be transferred to the Secretary of Commerce or the Assistant Administrator for Fisheries. Although some panelists felt that having SSC appointments made at the national level would increase the public perception of independence from political or industry influence, others stated that national appointments can be even more politically charged than regional ones and that Councils are likely to have greater awareness of their scientific needs and the specific expertise of potential SSC members. The panel concluded that Councils should retain appointment authority for SSCs, but existing membership should have a role in nominating/recruiting new members.

A discussion of the potential need for SSC members to be subject to term limits revealed that there is no formal process for removing members. However, no examples for which this might be necessary or desirable were provided. Several panelists expressed concern that, given the limited availability of qualified and willing scientists in certain regions, term limits would likely serve



VIRDIN BROWN:

What steps should be taken to ensure confidence that fisheries are managed on the basis of scientific information?

RUSS BROWN:

How do we reconcile the need for peer review with our desire for having timely and effective and responsible management system?

DON HANSEN:

The SSC should be paid and should be a highly respected group, but money is always an issue with management of fisheries. Where are we going to find this money?

CLARENCE PAUTZKE:

You are not going to solve a problem by having someone besides the Council appoint their own SSCs. The Councils have used the expertise that's available and can show that.



KATE WING:

Training should be tailored very much to what Council members are going to be seeing and dealing with on a regular basis from basic fishery management to the ethics and the details of the duties of being on a Council.

JOHN CARMICHAEL:

The idea is not to make the Council members become stock assessment scientists and to lose the ability to communicate with the fishermen, but just so that they will gain the ability to be able to understand what the scientists are telling them.

DAVE BENTON:

Vesting the entire and sole responsibility for who sits on Scientific and Statistical Committees in the hands of NOAA Fisheries causes a lot of people concern. How do you reach a balance that doesn't vest all the power in the hands of an agency that very often circles its wagons and doesn't want to entertain different scientific views?

to weaken SSCs rather than strengthen them. The panel concluded that SSC members should not be subject to term limits.

Regarding compensation for SSC members (beyond their travel and daily expenses which are currently reimbursed), some panelists felt that further compensation is appropriate given the increasing tasks that SSCs are being asked to assume. Although some SSC members are federal or state employees whose participation is part of their work assignment, those from academia or independent organizations take considerable time (and potential income) away from their everyday work. Some felt that a national appointment process would serve to increase the prestige of these appointments and thus attract greater interest among scientists, while others believed that compensation would be more important than who made the appointment. The panel recommended that SSC members should receive honoraria, or some other type of compensation for their services.

Panelists discussed the benefits of holding SSC meetings in association with Council meetings. Concurrent meetings have proven to facilitate attendance by the public and potentially affected stakeholders in the North Pacific, which in turn has led to improved understanding of the scientific basis for subsequent Council decisions. A panel member from the Western Pacific Council noted that although he favored this approach, it would not always be feasible for regions in which Council meetings may at times be held in remote locations. The panel concluded that SSCs should meet concurrently with Council meetings and at the same locale, when possible.

The panel discussed relative benefits of periodic national meetings of all SSCs. The panel concluded that national SSC meetings should be held to provide useful opportunities to exchange information, discuss emerging theories and methodologies, and discuss best practices and seek to identify analytical and research needs.

Separating Science and Management (Conservation Versus Allocation)

The U.S. Commission on Ocean Policy noted that “many fishery managers and analysts have recommended separating scientific assessment decisions from the more political allocation decisions. While not required by law, some Councils already follow this approach. For example, the North Pacific Council has a long history of setting harvest levels at or below the level recommended by its SSC. Many policy makers believe this practice is largely responsible for the successful management of the fisheries in that region.”



The Councils have raised concerns with the concept of separating conservation and allocation decisions (by assigning the conservation decisions to the Secretary of Commerce and the allocation decisions to the Councils), because conservation decisions have allocation effects and cannot be separated. Often these decisions involve a complex suite of interactive decisions which require a balance between competing users. Political and societal pressures occur in the Council process and are debated in an extensive public process. These same pressures would occur in an alternative process, and the decisions could be less open and transparent to the public.

Precautionary adjustments to science are frequently made in instances where the scientists deem it appropriate. Councils often are called on for practical solutions when scientific information is weak; basing their decisions on trade-offs between advice from fishery experts and public testimony — the exact process for which the Councils were designed. Some believe that SSC composition and role in Council decision making could be strengthened along the lines of successful Council models that currently exist. In situations where Councils are not believed to be following the proper scientific advice, or where the necessary provisions are not developed in the fishery management plans, the Secretary of Commerce (NOAA Fisheries) has the final authority to disapprove management decisions or initiate Secretarial fishery management plans.

Panelists felt that the Councils were already following SSC evaluations and recommendations (or those made by NOAA Fisheries Science Centers and other scientific bodies appointed by some Councils) regarding stock assessments, allowable biological catches (ABCs), total allowable catches (TACs) or other limits on total fishing mortality and should retain such authority. Panelists discussed situations in which no scientific stock assessment information is available, as well as when a range of estimates is provided along with their probabilities. In those situations, it has generally been left to Councils to integrate that data with other available information to determine a recommendation on total allowable fishing mortality. In other cases, scientific advice regarding certain aspects of the implementation of limits on total fishing mortality (e.g., spatial distribution) can be generally endorsed by Councils but cannot be immediately implemented due to the complexity of analyses required by the Magnuson-Stevens Act, the National Environmental Policy Act, and other applicable laws and statutes.

The panel recommended that Councils adopt ABC limits determined by their SSCs, and set TACs (or control efforts) such that catch would be at or below ABC.

DAVE WITHERELL:

Catch limits are the foundation of single species management. Although there are problems, I think we should make it a policy for the SSCs to set acceptable biological catch limits.

PAUL SANDIFER:

The problem is simply that there is no fundamental institutionalized process to ensure within the fishery management council system that the best available science is used appropriately and not overruled for social or economic reasons.

LEE CROCKETT:

We are talking about having the scientists set the overall catch parameters, and then let the Council decide which sectors of the fishery catch how much.

JIM COOK:

Regarding the issue of SSCs meeting concurrently, the language should allow flexibility, particularly for our Council because of the different geography involved.

DON McISAAC:

I want to make it clear that the scientific advice process is integral and integrated into the current Council meeting process.

MIKE SISSEWINE:

I don't see that you can escape the reality that there's a loss of independence when the SSCs are appointed by the Council itself.

BOB JONES:

Most of the Councils appoint the SSC for two or three-year terms, but there's no limit on how many times they can be reappointed, so you in effect, get to look at them every time.

Need for Independent Review

The U.S. Commission on Ocean Policy noted that “the National Research Council (NRC) has conducted a number of reviews of NOAA Fisheries science; however, the NRC cannot be called upon to review every scientific decision, particularly stock assessments, at the rate they are generated. An interesting model for external scientific review is the Center for Independent Experts that was established by NOAA Fisheries in 1998 to conduct reviews of fishery-related science. Although NOAA Fisheries pays for its operation, the Center is currently based at the University of Miami and is completely insulated from NOAA Fisheries once it initiates a peer review. Although the Center’s experts have examined a number of controversial topics, their reviews have so far been less subject to challenge than internal NOAA Fisheries peer reviews.”

While all Councils currently employ some procedure to obtain independent peer reviews of stock assessments and analyses, not all use their SSCs in this fashion. For some Councils, a variety of stock assessment review panels and fishery-specific scientific experts provide the scientific review. Most panelists felt that peer review is one of the important tasks currently performed by SSCs. Independent reviews by professional organizations such as the Center for Independent Excellence are extremely valuable. However, these reviews can be very expensive and time consuming and thus have been used sparingly.

To address the concern that analytical documents receive adequate peer review in a standardized fashion, the panel recommended that each Council’s SSC provide peer review of all fundamental analyses and make the determination that best available scientific information is provided prior to Council decision making. To further enhance the public’s confidence that the best available information is being used, the panel recommended that there be an independent external review of scientific information and processes used by each Council every five years if funds are available, and other times as necessary and appropriate (e.g., if there is controversy over scientific findings).

Using Default Measures to Ensure Progress

The U.S. Commission on Ocean Policy recommended that “indecision by SSCs or Councils should not delay measures to ensure the long term health and economic viability of a fishery. By setting clear deadlines for action, and activating established default measures if a deadline is missed, the roles of the different entities can be maintained without sacrificing the resource”.

Many Councils currently adopt their SSCs (or other committees) recommendations for a point estimate or range of acceptable ABCs and set the TACs at or below that level. However, not all Councils use quotas to manage fisheries. Greater reliance on scientific advisors may increase public confidence in the Council’s stewardship of marine resources. Limitations on available science (stock assessment or otherwise) and/or limitations on available funding that exist in some regions may be a factor impeding progress, but that appears to be independent of MSA provisions. Some panelists favored this approach, as existing MSA provisions allow NMFS to implement Secretarial amendments or emergency rules to prevent overfishing. To address these concerns, the panel recommended that emergency rules may be extended as necessary to address potential violations of National Standard 1.



NURCUNCV



Making Research Relevant

The U.S. Commission on Ocean Policy noted that Council members need access to reliable information to fulfill their responsibilities. Although the NOAA Fisheries science program has done a good job in providing biological information to manage single species, the research program is less able to answer questions involving interactions among fisheries, habitat, and other protected species (NRC 1998, POC 2003). Many Councils prepare annual recommendations on research priorities to address their fisheries management issues. The move toward ecosystem based management, including considerations such as essential fish habitat, highlights these shortcomings (USCOP 2004).

The importance of social and economic data and analysis for marine fisheries management should be recognized (NRC 2002). As noted by the U.S. Commission on Ocean Policy “due to the increasing popularity of marine recreational fishing, and its growing proportion of the total catch in some fisheries, it will be critical to collect timely data in this sector to allow for sustainable management of fisheries.” Improved social and economic data collection may improve our understanding of the effects of past management on fisheries and fishing communities and for predicting outcomes of management alternatives.

To address these information needs, the panel recommended that more resources be dedicated to stock assessments and socio-economic impacts. Additionally, the panel recommended that SSCs should develop research priorities and identify data needs for effective management.

References

- NATIONAL RESEARCH COUNCIL. 2004. Improving the use of the “best scientific information available” standard in fisheries management. National Academies Press, Washington, D.C. 105 p.
- NATIONAL RESEARCH COUNCIL. 2002. Science and its role in the National Marine Fisheries Service. National Academies Press, Washington, D.C. 83 p.
- NATIONAL RESEARCH COUNCIL. 1998. Improving Fish Stock Assessments. National Academies Press, Washington, D.C. 177 p.
- PEW OCEAN COMMISSION. 2003. America’s living oceans: Charting a course for sea change. A report to the nation. May 2003. Pew Oceans Commission, Arlington, Virginia. 144 p.
- U.S. COMMISSION ON OCEAN POLICY. 2004. An Ocean Blueprint for the 21st Century Final Report of the U.S. Commission on Ocean Policy. 412 p.



ADVISORY PANEL REPORT

Establishing Criteria for IFQ Programs

SYNOPSIS WRITTEN BY JON McCracken, Mark Fina, and Ken Roberts

The following is a synopsis of the panel presentations and discussions, and does not necessarily represent the views of individual panelists.

Chair:

DR. KEN ROBERTS
Louisiana State University

Panelists:

WILLIAM WELLS
Seaford Scallop Company

DR. SAM POOLEY
NOAA Fisheries

DAVE WALLACE
Wallace and Associates

WAYNE WERNER
Commercial fishermen

BOB ALVERSON
Fishing Vessel Owner's Association

KEVIN DUFFY
At-Sea Processors Association

JOE SULLIVAN
Mundt MacGregor

DR. CRAIG SEVERANCE
University of Hawaii

Rapporteur:

DR. MARK FINA
North Pacific Fishery Management Council

Staff Assistant:

JON McCracken
North Pacific Fishery Management Council

Presenters:

RICHARD ALLEN
Commercial fisherman/consultant

DOROTHY LOWMAN
Fishery consultant

DR. SETH MACINKO
University of Rhode Island

Past debates concerning the use of share-based management in U.S. fisheries are certain to be resurrected as Congress begins the process of reauthorizing the Magnuson-Stevens Fishery Conservation and Management Act. Share-based management programs or dedicated access privileges (such as individual fishing quotas (IFQs), cooperative allocations, and community allocations) allocate a portion of the total allowable catch (TAC) to specific persons or entities to harvest when they see fit. Proponents of share-based management argue that it can overcome many of the drawbacks of input controls. With an exclusive allocation of a portion of the TAC, participants may harvest their shares at their discretion, potentially reducing costs through more efficient harvesting and increasing revenues through better timing of harvests and improved handling, quality, and production choices. Participants with exclusive shares may also have time to be more selective in targeting potentially reducing bycatch and may have less incentive to take risks that compromise safety.

Share-based management, however, is not without controversy or opposition. Critics are concerned about the equity of initial allocations and argue that share based management can cause major disruptions for fishermen, processors, and communities and can contribute to environmental harms. The process for developing share based management programs must be fashioned so that potential benefits are realized and downfalls avoided.

The debate surrounding IFQs (and other share-based management) received national attention in 1996 during the process of reauthorizing the Magnuson-Stevens Act. Prior to the 1996 reauthorization, NOAA Fisheries had implemented three IFQ systems in U.S. fisheries; the North Pacific halibut and sablefish fisheries, the South Atlantic wreckfish fishery, and the Mid-Atlantic surf clam and ocean quahog fisheries. Uncertainties surrounding some aspects of these programs led Congress to place a moratorium on new IFQ programs until October 1, 2000. Congress, recognizing the benefits of IFQs but also seeing the need for further investigation, requested the National Academy of Sciences to study a wide range of issues related to IFQs. After an exhaustive study of IFQs and other share-based management tools, the National Academy of Science recommended lifting the moratorium and made recommendations for the development of new IFQ programs for Congress to consider.

As Congress considers reauthorization of the Magnuson-Stevens Act, many are advocating the development of a national policy for share-based management. In the past three years, no fewer than six proposed Congressional bills have included provisions defining future IFQ programs. Each bill included both substantive and procedural requirements for the development of

share-based management programs. This synopsis reviews changes of the law that have been previously proposed, and includes salient points made by the Advisory Panel.

Three papers were presented to the Advisory Panel. Discussions that occurred after the presentations are incorporated into the remainder of this paper under the above-identified seven issues. Dick Allen, was the initial presenter with a paper entitled: *How Legislated Criteria for Individual Transferable Quotas Could Defeat the Purpose of Transforming Fishermen from the Fox Raiding the Henhouse into the Farmer Guarding the Henhouse*. Dorothy Lowman presented a paper entitled: *Balancing Flexibility and Safeguards in IFQ Programs: A Plan for Action*. Dr. Seth Macinko presented the third paper entitled: *In Search of Transition, Community, and a New Federalism: Six Questions to Confront on the Road Towards a National Policy on Dedicated Access Privileges*. The papers are included elsewhere in these proceedings. Panel deliberations and public comment focused on potential IFQ program requirements, as summarized below.

Allocation Criteria

The initial allocation of quota is typically one of the most controversial aspects of the development of a share-base management program. The potential for gains or losses to historic participants are perhaps greatest at the time of the initial allocation. Many programs have allocated shares based on catch history of vessel owners during select years, excluding others from the initial allocation. Many in the fishing industry view catch history as a fair measure for awarding quota because it reflects quantifiable and verifiable participation. Catch history based allocations, however, create incentives for capacity increases in anticipation of development of a share-based program. Relying solely on catch history tends to reward those that remained in the fishery for several years and disadvantages those that moved between fisheries from year-to-year to alleviate capacity pressures and better use fishery resources (which may benefit others). In addition, making history based allocations exclusively to vessel owners leaves out many who depend on fisheries, including captains and crews, processors, and communities. Some stakeholders advocate including these interests in the initial allocation. In particular, the U.S. Commission on Ocean Policy, PEW Ocean Commission, and the National Academy of Science recommended that community-based quota shares be considered in designing a share-based management program. Some stakeholders also recommend a set aside to support entry level fishermen. Other commentators, however, believe that a program that creates a competitive market for transfers of quota with limitations on accumulation could provide opportunity for new entrants to purchase quota.

Most panelists agreed that granting regional councils broad authority to include a wide-range of stakeholders in an initial allocation (including vessel owners, captains and crew, processors, and communities) could ensure that councils have means at their disposal to address equity concerns arising from the initial allocation in share-based programs. The scope of this authority, however, became controversial among panelists, particularly when the panel considered program designs that create limitations on markets for landings.

In recent years, new systems have been developed for addressing shoreside interests including regional and community landing requirements intended to protect regional and community interests and “processing privileges” intended to protect shore-based processors. For example, the cooperative program created for the Bering Sea pollock fisheries includes cooperative/processor associations that are determined based on landings histories. Each harvest cooperative in the program is required to land 90 percent of its catch with its associated processor. To move between cooperatives (and hence processors) a harvester is required to enter a limited access race-for-fish



BOB ALVERSON:

I think the Council should have maximum flexibility on the initial allocation. They should not be put in a straitjacket by Congress.

JOE SULLIVAN:

I think the Councils should have a very broad range of authority to allocate fishing privileges to a wide range of stakeholders that are dependent upon or engaged in a fishery.

ZEKE GRADER:

If we are going to have successful IFQ systems, we better have good rules in place, and those National Standards are where we start.



KEVIN DUFFY:

I do not support sunset provisions in dedicated access privilege programs. Rather, I support having a comprehensive review of programs once implemented.

DICK ALLEN:

One of the things people are concerned about is the barriers to a young person getting into the fishery created by the prices of these rights. But the biggest barrier is not the price of the right. It's the fact that it is not secure.

DOROTHY LOWMAN:

It is important for us to define and reaffirm the full range of dedicated access privileges available for management of U.S. fisheries.

for a year, forsaking an exclusive allocation for that year. The controversy surrounding these limitations on landings markets reached a climax when the North Pacific Fishery Management Council included allocations of “processor shares” in its rationalization program for the Bering Sea and Aleutian Islands crab fisheries. In that program, 90 percent the annual allocation to each crab fisherman is delivery restricted, requiring delivery to a processor that holds processor shares. The limitations on competitive markets for these landings prompted debate at the national level, drawing attention from several major newspapers and the Antitrust Division of the Department of Justice. Many panelists questioned whether the creation of a separate “processing privilege” is necessary to protect the interests of processors. These panelists believe that processor interests could be protected by allocations of a portion of the fishing privileges to processors, which could be used either for their direct benefit from harvest of the shares or to leverage a processor’s position in the market for landings.¹

Panelists universally believe that a fair and equitable initial allocation of quota in a share-based program requires that the interests of all who depend on the fishery be considered. Providing regional councils with the authority to consider all interests when developing share-based programs is generally accepted. Extension of the authority to include the creation of interests other than basic harvest privileges (such as IFQs) drew controversy from both panelists and the public. In particular, panelists raised concern that creation of limitations on markets (such as processing privileges) that may be used to address distributional concerns could limit the realization of economic benefits in a fishery.

Conservation

Many current management programs limit catch of species through directed fishing closures and limitations on retention once the total allowable catch of the species is caught. Regulatory discards under these management rules cost fishermen, limit returns from the resource, and, if not carefully managed, can damage stocks. Proponents of share-based management are often quick to point to the potential for reduction of these discards as a benefit of share-based management. Whether substantial discard reductions are achieved under share-based management likely depends on the specific design of the program and the extent to which rules that limit or create disincentives for discarding are adopted and enforced.

In general, the PEW Commission, U.S. Commission on Ocean Policy, and the National Academy of Science recommend that conservation of the fishery resources be considered when developing a share-based management program. Some stakeholders also believe that share-based management programs should be required to include provisions that promote conservation, including bycatch reduction. One legislative proposal would create an incentive for participants to meet conservation standards by increasing the annual allocations of quota to participants who that meet those standards.

Duration of a Share-base Management Programs and Limitations on Interests in Shares

Public trust concerns and distributional impacts of share-based management programs have led some commentators to suggest that limits on the duration of these programs and the shares issued under them.

¹ The issue of processing privileges receives heightened attention in fisheries with substantial processing participation by foreign interests. Supporters of these allocations are quick to point out that these processors provide economic and fiscal support to the communities they reside in. Opponents, of course, question whether interests in public resources should be held by foreign entities.

Some stakeholders advocate that all share-based management programs sunset by a time certain after their implementation. Periods for sunset in proposed legislation range from 5 years to 10 years, with most proposing a 10-year sunset. One panelist expressed his belief that requiring a sunset is likely to compel council review of the program prior to its extension. Other panelists expressed their belief that program review requirements can be imposed without creating uncertainty and instability that are caused by sunset clauses. Another argument advanced for mandatory sunsets is that permanent allocations would violate the public trust. While arguments for limiting share tenure may be compelling, many panelists expressed concern that doing so by a required program sunset could limit or undermine some of the benefits of a share-based management program. One panelist pointed out that pending program sunsets create uncertainty, disrupting investment decisions. This uncertainty could discourage lending institutions from loaning money for the purchase of shares, vessels, or equipment, thereby limiting entry to the fisheries and causing instability. In addition, a sunset also could dampen the market for transfers thereby reducing economic efficiency gains. The National Academy of Science review of IFQs advised against a required sunset, instead expressing its belief that regional councils should be allowed the flexibility to decide whether the circumstances in the fishery justify the inclusion of a sunset provision.

All of the current legislative proposals and most recommendations for share-based programs support limiting the property interest that a person may hold in shares by allowing the revocation of quota at any time without compensation. This limitation runs counter to a position advanced by some commentators (and a presenter) that the benefits realized under share-based management are greatest when a permanent property right is granted in shares. Proponents of this position assert that a stewardship interest in the stock arises from the creation of the property right. One presenter holds the view that the stewardship interest created by a permanent property right in the stock obviates the need for management oversight of catch. Adopting this reasoning, the fisherman is argued to develop a stewardship interest similar to that of a farmer (or an aquaculture manager). While theoretically appealing to some panelists, this ideal is likely only attainable for small, stationary, localized stocks that exist and can be harvested with minimal interaction with other stocks or the ecosystem. Some panelists express concern that the separate interests of several persons each holding an interest in a portion of a transient stock would not be distinguishable. Also, if stock conditions have implications for other species, the effects of the proprietary stock on these other species is likely external to the interests of the holder of the property right. The property right holder is unlikely to consider the effects of fishing practices on portions of the ecosystem that do not affect returns realized from the owned stock. In general, the ability to create a stewardship interest for transitory or large stocks or stocks that are interactive with other stocks or the ecosystem is questionable. In addition, several panelists expressed concern that the creation of such a permanent property right (particularly if granted to individuals) is inconsistent with the public trust doctrine.

At least one panelist questioned whether simple provisions stating that shares are not permanent and are revocable without compensation are adequate to protect the public trust interest in the resource. One panelist proposed limiting the duration of shares under a program to a fixed term of years. The specific term could be set accordingly depending on the nature of the fishery and its participants. Fisheries that require greater, long-term capital investments would have a longer share term to encourage capital formation and provide stability. One panelist pointed out that using shorter terms may have an added benefit of reducing share prices, which would facilitate entry. Under this approach share terms would be limited, but the program itself could have an indefinite term. Using the system proposed by one panelist, shares that expire could be reissued

CLEM TILLION:

I wonder what a loaf of bread would cost if the farmers of the Dakotas had to bid for their land every fifteen years. I'll tell you what they would do in the last five: there would be no fertilizer or care. You would get a desert back when the fifteen years was over.

WAYNE WERNER:

Even though I feel every Council should have the right to do whatever they want, I don't feel processor shares are fair.

DON WALTERS:

Our snapper fishery is on a downhill spiral at this time, and without some kind of IFQ program implementation, I don't really see anything else that can save our fishery.





SAM POOLEY:

I am a proponent of permanent allocations if you are going to do an IFQ program. But there are probably very good arguments in some circumstances for fixed durations.

KEN ROBERTS:

If commercial quota increases because the stock has gone from an overfished status to an improved status, do you gain in all of that? Or do the gains get set aside for people to enter the fishery?

based on criteria established on program implementation (or shortly thereafter). It was pointed out by one panelist that if managers believed that capturing a portion of the rents from the resource is important, auctions or other measures to collect those rents could be incorporated into the reallocation. Allocations of shares at the outset of the program could be cost-free to relieve financial burdens that could arise in the transition to the share-based management. Alternatively, one panelist suggested that the collection of some revenues from share initially allocated (through either a one-time charge on allocation or landing fees) could be used to compensate stakeholders that do not receive shares in the allocation. Another panelist suggested that initial allocations could be limited to amount available under the current total allowable catch and that the potential benefits arising because of improvements in the stock (and total allowable catch) could be used to mitigate transitional impacts to persons left out of the initial allocation.

Limiting the duration of a share-based management program is likely to cause instability for stakeholders uncertain concerning future management. Limiting the term of shares under a program could also cause instability, but if terms are of reasonable and certain length and the process for reallocation is well-defined, this instability might be avoided. Term and program duration, however, are likely to remain controversial as long as some stakeholders question the benefits of share-based management and the potential windfalls that arise from allocations of unlimited duration.

Program Review

Transition to innovative management program of any type can have unintended consequences; share-based management programs are no exception. Panelists universally supported periodic comprehensive reviews to fully assess the effects of these innovative programs, including an examination of the effects on biological and natural environments, ecosystems, and economic and socioeconomic effects.

There is little disagreement about the necessity for periodic review of share-based programs. Whether those reviews should be conducted by regional councils or a more central body, such as a committee with members from each of the regional councils or a Secretarial review panel is subject to debate. Either of these national committees could serve several purposes including commenting on specific share-based programs (and specifying changes to be made prior to renewal) or providing general recommendations for all share-based management programs. The National Academy of Science report, as well as many commentators, concludes that regional councils are likely to be better positioned to determine whether a share-based management program is meeting program goals.

Enforcement, Monitoring, and Data Collection

Effective management, monitoring, and enforcement are critical to realizing the benefits of any management program, including a share-based management program. Increased observer coverage and routine collection of social and economic data are suggested by some commentators to assist managers in ensuring that a share-based management program meets its intended purposes without unintended negative effects. Collection of comprehensive economic and socioeconomic data is also critical to understanding the implication of management choices. In the absence of sound data concerning economic and socioeconomic conditions, any analysis of the impacts of management changes (including changes to share-based management) will be subject to some conjecture.

Quota Transfers

Stakeholders also differ in their views concerning the extent of permissible transfers of shares. Transferability of quota allows for improved economic efficiency. Unbridled transfers, however, could result in high concentrations of quota in only a few participants. Some commentators have recommended that quota be partitioned into different categories (e.g., small vessel shares) that would limit the transfer and use of quota to members of the identified category, as done in the halibut/sablefish IFQ program. The National Academy of Science recommended that the regional councils define quota transfer rules because of their relationship to the specific goals and objectives of the management regime.

Excessive Shares

Limits on accumulation of shares in IFQ programs are widely supported. Most stakeholders believe regional councils should be empowered to determine appropriate share caps to prevent accumulation of excessive shares.

Referenda

Since a new share-based management program is typically a dramatic management change in a fishery, some commentators support proposals requiring one or more referenda of permit holders approving such a program prior to its implementation. A double referenda system would require a referendum approval prior to a regional council initiating the development of a share-based management program and a second referendum approving the fully specified program. One panelist stated that the first referendum could be used to demonstrate general fleet support for share-based management to avoid a potential waste of council time developing a program that has little fleet support. Other panelists, however, expressed concern that this pre-development referendum has the potential to stagnate development of a program that once defined might appeal to most participants (including those initially averse to the management change) because of its benefits. Compelling a vote on the abstraction of a possible change to share-based management could inhibit developments in management that could ultimately have wide support.

Referenda on fully specified programs drew less criticism from the panel, but several panelists expressed concern that these referenda also have pitfalls. One panelist expressed concern that referenda of only permit holders have the drawback of excluding other interested parties (e.g. crew, communities) from full and equal participation in the management decision. As a corollary, another panelist stated that if these different interests are included in a referendum, a system for defining participation and weighting votes of the different constituents could cause contention.² Panelists also expressed concern that referenda, in general, create the potential for a management program to be held hostage by stakeholders who oppose a change despite potential environmental and economic benefits to others who rely on the fisheries. Reconciling a referendum requirement with the mandate to manage fisheries for the public benefit may be difficult. Other panelists pointed out that referenda may demonstrate approval of a program by an important subset of interested persons (e.g., permit holders), which may be important to generating political acceptance of the change of management. Other panelist questioned whether the benefit of the limited check on management of a permit holder referendum outweighs the potential harm of providing that constituency with a veto on management changes.

² For example, defining when a community should be permitted to participate in a referendum, who votes on behalf of the community, and the weight of the community vote could all generate controversy.

BILL WELLS:

In any initial allocation, the people that are already successful are going to be the people that end up with the fishing rights. Nobody is going to be made rich... they are already successful.

CRAIG SEVERANCE:

People need to be aware that referenda are easily manipulated with media images.





DAVE WALLACE:

When we try to have one set of criteria to fit all situations, we are doomed to failure.

SETH MACINKO:

In reality, permanent allocations are not needed to produce the on-the-water behavior we covet. We know this by confronting what I call the “inconvenient fact.” And the “inconvenient fact” is that leasing is ubiquitous.

Fees

Some stakeholders argue that share-based programs are more costly to implement and administer than other management programs. Since share-based programs may convey significant benefits to participants, to recompense additional costs some proposals include cost recovery programs for the collection fees at time of the initial allocation, annually, or on transfer of shares. While these fee systems are generally advanced as a means to cover the added costs of IFQ programs or to capture rents for the public benefit, the overall effect of fee programs could be a disincentive to establish share-based management (or to engage in trades, if the fee system taxes transfers). Some fee program proposals would also allow a portion of the fees to be set aside to fund a loan program for the purchase of quota by certain participants, such as small boat owners or new entrants. Some commentators oppose these loan programs on the basis that they inflate the price of shares in the market, with the only effect being to add further to the benefits realized by recipients of shares in the initial allocation.

In general, the panel supported the use of fee programs to cover any added management costs of share-based programs. One panelist, however, questioned whether fees should not be imposed on all catch under any management. Another panelist suggested that fees on transfers (in the form of a reduction in quota) could also be used to create a pool to support entry. Others questioned this approach instead suggesting that fees should be used to support the fishery. While panelists uniformly supported management fees, the use of fees for other purposes was generally opposed.



WORKSHOP SUMMARY

Defining Marine Protected Areas and Protecting Deep-water Corals

SYNOPSIS WRITTEN BY LESLIE-ANN MCGEE, CATHY COON, AND LAUREN WENZEL

The following is a synopsis of the panel presentations and discussions, and does not necessarily represent the views of individual panelists.

Moderator:

LAUREN WENZEL
NOAA MPA Center

Panelists:

DR. MIKE HIRSHFIELD
Oceana

PAUL DALZELL
*Western Pacific Fishery
Management Council*

TONY IAROCCI
Commercial fisherman, Florida

DR. WALLY PEREYRA
Arctic Storm

CAROL FORTHMAN
American Sport Fishing Association

Rapporteur:

LESLIE-ANN MCGEE
*New England Fishery
Management Council*

Staff Assistant:

CATHY COON
*North Pacific Fishery
Management Council*

Marine protected areas (MPAs) and deep-water corals are two contemporary and linked issues that are being widely discussed by fisheries managers worldwide. This panel was formed to deliberate the issues, and discuss possible policy changes to improve the management of U.S. fisheries.

As background information, workshop participants were provided a brief description of the current relevant issues facing marine fisheries management with regards to marine protected areas and protection of deep-water corals, and an overview of the issues by the Workshop's moderator, Lauren Wenzel of the NOAA MPA Center. Ms. Wenzel further refined the questions for the panel participants and audience to consider during the workshop:

- What are the strengths and weaknesses of MPAs?
- Where have MPAs been most and least successful?
- How might a national system of MPAs assist in sustaining fisheries?
- What management options should be explored to conserve deep-water corals?
- What are the top priorities (geographic and issue specific) for protecting deep-water corals?

Panel members each gave brief presentations in response to the overall topic and the associated discussion questions. Following these presentations, the audience provided comments and stimulated discussion among panelists. This summary reflects aspects of many of the presentations, discussions, and comments of the public and panel.

Marine Protected Areas

Marine protected areas are an important tool for managing fisheries and other human activities in the ocean. Hundreds of such areas exist in U.S. waters, ranging from management zones that restrict one specific activity, to sanctuaries that prohibit any extractive use of marine resources.

An Executive Order (EO13158) directs the Departments of Commerce and the Interior to develop a scientifically-based, comprehensive national system of marine protected areas. The Executive Order defines such areas as "any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources there." The Federal Advisory Committee, which is charged with providing advice to the Departments of Commerce and the Interior, has made substantial progress in its recommendations on how to structure a national system of MPAs.



TONY IAROCCHI:

I want to stress the importance of protecting the right bottom, but do it for the right reasons with the support of the Councils and its constituents.

Workshop attendees felt that the process for establishing the MPA system as prescribed by the MPA Executive Order needs to be transparent and involve stakeholders.

Historically, marine protected areas have been established to meet a number of goals, including conserving biodiversity and habitat, increasing scientific knowledge, providing educational opportunities, enhancing recreation activities, and supporting fish populations. Such areas can provide social and economic benefits by facilitating the sustainable recreational and commercial use of marine fisheries. Networks of marine protected areas may amplify the effectiveness and conservation benefits of each individual area in the network. Attendees agreed that marine protected areas should have clear goals and objectives, be scientifically based, and be monitored for effectiveness and be adaptively managed.

CAROL FORTHMAN:

No-take zones have tremendous social and economic impacts. They require bottom-up support. If you don't have the support of the community, you're going to have compliance and enforcement issues.

The importance of protecting the right bottom (benthic environment) for the right reasons with the support of fishing participants cannot be minimized. The U.N. Food and Agriculture Organization's (FAO) Committee on Fisheries wrote that there are some limitations on the effectiveness of MPAs to restore fisheries and that they could be counter-productive due to fishing effort displacement. Unintended consequences of MPAs due to shifting effort, lack of performance monitoring and effective enforcement need to be carefully considered. Development of MPA management measures need to address social and economic impacts and require community support.

BOB FLETCHER:

Are marine reserves necessary to protect fisheries from collapse?

Although MPAs can be a useful tool for fishery managers, they are not a panacea. For example, in many instances declines of fish stocks have been caused by overfishing and pollution (organics, nutrients, sediments), and MPAs may not be the best tool to address these problems. Panelists felt that MPAs should be established as a part of a comprehensive management strategy and not as a stand-alone entity.

The U.S. Commission on Ocean Policy and the Pew Oceans Commission made consistent recommendations for improving the use of marine protected areas with better coordination and integration of the existing network of marine managed areas. The Administration's Ocean Action Plan to implement the U.S. Commission recommendations, calls for:

- Better coordination and integration of the existing marine managed areas;
- Adoption of an ocean parks policy;
- The Committee on Ocean Policy to determine which agency or agencies will coordinate federal management and research on deep-water corals; and
- Fishery management councils to take action, where appropriate, to protect deep-water corals in their fishery management plans.



Deep-water Corals

Recent scientific exploration of communities of corals in deep, cooler waters off the United States have led to added focus on protections for these relatively unknown ecosystems. A bill introduced in the last Congress, the Cold Sea Coral Protection Act, would protect deep-water corals and sponges in federally-managed waters from damage by mobile bottom-tending fishing gear. In addition, the Department of Commerce was recently petitioned for rulemaking to protect deep-water coral and sponge habitats through additional fishing closure areas, monitoring, and research.

There are a number of efforts by fishery management councils across the country to identify and protect vulnerable deep-water coral and sponge communities. Most recently, the North Pacific Council decided to prohibit bottom trawling in a 280,000 square mile area of the Aleutian Islands to protect fragile seafloor habitat that occurs there. In 2004, the New England Council closed two offshore canyons southeast of Nantucket to protect deep-water corals from potentially damaging effects of vessels targeting monkfish in the area. Several years earlier, the South Atlantic Council restricted the use of fishing gear in an area containing rare corals off the east coast of Florida. Off Hawaii, deep-water coral species have been protected and the fishery for commercially viable coral species conservatively managed since implementation of a Coral Fishery Management Plan in 1983.

There is a lack of clear authority for the Councils to protect corals when they are not being harvested for commercial purposes. It was noted that although some Fishery Management Councils have been effective at protecting coral communities, it has sometimes been a challenge to justify within existing statutes and regulations (e.g., EFH). At least one panelist felt that deep-water coral protection efforts could be aided by new legislation.

Much of the workshop discussion focused on the effects of bottom trawling on deep-water corals, and management of fisheries using this gear type. One panelist noted that there is a strong scientific consensus that bottom trawling can greatly impact deep-water corals. Based on several comments, fishermen also agree that it does not make sense to trawl through corals due to the harm caused to both the corals and the fishing gear. One management solution may be to prohibit trawling from areas with aggregations of corals. NOAA has been petitioned to close currently trawled areas with known concentrations of corals and sponges and freeze the footprint of fishing with trawls and not to allow trawling to expand into currently untrawled areas where the potential for coral communities existing is high. Another possible management solution would be to modify trawl gear so that trawling in areas of coral concentrations is no longer mechanically possible. Lastly, it was noted that other types of gear, in addition to trawl gear, can impact corals, and management of fisheries using these gears may also be necessary.

LAUREN WENZEL:

What are the strengths and weaknesses of MPAs as a management tool? What management options should be explored to conserve the corals?

MIKE HIRSHFIELD:

How we address management of deep sea coral and sponge, biogenic, benthic, ecosystem habitats on the bottom of the sea is a real test of our ability to do ecosystem-based management.

WALLY PEREYRA:

The establishment of MPAs and their effectiveness has been hampered by overlapping authorities and jurisdictions, at both the federal and regional levels.

Regardless of the management measure proposed, panelists and public agreed that fishery participants be actively involved in the development, discussion and consideration of deep-water coral protection is essential. Participants from all sectors and interests, including commercial fisheries, recreational fisheries, and environmental groups should be included in the development of coral protection measures.

PAUL DALZELL:

If we shut down all fishing in the Northwestern Hawaiian Island, is that magically going to make things better in the main islands? I don't think so.

JOHN GAUVIN:

I think we'd all be better off if we just laid our guns to the side here and stopped with inflammatory language and started looking at how we can protect corals and how we can zone fisheries for productivity without getting everyone's back up.

The workshop discussions highlighted the need for additional research. Identification and mapping all locations of coral communities are vital to conservation of these resources, and more funding is needed to conduct these activities. Additionally, certain corals and sponges with vertical structure such as *Lophelia* and basket sponges are very vulnerable to fishing gear but other corals and sponges (encrusting) are not likely to be vulnerable. This information is important for identifying which coral and sponge species need to be protected.

Summary

There was tremendous agreement on the panel on the need to protect deep-water corals and the utility of MPAs as a management tool. However, the panel and workshop discussion made it evident that there are still conflicts related to protection versus use of particular areas. Recent progress on MPA and coral issues is clear and may be due to the recognition among different groups of overlapping interests. MPAs are created to serve varying purposes: to protect biodiversity or cultural heritage, and as a fisheries management tool. The panel agreed with the need to fully protect some marine areas from many uses, including fishing, and that there is a role for MPAs beyond fisheries management. Two recurring themes were apparent during the workshop: (1) The importance of and need for science to support management decisions, and (2) The need to identify clear goals for protected areas.





NOAA Fisheries

WORKSHOP SUMMARY

Addressing Overfishing and Stock Rebuilding

SYNOPSIS WRITTEN BY RICHARD METHOT, DIANA STRAM, AND GRANT THOMPSON

The following is a synopsis of the panel presentations and discussions, and does not necessarily represent the views of individual panelists.

Moderator:

DR. GRANT THOMPSON
NOAA Fisheries

Panelists:

DR. TERRY QUINN
University of Alaska

DANIEL COHEN
Atlantic Cape Fisheries

PAUL DALZELL
Western Pacific Fishery
Management Council

JIM MARTIN
Berkeley Conservation Institute

SONJA FORDHAM
The Ocean Conservancy

Rapporteur:

DR. RICHARD METHOT
NOAA Fisheries

Staff Assistant:

DR. DIANA STRAM
North Pacific Fishery
Management Council

Substantial improvements have been noted in the 2003 Report to Congress on the Status of U.S. Fisheries. Since the 2002 report, many stocks previously listed as overfished have rebounded and the number of stocks subject to overfishing or approaching an overfished condition has declined. The National Standard 1 guidelines may be revised to better address the control of fishery harvest rates and the timeframe for rebuilding depleted stocks. Draft legislation has also addressed concerns with respect to the definition and listing of overfished stocks and the timeframes and mechanisms for rebuilding depleted stocks. Improvements are being made yet many issues remain. Many stocks are still overfished, information is lacking on many stocks, and attempting to establish a one-size-fits-all approach may result in definitions that are not meaningful in certain applications and may complicate the development of optimal rebuilding plans. A report from the Pew Commission (2003) calls for “redefining overfishing in an ecosystem context.” It is still unclear how environmental variability should factor into assessments of sustainable stock sizes. How is Congress addressing these concerns in the re-authorization of Magnuson-Stevens Act and where do they fit within proposed revisions to the National Standard 1 guidelines? How do potential solutions interface with ecosystem-based management initiatives?

The Magnuson-Stevens Act contains definitions, National Standards, and requirements which form the cornerstone for federal fishery management to rebuild overfished fisheries. However, a lack of specificity in the language has often led to different interpretations by fishery managers and conflicting direction in the resulting management actions. National Standard 1 (NS1) to the Magnuson-Stevens Fishery Conservation and Management Act (sec 303(a)(1)) 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.

This standard has proven contentious to implement, due to potential or perceived conflicts between the mandate to provide optimum yield (OY) as defined in the law (MSA sec 3(28)¹ and the mandates to protect stocks from overfishing and to rebuild those stocks which are already overfished.

¹ The term “optimum”, with respect to the yield from a fishery, means the amount of fish which: (A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protections of marine ecosystems; (B) is prescribed as such on the basis of the maximum sustained yield from the fishery, as reduced by any relevant economic, social or ecological factor; and (C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.



PETER FLOURNOY:

Does the Magnuson Act in its definition of overfished and overfishing have any relevance to a fishery that's being managed internationally?

CAROL FORTHMAN:

Radical changes to Magnuson would only cause another culture shift and get us off track.

To guide managers in adhering to NS1, NOAA Fisheries produced guidelines in May of 1998. By 2003, NOAA Fisheries and the Councils had accumulated five years of experience operating under the 1998 NS1 guidelines, and a NOAA Fisheries working group was established to examine possible revisions to those guidelines (Mace et al. 2003). Following recommendations from Mace et al. and extensive public comment, NOAA Fisheries is currently considering the possibility of revising the NS1 guidelines, primarily to clarify and simplify them (NOAA Fisheries 2004a). The most significant of the changes recommended by Mace et al. are as follows:

- Strengthen the requirements for ending overfishing quickly.
- Establish fishing mortality targets safely below the corresponding fishing mortality limits.
- Increase the flexibility of rebuilding time horizons (where appropriate and within limits).

This workshop discussed the current requirements for sustaining healthy fish stocks as well as the provisions for rebuilding depleted fish populations. The moderator, Dr. Grant Thompson, presented background information organized into four themes: Determining Status of Stocks, Sustainability of Managed Stocks, Rebuilding Plans, and Ecosystem Considerations. Presentations by Dr. Terry Quinn (University of Alaska, NPFMC SSC member), Daniel Cohen (President, Atlantic Capes Fisheries), Paul Dalzell (Sr. Scientist, Western Pacific Fishery Management Council), Jim Martin (Conservation Director, Berkley Conservation Institute), and Sonja Fordham (The Ocean Conservancy) provided science, management, fishing industry, and conservation community perspectives. Questions from the floor and responses from the panel further broadened the diversity of discussion on overfishing and stock rebuilding.

Determining Status of Stocks

The annual Report to Congress, mandated by the Magnuson-Stevens Act², describes the state of the nation's fisheries and the effectiveness of federal fisheries management (NOAA Fisheries 2004b). Critical in this description are the Status Determination Criteria (SDC) used as benchmarks for each fishery, as well as the identification of managed stocks and the degree of information available for each of them. Definitions contained in the Act and the NS1 guidelines are key, as it is upon these that determinations of "overfished" and "overfishing" are made. Potential NS1 guideline revisions as well as several legislative proposals contain revised definitions for some important terms. For example, it has been suggested that the term "overfished" should be changed to "depleted" (Mace et al. 2003).

The current NS1 guidelines distinguish between two status determination criteria: a maximum fishing mortality threshold (MFMT) and a minimum stock size threshold (MSST). In any given year, these criteria are used to make two status determinations: The first determination is based on the relationship between the current fishing mortality rate and the MFMT. If the current fishing mortality rate is greater than the MFMT, a determination is made that the stock is being subjected to "overfishing." The second determination is based on the relationship between the current stock size and the MSST. If the current stock size is less than the MSST, a determination is made that the stock is "overfished." Mace et al. (2003) recommended that the MFMT and MSST be renamed fishing mortality limit (F_{lim}) and biomass limit (B_{lim}), respectively. Mace et al.

² The Secretary shall report annually to the Congress and the council's on the status of fisheries within each council's geographic area of authority and identify those fisheries that are overfished or approaching a condition of being overfished." Sec 304(e)(1) Magnuson-Stevens Act.

also recommended clarifications pertaining to the use of B_{lim} and suggested situations in which alternative methods of status determination should be permissible. Under the Magnuson-Stevens Act, maximum sustainable yield (MSY) serves the important purposes of providing an upper limit on the specification of OY and defining the target biomass for a rebuilding plan in the case of an overfished fishery. Under the current NS1 guidelines, MSY is defined as the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions. The current NS1 guidelines also state that estimates of MSY should, among other things: (1) be based on the best scientific information available, (2) incorporate appropriate consideration of risk, (3) be made for each fishery (and preferably for each stock in a mixed-stock fishery), and (4) be re-estimated as required by changes in environmental conditions or new scientific information. What these “environmental conditions” are, how they vary, and who determines when they have changed are subjects of debate.

Trigger questions:

- How well do proposed changes to NS1 guidelines and legislative proposals address the clarifications and other changes needed in the definitions of status determination criteria?
- Are additional clarifications needed and, if so, what are they?
- How should changes in “prevailing ecological and environmental conditions” be determined?
- Should prevailing technological conditions also play a role in specification or estimation of MSY and, if so, how?

Workshop Discussion

Overfishing still persists, not all stocks on rebuilding plans have rebuilt to target levels of abundance, the status of many minor stocks remains unknown, and the level of fishing effort is greater than it should be. While such bad news is true, it overlooks the many successes of the MSA: overfishing has been eliminated in many fisheries, stocks are rebuilding, our assessment capability is improving, and fishery participation is increasingly governed by limited entry and other controls. Some workshop participants expressed the view that the MSA process is adaptive and sufficient to achieve considerable success, implying that changes in the MSA are not needed. We need to improve communication to provide a balanced perspective on the problems and successes. With this balanced communication we can focus attention on the data and management needs to achieve fishery management goals.

Many workshop participants expressed support for the concept of controlling fishing mortality (F) as the first line of defense in managing fisheries. Replacing the term “overfished” with “depleted” for fish stock status helps reinforce this focus on control of F as the primary tool for fishery management. Further reducing F when biomass falls to low levels can provide an additional guard against stock depletion. However, the degree to which the optimal level of F should be set below the fishing mortality limit is not clear due to the lack of technical guidance for use of socio-economic considerations. Many challenges remain in measuring and managing fishing mortality such that overfishing is prevented and overfished stocks become rebuilt. Most of our technical stock assessments do not have enough timely data to track F closely and especially not enough to forecast changes in response to environmental conditions. Extenuating circumstances, such as international management of highly migratory species, confounds our ability to manage the total fishing mortality on the stock, but the U.S. should continue to manage its fisheries in a way that leads to better international management.

DAVE PIERCE:

We know that the environment is having a major impact on fish abundance. How do we then factor in those environmental variables with our fisheries management strategies?

PAUL DALZELL:

We can't control biomass. What we can control is fishing mortality via fishing effort. And that should always be where our emphasis is.



Robert Wakeford/MRAG



DAN COHEN:

It's a shame that we have a species that's recently been listed as overfished, and it's clear that the council is going to start dealing with that. But I don't think that that's a sign that the system is horrible and that we're doing a really bad job.

TERRY QUINN:

There should be strong consideration of automatic rebuilding plans that are based on reducing fishing mortality when populations are at low levels.

JIM MARTIN:

Have we turned the corner and are we rebuilding most of our stocks? I say yes.

Sustainability of Managed Stocks

Managing marine fisheries, particularly those involving multiple stocks, is inherently problematic. National Standard 2 requires that management be based upon the best available scientific information, but the best information may still be inadequate for some stocks. In a mixed-species fishery, a primary challenge is to avoid jeopardizing those stocks for which the least information exists. Reporting the status of mixed-species fisheries is also complicated, as NOAA Fisheries has traditionally reported status on the basis of individual stocks even in cases where the status determination criteria are defined only for the fishery as a whole, thus leading to confusion regarding the “known” and “unknown” status of many stocks and the relative priority the agency should give to these. Mace et al. (2003) recommended distinguishing between “core” stocks and stock “assemblages,” with assessment and management of each depending on the information available. Even where data limitations preclude establishment of stock-specific status determination criteria, it may be possible to establish meaningful status determination criteria for an overall assemblage, particularly if the assemblage includes one or more “indicator” stocks characterized by a high level of information availability. However, this approach could prove non-precautionary if unproductive, data-poor stocks are inappropriately included in an assemblage with a productive, data-rich indicator stock.

Trigger questions:

- How should mixed-stock fisheries be managed?
- How should the status of mixed-stock fisheries be reported?
- What protections exist for stocks with limited information?

Workshop Discussion

Workshop participants provided a diversity of perspectives on the problem of adequately assessing and managing all species in a fishery. Good information on species-specific bycatch is necessary to understand and manage mixed-stock fisheries so that overfishing is prevented for all stocks. The level of assessment data for most minor stocks is low so it is tempting to use proxies, such as fishery catch per unit of effort as a proxy for fishery-independent stock abundance data, but such proxies should be used cautiously because of the greater uncertainty associated with their calibration. Stocks that are minor components of fisheries often receive limited attention in the fishery assessment and management process. Other programs, such as the NMFS “Species of Concern” program, could help raise the awareness and attention on these stocks.

Some noted that good single-species assessments are a necessary and important step towards management of entire assemblages and even the whole ecosystem. On the other hand, the same level of fishing mortality will not occur for every stock and not all stocks have the same optimal level of fishing mortality. Thus, setting the right level of fishing mortality for a multi-stock fishery is a challenging task. A variety of observations, suggestions and questions surfaced at the workshop. It was noted that effort shifts between fisheries can shift overfishing onto different stocks. Some participants asked for better information on the conditions under which it is acceptable to exceed the fishing mortality limit for some stocks in a mixed stock fishery and some asked whether it is ever OK to exceed F_{msy} when abundance is high. Others asserted that it should never be OK to overfish a major stock intentionally. Such diversity of views is representative of the issues facing each Council as it deliberates management of multi-stock fisheries. A clear statement of goals for Optimum Yield is an important step in an open and transparent decision-making process.

Rebuilding Plans

Section 304(e) of the Magnuson-Stevens Act details the requirements for development of rebuilding plans. This section specifies that, within one year of being notified that a fishery is overfished or approaching a condition of being overfished, a Council is to prepare a fishery management plan, plan amendment, or proposed regulation to end overfishing and rebuild affected stocks or to prevent overfishing from occurring. The Act requires each rebuilding plan to include specification of a time period, not to exceed 10 years except under certain circumstances, within which overfishing is to end and the fishery is to be rebuilt. The 10-year limit has been criticized as being arbitrary or insufficiently cognizant of biological realities. The method of implementing the 10-year limit in the current NS1 guidelines has been criticized on similar grounds. Mace et al. (2003) proposed a modified method of implementing the 10-year limit. The Act's use of MSY biomass as the rebuilding target has also caused concern, in part because this quantity can be difficult to estimate and in part because these estimates are subject to change. The Act does contain provisions for modification of existing rebuilding plans, but these deal only with cases where an existing plan has been found to result in inadequate progress toward ending overfishing and rebuilding affected stocks. Mace et al. (2003) suggested other circumstances under which modification of an existing rebuilding plan may be warranted, such as the accrual of new information leading to substantial revisions in estimates of target stock size or other rebuilding parameters.

Trigger questions:

- How well do rebuilding targets and timelines address the conservation needs of depleted stocks?
- How can rebuilding plans best incorporate short-term and long-term changes in recruitment and stock status due to environmental variability?
- Under what conditions, and to what extent, should rebuilding plans be revised?

Workshop Discussion

The MSA's requirements to rebuild overfished stocks in as short a time as possible and not to exceed 10 years except under limited circumstances is a challenge for the fishery assessment and management process. Some participants noted that the MSA requires rebuilding fully to the target and that "not overfished" does not necessarily mean "rebuilt". Others focused on the control of fishing mortality and suggested that the MSA should allow for flexibility in rebuilding so long as consistent progress is achieved. Our technical ability to forecast the time to rebuild an overfished stock is necessarily inexact because it depends on future, fluctuating levels of stock productivity. Some participants noted that we have a good and adequate technical ability to translate the scale of those fluctuations into an useful probability distribution of times to rebuild under various fishing scenarios. Others commented that our technical ability to predict rebuilding is still in its infancy and that insufficient consideration has been given to allocative issues associated with stock rebuilding and status changes.

Rebuilding international stocks with multiple jurisdictions is especially difficult. We are leaders in conservation, but U.S. action alone cannot rebuild these stocks. Until there is sufficient participation and action by international bodies, there should be continued focus on good U.S. management to encourage actions at the international level.

GRANT THOMPSON:

What do we do when we just don't have the data to estimate these status determination criteria that are required under the guidelines?

SONJA FORDHAM:

For many of these minor and non-target species, bycatch is really impeding recovery of, or is the major obstacle to rebuilding populations.





References

- BOLDT, J. (ED) 2004. Ecosystem Considerations for 2005: Appendix C to the Stock Assessment and Fishery Evaluation Report for the Groundfish of the Gulf of Alaska. Compiled by the Groundfish Plan Team for the Gulf of Alaska. North Pacific Fishery Management Council, 605 West 4th Avenue, Anchorage, AK.
- MACE, P.M., S. CADRIN, R. CRABTREE, G. DARCY, J. DUNNIGAN, A. KATEKARU, A. MACCALL, M. MCCALL, R. METHOT AND G. THOMPSON. 2003. Report of the NMFS National Standard 1 Guidelines Working Group. NOAA, NMFS, Washington, D.C. <http://www.nmfs.noaa.gov/directives>
- MACE, P.M. (ed.) 2003. Proceedings of the Seventh NMFS National Stock Assessment Workshop: Rebuilding Sustainable Fisheries and Marine Ecosystem. NOAA Technical Memorandum NMFS-F/SPO-62, 45 p.
- NOAA FISHERIES 2004a. Proposed Revision to National Standard 1 Guidelines. June 10, 2004. http://www.nmfs.noaa.gov/sfa/domes_fish/NS1/
- NOAA FISHERIES 2004b. Annual Report to Congress on the Status of U.S. Fisheries -2003, U.S. Dept. Commerce, NOAA, NMFS, Silver Spring, MD, 24p.
- PEW OCEANS COMMISSION. 2003. America's Living Oceans: Charting a Course for Sea Change. A Report to the Nation. Recommendations for a New Ocean Policy. May 2003.

Ecosystem Considerations

As improved scientific information has been gained on climate variability, oceanographic processes, and fish population dynamics, more consideration has been given to ecosystem concerns in the context of fisheries management. Quantifying environmental variability in stock assessments is a difficult undertaking at best. Some have proposed that environmental variability be explicitly considered in developing definitions for terms such as overfishing and MSY. These definitions are currently tied to “prevailing ecological and environmental conditions,” yet appropriate methods of determining changes therein remain elusive.

In the gradual evolution toward ecosystem-based management, concern has grown over the effectiveness of single-species management, for example, the single-species basis of current status determination criteria. Scientists grapple with holistic approaches to stock assessment and the incorporation of ecosystem considerations, striving to consider the effects of fishing on the ecosystem as well as the effect of environmental change on fish stocks (Mace 2003; Boldt 2004). The Pew Commission report calls for overfishing to be defined in “an ecosystem context.” Some NOAA Fisheries scientists have suggested the need for national guidelines for determining “ecosystem overfishing,” using model-based approaches along with statistical and comparative empirical approaches (Mace 2003). These ideas circulate within the context of national initiatives calling for fishery ecosystem plans (FEPs) and the inclusion of a broader scope of ecosystem considerations in fisheries management.

Trigger questions:

- How can we improve upon existing strategies for incorporation of environmental variability in status determination criteria?
- Should environmental variability be explicitly considered in developing definitions for, or estimates of, quantities such as MSY?
- Redefining overfishing in an ecosystem context: Can it be done? Should it be done?

Workshop Discussion

It was noted that the first steps to ecosystem management are good single species data and management, but the concepts of ecosystem overfishing and cumulative effects of fishing were deferred to the ecosystem panel. The workshop discussion focused primarily on our evolving ability to include environmental information in assessments and MSY estimates. Environmental information can be used to improve our interpretation of historical assessment data, to gauge long-term shifts in stock productivity, and to aid in the prediction of short-term fluctuations in stock productivity. Many technical and conceptual challenges remain in calibrating these environmental influences sufficiently well to serve as the basis for adjustments to fishery management. For example, risk analyses for long-term harvest strategies need to account more fully for the possibility of regime shifts and climate change. Workshop participants recognized that stocks are affected by a combination of environmental effects and fishing, and that it is extremely difficult to separate completely the influence of these two factors. We should be cautious in placing “blame” for depletion on environmental factors because this could detract attention from management responsibilities for controlling fishing mortality, especially for depleted stocks. Increased incorporation of environmental information could also lead to better harvest strategies for highly fluctuating stocks. Such strategies could provide better access to pulses of strong productivity while providing needed protection during periods of weak productivity.



WORKSHOP SUMMARY

Fisheries Governance

SYNOPSIS WRITTEN BY JIM RICHARDSON

The following is a synopsis of the panel presentations and discussions, and does not necessarily represent the views of individual panelists.

Moderator:

CHRIS KELLOGG
*New England Fishery
Management Council*

Panelists:

SARAH CHASIS
*Natural Resources Defense
Council, Inc.*

DAVE FRULLA
*Collier Shannon Scott
Washington, D.C.*

BOB HAYES
Coastal Conservation Association

DR. REBECCA LENT
NOAA Fisheries Service

ROD MOORE
*West Coast Seafood
Processors Association*

PAT WHITE
Maine Lobstermen's Association

Rapporteur:

JAY GINTER
National Marine Fisheries Service

Staff Assistant:

JIM RICHARDSON
*North Pacific Fishery
Management Council*

What a difference two years makes! The 2003 conference workshop panel on fisheries governance discussed the need for change, focusing on separating science from allocation, Regional Fishery Management Council (Council) membership and streamlining implementation of regulations. However, there seemed little impetus for change within the fishery management system. Since then, several major events set the stage for addressing outstanding fisheries governance issues facing the Councils.

The interest of the public has been focused by the long-awaited U.S. Oceans Commission final report, released in September 2004. In their December 2004 response, the Bush Administration released the U.S. Ocean Action Plan, outlining specific plans for implementing the U.S. Ocean Commission's recommendations.

Additionally, reauthorization of the Magnuson-Stevens Act has focused congressional and public interest on changes to fishery governance. Its enactment in 1976 as the Fisheries Conservation and Management Act (FCMA) created the Regional Fishery Management Council system and established guidance for their operation and development of fisheries regulations. The concept of changing the Council system of fisheries governance is not new. The Magnuson-Stevens Act has been evolving with each amendment. The 109th Congress may enact new amendments to the Magnuson-Stevens Act as it once more goes through reauthorization. A number of bills were introduced into the 108th Congress that proposed changes to aspects of fisheries governance within MSA. The slate of bills did not receive action by the end of the session but will likely be reintroduced for the 109th session of Congress.

The task set for the governance workshop panel for this conference was to focus on three main governance issues: regional ocean councils, separating science from allocation decisions, and Council membership/conflict of interest. The following sections present a summary of the panel discussions and findings relating to these topics, as well as other topics commented upon by panel members. The discussions of the workshop panel are presented in the following sections by the general topic areas of: regional ocean councils, separating science from allocation, and Council membership/conflict of interest.



CHRIS KELLOGG:

Are rules needed to prevent the appearance of conflict of interest in order to increase public confidence?

REBECCA LENT:

How do we know that we're making progress on ecosystem approaches? It's going to take some new measurements. It's not going to be just are we overfishing or overfished, or not. It's going to be a lot more than that.

PAT WHITE:

Fisheries are affected by many human activities, and fisheries management needs to put itself in a position to influence the impacts of these activities on our fisheries.

Regional Ocean Councils

Regional Ocean Councils are clearly an important fisheries governance issue and the discussions of the workshop panel reflected this priority. The panel was advised that NOAA Fisheries position is that the Councils should look to the U.S. Oceans Action Plan for guidance in developing governance systems. The U.S. Oceans Commission recommended that:

The establishment of regional councils is intended to be voluntary and flexible, guided by the needs and circumstances of each region. The councils on their own, will not supplant existing laws or authorities, or alter state, territorial or tribal sovereignty. However, as the councils evolve, participants may choose to pursue more formal mechanisms for implementing decisions, such as interstate compacts.¹

Discussions by the panel emphasized that our nation's ocean fisheries are affected by a wide variety of activities, not just fishing-induced impacts. Examples of non-fishing impacts cited by panel members included feedlot or sewage surface water runoff and development of offshore oil & gas platforms. Panel members expressed the opinion that Councils need to be in a better position than they are currently to affect development and activities that affect both fisheries habitat and fisheries resources. Under the current Council structure, there is no easy or effective way to affect this type of decision. Broad-based ecosystem management through regional ocean councils may help to address these types of impacts. Some panel members welcome the concept of an ecosystem plan as a means to more comprehensively address combined effects on the ocean ecosystem. Other panel members were unsure how effective regional councils might be in affecting developments such as offshore oil & gas platforms without additional statutory authority. An example brought up in discussions of this issue related to recent development of a liquefied natural gas plant in the Gulf of Mexico. It was suggested that this development would likely contribute to mortality of redfish, a negative outcome from the perspective of fisheries interests. Over the objections of commercial fishermen, recreational fishermen, NOAA and others, however, the project appears likely to be permitted. Currently, fishery management Councils cannot comment upon developments like this example that directly, and negatively, affect fisheries. Panel members wondered if Councils will be able to utilize an ecosystem approach to effectively deal with impacts of this type of development and considered whether regional ocean councils may help to address this need.

In a discussion on comprehensively addressing fishing-related impacts of Council actions, it was stressed that the NEPA process is important, but it does not require agencies to address ecosystem effects of decisions. Therefore, an ecosystem-based approach was a necessary component to successfully address this type of impact in the future.

The panel members also identified a general reservation that fisheries management could be singled out for restrictive action as comprehensive systems to address cumulative ocean ecosystem impacts are implemented on their own or through regional ocean councils. Because fishing impacts are relatively direct and easily quantified and other areas affecting fisheries resources may be less easily quantified, there was a strong concern expressed that a comprehensive system addressing ocean impacts may focus on fishing as the most convenient group to regulate.

¹ U.S. Commission on Ocean Policy, *An Ocean Blueprint for the 21st Century*, Final Report, Washington, D.C., September 2004.

Separating Scientific from Allocation Decisions

This issue was addressed by the fisheries governance panel in 2003. However, it continues to be in the public focus and therefore was included as one of the issues included for the fisheries governance panel to address. Over the past couple of years, recommendations for change within this area has come via the U.S. Ocean Action Plan, from draft legislation submitted to Congress, from the Pew Oceans report as well as other reports.

A segment of the public believes the fishery management Council process to be flawed in not utilizing the best scientific information in its decisions, sometimes resulting in exceeding the allocable catch limits determined by rigorous scientific analysis. This issue relates to the Council policies and practices for reviews by the Scientific and Statistical Committees as well as the practices of the Council process in utilizing scientific information and making decisions.

Most panel members agreed that it was important to strengthen and improve science in the Council process. Opinions on which actions would be likely to further this goal varied among the workgroup panel members. There was, however, general agreement among the workgroup that it would be illogical to separate science from allocation. These are not two separate worlds, in the words of one panel member, and the Council process necessarily consists of management, science and industry working together.

The panel also emphasized the need for scientific contributions to the Council process to be transparent, inclusive and understandable to the Councils and to the public. The issue of transparency includes the basic tenets of adherence to scientific principles of fisheries management, scientific integrity and effective communication with the public. It also includes transparency within the fishery management process. The latter refers to congressionally-mandated programs and amendments to fishery management plans that bypass portions of the public process and reduce the importance of scientific input in fishery management decisions. In their discussions on this topic, panel members were careful to state that identical structures for scientific contributions to the management process were not a requirement, reflecting the regional differences among the Councils. In the words of one panel member, one size does not fit all.

In the time available for the workshop, the governance panel did not have the opportunity to specifically discuss peer review of the science process within Council decisions. However, this is an important component of the role of science in fisheries management decisions. In their recent position paper on issues for MSA reauthorization, the Council Chairs made the following recommendations. *“Final determination of necessary scientific fishery parameters should be made within the FRMC management process and not in separate, distinct bureaucracies.”* The Chairs also suggest that independent scientific peer review should be part of the process for each Council, including social and economic sciences as well as stock assessments. This process calls for a periodic independent review of the scientific review process for each Council but does not require an independent scientific peer review, beyond that made by the respective Scientific and Statistical Committees (SSC), for each decision.

SARAH CHASIS:

Regional ocean governance compliments the ecosystem-based fishery management process.

PHIL RUHLE:

I'm not here to line my pockets. I'm a one-boat operation, and I took on this burden as a Council member to be able to assure that my grandsons and their grandsons will be able to go fishing.

ERIC SCHWAAB:

Dealing with some of these non-fishing related habitat impacts is a fisheries management challenge and a fisheries management responsibility.



NURGUNCV



Council Membership/Conflict of Interest

There were two basic issues under the general topic of Council membership discussed by the workshop panel. One issue is the appointment process and 'balance' of representation for Council members. The other area of discussion related to conflict of interest for Council members, and how to resolve this problem.

There was a wide variety of opinions within the panel on the subject of Council appointments. The panel generally agreed on the need for broadening the selection process for Council member appointments. The Council appointment process is geared around governors, since they promote and solicit nominees, contact user groups and public interest groups, develop lists of candidates and send the candidate list to the Secretary of Commerce. The governors decide whether they want to recommend members with a background oriented to commercial, recreational or environmental interests. The governors' lists of candidates are ranked, and typically, the Secretary of Commerce tends to follow the recommendations. The ranking is available to the public and is an open process.

It is the role of the Secretary of Commerce to maintain "balance" in Council appointments. The panel had a wide ranging discussion on the appropriate background for council members. In their discussion, panel members stressed that it was more important to make sure that individuals appointed have a basic public interest, rather than try to make appointments to fill a 'quota' of disparate interests. There was general agreement by panel members that a change in the MSA would be desirable to define 'balance' in the composition of the backgrounds of Council member appointments.

There was also broad agreement among the workgroup panel that conflict of interest is an area for improvement in the Council process, but not all panel members supported the same approach to resolving this problem. Ideas presented and discussed in the panel discussions included the following points.

One panel member suggested that it is not appropriate for Council members to be financed by an interest organization. Another member followed up with the suggestion that if not having financial support from industry was a hardship, then Council members should be paid at a level that eliminates the need for interest group financial support. There was general agreement among panel members that Council members should be required to disclose conflict of interest and recuse themselves from voting on an issue where a conflict was identified. Different methods for defining a financial limit as a threshold for recusal of a Council member for a particular issue were discussed. In general, workshop panel members believe that full disclosure is preferred to any type of financial interest criterion.

ROD MOORE:

There are some real problems with the Councils as a form of governance, but I can't think of a better one.

DAVID FRULLA:

Full disclosure represents the bedrock element of any conflict of interest regime.

BOB HAYES:

Balance means that the people who are on the Council ought to reflect the fisheries that they're managing.



WORKSHOP SUMMARY

Reconciling Conflicting Statutes

SYNOPSIS WRITTEN BY LENA KOFAS AND BILL WILSON

The following is a synopsis of the panel presentations and discussions, and does not necessarily represent the views of individual panelists.

Moderator:

DAN FURLONG
Mid-Atlantic Fishery
Management Council

Panelists:

MARY HOPE KATSOUROS
Fisheries consultant

JANE CHALMERS
Deputy General Counsel, NOAA

KIM DIANA CONNOLLY
University of South Carolina

ED EBISUI
West Pacific Fishery
Management Council

KEN HINMAN
National Coalition for
Marine Conservation

PAUL MACGREGOR
Mundt MacGregor Law Firm

Rapporteur:

LENA KOFAS
Atlantic States Marine
Fisheries Commission

Staff Assistant:

BILL WILSON
North Pacific Fishery
Management Council

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) as amended in 1996 is the principal law governing fishery management in U.S. territorial waters. Marine resource management is further governed by several federal statutes, including the Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), National Marine Sanctuary Act (NMSA), National Environmental Policy Act (NEPA), Freedom of Information Act (FOIA), Federal Advisory Committee Act (FACA), and Administrative Procedure Act (APA). Each of these statutes respectively has its intrinsic design, intent and purpose. From a management perspective, integrating compliance with all applicable statutory provisions within the sphere of fishery management and conservation reveals incongruities with the provisions of the MSA. The incongruities between statutes lead to costs, redundancies, delays, and confusion in the process of fishery management that consequently result in dissatisfaction among stakeholders and potential lawsuits.

This workshop focused on the respective incongruities of the many federal statutes governing fishery management, and addressed options for integrating regulatory and/or statutory provisions to improve fishery management and conservation in light of the upcoming MSA reauthorization. The Regional Fishery Management Councils (Councils) and regulated communities have identified the issue of conflicting statutory requirements as a weakness in the current fisheries governance structure that must be addressed in the reauthorization of the MSA. The National Oceanic and Atmospheric Administration (NOAA) Fisheries Service has responded to management inefficiencies in the regulatory process by implementing a Regulatory Streamlining Project (RSP). While the workshop panelists generally supported streamlining of the present complex regulatory structure, some of the panelists called for legislative amendments. They argued that inherent differences in statutory provisions and resulting conflicts of interest among various stakeholders necessitate amendments to the MSA. Thus, this summary provides policy alternatives to the current statutory requirements as the nation moves forward to implementing an effective regulatory structure for managing our valuable marine resources.

MSA and NEPA

The most contentious debate among panelists focused on NEPA requirements with respect to the MSA. NEPA requires Councils and NOAA Fisheries Service to thoroughly weigh the environmental consequences of any potential action and proceed with a scoping and public review process that generally takes one to two years before the possibility for implementation of any management measure. The NEPA analyses and timelines can be much longer than the analytical and review process required under MSA; thus fishery managers contend with a duplicative and

slow process that impedes immediate conservation actions. NEPA requirements involve onerous paperwork, and the extensive length of reports has in some cases been characterized as an attempt to preclude the potential for lawsuits. NEPA has been increasingly invoked to overturn or contravene fishery management decisions, and has thus become the guiding law for processing and reviewing fishery management actions largely due to the threat of litigation.

In response to these issues with NEPA, some stakeholders have supported the implementation of a Programmatic Environmental Impact Statement (EIS) for fishery management plans (FMPs). However, this option may still lead to the same problem of a long, delayed process. NOAA Fisheries Service has dedicated resources to the development and implementation of the RSP with frontloading as a key component to ensure that all responsible parties for issues addressed in fishery management actions are engaged early in the process and on a continuing basis. A few panelists reflected on whether regulatory streamlining sufficiently addresses the fundamental incongruities between NEPA and MSA. The question raised was whether NEPA was intended for long-lived projects as opposed to short-term adjustments such as annual setting of total allowable catch (TAC) required under MSA.

Another approach would be to have critical NEPA provisions be added to MSA through legislation, thereby making MSA “NEPA compliant”. For example, MSA could be amended to require analysis of a full range of reasonable alternatives to a proposed fishery regulatory action and to require analysis of cumulative effects of a proposed action, without lengthening the analysis process. Also, MSA could be reauthorized to allow the integration of new data into fishery regulatory analyses that are under way (as required under National Standard 2) without restarting the environmental assessment process currently required under NEPA. Some caution that any efforts to amend MSA should be accomplished in a manner that avoids turning MSA into a procedural act. Given the multiple challenges in simultaneously complying with NEPA and MSA, particularly with regard to MSA National Standards 2 and 7, the Conference Panel supported the recommendation to add such critical provisions of NEPA to the MSA, thereby making the fishery management decision-making process under the MSA functionally equivalent to NEPA’s requirements.

MSA, ESA and MMPA

The MSA requires managing fisheries for optimum yield, rebuilding overfished stocks, creating opportunities for commercial and recreational use of marine fish stocks, minimizing adverse social and economic impacts on fishing communities, and protecting marine habitat and endangered and other protected species. Frequently, the Councils and NOAA Fisheries Service struggle with prioritizing these objectives, and case law has further complicated the management process. Fishery managers are challenged with determining which regulatory requirements to follow in accordance with precedence. While the MSA is the principal law that regulates U.S. commercial fisheries, the ESA restricts the Councils and NOAA Fisheries Service from taking fishery management actions that may result in jeopardizing the continued existence of endangered or threatened species or may result in the destruction or adverse modification of their critical habitat. Likewise, the MMPA requires implementation of a process of take reduction and reduction of incidental mortality and serious injury to marine mammals to insignificant levels approaching a zero mortality and serious injury rate. While permits may be granted for incidental and non-intentional take, there is confusion in determining what constitutes take in a seemingly subjective process.

ED EBISUI:

The Council process is open and comprehensive.

KEN HINMAN:

If process is the problem, then streamline the process.

PAUL MACGREGOR:

NEPA confounds informed decision-making under MSA.



Often a marine mammal may be under the protection of both the ESA and MMPA simultaneously. The ESA is arguably the law with the most “teeth” when it comes to potential differences with the goals of the MSA. The “bar” under which a fishery must operate to avoid jeopardy or adverse modification is set conservatively, and Reasonable and Prudent Alternatives (RPAs) may be imposed on a fishery. Where the fishery management process encounters the ESA, fishery managers (“Action Agency”) must enter into a Section 7 consultation with the agency responsible for the ESA listed species likely to be affected by the action (“Consulting Agency”). Potential impacts of commercial fisheries include incidental injury or mortality in fishing gear, degradation of marine habitat, and the removal of prey species important to the nutrition of a listed species. Often there is confusion over how specific fishing activities may cause jeopardy or adverse modification. The consultation process can be lengthy and complicated, and often involves intervention by courts, resulting in further delays in fishery authorizations.

The role of the Councils in the consultation process is unclear — many consider Councils part of the Action Agency, but Councils do not directly participate in the consultation process. The product of such consultations is a Biological Opinion that helps the Action Agency identify any endangered or threatened species that might be adversely impacted by a fishery management action and describes how the proposed action may jeopardize the continued existence of a listed species or may adversely modify that species’ critical habitat. Sometimes there is disagreement among stakeholders and NOAA Fisheries Service over how some RPAs will benefit a listed species, particularly when such measures adversely impact commercial fishers and fishing communities. Often, litigation occurs over the Biological Opinion and the proposed RPAs, especially with respect to presentation of data that substantiate a determination of jeopardy and adverse modification. Some also suggest that perhaps the NEPA scoping process could be used to identify potential concerns early in the process rather than near the end when the Biological Opinion is prepared.

MSA and NMSA

Currently, there is vigorous debate in fisheries management regarding the NMSA, particularly with respect to the Northwest Hawaiian Islands Reserve. The NMSA establishes a National Marine Sanctuary System consisting of marine sanctuaries designated by the Secretary of Commerce. As discussed at the workshop, the conflicting regulatory authority and process under NMSA and MSA have resulted in confusion and misperceptions among stakeholders. Some are concerned about non-Council fishery regulations proposed for the Northwest Hawaiian Islands Reserve. The process for establishing fishery regulations within sanctuaries is unclear and confusing, and the NOAA National Ocean Service fishery management regulations may preempt Council management of the Reserve. Therefore, the Conference Panel supported the recommendation to clarify the fishery management authority in national marine sanctuaries within NOAA and federal law.

MSA, APA, RFA, and FACA

The complex interplay among the many marine resources laws, especially with regard to procedural duties, sometimes obscures the substantive matters of these laws. Fishery management actions involve considerable requirements for compliance with the APA, particularly the rulemaking process. The overall process involves a lengthy period of time to comply with the various notices, public review, and internal agency reviews, often delaying implementation of new regulations and imposing costs on the fishing industry. This focus on process as opposed to substance often compromises implementation of management programs. Moreover, the recordkeeping, notice



JANE CHALMERS:

Regulatory streamlining provides a mechanism for harmonizing existing statutory requirements.

MARY HOPE KATSOUROS:

NEPA was never intended for MSA; the essence of NEPA is captured in MSA.

KIM DIANA CONNOLLY:

Environmental law is overlapping, complex and dense because the environment is overlapping, complex and dense.



and public review, economic analysis, rulemaking, and agency and congressional review requirements of the APA, as well as the RFA and FACA, add financial and administrative burden to the Councils and related agencies. FACA restricts the Secretary from considering comments and suggestions for improved fishery management measures developed during annual Council Chairs and Executive Directors meetings. Many believe FACA must be changed to accommodate input from such sources to allow for more broad input of ideas that could improve the fishery management decision-making process.

MSA and FOIA

As future fishery management programs grow in complexity, particularly with the introduction of an ecosystem approach to management, more detailed data on fisheries from such sources as observers, video cameras, and vessel monitoring systems (VMS) will likely be required of the fisheries industry. As such, there is a conflict of interest between fisheries managers who need data for management purposes and the fisheries industry that must protect its competitive business interests. The confidentiality of fishery data is of major concern to the fisheries industry, and most (fishers) are proponents of ensuring proprietary provisions regarding data collection for fisheries management in the MSA. The Conference Panel supported the recommendation that the MSA be amended to provide for mechanisms to better shield proprietary data from FOIA. However, state law enforcement officials should be provided access to information and data gathered by VMSs operated by the NOAA Fisheries Service Office of Law Enforcement. In accordance with the current homeland security policies implemented by the Bush Administration, it is important that the U.S. Coast Guard also be provided access to VMS data for homeland security purposes.

Summary

Marine resources law is indeed a complex combination of legislation, common law, and international agreements. After a long history of responding to environmental disputes through common law, regulatory statutes have emerged with broad goals while delegating to administrative agencies substantial responsibility for developing and implementing policy. As such, the panel discussion generated the notion that complexity in environmental law reflects a complex interplay of economic, social, political and environmental conditions.

The workshop presented various perspectives on the incongruities of several different federal statutes governing fishery management. The issues of this workshop reveal that incongruities between statutes and the complex interplay of marine resources laws sometimes lead to unnecessarily complex administrative procedures resulting in delays in authorization of regulations. The fishery management process often results in litigation to resolve or mediate various stakeholder interests. Only rarely has Congress established a clear hierarchy of laws in the management of marine ecosystems, and case law has been necessary for establishing Congressional intent in situations that involve inconsistent mandates. Some perceive legal challenges as the routine, rather than the exception, often thwarting necessary conservation actions. The laws governing the use of our nation's marine resources, and their intent, should be clear, coordinated, and accessible to the public to facilitate compliance, implement timely development and application of appropriate conservation measures, and ensure healthy sustainable marine resources for future generations.

Ecosystem Approaches

Topic	Background	Advisory Panel Findings	SSC Comments	Main Conference Panel Findings
<p>Technical Requirements for an Ecosystem Approach to Fisheries</p>	<ul style="list-style-type: none"> ■ Research and science program. ■ Risk assessment strategies. ■ Collaboration with managers and stakeholders. ■ Monitoring and evaluation. 	<ul style="list-style-type: none"> ■ The Councils and NOAA Fisheries should work collaboratively to pursue an ecosystem approach to fisheries. ■ Given limited funds for research and staff, and limited human capital with fisheries expertise, we need to prioritize our needs. ■ An ecosystem approach should be evolutionary and iterative, progressing from the present. 	<ul style="list-style-type: none"> ■ First, the SSC recommends that all fishery stakeholders need to be involved very early in the process. Active collaboration among scientists, managers and stakeholders is a prerequisite for successful development of an ecosystem approach to fisheries that includes humans as part of the ecosystem. ■ Second, the SSC notes that the scale of particular marine ecosystems may not match political boundaries in particular cases, so technical requirements for development of ecosystem approaches may require the implementation of a process that crosses customary jurisdictional boundaries. ■ Third, just as successful attainment of biological conservation objectives in a single-species context can be judged by comparing performance indicators against a set of biological reference points, technical requirements for an ecosystem approach to fisheries include the development of a set of ecosystem characteristics deemed important, definition of management objectives concerning those characteristics, and development of reference points and performance indicators by which to measure progress. The performance measures themselves may require alternative proxies owing to imperfect knowledge within and between ecosystems. ■ Fourth, having defined a set of desirable ecosystem characteristics and objectives, weights should be developed for each characteristic. Weights are necessary, because ecosystems are inherently dynamic and it will be impossible to achieve all desired characteristics simultaneously. The prescription of these metrics should be robust to the role of natural variability (e.g., decadal-scale climate regimes) in structuring marine ecosystems and should recognize that alternative natural states (e.g., warm- versus cold-water species assemblages) of the ecosystem are neither "good" nor "bad." ■ Finally, technical requirements must include the development of analytical procedures for ecosystem evaluation and plans for future monitoring and research. As a first step, the SSC recommends giving high priority to the process of identifying and prioritizing the set of desirable ecosystem characteristics. 	<ul style="list-style-type: none"> ■ The Councils and NOAA Fisheries should work collaboratively to pursue an ecosystem approach to fisheries involving all stakeholders, managers, and scientists. ■ The Councils and NOAA Fisheries should identify, prioritize, and develop weighting for ecosystem characteristics per SSC comments (including human characteristics and reference points and performance indicators to measure progress, future monitoring, and research). ■ Inventory current ecosystem projects. ■ An ecosystem approach should be evolutionary and iterative, progressing from the present.
<p>Science Limitations</p>	<ul style="list-style-type: none"> ■ Effective multispecies and ecosystem modeling is critical to implementing an ecosystem approach. ■ Requires data that is not currently available in all regions. 	<ul style="list-style-type: none"> ■ A lack of data should not limit our ability to adopt an ecosystem approach. ■ However, we fully support seeking additional funding to enhance ecosystem data collection and model development. ■ We also support continuing to use and improve on current tools. ■ We should maximize the mining of existing data sets and knowledge. 	<ul style="list-style-type: none"> ■ Many ecosystem research projects are currently feasible, including predator-prey studies, bycatch estimation, basic ecosystem modeling, habitat mapping, etc. We must focus on what is feasible today and in the near future rather than on focusing on what ultimately may be desirable. ■ The SSC believes that the Councils must be realistic about the ecosystem management goals, objectives, and methods. While it is an exciting intellectual exercise to imagine how ecosystem management could work with unlimited resources and perfect data, we must focus our energies on the resources we have and the goals we can accomplish in the present. ■ While our intellect is infinite, our resources are not. Our current funding, manpower, and data are limited. Future increases are unlikely to be orders of magnitude higher. A modest increase in funding will not lead to a dramatic increase in our capabilities. An ideal implementation of ecosystem management is not one budget or reauthorization away. ■ Our current and planned datasets are not ideal and in many cases insufficient for our ultimate goals. This is a constraint which should not stop us, but must be acknowledged and incorporated into any legislation and any plan. ■ Ecosystem management must be thought of as an evolutionary process that will move in incremental steps. Over time, our capabilities will improve. Our resources will increase and will be better directed as we better identify our needs. Our data will be more focused and our time series will be longer. ■ The SSC urges the Councils to focus on what can be done now and in the near future with ecosystem management. Planning should focus on identifying the positive, incremental steps we can reach and the strategies that can accomplish them. Expectations must be kept realistic or we will fail before we begin. 	<ul style="list-style-type: none"> ■ A lack of data should not limit our ability to adopt an ecosystem approach. ■ However, we fully support seeking additional funding to enhance ecosystem data collection and model development and to match goals and objectives to the reality of available information and the reality of budget limitations. We must recognize the evolutionary nature of the process in this context. ■ Focus on improvements that can realistically be made in the short-term. ■ We also support continuing to use and improve on current tools. ■ We should maximize the mining of existing data sets and knowledge. ■ Must recognize that models and available data will differ by region.

Ecosystem Approaches

Topic	Background	Advisory Panel Findings	SSC Comments	Main Conference Panel Findings
<p>Regional Ecosystem Planning and the Role of Regional Ocean or Ecosystem Councils</p>	<ul style="list-style-type: none"> ■ NOAA Fisheries supports creating 10 regional ecosystem councils that will develop goals and objectives for the ecosystem, provide ecosystem information and performance metrics. 	<ul style="list-style-type: none"> ■ The panel does not support regional ecosystem councils — discomfort is with adding another layer of bureaucracy. ■ However, the need for a forum to resolve fishery and non-fishery issues within an ecosystem is recognized. ■ Fishery management councils should not become ecosystem councils. 	<ul style="list-style-type: none"> ■ See <i>Technical Requirements</i>. 	<ul style="list-style-type: none"> ■ No separate ecosystem councils; but to support establishment of regional (voluntary) coordinating bodies comprised of regional authorities/ jurisdictions and public expertise to address non-fisheries management issues.
<p>Type of Ecosystem Planning Document: Fishery Ecosystem Plans, or Other?</p>	<ul style="list-style-type: none"> ■ Three scales of ecosystem plan have been suggested: <ol style="list-style-type: none"> a) Ocean council-level document b) Fishery Ecosystem Plan c) Ecosystem-based FMP 	<ul style="list-style-type: none"> ■ Councils should develop their own ecosystem-based management documents for fisheries; requirements should not be imposed from above. ■ Some panel support for FEPs; others concerned about data limitations. ■ An FEP should be a strategic guidance document that looks at what we know, and where the gaps in our knowledge are. ■ FEPs should reflect regional flexibility and the different interests in each region. 	<ul style="list-style-type: none"> ■ The SSC did not address this issue. 	<ul style="list-style-type: none"> ■ Councils should develop ecosystem-based management documents for fisheries. ■ Ecosystem-based FMP should be a fundamental, first order goal (relative to FEPs) for each Council or region. ■ If an overarching FEP is developed, it should be to provide general guidance to FMP development.
<p>Elements of an Ecosystem Approach to Fisheries that Should be Codified in the MSA</p>		<ul style="list-style-type: none"> ■ The panel is cautious about amending the MSA — wary of strict regulations and guidelines that will require Councils to produce new FMP amendments across the board (e.g., SFA), rather than building an ecosystem approach into existing management practices. ■ MSA allows for ecosystem-based management; national guidance can help Councils to move forward. 	<ul style="list-style-type: none"> ■ Not a scientific issue. 	<ul style="list-style-type: none"> ■ Cautious about amending the MSA with any specific requirements — wary of strict regulations and guidelines that will require Councils to produce new FMP amendments across the board (e.g., SFA), rather than building an ecosystem approach into existing management practices. ■ MSA allows for ecosystem-based management; national guidance and subsequent regional guidance can help Councils to move forward.
<p>Development of National Guidelines for an Ecosystem Approach to Fisheries</p>	<ul style="list-style-type: none"> ■ National guidelines on ecosystem management should avoid the pitfalls of the essential fish habitat guidelines. ■ However, ocean reports have demonstrated a need to standardize regional best practices across all fisheries. 	<ul style="list-style-type: none"> ■ Recommendation for guidance not technical guidelines. ■ Guidance should help Councils and regions to use tools available under MSA and other mandates, to evaluate the potential for ecosystem-based management in each region — would address uneven progress among Councils and regions. 	<ul style="list-style-type: none"> ■ See <i>Process for Developing Ecosystem-based Goals and Objectives</i>. 	<ul style="list-style-type: none"> ■ Recommendation for guidance not technical guidelines. ■ Guidance should help Councils and regions to use tools available under MSA and other mandates, to evaluate the potential for ecosystem-based management in each region — would address differences, as per SSC discussion, among Councils and regions.

Ecosystem Approaches

Topic	Background	Advisory Panel Findings	SSC Comments	Main Conference Panel Findings
<p>Process for Developing Ecosystem-based Goals and Objectives</p>	<ul style="list-style-type: none"> Who is responsible for developing goals and objectives? Who should be involved in development? What is the desired state of the ecosystem? 	<ul style="list-style-type: none"> The ecosystem goal should be to manage for sustainability and productivity. Development of goals and objectives should be a regional, bottom-up process; should engage a broad cross-section of stakeholders (fishery and others). Where multiple jurisdictions intersect, it is most productive to identify the relevant players and engage them in partnerships. 	<ul style="list-style-type: none"> This topic and the one below are complementary aspects of the same theme, namely defining ecosystem-based management. Goals and objectives should first be generally outlined at the national level and should include consideration of traditional single-species objectives such as optimal yield, sustainability, bycatch reduction and protection of essential fish habitat, but should be expanded to include protection of ecosystem function, safeguarding water quality, and protection of marine biodiversity. Goals and objectives also need to include social dimensions and safeguards. Some of these objectives will have to be defined in greater detail in order to make implementation clear and practical. Strong regional differences exist in ecosystem makeup and function; these differences are most pronounced between temperate and tropical regions. While, it would be worthwhile to attempt to develop general attributes that extend to all regions, ultimately guidelines will need to be refined at the regional, or eco-regional, level in order to address ecosystem differences that exist between regions. Guidelines should include identification of metrics that can be used to characterize ecosystem health biologically, ecologically, socio-economically, and managerially. Broad stakeholder input should be solicited during guideline development. 	<ul style="list-style-type: none"> Broadly defined national level objectives followed by regionally defined goals and objectives (using SSC guidance). Agency/Council steering committee in each region (or large marine ecosystem). <p>MOTION PASSED WITH 1 OBJECTION.</p>
<p>Other Issues</p>	<ul style="list-style-type: none"> Overfishing scorecard. 		<ul style="list-style-type: none"> The SSC feels that development of an overfishing scorecard is not ideally placed under the topic of ecosystem approach to fisheries. However, given that it was presented, the SSC offers the following comments. The SSC urges caution in the development and presentation of simple numerical summaries of regional performance in meeting ecosystem objectives. While simple numerical scores across species within regions are appealing because of their simplicity, the systems they purport to represent are complex and the objectives of management are multidimensional. The relative importance of single species exploitation rates, exploitation rates across species assemblages, status of non-target stocks, biodiversity, etc. may differ across regions. Because the relative importance of management objectives may differ across regions, unidimensional performance measures may not be appropriate representations of the degree to which regions have successfully implemented ecosystem management. In addition, a simple summary score to represent the number of overfished stocks within a region may not reflect the level of concern about the status of particular stocks, such as keystone species and ESA candidate or listed species. The analysis of the correlation between the status of managed stocks and the types of management measures is interesting and warrants further development. However, the SSC cautions that while correlative models may indicate the possible existence of causal relationships, correlations are not evidence of causation. In addition, the SSC notes that the status of the stock (overfished, at risk, not overfished) is a categorical difference and should be modeled using regression procedures appropriate for multinomial-limited dependent variables. In addition, to binary variables representing differences in management measures and regions, the explanatory variables should include information about the susceptibility of the managed stock to uncontrolled effects (e.g., climate variation of regime shifts). If possible, the model should incorporate observations across several years to help isolate differences in the application of management measures across regions and within regions through time to eliminate possible collinearity between management measures and regions. 	<ul style="list-style-type: none"> An overfishing report card is not an appropriate measure of ecosystem health or meeting broader ecosystem objectives (though reducing or eliminating overfishing should be a primary goal of each region, and is currently required by law).

Topic	Advisory Panel Findings	SSC Comments	Main Conference Panel Findings
<p>Overall Conclusions for Ecosystem Approaches</p>	<ul style="list-style-type: none"> We endorse the finding of many other science and management boards, that ecosystem-based management can serve as a potentially important tool for enhancing fisheries and the ecosystems on which they depend. We endorse a preference for the use of currently available tools in that regard, and the resources and funding necessary to better engage those tools. Councils and regions need to retain the flexibility to manage their regional fisheries. The concept of 'standardization' is incompatible with the need for ecosystem approaches to reflect regional differences. A holistic approach is a realistic approach only with collaboration among Councils and NOAA Fisheries, partner agencies, and stakeholders. 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> We endorse the finding of many other science and management boards, that ecosystem-based management is an important tool for enhancing fisheries and the ecosystems on which they depend. We endorse a preference for the use of currently available tools in that regard, and the resources and funding necessary to better engage those tools. Councils and regions need to retain the flexibility to manage their regional fisheries. The concept of 'standardization' is incompatible with the need for ecosystem approaches to reflect regional differences. A holistic approach is a realistic approach only with collaboration among Councils and NOAA Fisheries, partner agencies, and stakeholders.

Strengthening Science Advice for Management

TOPIC: Best Scientific Information Available

Background	Advisory Panel Findings	SSC Comments	Main Conference Panel Findings
<ul style="list-style-type: none"> ■ Ensure use of best available scientific information. ■ SSC appointments: <ul style="list-style-type: none"> • Criteria • Terms • Compensation ■ Require training of Council members. 	<ul style="list-style-type: none"> ■ Scientific determinations of necessary fishery parameters should be made within the regional fishery management council process, consistent with MSA and other findings of this panel. ■ Councils should retain appointment authority for SSC, but existing membership should have a role in nominating/recruiting new members. ■ SSC members should receive honoraria (compensation) for their services. ■ SSC members should not be subject to term limits. ■ SSC should meet concurrently with Council meetings, and at the same locale, when possible. ■ Each Council's SSC shall provide peer review of all fundamental analyses and make the determination that best available scientific information is provided prior to Council decision making. ■ Councils shall provide written rationale for their decisions, including how scientific information was incorporated. ■ Opportunity should be provided for regional or national SSC meetings, where members from different regions could discuss best practices and seek to identify analytical and research needs. ■ Require a formal but brief training course for new Council members to be provided within 6 months of appointment. NOAA and Councils should collaborate with an external organization to offer a course in several locations around the US as a condition of voting. After six months, a new member who has not completed the training should continue to participate in Council meetings, but should not be allowed to vote. 	<ul style="list-style-type: none"> ■ Defining and using the best scientific information available is an important goal in conducting fisheries science and implementing fisheries management objectives. Rather than define and develop these ideas in this venue we direct those interested to a recent report developed on this topic by the National Research Council and one that is soon to be released by the American Fisheries Society. One should recognize, however, that the best scientific information available includes the social and economic sciences as well as the physical and biological sciences. ■ Unfortunately, having the best available science doesn't necessarily mean that it will be used. The existing institutional mechanism should be strengthened, for example, by having the Secretary of Commerce examine if management is at least consistent with scientific advice. This might be done, for example, as part of the EIS review. For instance, EISs prepared by the Councils in setting their annual specifications could be required to include explicit discussion of whether Council recommendations deviated from SSC advice and why. To evaluate Council effectiveness at controlling harvests, the EIS could also be required to include a table that provides an historical comparison of TACs and actual harvests. Other methods of encouraging vigilance toward and compliance with scientific advice should also be explored. If the council takes an action that deviates significantly from the scientific advice, the SOC would have the final word on whether the plan or some modified version of the plan gets implemented, or whether the fishery should be closed until an appropriate plan becomes available. ■ The SSC should serve as the primary entity to review and provide advice on scientific documents for the Council. It makes sense for the SSC to review scientific issues and identify information needs regularly, and we would recommend that this be done in conjunction with each Council meeting and recommendations should be provided prior to decisionmaking. If the Council is required to respond more closely to the best available science and associated SSC comments then the SSC may need to provide more detailed documentation on their deliberations to make them understandable to outside interpretation. One of the reasons for the SSC to meet regularly and in conjunction with the Council is so that the SSC can keep up with the scientific issues related to the fisheries of concern. Another is to provide advice to the Council in real time. <p>Summary of use of best available scientific information</p> <ul style="list-style-type: none"> ■ NRC and AFS reports could be used to inform this issue. ■ If the Council makes a decision counter to the best science available, there is a need for a rationale and scrutiny of this action. There is a process in place currently to do this, but it may be necessary to introduce requirements to ensure that process is used. ■ The SSC should serve as the primary entity to review and provide advice on scientific documents for the Council. ■ As such, it is probably most efficient and effective for the SSC to meet in conjunction with regular Council meetings. <p>Summary of SSC appointment issues</p> <ul style="list-style-type: none"> ■ Conflict of interest: If the Council chooses to implement a conflict of interest (COI) review process for SSC members, it would be useful to consider adopting the COI procedures used by the National Academies and National Research Council. Under the National Academies COI procedures, committee members are asked to prepare a Background Information/COI disclosure document and the committee meets in executive session to review the COI disclosures and determine if there are particular concerns would preclude an individual from serving as a committee member. The COI disclosure and review could take place at the beginning of the first SSC meeting of each year. ■ External certification: It might be difficult to identify an external body with the qualifications to judge the expertise of all of the diverse areas represented by the SSCs. Perhaps the SSC could aid with this process by self-evaluation and evaluation of newly appointed members. ■ Term limits: There is a finite pool of individuals who are qualified and willing to serve the public in this role, thus term limits may not be practical. ■ Cross-regional SSC meeting: It may be worthwhile to have an annual meeting of all SSC members across regions to share ideas in much the same way that Council leaders from across regions regularly meet. ■ Compensation: There is generally a large opportunity cost for academic members to serve on an SSC so compensation might be warranted. But if compensation is introduced, then appointment authority may need to be moved above the Council level to avoid the appearance or reality of a conflict of interest. 	<ul style="list-style-type: none"> ■ Scientific determinations of necessary fishery parameters should be made within the regional fishery management council process, consistent with MSA. ■ Councils should retain appointment authority for SSC. ■ SSC members should not be subject to term limits. ■ SSC should meet concurrently with Council meetings, and at the same locale, when possible. ■ Each Council's SSC shall provide peer review of all fundamental analyses and make the determination that best available scientific information is provided prior to Council decision making. ■ Opportunity should be provided for regional or national SSC meetings, where members from different regions could discuss best practices and seek to identify analytical and research needs. ■ Best scientific information available includes the social and economic sciences as well as the physical and biological sciences. <p>PASSED WITH 3 OBJECTIONS.</p>

Strengthening Science Advice on Management

Topic	Background	Advisory Panel Findings	SSC Comments	Main Conference Panel Findings
<p>Conservation versus Allocation</p>	<p>■ Separate science and management:</p> <ul style="list-style-type: none"> • Quota setting or all decisions • Secretary or NOAA 	<p>Councils shall adopt ABC limits determined by their SSCs and shall set TACs (or control efforts) such that catch would be at or below ABC.</p>	<p>■ Important roles for the SSC in the specification of ABCs include peer review of the stock assessments and harvest formulas that are used to calculate ABC, and review of regulatory analysis describing relevant effects (including the extent of risk and uncertainty) of harvest alternatives. While computation of an ABC is a scientific process, how it is derived is based on policy. Designating the SSC as the ultimate arbiter of ABCs involves a blurring between science and policy, and is not a desirable way to ensure adequate consideration of science in management decisions. The SSC recommends that this issue be instead addressed by enhancing the process by which Council recommendations are reviewed by the Secretary of Commerce, as discussed under "Best Scientific Information Available."</p> <p>■ There is considerable variation in the structure of SSCs and other scientific advisory panels across regions. Some regions have chosen to operate a single SSC that meets as a whole to review all information and analyses prepared in support of Council decision-making. Other regions have chosen to create multiple committees, science advisory panels, or subcommittees, each tasked with responsibility for the review of a subset of the information and analyses prepared in support of Council decision-making. These differences have arisen for historical reasons and as a reflection of differences in the types of management issues being addressed by the various Regional Councils. We conclude that it may not be desirable to mandate a subdivision of SSC functions with issues relegated to biological, ecological, economic and socio-cultural categories.</p> <p>■ The SSC notes that many of the issues that arise in fisheries management are inherently interdisciplinary, that Council actions are often interdependent, and that many SSC members have multiple areas of expertise. Ecologists, marine mammal specialists, seabird specialists, turtle specialists, economists, anthropologists, sociologists, marine lawyers and other social scientists on the Council SSCs need to be aware of the status of target and non-target fish populations and the range of exploitation rates and harvest strategies that are being considered for those populations and, population biologists need to know the potential biological, ecological, social, legal, and economic consequences of those exploitation rates and harvest strategies. In addition, the ecologists, marine mammal specialists, seabird specialists, turtle specialists, economists, anthropologists, sociologists, marine lawyers and other social scientists on the Council SSCs may have particular expertise in statistical sample design, statistical inference, modeling dynamic systems, etc. that may provide important understanding and review of the data and models used in determining the status and trends of target and non-target stocks, and the probable response of those stocks to alternative exploitation rates and harvest rules. We conclude that it may not be desirable to mandate subdivision of SSC functions, such as forming separate committees for biological, ecological, economic, or sociological issues.</p>	<p>■ Councils shall adopt ABCs within limits determined by their SSCs (or appropriate scientific body) and shall set TACs (or control efforts) such that catch would be at or below ABC, unless fully justified by the Council.</p>
<p>Need for Independent Review</p>	<p>■ Require SSC recommendations on:</p> <ul style="list-style-type: none"> • Stock assessments • Other actions <p>■ Independent reviews:</p> <ul style="list-style-type: none"> • On some/all analyses • Who to conduct 	<p>■ There should be an independent external review of scientific information and processes used by each Council every five years if funds are available and other times as necessary and appropriate (e.g., if there is controversy over scientific findings).</p>	<p>■ While the SSC can provide review at one level, reviews at other levels may be needed, such as periodic review of stock assessments by the Center for Independent Experts. Occasionally more intensive reviews of processes may be needed and conducted either by independent contract scientists or by the National Research Council.</p> <p>■ In circumstances where an issue has unusual repercussions or is particularly controversial, outside review (involving, for instance, the Center for Independent Experts) may be warranted. Such reviews should not be limited to stock assessments but could also extend to socioeconomic and other types of models and analyses used by the Council.</p>	<p>■ There should be an independent peer review of scientific information and processes used by each Council, at appropriate intervals determined by the Council. In circumstances where an issue has unusual repercussions or is particularly controversial, outside review (involving, for instance, the Center for Independent Experts) may be warranted. Such reviews should not be limited to stock assessments but could also extend to socioeconomic and other types of models and analyses used by the Council.</p>
<p>Using Default Measures to Ensure Progress</p>	<p>■ ABCs:</p> <ul style="list-style-type: none"> • Point estimate • Acceptable range 	<p>■ Emergency rules may be extended as necessary to address potential violations of National Standard 1.</p>		<p>■ Emergency rules may be extended as necessary to address potential violations of National Standard 1.</p>
<p>Making Research Relevant</p>	<p>■ Adequacy of science for ecosystem management.</p>	<p>■ SSCs should develop research priorities and identify data needs for effective management.</p>	<p>■ The SSC should play an active role in identifying data and models that are needed for ecosystem management. It is also important that SSC recommendations regarding research and data needs be conveyed to NOAA Fisheries and other relevant entities responsible for ecosystem management.</p>	<p>■ SSCs should develop research priorities and identify data and model needs for effective management.</p>
<p>Other</p>		<p>■ There is a need for more resources to be dedicated to stock assessments and socio-economic impacts.</p>		<p>■ There is a need for more resources to be dedicated to stock assessments and socio-economic impacts.</p>

IFQ Programs

Topic	Background	Advisory Panel Findings	SSC Comments	Main Conference Panel Findings
<p>Preamble</p>				<ul style="list-style-type: none"> ■ Regional fishery interests require that share-based management programs (could include other forms than IFQs) be considered to satisfy specific needs by fishery and locale. To accomplish this, the regional councils require liberal authority to develop share-based programs within specified guidelines. ■ The Secretary of Commerce in consultation with Regional Fishery Management Councils should develop national guidelines consistent with the recommendations of this conference panel, for the establishment of market-based systems (including, but not limited to, IFQs, community quotas, co-ops, etc). ■ Consistent with these guidelines, the councils shall enumerate goals and objectives for the program and consistent with those goals and objectives shall define the following:
<p>Allocation Criteria</p>	<ul style="list-style-type: none"> ■ Is catch history a fair measure of awarding quota? ■ Should quota be awarded to persons that do not own vessels? ■ Should quota programs include allocations for entry-level fishermen? 	<ul style="list-style-type: none"> ■ Councils should have broad authority to allocate harvest privileges to a wide-range of stakeholders (vessel owners, processors, communities, captains and crew) to suit the needs of the specific fishery. ■ Some panelists believe that authority to allocate processor privileges may be necessary to accommodate interests of those who depend on a fishery. ■ Some panelists believe that processor interests can be adequately protected by harvest privilege allocations to processors that would not limit the market for landings. 	<ul style="list-style-type: none"> ■ In allocating a resource, there are a limited set of alternatives, which can range from the use of market mechanisms, considerations of deservedness or fairness, the taking by force, or a random allocation, such as by lottery. Under current MSA provisions, market mechanisms such as auctions are somewhat off the table, but maybe should be reconsidered. We reject allocation by force, and tend to rule out allocation by lottery, leaving the Councils with considerations of deservedness or a market mechanism. It is very unlikely that one process will be right for every fishery or region. The SSC recommends openness to new ideas on allocation, leaving the choice of criteria for the Councils to decide based on the objectives of each plan. ■ Social science tells us that the allocation criteria can make or break the IFQ system, that avoiding mistrust and unfairness is essential to success, and that even a perception of unfairness can derail the process. Alternative criteria for deservedness have various implications. Vesting interest based on past records of fish landings can create incentives for speculative fishing in the preliminary stage, often when the resource is most vulnerable. Deservedness criteria may also encompass a broader population than current participants, depending on the objective of the fishery program. Bringing user groups together to come up with allocation mechanisms might facilitate a better process. Providing analyses of social and economic consequences of alternatives is dependent on the availability of many kinds of information beyond those usually available, specifically cost data and processor information. The SSCs should be responsible for defining such data requirements and Councils should make broader reporting a condition of limited access. 	<ul style="list-style-type: none"> ■ The initial allocation of interests under the program shall be fair and equitable. In developing the initial allocation, the Council shall consider the interests of those that rely on the fishery, including vessel owners, processors, communities, captains, and crew. A program may include provisions to protect these interests including the allocation of shares to any of these interests, license requirements on the harvest of shares, or limitation on landings of harvests from the fisheries (including processing shares or regional community landing requirements).
<p>Limitation of Interests in IFQs and the Duration of an IFQ Program</p>	<ul style="list-style-type: none"> ■ Should an IFQ program have a sunset date or term? 	<ul style="list-style-type: none"> ■ Sunset: To avoid instability, programs should not be subject to sunset. ■ Share tenure: The panel reached no agreement on share tenure. ■ Some panelists believe that shares of limited duration with defined terms for reallocation would be appropriate to protect public trust interests. ■ Some panelists believe that limited duration contributes to instability in investment. 	<ul style="list-style-type: none"> ■ IFQ programs can be viewed as supplying entitlements to an entity. The entitlement is composed of a bundle of endowments. The question of the appropriate duration of an entitlement is important. The MSA now allows entitlements to be removed at any time, but does not require the program to be terminated after any particular interval. The duration of a program can be different from the duration of an individual's share-based privilege. Councils can consider fixed period entitlements to comprise a permanent program (e.g., Australia's drop through program; pollution discharge program in Midwest). Longer-term entitlements tend to foster the benefits of IFQs. The role of science is to identify the economic and social consequences of the range of alternatives being considered. 	<ul style="list-style-type: none"> ■ Shares under the program must have tenure sufficient to support and facilitate reasonable capital investment in the fishery; however, any shares allocated under the program will be a privilege, which may be revoked without compensation to the holder. ■ Program duration shall be at the Council's discretion without required sunset.

IFQ Programs

Topic	Background	Advisory Panel Findings	SSC Comments	Main Conference Panel Findings
Conservation	<ul style="list-style-type: none"> Should IFQ programs include incentives for participants who reduce bycatch and discards? 	<ul style="list-style-type: none"> Not addressed. 		<ul style="list-style-type: none"> To accomplish this, the regional councils require liberal authority to develop share-based programs within specified guidelines, including conservation.
Program Review	<ul style="list-style-type: none"> What is the appropriate review process? Who should conduct the periodic reviews? What criteria should be used to conduct periodic reviews? 	<ul style="list-style-type: none"> Periodic comprehensive program reviews should be required to ensure that programs meet their objectives (including ecosystem goals). 	<ul style="list-style-type: none"> Program reviews are considered an important feature of a quota share or management program. However, the lack of data, including baseline information, limits the ability to perform such reviews effectively. This problem could be reduced if the submission of economic data is made mandatory. 	<ul style="list-style-type: none"> Required periodic comprehensive review of the program, including the mandatory collection of social and economic data from beneficiaries to assess the extent to which the program is meeting the goals and objectives.
Quota Transfers	<ul style="list-style-type: none"> To what extent should quota be transferable in an IFQ program? 	<ul style="list-style-type: none"> Not addressed. 	<ul style="list-style-type: none"> Transferability is considered a favorable characteristic of a quota share program. However, if there are objectives other than economic efficiency, there are no objections to adjusting or restricting transferability to account for other considerations. 	<ul style="list-style-type: none"> Appropriate provisions governing transferability, which may include permanent and temporary transfers subject to limitations consistent with the social objectives of the program.
Excessive Shares	<ul style="list-style-type: none"> What limits should be placed on quota accumulation? 	<ul style="list-style-type: none"> Not addressed. 	<ul style="list-style-type: none"> There is a need to identify the concerns clearly before one can make the determination that excessive shares need to be regulated in order to solve the problem. If market power is the concern, in general, the industrial structure of most fisheries is such that it should not be a problem. If excessive shares are a concern, it is the responsibility of scientists to point out the implications of the alternatives under consideration to address those concerns. 	<ul style="list-style-type: none"> Limits on excessive shares including caps on holdings of a person or use of shares by a person or a single vessel.
Referenda of IFQ Program	<ul style="list-style-type: none"> Should a referendum be required in an IFQ program? Who should be allowed to participate? What percentage should be required for approval? 	<ul style="list-style-type: none"> No agreement was reached concerning referenda (few support double referenda). Referenda prior to program development may save Council time and resources. Referenda after program development can be used demonstrate fleet support for a program. Referenda may be opposed because they may not include all interests. 	<ul style="list-style-type: none"> In general, referenda are not considered a good mechanism to decide whether a Council should consider implementing an IFQ or share-based program. In all likelihood, the public will not approve if they do not know the characteristics of the specific program that the Council is likely to adopt. Referenda might make sense after a specific share-based program is already approved by the Council, allowing the public to vote on whether that plan should be implemented. If the Council process is working as intended, with extensive committee and public feedback, it should serve the same purpose as a referendum. If there is a decision to undertake a referendum, care must be taken to identify who should be entitled to vote. This equates to defining a set of stakeholders. For example, are communities included and do they represent one vote or more? Are we being sufficiently inclusive and soliciting the opinions from the set of stakeholders that we need? If those stakeholders are not already represented sufficiently, perhaps that represents a flaw in the Council process. Scientists can assist in the design of referenda, and in identifying mechanisms for balanced representation. Scientists can also identify and evaluate the alternatives for which information is being sought. 	<ul style="list-style-type: none"> Referenda shall not be required to approve a program. Referenda will, by necessity, exclude some interested persons and have the potential to substitute the interests of referenda voters for the interests of the Nation. National interests are better advanced by providing Council authority for program development and approval. Councils may however establish their own requirements for referenda.
Fees	<ul style="list-style-type: none"> Should an IFQ program include cost recovery fees? What should be the purpose of the fees? Should some fees collected be reserved for new entrants? 	<ul style="list-style-type: none"> All management programs (possibly including non-IFQ programs) should include the collection of fees for administration, management, monitoring, and enforcement of the program. Fees could be used to mitigate impacts on parties not included in the initial allocation. 	<ul style="list-style-type: none"> Fees are one way to make sure the public is compensated for the use of the resource by an individual. Fees can be viewed as a means of recovering management costs associated with the administration of a share-based program, or may alternatively represent payment for access to a public resource. When considering the applicability of fees, it is preferable to use the incremental cost of setting up an IFQ system, as opposed to the average cost. 	<ul style="list-style-type: none"> Collection of fees to cover the cost of management and monitoring or collection of portion of the value of the resource to offset management and monitoring costs, including state costs.

IFQ Programs

Topic	Background	Advisory Panel Findings	SSC Comments	Main Conference Panel Findings
Enforcement, Monitoring, and Data Collection	<ul style="list-style-type: none"> ■ When should IFQ programs include increased observer coverage? ■ Should an IFQ program include a data collection program? ■ What type of data should be collected? 	<ul style="list-style-type: none"> ■ Data should be collected to facilitate a review of the program. 	<ul style="list-style-type: none"> ■ Not addressed. 	<ul style="list-style-type: none"> ■ Provisions for effective monitoring and enforcement of the goals, and objectives under the program.
Other			<ul style="list-style-type: none"> ■ The SSC also recognizes that there are other allocation mechanisms other than IFQs. Councils should be authorized to consider other types of allocation schemes (e.g., community allocations, cooperatives). To open up the class of rights and allocations that can be considered would be desirable. It would then be up to the Councils to select across the range of dedicated access privilege tools to achieve various objectives. 	

MPAs and Cold Water Corals

Topic	Workshop Discussion/Findings	Main Conference Panel Findings
MPAs	<ul style="list-style-type: none"> ■ The public is knowledgeable about the concepts of some MPAs. However continuing education to inform the public on the range and types of MPA definitions are still needed. Stakeholders need to be educated within each region. <p>MPAs are only one tool in the management tool box; quotas, TACs, gear restrictions may also address a baseline problem prior to a closure or managed area being necessary.</p> <p>If needed, MPAs should be established as a subcomponent of an overall fisheries management regime. Formation should be based on clearly articulated needs based on the best available science, with participation of stakeholders in a transparent process.</p> <ul style="list-style-type: none"> ■ MPAs have been the most successful where they have had community buy-in from all levels of the public. A key component is to identify problems before solutions are created. <p>Successful MPAs should have adaptive management that is identified along with implementation to evaluate the efficacy of the area. A full evaluation of consequences (i.e. ramifications of effort displacement) should be necessary.</p> <ul style="list-style-type: none"> ■ The committee discussed the upcoming document from National MPA advisory committee (May 2005) as guidance. Educate stakeholders on the benefits of a national system. ■ Councils need to have role in developing MPAs including National sanctuary areas. 	<ul style="list-style-type: none"> ■ The panel finds that it would be appropriate to base MPA formulation on: <ul style="list-style-type: none"> • Clear objectives and goals • Transparent process • Sound science • Consideration of human dimension and socioeconomic issues • Stakeholder participation • Monitoring and evaluation • Adaptive management ■ Clearly define and inform stakeholders of terms such as MPAs, marine reserves, etc. ■ Use MPAs as a component of management and not as a standalone solution. ■ Address pollution and habitat loss impacts on marine resources. ■ Acquire better information (e.g., fisher input) and science (e.g., mapping). ■ Acquire more funding.
Cold Water Corals	<ul style="list-style-type: none"> ■ More research is needed to identify coral /sponge abundance and distribution. Funds should be allocated for research on coldwater corals in addition to their warmer climate counterparts. <p>A more precise definition of corals/sponges (which species are more vulnerable to gear impacts) needs to be established.</p> <ul style="list-style-type: none"> ■ Explore differential gear impacts where fisheries occur- (i.e., trawl in area of shelf, fixed gear on other) and identify problems accordingly. ■ Western Pacific FMP for corals: For 23 years no trawling in federal waters in Western Pacific. This essentially is an enormous MPA for coldwater coral. Could be used as a template for other FMP or management concepts. ■ Should there be some overarching legislative solutions, without having to prove that coral is linked to fish (as in current EFH provisions). This concept is important for ecosystem approach for management. 	<ul style="list-style-type: none"> ■ The panel finds that it would be appropriate to: <ul style="list-style-type: none"> • Address differential gear impacts in areas with cold water corals. • Improve mapping and comprehensive planning supported by science. • Include protection through ecosystem management plans. • Clearly define types of cold water corals and sponges and their vulnerability.

Overfishing and Stock Rebuilding

Topic	Workshop Discussion/Findings	Main Conference Panel Findings
Mixed Stock Management	<ul style="list-style-type: none"> ■ Difficult to assess all species in assemblages. ■ Management of major species must take into account protection of minor species especially when assessment data on these minor species is lacking. ■ Need to: <ul style="list-style-type: none"> • Improve species-specific data collection. • Improved bycatch reporting for all stocks (especially minor stocks). ■ Problems: <ul style="list-style-type: none"> • New problems emerge as effort shifts between fisheries. • Controlling fishing mortality rates still primary means of managing stock status. ■ Socio-economic goals of OY should be clarified. ■ Reduce capacity to maintain healthy stocks. 	<ul style="list-style-type: none"> ■ The panel encourages improved species-specific data collection and increased management measures to control bycatch, understanding that it is a necessary step in rebuilding minor stocks in mixed-stock fisheries. ■ The panel supports the use of fishing mortality rates as the primary tool in managing fish stocks, but also recognizes that we need more data to provide assessments for more stocks. <p>I ABSTENTION.</p>
Rebuilding Plans	<ul style="list-style-type: none"> ■ Progress made in rebuilding overfished stocks but some problems still exist for some stocks and regions. ■ Insufficient consideration given to allocative issues associated with stock rebuilding and status changes. ■ Need for improved communication of problems, successes and data and management needs ■ Rebuilding multiple jurisdiction, international stocks are especially difficult. <ul style="list-style-type: none"> • Need to encourage participation and action by international bodies. • Continue to focus on good U.S. management. • U.S. is leader in conservation. 	<ul style="list-style-type: none"> ■ The panel finds that, with respect to overfishing definitions and rebuilding plans, the MSA does not need major changes, however we recognize that improved communication of fishery successes and problems may provide a more accurate portrayal of the status of our fisheries. ■ The panel endorses the use of "depleted", where the cause is unknown or is not fishing related, while keeping focus on the need to rebuild these stocks. ■ The panel notes the difficulty in rebuilding multiple jurisdictional international stocks. ■ The panel encourages participation and action by international bodies. <p>I ABSTENTION.</p>
Ecosystem Considerations	<ul style="list-style-type: none"> ■ Ability to include environmental information in stocks assessments and MSY determinations is evolving but remains a technical and conceptual challenge. ■ Next step to prepare for long-term changes including risk modeling on the impacts of climate change. ■ Alternative strategies necessary for highly fluctuating, environmentally driven stocks. ■ Can harvest control rules be designed to more quickly access pulses of highly fluctuating stocks? ■ Caution that the shift in blaming stock status changes on environmental factors could detract from management responsibilities. 	<ul style="list-style-type: none"> ■ The panel encourages the incorporation of environmental variability as much as possible in stock status determination. <p>I ABSTENTION.</p>

Governance

Topic	Workshop Discussion/Findings	Main Conference Panel Findings
Regional Ocean Councils	<ul style="list-style-type: none"> ■ Councils should look to the U.S. Oceans Action Plan for guidance in developing governance systems. 	<ul style="list-style-type: none"> ■ The panel finds that Councils should look to the US Oceans Action Plan for guidance in developing governance systems.
Separating Science and Allocation	<ul style="list-style-type: none"> ■ All panel members said that we need to strengthen and improve science. ■ The majority of the panel believes that would be illogical to separate science from allocation. ■ Panel members stressed that science contributions need to be transparent, inclusive and understandable to the council and to the public. 	
Council Appointments	<ul style="list-style-type: none"> ■ The panel agreed on the general need for broadening the selection process for council member appointments. 	
Council Members-Conflict of Interest	<ul style="list-style-type: none"> ■ There was broad level of agreement that Council member conflict of interest was an issue for improvement in the Council process. 	<ul style="list-style-type: none"> ■ The panel supports the current conflict of interest guidelines and recommends that member training include specific reference to these guidelines. I OBJECTION.

Reconciling Statutes

Topic	Workshop Discussion/Findings	Main Conference Panel Findings
MSA & NEPA	<ul style="list-style-type: none"> ■ There are multiple challenges & options for simultaneously complying with NEPA & MSA, particularly in light of NS 2 & 7. ■ To some, NEPA principles and intended outcomes are already contained within MSA. ■ NEPA was intended for long-lived projects, not short-term adjustments such as annual setting of TAC required under MSA. ■ Some believe critical NEPA provisions should be added to MSA through legislation, thereby making MSA "NEPA compliant". ■ The process of fishery management can cope with statutory complexity through regulatory streamlining. ■ Some believe MSA should be exempt from NEPA. 	<ul style="list-style-type: none"> ■ Following the addition of critical NEPA provisions to MSA, thereby making MSA fully compliant with NEPA's intent, the panel finds that legislation should be developed specifying MSA as the functional equivalent of NEPA. I OBJECTION; I ABSTENTION.
MSA & FOIA	<ul style="list-style-type: none"> ■ Future fishery management programs will likely require more detailed data on fisheries from such sources as observers, video cameras, vessel monitoring systems, etc. ■ Confidentiality of fishery data is of major concern to industry and future data needs will likely increase such concerns. ■ Most fishermen are proponents of ensuring proprietary provisions regarding data collection for fisheries management are added to MSA. 	<ul style="list-style-type: none"> ■ The panel finds that MSA should be amended to provide for mechanisms to better shield proprietary data from FOIA. I ABSTENTION. ■ The panel finds that State law enforcement officials should be provided access to information and data gathered by VMS operated by the Office of Law Enforcement of NMFS. ■ The panel finds that the U.S. Coast Guard should be provided access to VMS data for homeland security purposes/Maritime Domain Awareness.
MSA & NMSA	<ul style="list-style-type: none"> ■ Conflicts between NMSA and MSA have developed in the Hawaiian Islands. ■ Some are concerned about non-Council fishery regulations proposed for the NW Hawaiian Islands Reserve. ■ The process for establishing fishery regulations within sanctuaries is unclear and confusing. ■ NOS fishery management regulations may pre-empt Council management (NW HI Islands Reserve). Who's in charge of fishery management in national marine sanctuaries? 	<ul style="list-style-type: none"> ■ The panel finds that fishery management authority in national marine sanctuaries should be clarified within NOAA and Federal Law. I ABSTENTION.

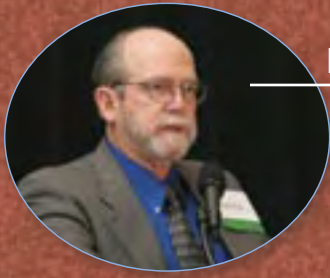


SECTION IV

Invited Papers

1. Ecosystem-based Management: To Amend or Not Amend (The Magnuson-Stevens Act), That is the Question
Gregg T. Waugh ... 148
2. Overfishing Scorecard
Roger Rufe ... 158
3. Strategies for Incorporating Ecosystem Considerations in Fisheries Management
Steve Murawski ... 163
4. Use of Scientific Review by the Regional Fishery Management Councils
David Witherell ... 172
5. Improving the Scientific Basis for Management by Separating Conservation and Management Decisions
Lee Crockett ... 190
6. Practical Recommendations for Improving the Use of Science in Marine Fisheries Management
Paul A. Sandifer and Andrew A. Rosenberg ... 197
7. How Legislated Criteria for Individual Transferable Quotas Could Defeat the Purpose of Transforming Fishermen from the Fox Raiding the Henhouse into the Farmer Guarding the Henhouse
Richard B. Allen ... 211
8. Balancing Flexibility and Safeguards in IFQ Programs: A Plan for Action
Dorothy M. Lowman ... 226
9. In Search of Transition, Community and a New Federalism: Six Questions to Confront on the Road Towards a National Policy on Dedicated Access Privileges
Seth Macinko ... 236





INVITED PAPER

Ecosystem-based Management: To Amend or Not Amend (The Magnuson-Stevens Act)—That is the Question.

GREGG T. WAUGH

GREGG T. WAUGH
Deputy Executive Director
South Atlantic Fishery
Management Council
1 Southpark Circle, Suite 306
Charleston, South Carolina
29407-4699
Gregg.Waugh@safmc.net

The views and opinions expressed in this paper are the author's alone, and should not be interpreted as those of the South Atlantic Council or any of the regional fishery management councils.

Abstract

The new buzz word is out and it's ECOSYSTEM MANAGEMENT. Everywhere one looks, it's ecosystem-this and ecosystem-that. Seems like everyone everywhere is working on something to do with ecosystem management. How do we bring some order to the ecosystem clutter that is engulfing us all? A review of the Magnuson-Stevens Act and the Ecosystem Principles Advisory Panel recommendations is provided in this paper. Based on these reviews, I conclude that current guidance is sufficient for the Councils and NOAA/NMFS to pursue ecosystem-based management, but a few actions would make this effort much more productive. I recommend:

- The Magnuson-Stevens Act not be amended to further address ecosystem-based management at this time.
- We continue to implement the Atlantic Coast Cooperative Statistics Program (ACCSP) and that ACCSP data be used in the Fishery Ecosystem Plan and Comprehensive Amendment.
- The NMFS SERO complete revisions to the permit database to allow tracking vessels across different fisheries/jurisdictions and that we continue to administer economic logbooks/expand their use.
- Guidelines not be developed at this stage and that we let each Council approach ecosystem management based on their best judgment and let the legal system develop case law to set limits.
- A meeting within each large marine ecosystem (however defined) be held each year so that existing agencies can share information and plan on ways to better address ecosystem-based management.
- NOAA fully implement the ACCSP Bycatch Module for all fisheries along the Atlantic Coast.
- NOAA fully implement the ACCSP Biological Module for all fisheries along the Atlantic Coast.
- NOAA supply sufficient support to collect, input, clean-up and analyze data through the economic logbook program in the snapper grouper fishery; further, that this logbook program be expanded to all of the Council's fisheries. In addition, in-depth studies of communities (including detailed in-person interviews) should be conducted within the South Atlantic Council's area.
- A Council/Agency Steering Committee be formed to guide ecosystem work, guide future ecosystem funding to the areas and projects that get the most done, and ensure outputs the Councils can use.
- NOAA map all NMFS, NOS and private sector individuals working on ecosystem projects supported by government funding.

Introduction

The new buzz word is out and it's ECOSYSTEM MANAGEMENT. Everywhere one looks, it's ecosystem-this and ecosystem-that. Seems like everyone everywhere is working on something to do with ecosystem management. How do we bring some order to the ecosystem clutter that is engulfing us all?

First we should examine the Magnuson-Stevens Fishery Conservation and Management Act (MSA), which is the governing law for managing fisheries in the United States, to see what direction is provided to the eight regional fishery management councils (bold emphasis added by author):

- Section 2(a) Findings (9) "One of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other **aquatic habitats**. **Habitat considerations** should receive increased attention for the conservation and management of fishery resources of the United States."
- Section 3 Definitions (5) "The term "conservation and management" refers to all of the rules, regulations, conditions, methods, and other measures (A) which are required to rebuild, restore, or maintain, and which are useful in rebuilding, restoring, or maintaining, any fishery resource and the **marine environment**; and (B) which are designed to assure that... (ii) irreversible or long-term adverse effects on fishery resources and the **marine environment** are avoided;..."
- Section 3 Definitions (28) "The term "optimum", with respect to the yield from a fishery, means the amount of fish which: (A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the **protection of marine ecosystems**;"
- Section 406 Fisheries Systems Research (a) Establishment of panel "Not later than 180 days after the date of enactment of the Sustainable Fisheries Act, the Secretary shall establish an advisory panel under this Act to develop recommendations to expand the application of ecosystem principles in fishery conservation and management activities." (d) Report — Within 2 years after the date of enactment of this Act, the Secretary shall submit to the Congress a completed report of the panel established under this section, which shall include: (1) an analysis of the extent to which ecosystem principles are being applied in fishery conservation and

management activities, including research activities; (2) proposed actions by the Secretary and by the Congress that should be undertaken to expand the application of ecosystem principles in fishery conservation and management; and (3) such other information as may be appropriate."

Evolving from single species management to ecosystem-based management is clearly allowed by the Magnuson-Stevens Act. Just how we get from "here" to "there" is open to much debate. Ecosystem recommendations from the U.S. Commission on Ocean Policy (USCOP 2004), the PEW Oceans Commission (POC 2003), the Ocean Action Plan, HR 4900 Oceans' Caucus Oceans 21 bill, and S 2647 Hollings National Ocean Policy and Leadership Act are outlined in Table 2 of the "Developing an Ecosystem Approach to Fisheries" background paper and are not repeated here.

In this paper, I review the recommendations from the Ecosystem Principles Advisory Panel and indicate how the South Atlantic Fishery Management Council (SAFMC) is addressing each recommendation. Further, I provide additional details and discussion of the approach to ecosystem-based management in the South Atlantic Council's area of authority. Additionally, I respond to the major recommendations from various commissions identified above and offer suggestions on whether the MSA needs to be amended for the Councils to implement ecosystem-based management.

Methods

In order to understand just exactly what the Councils are allowed to do concerning ecosystem-based management I went to the source — the Magnuson-Stevens Act. I also examined the detailed recommendations provided by the Ecosystem Principles Advisory Panel in response to the charge outlined in the Magnuson-Stevens Act. Ecosystem-based management recommendations from various bodies were also examined. Finally, I compared the various recommendations with available data and ongoing procedures used by the South Atlantic Council, based on my personal experience, along with the Council's Action Plan for ecosystem-based management (SAFMC 2004).

Results

In its report to Congress, the Ecosystems Principles Advisory Panel recommended eight actions that regional Councils should undertake in order to move toward ecosystem-based

fisheries management (EPAP 1999). The South Atlantic Council is taking action to fulfill these recommendations. Specific activities are identified below. In addition, critical research and monitoring needs under these actions were identified during the January 2003 Southeast Coastal Science Conference held in Charleston, South Carolina. The conference focused on current and planned research, outreach, education, observations, monitoring, assessments and management in the South Atlantic Bight.

Actions to be taken under the Council's Fishery Ecosystem Plan and Comprehensive Amendment:

1. Define the geographical boundaries of the ecosystem, including characterization of its biological, chemical and physical dynamics.

The SAFMC has undertaken cooperative mapping of deep-water coral habitat in the South Atlantic region. In partnership with the National Undersea Research Center at the University of North Carolina at Wilmington (NURC/UNCW), the Council will begin multi-beam sonar mapping of the outer continental shelf and upper continental slope off the coasts of North and South Carolina, covering a depth range of 100-500 m. Field-testing will occur January 2005 and the first offshore surveys will begin in October 2005. Significant additional funds will be needed to expand from the beta testing to not only map deepwater coral and snapper grouper habitat but also direct efforts onto the shelf to refine the mapping and characterization of all benthic habitats including those designated as EFH, EFH-HAPCs, SMZ, MPA or Coral HAPCs.

The SAFMC, in partnership with the Florida Fish and Wildlife Research Institute has developed an Essential Fish Habitat/Ecosystem homepage. The homepage hosts an Internet Map Server (IMS) application with links to downloadable bottom type data, associated metadata, substantial program information for the SAMFC, and links to related sites. The video and still imagery archives served from this site will provide researchers a unique opportunity to monitor coral health and abundance. It is strongly recommended that all research funded through programs in the South Atlantic provide results and metadata for inclusion into the regional system. Additional funds are required to expand information presented through the server and available on the Habitat/Ecosystem homepage. In addition, funds are required to capture readily available existing deepwater species information to support GIS for incorporation into the developing Council ArcIMS system and geodatabase.

The SAFMC has developed an *Oculina* Experimental Closed Area Evaluation Plan. Additional resources are required to complete mapping and characterization of habitats by December 2006. Further, resources are required for research and long-term monitoring identified in the plan. All research areas identified must be addressed by 2013 (10 years after implementation of Amendment 13A).

Funds are required for participation of State, University and other technical experts for participation in the FEP development process. Follow-up workshops will be held in 2004/2005 and writing teams will be developing draft Section of the FEP. In addition, these individuals will also participate in review and writing of sections of the FEP in their field of expertise. It is also essential that appropriate personnel in NOAA Fisheries SERO, SEFSC, and NOS, and other appropriate NOAA individuals be provided travel to participate in the FEP development process.

Additional Needs

- (i) Understand and model relationships of water flows among groundwater, riverine and estuarine systems and the impacts of water withdrawals and diversions on these systems.
- (ii) Improve understanding of cross-shelf transport processes and the effects on larval recruitment, adult movement patterns, contaminant distribution and other exchanges.
- (iii) Determine a mechanism to link oceanographic processes to ecosystem management.
- (iv) Role of remote-sensing in mapping processes and populations.
- (v) Develop a systematic approach to deliver high-resolution sea floor maps of shelf resources.
- (vi) Determine the extent of hardbottom habitats on the shelf.
- (vii) Evaluate locations and suitability of sand resources, the movement and fate of sand from beaches and the ecological impacts of beach renourishment.
- (viii) Characterize and map coastal processes (i.e., currents, gyres, etc.).
- (ix) Determine the ecological impacts of channel maintenance including the transport and fate of sediments from disposal sites.
- (x) Characterize benthic communities from soft and hard bottom habitats.
- (xi) Better outreach of map resources to the public.

- (xii) Relate coastal processes and mapping of shelf resources to EFH.
- (xiii) Document the effects of trawling on soft and hard bottom shelf habitats.

2. Assess ecological, human and institutional elements of the ecosystem.

A project has been completed to document the location, type and some historical aspects of fishing communities in the south Atlantic region. This effort has been spearheaded by Council staff working in conjunction with independent social science consultants. In this first phase of work, as much secondary data as possible was collected and then “ground-truthed” with rapid assessment fieldwork in the fishing communities. The secondary data included U.S. Census records, landings, permits and state information. Some of the secondary data are still being compiled. There now exists a digital report of the communities in the south Atlantic region and a broad GIS that visually represents communities from 1998 through 2001. There is a great need for funding to update the GIS of communities.

The second proposed phase of the project includes a more in-depth study of a sample community (or communities), including ethnographic (detailed in-person) interviews with different members of each fishing sector in order to compile community histories and describe current fishing practices, conflicts, coastal development, etc. Further work will be done employing GIS techniques to map community natural resource use and fishing patterns, past and present. Some of this work is being carried out in conjunction with anthropologists in both the SERO and the SESC in the summer and fall of 2004.

The South Atlantic Council and NOAA Fisheries partnered to develop and implement a Cost/Earnings Data Collection Program for South Atlantic Fisheries in 2002. This involves a separate logbook in addition to the ongoing logbook data collected from fishermen in the commercial snapper grouper fishery and the king and Spanish mackerel fishery. Trip specific information such as fuel costs, grocery costs, gear and boat expenses, revenue earned per trip and crew share is collected from fishermen participating in the survey. An end of the year survey to collect complementary fixed costs and annual expenditures will be administered as part of the program. Resources are required to expand and refine community research and cost and returns studies for all South Atlantic Fisheries.

Additional Needs

- (i) Document fleet dynamics in the South Atlantic commercial fisheries (including activity in Gulf and Mid-Atlantic/New England fisheries) using economic profiles. As a first step, existing data collection programs can be compiled in such a manner that it is possible to link vessels across fisheries and across states. Such preliminary models would form the basis for predicting fleet behavior under different management scenarios in a holistic manner (the flow of harvesting effort among different fisheries). These preliminary models can then be followed up with the development of more sophisticated simulation models that incorporate a wide array of biological, economic and social variables. [Note: The NMFS SERO is completing revisions to the permit database that will allow tracking vessels across different fisheries. The new system will be demonstrated at the June 2005 Joint Snapper Grouper Committee and Advisory Panel meeting in Cocoa Beach, Florida.]
- (ii) Broad-scale multidisciplinary assessment of both natural and human resources (especially current land use and demographic profiles) to identify components of the system most sensitive to stress and to define research priorities.
- (iii) Improve cross-disciplinary communication that will facilitate the development of society-sensitive instruments responsive to the impacts of land use change on resource sustainability.

3. Develop a conceptual model of the food web.

The SAFMC is currently partnering with Dr. Tom Okey (University of British Columbia) to develop an Ecopath model for the South Atlantic ecosystem from Cape Hatteras, North Carolina to the Florida Keys.

Resources are required to complete/refine and expand the SA Ecopath Model. This includes additional contract funds to conduct workshops to review, revise and re-parameterize the developing model and initiate the development of possible embedded sub-models for the *Oculina* Bank HAPC, the Florida Keys, Deepwater Snapper Grouper Habitat, and Albemarle-Pamlico Sound. Additional funds are needed to re-program and optimize the model and develop an automated function to import GIS for habitat (EFH & EFH-HAPCs) and possibly environmental parameters. Funds are required for participation of State, University and other technical experts in model development. In addition, some

participating individuals will also be involved in the review, writing or development of sections of the FEP in their field of expertise. It is also necessary that appropriate NOAA Fisheries, NOAA Beaufort Lab and NOS personnel participate in the ongoing Ecopath Model development process.

4. Describe the habitat needs of different life history stages for all managed species (including protected resources).

The SAFMC has initiated coupling reporting of fishing location from VMS with known habitat characterization in the rock shrimp fishery. Funds are needed to undertake research identified in the *Oculina* HAPC Research Plan and initiate comprehensive *Sargassum* research.

Additional Needs

- (i) Improve understanding of the life histories and critical habitats of deepwater species.
- (ii) Improve understanding of the life histories of seriously overfished and infrequently encountered species.
- (iii) Identify factors responsible for successful recruitment and develop indices of year class strength.

5. Calculate and characterize total removals (i.e., landings, effort, catch location, discards, and bycatch).

The SAFMC has included this information, to the extent possible, within FMPs since 1982.

Additional Needs

- (i) Track vessels across fisheries — ACCSP funded a project to transfer the NMFS Southeast Permits Database to Oracle. Based in part on this work, NMFS is scheduled to complete the transfer and have the capability to easily link the permit and landings databases. This will for the first time allow us to track a vessel's landings across different fisheries.
- (ii) Coordinate all data management for managed species — this should include Metadata.
- (iii) Implement ACCSP — need to improve catch and effort and quality control.
- (iv) Develop methodologies for integrating data management into ecosystem management.
- (v) Collect gut content data.

6. Develop indices of ecosystem health (e.g., biological indicators).

Additional Needs

- (i) Determine causes of HABs.
- (ii) Identify useful biological indicators to assess stress on estuarine systems.
- (iii) Develop long-term coordinated monitoring programs to document natural and anthropogenic variability in estuarine systems.
- (iv) Document the status and trends of estuarine fauna and their contaminant loads.
- (v) Better characterize the sources and impacts of nutrient inputs to rivers and estuaries.
- (vi) Better characterize the sources and impacts of contaminant inputs to rivers and estuaries.

7. Establish long-term monitoring.

Additional Needs

- (i) Develop long-term coordinated monitoring programs to document natural and anthropogenic variability in estuarine systems.
- (ii) Determine which agency is responsible for conducting this monitoring.

8. Develop appropriate management including catch limits, gear regulations, zoning, etc.

The SAFMC regulates fisheries to protect habitat from direct and/or indirect impacts of fishing through the following fishery management plans/activities: Snapper Grouper Plan; Shrimp Plan; Coral, Coral Reef & Live/Hardbottom Plan; Habitat Plan; *Sargassum* Plan; Dolphin/Wahoo Plan; Golden Crab Plan; *Oculina* Coral HAPC (closed area); Essential Fish Habitat & Habitat Areas of Particular Concern Designations and Protection; and Live Rock Aquaculture Program.

Additional Needs

- (i) Develop decision criteria for siting of MPAs in the region.
- (ii) Determine baseline conditions and evaluate response of newly established MPAs.
- (iii) Expand research in the *Oculina* Bank HAPC.

Progress on the SAFMC Fishery Ecosystem Plan

With the Habitat Plan as a cornerstone, the South Atlantic Council is developing an ecosystem-based approach to resource management. Evolution of the Habitat Plan into a Fishery Ecosystem Plan (FEP), and transition from single species management to ecosystem-based management, will require a greater understanding of the South Atlantic Bight ecosystem and the complex relationships among humans, marine life and essential fish habitat. This effort will provide a more comprehensive understanding of the biological, social and economic impacts of management.

Technical Workshops (2003)

A series of 15 workshops were held during 2003 to integrate and update habitat information and begin development of the South Atlantic Fishery Ecosystem Plan (FEP). These workshops brought together Habitat and Coral Advisory Panel members and a core group of resource and habitat experts from cooperating federal, state and academic institutions as well as conservation organizations that participated directly in development of the Habitat Plan.

The Habitat Plan will serve as the basis for the FEP. Updated life history and stock status information on managed species and the characteristics of the food web they exist within will be incorporated as well as social and economic research needed to fully address ecosystem-based management. Writing Teams (composed of AP members, experts from state and federal agencies, universities and Council staff) will review, update and expand existing chapters of the Habitat Plan and incorporate this material into new chapters for the FEP (e.g., Ecosystem Modeling and Research Needs to support Ecosystem-based Management).

Information compiled during and as follow-up to the workshops is helping the Council meet the EFH mandate to update EFH and EFH-HAPC information and designations. Also, this process would follow both the Council of Environmental Quality's and NOAA's recommendations (in 46 FR 18026/51 FR 15618 and NOAA Order 216-6 respectively) to review any EIS or SEIS that is more than five years old to determine if the preparation of a new EIS or SEIS is warranted. The FEP will be used to develop a Comprehensive Amendment/EIS for all Fishery Management Plans (FMPs) similar to the Habitat Plan and Comprehensive Habitat Amendment completed in 1998.

Workshops were conducted on habitat types including wetlands, oyster/shell habitat, seagrass, pelagic habitat (including *Sargassum* and the water column), coral and live/hard bottom and artificial reefs. In addition, workshops on the use of GIS to support EFH and ecosystem-based management and water issues affecting fishery habitat and production were held.

Technical Workshops (2004/2005)

Workshops to expand efforts initiated during the habitat and issue-based workshops will be held during 2004 and 2005 on topics such as artificial reefs, deepwater habitat/coral, marine zoning and impacts of fishing on habitat. In addition, it is anticipated that a regional workshop to identify research and monitoring needs to support ecosystem-based management and further development of the FEP in the South Atlantic region will be held in 2004 and 2005. Internationally recognized experts in ecosystem characterization would be invited to participate and provide guidance to managers and researchers in determining the most significant needs to be addressed in development of ecosystem-based management.

Workshop to Refine South Atlantic Bight Ecopath Model (2004)

A preliminary South Atlantic Bight Ecopath model was developed cooperatively between Dr. Tom Okey (University of British Columbia) and Roger Pugliese (SAFMC staff) as part of the Sea Around Us project funded through the PEW Charitable Trust Foundation. This model will be refined with the aid of a broad range of experts and involve: (1) scoping and system definition, (2) parameter estimations and refinement and (3) "mass balancing". The Ecopath model developed will help the Council and cooperators in identifying available information and data gaps while providing insight into ecosystem function. More importantly, the model will aid in identifying research necessary to better define populations, fisheries and their interrelationships. The two workshops held in 2003 to refine the Ecopath/Ecosim model have resulted in development of a list of functional groups constituting the South Atlantic Bight (SAB) ecosystem and preliminary designation of the areal extent of habitats to be included in the model. Experts in various aspects of the ecology of the SAB have been requested to participate in the process by providing various input parameters for the model.

The model is being developed to cover the area between Cape Hatteras, North Carolina through the Florida Keys and extend from the upper wetlands to the 1000-meter isobath. Catch data from 1995 to 2002 will be included. Currently,

the model is being constructed to include 93 biotic groups. The Council is investigating the possibility of expanding and refining the South Atlantic Ecopath Model with development of embedded sub-models for the *Oculina* Bank HAPC, The Florida Keys, Deepwater Snapper Grouper Habitat and Albemarle-Pamlico Sound.

Cooperative Research to Support Ecosystem-based Management

The Council has partnered with the National Undersea Research Center at the University of North Carolina at Wilmington (NURC/UNCW) by providing seed money to begin multi-beam sonar mapping of the outer continental shelf and upper continental slope. This region of the Exclusive Economic Zone (EEZ) from just north of Cape Hatteras (North Carolina) to Cape Canaveral (Florida), covering a depth range of 100-500 m, includes important habitat for current and future economically valuable species (e.g., groupers, wreckfish, crabs, tilefish, etc.). Habitats used by these species include soft bottoms of various types and a wide range of hard bottom lithotypes. This area includes important and unique features such as “The Point” canyon system (just north of Cape Hatteras, North Carolina) and the “Charleston Bump” (off of Cape Romain, South Carolina). The features of these two EFH-HAPCs result in significant oceanographic effects in the region (e.g., upwellings) and also represent productive fishery areas. Throughout the region, and toward the deeper end (350-450 m), are scattered but extensive deep reef systems composed of delicate, slow growing ahermatypic corals (e.g., *Lophelia*). All of these habitats are poorly mapped. In addition, the Council is considering deepwater MPAs that fall in the

same depth range. High-resolution (1-2 m) bathymetry maps are required for these areas.

The NURP Autonomous Underwater Vehicle (AUV) will be operated by NURC/UNCW. The unit will be maintained and operated by NURC/UNCW and be used in the initial testing by mapping deepwater coral and associated habitats in the South Atlantic.

The South Atlantic Council and the Florida Fish and Wildlife Research Institute are partnering to develop an Essential Fish Habitat/Ecosystem website that will be accessible from the South Atlantic Council’s website. The Florida Fish and Wildlife Research Institute will host an Internet Map Server (IMS) application with links to bottom type data that can be downloaded, associated metadata, substantial program information for the Council and links to related sites. The Website will be operated and maintained at the Florida Fish and Wildlife Research Institute in partnership with the South Atlantic Council.

The Internet Map Server (IMS) component of this project will bring the power of Geographic Information Systems (GIS) technology and Image Analysis tools to ordinary Internet browsers. The Coral and Benthic Habitats IMS will be an effective tool for displaying, sharing and querying information related to hard bottom and EFH across the South Atlantic coast. The video and still imagery archives served from this site will provide researchers a unique opportunity to monitor coral health and abundance.

Figure 1.

Fishery Ecosystem Plan Timeline

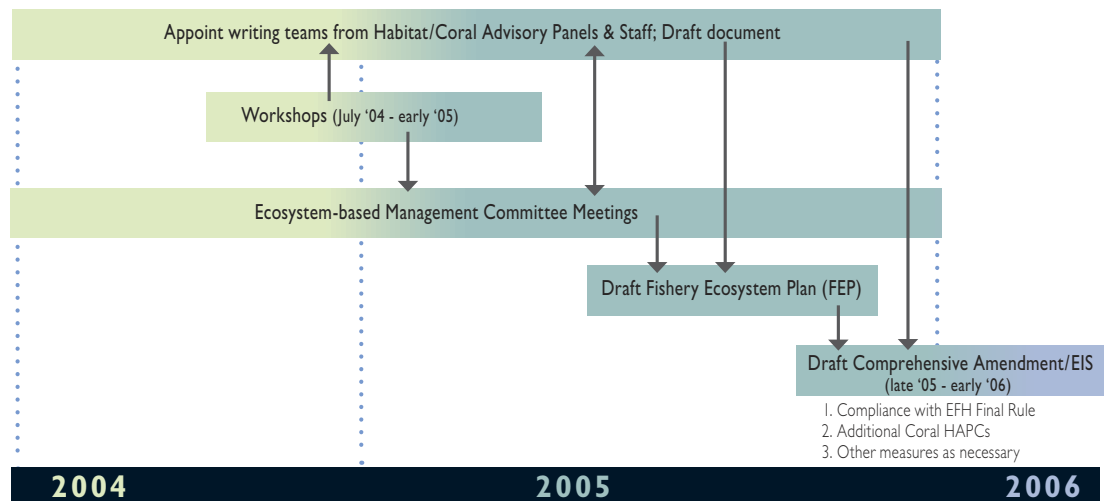
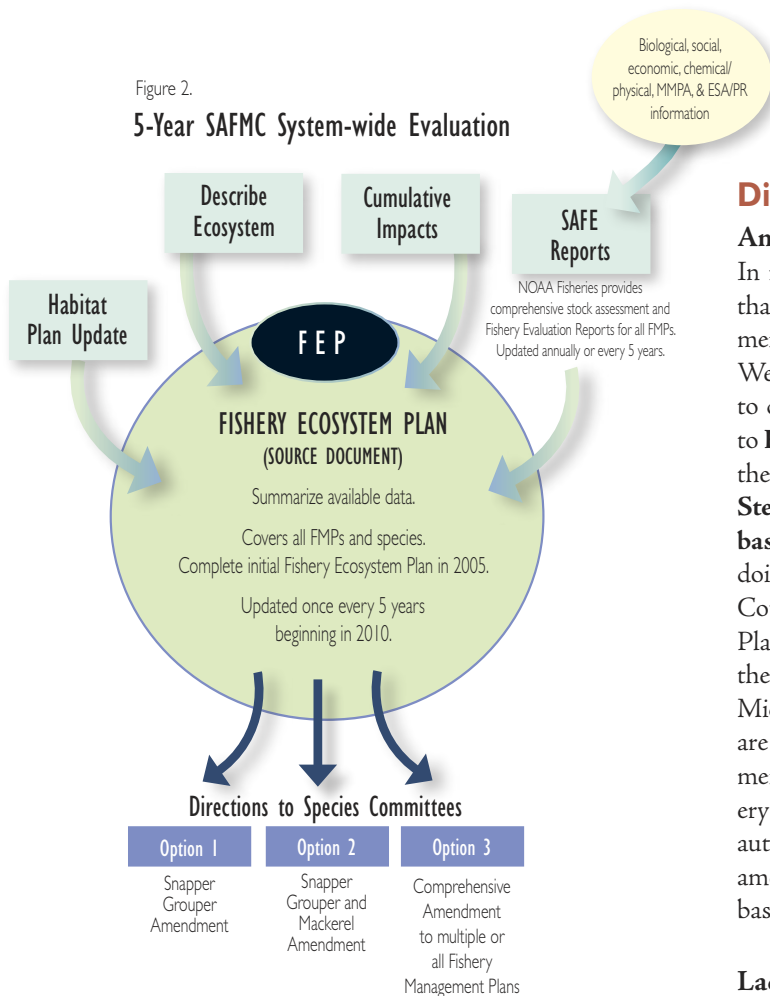


Figure 2.

5-Year SAFMC System-wide Evaluation



This partnership involves two project phases: (1) configuring of hardware, software and GIS data for serving via the Internet; and (2) inclusion of video and imagery processing, website development and maintenance of products and services developed in Phase 1. Additional funding is needed to maintain the system and provide a mirror ArcIMS Intranet system which will further integrate baseline information (e.g., habitat, catch, community, fishery operations and economics) to support ecosystem-based management and the FMP/EIS development process.

Approach

The South Atlantic Council has adopted a 3-pronged approach: (1) Map fishermen and document their catch/bycatch as they move across fisheries in our ecosystem; (2) Expand existing relationships with other management agencies; and (3) Expand and refine the South Atlantic Ecopath Model and explore sub-models for the *Oculina* Bank HAPC, FL Keys, Deepwater Snapper Grouper Habitat and Albermarle-Pamlico Sound areas. The initial plan will be completed in 2005 (see detailed timing Figure 1), and it is the South Atlantic Council's intent that the Fishery Ecosystem Plan be updated every five years beginning in 2010 (see Figure 2).

Discussion

Amending the Magnuson-Stevens Act

In reviewing the Magnuson-Stevens Act, I have concluded that there is sufficient legal authority for the Fishery Management Councils to implement fishery eco-system management. We don't need to amend the Act to **ALLOW** the Councils to do ecosystem-based management. However, if you want to **FORCE** the Councils to do ecosystem management, then the Act should be amended. **I recommend the Magnuson-Stevens Act not be amended to further address ecosystem-based management at this time.** The Councils are already doing ecosystem-based management (e.g., the South Atlantic Council's Habitat Plan, the Western Pacific Council's Coral Plan, the North Pacific Council's ecosystem considerations in their SAFE report). Further, four Councils (New England, Mid-Atlantic, South Atlantic and Gulf of Mexico) currently are conducting pilot projects on ecosystem-based management. The South Atlantic Council intends to produce a Fishery Ecosystem Plan. Allowing more time under the existing authority would provide more insight into the need for future amendments. Currently the two biggest threats to ecosystem-based management are lack of data and potential guidelines.

Lack of Data

If we have sufficient information to address ecosystem-based considerations and do not use it, then we are not using the best available science, and a plan or amendment could be rejected. If on the other hand we do not have sufficient information, then we would be in the same boat as we were/are concerning habitat considerations which would provide lots of opportunity for lawsuits. Let the available information/data dictate how each Council does ecosystem management.

In the South Atlantic Council's area, basic data on number of fishermen, catch, bycatch, discards, size/age composition, and CPUE is incomplete to missing. The solution, **I recommend we continue to implement the Atlantic Coast Cooperative Statistics Program (ACCSP) and that ACCSP data be used in the Fishery Ecosystem Plan and Comprehensive Amendment.**

Information on fleet dynamics in the South Atlantic Council's area and links to the Gulf of Mexico, Mid-Atlantic and New England areas is not yet available. The solution, **I recommend the NMFS SERO complete revisions to the permit database to allow tracking vessels across different fisheries/jurisdictions and that we continue to administer economic logbooks/expand their use.**

Guidelines

Whether the Act is amended or not we need to address Guidelines versus Case Law. In most aspects of our lives we do not have detailed guidelines that tell us what to do. In many cases, we rely on case law to set limits. That is, if someone does not agree with something being done, they can sue to determine whether the proposed action is allowed under existing law. If this works for most aspects of our lives, then why do we need guidelines for ecosystem-based management? Currently there are no guidelines so we are only limited by available data and each individual Council's willingness to explore this new area. Guidelines at this stage would not help and may hurt the process by providing lots of opportunities for lawsuits similar to the habitat guidelines. **I recommend guidelines not be developed at this stage and that we let each Council approach ecosystem management based on their best judgment and let the legal system develop case law to set limits.**

Evolution not Revolution

The South Atlantic Council's approach is one of Evolution from the Habitat Plan to a Fishery Ecosystem Plan. Get the basics first — don't put the satellite dish on the house before you build the foundation. We need basic data on catch, CPUE, size and age data; the ability to track fishermen across fisheries; to know who is eating whom; etc. Then model the data as best as we can. The Council is currently setting the optimum fishing mortality rate (Foy) as 75% of the fishing mortality rate that produces maximum sustainable yield (Fmsy) with this "step-down" addressing risk and ecosystem functions. To determine the split, one can use the assumption that most people feel "safe" going about 10% above the speed limit. Therefore, let's attribute 10% to risk. The remaining 15% would then be attributed to ecosystem function/services. This is another example of how the Councils are currently implementing ecosystem-based management.

Regional Ocean/Ecosystem Councils

The current landscape within the coastal zone is crowded enough. The last thing we need is another player in the game. Unless you are willing to change existing legal authority, which all the proposed modifications make clear is not the case, then simply creating another layer of bureaucracy will not be productive. What is needed is a mechanism for the existing players to meet and work together. **I recommend a meeting within each large marine ecosystem (however defined) be held each year so that existing agencies can share information and plan on ways to better address ecosystem-based**

management. The South Atlantic Council currently uses a Habitat Advisory Panel comprised of representatives from State/Federal agencies and the private sector. This Advisory Panel recommends action to the Council on individual projects that may impact habitat and develops policy recommendations. The Council is exploring ways to expand this group to include all players involved with managing our ecosystem.

FEPs, Ecosystem-based FMPs

The U.S. Commission on Ocean Policy recommends consideration of cumulative impacts of fishing and other activities on all components of the ecosystem, setting harvest quotas based on a holistic ecosystem understanding, redesignating EFH in the ecosystem rather than on a single-species basis and developing broad regional bycatch reduction plans targeting all components of the ecosystem. The PEW Oceans Commission has similar recommendations and add regulating use of fishing gear that is destructive to marine habitats and requiring access and allocation planning as a condition of fishing. The South Atlantic Council has a long list of gear restrictions and/or prohibitions addressing fishing trawls, entanglement nets and fish traps in the snapper grouper fishery; prohibition on rock shrimp trawling in the *Oculina* HAPC; prohibition on all harvest or possession of coral). The South Atlantic Council has an ITQ program in the wreckfish fishery and controlled access programs in the snapper grouper, rock shrimp and king mackerel fisheries. Redesignating EFH in an ecosystem sense will be evaluated during preparation of the fishery ecosystem plan. The South Atlantic Council is aggressively pursuing implementation of a regional bycatch monitoring program for all fisheries through implementation of the ACCSP Bycatch Module. **I recommend NOAA fully implement the ACCSP Bycatch Module for all fisheries along the Atlantic Coast.** The idea of setting quotas based on a holistic ecosystem understanding is very much dependent on us understanding our ecosystem. This data is simply unavailable in the southeast. In fact, I know of no current gut content studies being conducted within the South Atlantic Council's area of jurisdiction. **I recommend NOAA fully implement the ACCSP Biological Module for all fisheries along the Atlantic Coast.** Modeling to evaluate holistic ecosystem considerations will be examined during preparation of the fishery ecosystem plan.

Contents of FMPs

The U.S. Commission on Ocean Policy recommends each FMP consider the effects of fishing on the ecosystem, impacts of environmental phenomena, more data to consider the

impacts of fishery management on fishermen and communities and use of MPAs. The PEW Commission recommends each FMP require zoning/closed areas, redefine overfishing in an ecosystem context and require cooperative data collection and planning. The South Atlantic Council has been very active in the zoning area (e.g., special management zones through the snapper grouper plan, *Oculina* HAPC closed area, *Oculina* HAPC). The Council will be evaluating MPAs as a part of the fishery ecosystem plan and comprehensive amendment. The Council has been active in developing social and economic data collection programs to further our understanding of the human impacts. **I recommend NOAA supply sufficient support to collect, input, clean-up and analyze data through the economic logbook program in the snapper grouper fishery; further, that this logbook program be expanded to all of the Council's fisheries. In addition, in-depth studies of communities (including detailed in-person interviews) should be conducted within the South Atlantic Council's area.** Considering the effects of fishing on the ecosystem is a very difficult and data intensive task. The Council will evaluate this area during preparation of the fishery ecosystem plan.

Other Recommendations

Earlier I mentioned the high level of ecosystem clutter we are all experiencing. There are two major areas where we need help in the short-term. The first has to do with planning. **I recommend formation of a Council/Agency Steering Committee to guide ecosystem work, guide future ecosystem funding to the areas and projects that get the most done, and ensure outputs the Councils can use.** The steering committee should include 1 Council staff from each Council, 1 NMFS staff from each Center, 1 NMFS staff from HQ and 1 NOS staff. The steering committee should be established within 30 days and/or before new funding becomes available (whichever occurs sooner).

The second recommendation addresses the large number of individuals working on a very diverse number of ecosystem-related projects. **I recommend that NOAA map all NMFS, NOS and private sector individuals working on ecosystem projects supported by government funding.** Results should include location, contact information, description of project, level of funding and timeframe of project. This should be completed within 30 days.

Conclusion

The Magnuson-Stevens Act does not need to be amended to allow the Councils to pursue ecosystem-based management. Based on my review, I suggest some additional actions that would make the Council's work more productive and further the collective ecosystem-based management.

Acknowledgments

I thank the South Atlantic Council members for their willingness to tackle such a complex issue and council staff for all their work as we move into ecosystem-based management. Roger Pugliese has been responsible for our Habitat Plan which forms the basis of our fishery ecosystem plan. Thanks to the Florida Fish & Wildlife Research Institute for all their help with our website and for hosting an Internet Map Server. In addition, thanks to Congress and NMFS for providing funding for the ecosystem pilot projects.

References

- ECOSYSTEM PRINCIPLES ADVISORY PANEL. 1999. Ecosystem-based Fishery Management: A Report to Congress by the Ecosystem Principles Advisory Panel. April 1999. U.S. COC, NOAA, NMFS.
- PEW OCEANS COMMISSION. 2003. America's Living Oceans: Charting a Course for Sea Change. A report to the Nation. Recommendations for a New Ocean Policy.
- SAFMC. 2004. ACTION PLAN. Ecosystem-based Management: Evolution from the Habitat Plan to a Fishery Ecosystem Plan. South Atlantic Fishery Management Council.
- U.S. COMMISSION ON OCEAN POLICY. 2004. An Ocean Blueprint for the 21st Century. Final Report of the U.S. Commission on Ocean Policy. Washington, D.C.



INVITED PAPER

Overfishing Scorecard

ROGER RUFÉ

VICE ADMIRAL ROGER RUFÉ
President and CEO
The Ocean Conservancy
2029 K Street
Washington, D.C. 20006
www.oceanconservancy.org

Abstract

The purpose of this scorecard is to help build on successes in U.S. federal fishery management. To accomplish this goal, the Ocean Conservancy has devised an objective two-step approach for: (1) identifying examples where management has been most successful at ending overfishing and rebuilding depleted fish stocks, and (2) evaluating what makes these examples relatively successful. The results of this scorecard provide clear recommendations on how to make management more successful where overfishing and depleted fish stocks are ongoing problems. We offer this scorecard as a draft, and we hope discussion and suggestions from others will help us revise and improve it. The current draft has already benefited from initial discussions with managers and others.

Preliminary results show that success rates vary among regions and fisheries, and that a number of best management practices promote success. These best management practices include preventing or eliminating overcapacity, and establishing and enforcing science-based catch limits that effectively constrain total mortality of target species to levels below maximum sustainable yield (MSY) fishing rates. In regions where these practices are more commonly used, such as the North Pacific, regional success rates are higher. In regions where overall success rates are lower, those fisheries that utilize more of these best management practices exhibit success rates higher than regional averages. The same trend is also apparent within individual fisheries. For example, in the New England groundfish fishery, which has a relatively low score overall, some individual stocks are faring better where one of these best practices is used: fishing below MSY fishing rates.

This scorecard provides strong evidence that broader use of the identified best management practices would improve success rates for ending overfishing and rebuilding depleted stocks.

Methods

The annual *Status of the Stocks* report to Congress contains the information that was used in evaluating success in ending overfishing and preventing and reversing the depletion of fish populations. Status determination criteria for “overfishing” and “overfished” have been established by the Councils, based on guidelines prepared by NMFS.¹ This evaluation scores each Council for how many major stocks² managed by that Council are above and below thresholds for overfishing and overfished (depleted), and how many major stocks lack sufficient information for status determinations.

¹ Status as reported in NOAA’s annual report to Congress. Status determinations do not necessarily conform to the most recent technical guidance produced by NOAA.

² Major stocks = stocks with landings in excess of 200,000 pounds per year, according to criteria from SOS 2003. Stocks with jurisdiction shared between two Councils are not included.

Overfishing is defined as a rate of fishing that exceeds a maximum fishing mortality rate (MFMR), and overfished is defined as stock abundance that falls below the stock's minimum stock size threshold (MSST). To avoid confusion between the terms "overfishing" and "overfished," the term "depleted" will sometimes be used to refer to stocks defined as overfished. Scores for success at ending overfishing and rebuilding depleted stocks were obtained as follows. First, data were obtained from NMFS' annual report to Congress on the status of U. S. fisheries. For each fish stock, a score of 1 was assigned for stocks with overfishing not occurring, a score of 0 was assigned for stocks with identified overfishing, and a score of 0.5 was assigned for stocks "at risk" because of insufficient information for status determination or no status determination criteria. This "at risk" category is necessary because substantial risk of overfishing and depletion exists when major fisheries exist on stocks of unknown status. Similarly, each stock received a score of 1 for not overfished, 0 for overfished, and 0.5 for unknown or undefined status for overfished.

Each stock was scored separately for overfishing status and overfished status and the results averaged. Thus, a single stock would score an average of 1 for no overfishing (score=1) and not overfished (score=1), 0.5 for overfishing (score=0) and not overfished (score=1), 0.5 for no overfishing (score=1) and overfished (score=0), 0 for overfishing (score=0) and overfished (score=0), and 0.75 for no overfishing (score=1) and overfished status unknown (score=0.5). Scores for more than one fish stock were combined by averaging the scores obtained for each stock. All scores were converted to % by multiplying by 100 to yield a scale of 0-100%. This scoring method can be used for any number of stocks, and it will produce a range of 0-100% success, with 100% indicating all stocks with no overfishing and not overfished status, 0% indicating all stocks with overfishing and overfished status.

Results and Discussion

Some regions and some fisheries are close to achieving the goal of ending overfishing and rebuilding depleted fish stocks, but persistent overfishing continues in many important U.S. fisheries. Using status determinations from the most recent report to Congress by the National Marine Fisheries Service (NMFS), scores for ending overfishing and rebuilding depleted stocks are as follows for the major stocks in each region. Note that management in each region is not the sole responsibility of the Management Councils. Jurisdiction is typically shared among the Councils, NMFS, states, and

Council	Score	% Change since 1997
North Pacific	82%	+2%
Western Pacific	77%	-8% (decline)
Pacific	75%	+24%
Mid-Atlantic	70%	+15%
New England	58%	+18%
Gulf of Mexico	58%	+7%
South Atlantic	57%	+12%
Caribbean	50%	+1%

in some cases, international entities. Thus, scores should be interpreted as an evaluation of overall management success for federal fishery management in a region.

The scores measure success at avoiding or ending overfishing and rebuilding depleted (overfished) stocks. Scores are reported for all of the "major" stocks with a single Management Council responsible for federal management. These scores are derived from Table 1, pages 7-8 of *The Status of U.S. Fisheries, 2003*, the annual report that is provided to Congress by NMFS. The "% change" column reports the change in the score since the first report on stock status in 1997. The data used to calculate these scores are presented in Table 1. The scores reported in Table 1 were calculated as described in "Methods."

Progress in ending overfishing and rebuilding depleted fish stocks has been limited by the failure of managers to end persistent overfishing in a number of important fisheries, including some that have experienced overfishing every year since reporting began in 1997. Further progress will require concerted efforts to end overfishing in these problematic fisheries where overfishing is a long-term problem. How can these problems be corrected?

One useful approach is to identify the best management practices that have produced success where it currently exists and to begin to utilize these approaches where management has been less successful. To identify the best management practices that produce success, we applied the scoring method developed for Table 1 to compare the success of individual Fishery Management Plans at ending overfishing and rebuilding depleted stocks. This comparison should allow us to identify the management practices that produce success. These results, presented in Table 2, show that some regions have generally higher scores, but success rates do vary within each region. Thus, management performance and success cannot be solely attributed to regional factors.

Table 1.

Regional Scores for Success at Ending Overfishing and Rebuilding Depleted Fish Stocks

Region	Overall Score	Overfishing					Overfished				
		Yes	No	unk/ND	# Stocks	Overfishing Score	Yes	No	unk/ND	# Stocks	Overfished Score
North Pacific	82%	0	49	10	59	92%	1	28	30	59	73%
Western Pacific	77%	1	7	5	13	73%	0	8	5	13	81%
Pacific	75%	2	34	17	53	80%	7	27	19	53	69%
Mid-Atlantic	70%	3	8	0	11	73%	3	7	1	11	68%
New England	58%	8	12	7	27	57%	10	15	2	27	59%
Gulf of Mexico	58%	4	8	11	23	59%	4	7	12	23	57%
South Atlantic	57%	8	10	6	24	50%	1	1	2	4	50%
Caribbean	50%	1	1	2	4	50%	1	1	2	4	50%

Table 2.

Success Scores for Selected Fishery Management Plans

FMPs were included if enough information was available for The Ocean Conservancy to answer the questions in Table 3.

Fishery	Overall				Overfishing				Overfished			
	Yes	No	unk/ND	Overall Score	Yes	No	unk/ND	Overfishing Score	Yes	No	unk/ND	Overfished Score
NE multispecies	18	21	3	54%	8	10	3	55%	10	11	0	52%
Pacific groundfish	9	27	26	65%	2	16	13	73%	7	11	13	56%
Pacific coastal pelagics	0	6	6	75%	0	4	2	83%	0	2	4	67%
Gulf of AK groundfish	0	33	15	84%	0	24	0	100%	0	9	15	69%
W. Pacific pelagics	1	15	10	77%	1	7	5	73%	0	8	5	81%
Gulf of Mexico reef fish	6	6	16	50%	3	3	8	50%	3	3	8	50%
Coastal pelagic Gulf & SA	1	9	4	79%	0	5	2	86%	1	4	2	71%
S Atlantic snapper grouper	11	13	8	53%	6	6	4	50%	5	7	4	56%
Mid Atl s fl, scup, b s bass	3	3	0	50%	2	1	0	33%	1	2	0	67%
Mid Atl mack, squid, bfish	2	7	1	75%	1	4	0	80%	1	3	1	70%
Bering, Aleutians gndfish	0	29	19	80%	0	17	7	85%	0	12	12	75%
Bering, Aleutians crab	1	5	6	67%	0	3	3	75%	1	2	3	58%
Atl. surf clam, quohog	0	4	0	100%	0	2	0	100%	0	2	0	100%
Mid Atl golden tilefish	2	0	0	0%	1	0	0	0%	1	0	0	0%
Atlantic sea scallop	0	2	0	100%	0	1	0	100%	0	1	0	100%
Atlantic herring	0	2	0	100%	0	1	0	100%	0	1	0	100%
Western Pacific pelagics	1	15	10	77%	1	7	5	73%	0	8	5	81%

What is the basis for success at the fishery level? To address this question, we developed a list of candidate “best management practices” that we expected might be responsible for success where it exists. To identify which fisheries use these candidate best practices, we developed the following list of questions:

1. Are target stocks assessed?
2. Has overcapacity been prevented or eliminated?
3. In general, are catch levels constrained by quota-type limits on landings?
4. Are catch limits adequately monitored and enforced?
5. In general, are catches below targets or quotas?
6. Is bycatch monitoring routine and reliable?
7. Are fish stocks protected by bycatch caps or limits?
8. Is MSY established, or are MSY proxies established?
9. Are target fishing rates established at levels below MSY or MSY proxies?

The questions are “yes” or “no” questions, and the range of answers include “yes,” “no,” and “partial yes.” For complex situations, “yes” is reasonable even if the answer is not “100% yes.” For example, if a fishery has most target stocks assessed, then “target stocks assessed” could be answered “yes” even if a few minor stocks have not been assessed. The goal is to determine the general character of each fishery. “Yes” or “no” were used where answers were clearly yes or no, and also where some exceptions may exist, but where “yes” or “no” seemed to describe best the general approach used in a fishery. Management of some fisheries was clearly intermediate between “yes” or “no” answers for some questions, so an answer of “partial yes” was used (indicated by a “P” in Table 3). Improvement in the answers to these questions and expansion to other fisheries is an important area where we expect to improve this scorecard following review and comment of this draft.

We applied these questions to a wide range of fisheries for which we had adequate information to answer the questions (Table 3). We welcome review and comment on the answers, and help in expanding this matrix to other fisheries not yet

Table 3.

Success Scores and Use of Candidate Best Management Practices in Fishery Management Plans

Y Yes N No P Partial Yes

	% Success	1 Stocks assessed	2 Overcapacity prevented	3 Quotas exist	4 Limits enforced	5 Catches below targets/quota	6 Bycatch monitoring	7 Bycatch limits	8 MSY or proxy	9 Targets/quotas < MSY
Atlantic surf clam, quohog	100%	Y	Y	Y	Y	Y	N	N	Y	Y
Atlantic sea herring (NEFMC)	100%	Y	Y	Y	Y	Y	P	N	Y	Y
NE sea scallops (NEFMC)	100%	Y	N	P	P	Y	P	P	Y	Y
Gulf of AK groundfish	84%	Y	P	Y	Y	Y	Y	Y	Y	Y
Bering, Aleutians groundfish	80%	Y	P	Y	Y	Y	Y	Y	Y	Y
Coastal pelagics, GM & SA	79%	P	Y	P	P	Y	N	N	P	Y
Western Pacific pelagics	77%	P	Y	N	N	Y	Y	N	N	N
Pacific coastal pelagics	75%	P	Y	P	P	P	P	N	Y	Y
Mid Atl mack, squid, butterfish	75%	Y	P	Y	Y	P	Y	P	Y	N
Bering, Aleutians crab	67%	Y	N	Y	Y	Y	Y	Y	Y	Y
Pacific groundfish	65%	Y	N	Y	Y	P	Y	P	Y	Y
New England multispecies	54%	Y	N	N	N	P	N	N	Y	N
S Atlantic snapper grouper	53%	Y	N	Y	Y	P	N	N	Y	Y
Gulf of Mexico reef fish	50%	P	N	P	P	P	P	N	P	Y
Mid Atl s fl, scup, b s bass	50%	Y	P	Y	Y	P	Y	N	Y	N
Mid Atl golden tilefish	0%	Y	N	Y	Y	Y	Y	N	Y	Y

included. The fisheries included in this analysis include examples from most regions as well as fisheries with a wide variety of target stocks and fishing methods. Expansion to other fisheries will probably provide further insight, but we believe that the conclusions of the analysis are useful with the present list of fisheries.

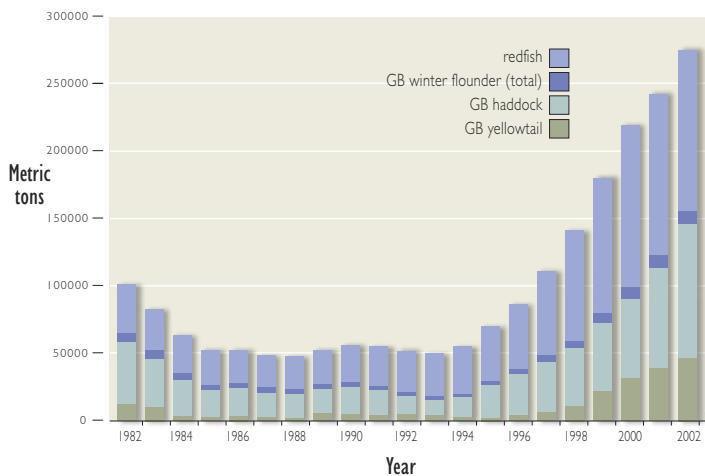
In general, the most successful fisheries tend to have catch limits on total mortality that are established below MSY and enforced, and the most successful fisheries also tend to have avoided or solved problems with excess fishing capacity (column 2). This is shown by the grouping of “yes,” “partial

yes,” and “no” answers to questions 2 (overcapacity prevented), 5 (catches below limits), and 9 (target fishing rates below MSY). None of the questions shows perfect trends, but success rates tend to be higher for fisheries that do a better job of implementing these three best management practices.

These best management practices can also be validated by trends within a single fishery. For example, the New England groundfish fishery shows better success for individual stocks that utilize one of the best management practices, mortality constrained below MSY fishing rates (see Figures 1A,B).

Figure 1A.

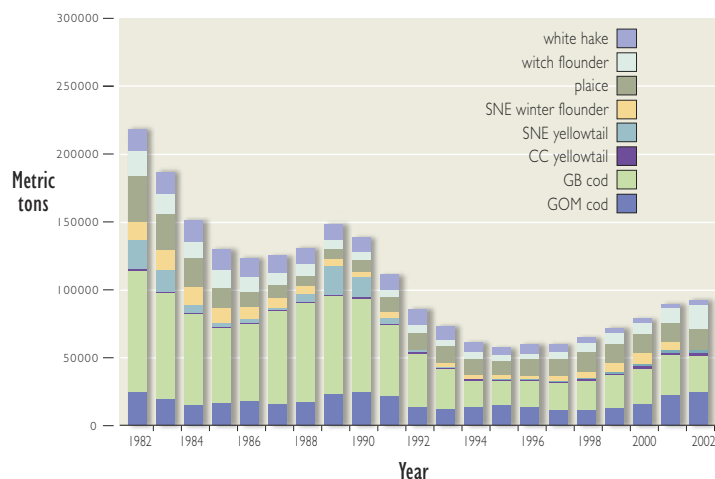
SSB of Four Groundfish Stocks - Overfishing Ended



Sources: 1982-2001 GARM Report (NEFSC, 2002). SSB estimates for redfish and white hake from SAW 33 (2001). SSB estimates for 2002 based on projections presented to NEFMC by Steve Murawski (2003).

Figure 1B.

SSB of Eight Groundfish Stocks - Overfishing Continues





INVITED PAPER

Strategies for Incorporating Ecosystem Considerations in Fisheries Management

STEVEN MURAWSKI

STEVEN MURAWSKI
Director
Office of Science
and Technology
NOAA Fisheries Service
1315 East West Highway
Silver Spring, MD 20910

Abstract

Ecosystem considerations are increasingly being advocated for inclusion in fisheries and other marine and coastal management programs. Ecosystem-level issues most commonly cited as relevant to fisheries management include conservation and management of target and non-target species and biodiversity, consideration of tradeoffs among fisheries and other sectors, accounting for feedback effects (e.g., predator-prey and habitat effects of gear), maintaining ecosystem productivity and balanced trophic structure, and use of adaptive approaches in management. The national standards and essential fish habitat provisions under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) provide tools to address many but not all of these issues. Some ecosystem issues may well be addressed as emergent properties of regional ecosystems that are managed with integrated fishery management plans emphasizing conservative single-species or fishery-by-fishery FMPs. Other issues may only be addressed under umbrella ecosystem plans or by additional authorities not currently provided in relevant fisheries or other implementing legislation. Existing provisions of MSFCMA may be more relevant to management of recovering resources but less so for optimizing among multiple conflicting uses of rebuilt ecosystems.

Introduction

Explicit accounting for the health and productivity of ecosystems as a focus of marine and coastal management is a central recommendation of both the report of the U.S. Commission on Ocean Policy (USCOP 2004) and the Pew Oceans Commission (Pew Oceans Commission 2003). There is considerable parallel international interest in ecosystem issues, with the emphasis on integrated approaches to management (Constable et al. 2000; Sainsbury et al. 2000; Garcia et al. 2003; Aqorau 2003; Sainsbury and Sumaila 2003). The recommendations resulting from high-level U.S. and international policy commissions, and those from other from science, management and stakeholder groups have identified ecosystems perspectives as both an organizing theme for science, and as a basis for balancing societal needs for continuing production of goods and delivery of services resulting from healthy ecosystems. Recently, NOAA has adopted a set of ecosystem principles both as a way to efficiently organize and integrate its internal science activities, and to provide a consistent set of institutional goals in the various marine and coastal management activities in which it participates (e.g., fisheries, sanctuaries, coastal management, protected resources, etc.; Sissenwine and Mace 2003; Sissenwine and Murawski 2004).

The purpose of this paper is to explore the extent to which issues commonly identified as being part of an "ecosystem approach" can and are being addressed within existing legislation that bears upon marine and coastal resource management. A view in some fishery science

and management circles is that if conservative single species management is applied to all the significant fisheries within a regional ecosystem, many (perhaps most) of the ecosystem issues of interest would be addressed either explicitly in conservation measures or implicitly as a result of the cumulative effects of the management program (ICES 2000; Witherell et al. 2000; Bodal 2003; Mace et al. 2004). Existing provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), including its 10 national standards (NS), and provisions to identify and protect essential fish habitat, provide broad prescriptive guidance for conserving species, minimizing bycatch, protecting habitat, and involving stakeholders in decision making. Additionally, there are institutional arrangements that allow the fishery management Councils and NOAA to comment upon or otherwise participate in the management of activities outside the scope of fisheries, but which bear upon fisheries. For example, management measures developed under the authority of the Marine Mammal Protection Act, Endangered Species Act and other legislation may be codified within fishery management plans (e.g., closed areas, gear restrictions, etc.), which will have impacts on fishery resources and fisheries.

In order to facilitate discussion of the extent to which ecosystem issues are addressed under existing authorities, the MSFCMA national standards and EFH provisions are mapped into a list of ecosystem principles and objectives that are commonly cited as embodying an ecosystem approach to management (Table 1). Based on this analysis, some strategies are explored for emphasizing ecosystem-level issues in current and future governance discussions.

Ecosystem Principles, Objectives and Goals

A number of recent policy and science-related reviews have suggested both high-level and operational principles, and objectives as the goals of ecosystem approaches to management (e.g., Larkin 1996; Done and Reichelt 1998; USDOC 1999; ICES 2000; Murawski 2000; Sainsbury et al. 2000; Dayton et al. 2002; Garcia et al. 2003; Browman and Stergiou 2004; Hall and Mainprize 2004; Sainsbury and Sumaila 2003; Sissenwine and Murawski 2004; Sissenwine and Mace 2003). While there is no commonly agreed set of goals comprising an ecosystem approach, most reviews have focused on some or all of the following elements:

Conservation and Management of Species

Fisheries management programs focus on target species of fisheries economic concern. Non-target species are increasingly

a concern (Pope et al. 2000; Gislason 2003), particularly if the effects of harvesting result in the status of a non-target species approaching protected, endangered or threatened (PET) status. Increasingly, ecosystem discussions include the direct and indirect effects of harvesting on measures of biodiversity. There remains an ongoing debate regarding the usefulness of indices of diversity as management indicators, and whether biodiversity is an 'emergent' property of ecosystems, as opposed to a direct indicator that would support reference points (ICES 2000, Rice 2000, Link et al. 2002; Sainsbury and Sumaila 2003; Rice and Rochet 2005).

Minimization of Bycatch

Bycatch includes both 'byproduct' species that are caught in association with target species, and are retained for sale, as well as target and non-target species or sizes of animals that are discarded (Alverson et al. 1994; Cook 2003; Kelleher, in press). While most bycatch concerns relate to the conservation status of target and non-target species, there is an additional concern regarding the magnitude of discards (an issue of waste), irrespective of the mortality rates that may affect conservation status. Additionally, discards may create secondary ecosystem impacts due to scavenging and nutrient recycling.

Consideration of Tradeoffs

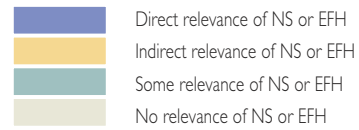
Tradeoff issues involve reconciling conflicting goals in the management of species due to their interactions, or among fishing sectors that compete for target or non-target species. Optimization of regional ecosystem benefits within the fisheries sectors involves considering the socioeconomic impacts of various alternatives. Characteristics of the management system that evaluate tradeoffs include equity among stakeholders, fairness in dealing with conflicting objectives, and transparency of the deliberative process. The cumulative effects of fishing and non-fishing impacts on ecosystems, and the evaluation of tradeoffs between fishing and non-fishing impacts and benefits are also important aspects of ecosystem-level tradeoffs.

Accounting for Feedback Effects (Interactions Among Components)

Feedback effects include several categories of interaction effects among species within an ecosystem and the impacts of fishing on the productive capacity of ecosystems. These effects include harvesting in predator-prey systems (Larkin 1996; Pauly et al. 1998), and the impacts of bottom-tending fishing gears on habitat, which may, in turn negatively influence productivity of target or non-target species (Collie et al.

Table 1.

Mapping of Ecosystem-related Principles and Objectives to Magnuson-Stevens Act National Standards (NS) and Essential Fish Habitat (EFH) Provisions



Ecosystem-related Principles or Objectives	NS 1 Prevent overfishing OY	NS 2 Best science available	NS 3 Manage stocks throughout range	NS 4 Non- discrimination among states	NS 5 Efficiency in management	NS 6 Allow for variation	NS 7 Minimize costs	NS 8 Fishing communities	NS 9 Minimize bycatch	NS 10 Human safety	EFH Designation and HAPC
Conserve & Manage Species											
Target stocks	Blue	Blue	Blue	Light beige	Light beige	Blue	Light beige	Light beige	Blue	Light beige	Blue
Assemblages of target stocks	Yellow	Blue	Yellow	Light beige	Teal	Yellow	Light beige	Light beige	Blue	Light beige	Yellow
Non-target species	Light beige	Blue	Teal	Light beige	Light beige	Light beige	Light beige	Light beige	Teal	Light beige	Light beige
PET species ¹	Light beige	Blue	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige
Biodiversity	Light beige	Blue	Teal	Light beige	Light beige	Light beige	Light beige	Light beige	Teal	Light beige	Yellow
Minimize Bycatch											
Target species	Blue	Blue	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Blue	Light beige	Teal
Non-target species	Light beige	Blue	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Yellow	Light beige	Teal
PET species ²	Light beige	Blue	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige
Consider Tradeoffs											
Among fisheries sectors	Yellow	Blue	Yellow	Blue	Yellow	Yellow	Yellow	Yellow	Blue	Yellow	Teal
Optimization among fisheries	Yellow	Blue	Light beige	Yellow	Teal	Yellow	Yellow	Yellow	Blue	Yellow	Teal
Sequential depletion/effort transfer	Yellow	Blue	Light beige	Yellow	Teal	Yellow	Yellow	Yellow	Blue	Yellow	Teal
Fairness, equity, transparency	Light beige	Blue	Yellow	Blue	Teal	Yellow	Teal	Blue	Yellow	Light beige	Light beige
Cumulative impacts	Light beige	Blue	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Yellow
With non-fishing sectors ³	Light beige	Blue	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Teal
Account for Feedback Effects											
Predator-prey	Yellow	Blue	Teal	Light beige	Light beige	Yellow	Light beige	Light beige	Light beige	Light beige	Light beige
Gear Impacts	Blue	Blue	Light beige	Light beige	Teal	Yellow	Light beige	Teal	Light beige	Light beige	Blue
Irreversibility of impacts	Blue	Blue	Light beige	Light beige	Light beige	Yellow	Light beige	Yellow	Light beige	Light beige	Yellow
Harvesting-induced regime change	Light beige	Blue	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige	Light beige
Establish Ecosystem Boundaries											
Definition allows for leaky boundaries	Light beige	Blue	Blue	Yellow	Teal	Blue	Teal	Yellow	Light beige	Light beige	Yellow
Multiple scales for ecosystem boundaries	Light beige	Blue	Yellow	Light beige	Teal	Blue	Teal	Yellow	Light beige	Light beige	Yellow
Maintain Ecosystem Productivity											
Capacity	Yellow	Blue	Yellow	Yellow	Light beige	Yellow	Light beige	Blue	Light beige	Light beige	Teal
Resilience/resistance to perturbations	Yellow	Blue	Yellow	Yellow	Light beige	Yellow	Light beige	Blue	Light beige	Light beige	Teal
Balance Ecosystem Structure											
Trophic balance	Yellow	Blue	Yellow	Yellow	Light beige	Yellow	Light beige	Light beige	Light beige	Light beige	Teal
Account for Climate Variability											
Low frequency	Yellow	Blue	Yellow	Yellow	Light beige	Yellow	Light beige	Teal	Light beige	Light beige	Light beige
High frequency	Blue	Blue	Teal	Light beige	Light beige	Blue	Light beige	Light beige	Yellow	Light beige	Light beige
Regime change	Yellow	Blue	Teal	Light beige	Light beige	Blue	Light beige	Teal	Light beige	Light beige	Yellow
Use Adaptive Approaches											
Considers multiple ecosystem states	Yellow	Blue	Teal	Light beige	Light beige	Blue	Light beige	Teal	Light beige	Light beige	Light beige
Scientific uncertainty incorporated	Yellow	Blue	Teal	Light beige	Light beige	Blue	Light beige	Teal	Light beige	Light beige	Light beige
Reverse burden of proof	Light beige	Blue	Light beige	Light beige	Light beige	Blue	Light beige	Teal	Light beige	Light beige	Teal
NOAAs Ecosystem Approach											
Adaptive ⁴	Yellow	Blue	Yellow	Teal	Light beige	Blue	Light beige	Yellow	Light beige	Light beige	Yellow
Regionally directed	Yellow	Blue	Blue	Light beige	Light beige	Teal	Light beige	Yellow	Light beige	Light beige	Yellow
Uses ecosystem knowledge	Yellow	Blue	Yellow	Light beige	Light beige	Blue	Light beige	Teal	Light beige	Light beige	Blue
Accounts for uncertainty	Yellow	Blue	Yellow	Light beige	Light beige	Blue	Light beige	Light beige	Light beige	Light beige	Light beige
Considers multiple external influences	Yellow	Blue	Yellow	Light beige	Light beige	Blue	Light beige	Light beige	Light beige	Light beige	Light beige
Seeks to balance diverse objectives ⁵	Yellow	Blue	Yellow	Light beige	Light beige	Blue	Light beige	Teal	Light beige	Light beige	Yellow

¹ PET = Protected, endangered or threatened species.

² PET species are managed directly under MMPA, ESA or other statutes, but measures are often codified in FMPs.

³ Non-fishing sector impacts are considered in MSA FMPs primarily in EIS documents and in consultation with non-fishing related management authorities.

⁴ Adaptive approaches are proposed in revised NS-1 guidelines when biomass targets for stocks are poorly understood.

⁵ Provisions of MSA relate primarily to societal objectives within the fishing sectors.

2000; Kaiser et al. 2004). A critical issue in ecosystem analysis is understanding the potential for creating irreversible effects due to harvesting, and the induction of alternative biological community regimes due to harvesting.

Establishment of Ecosystem Boundaries

Ecosystem issues occur over a continuum of spatial scales, from very local to global. Because of the open nature of marine systems, boundaries among regional ecosystems will always be variable, and pertain differently to the species and processes being considered. An important aspect of an ecosystem approach is to allow flexible boundaries depending on issues being considered, and variations in the physical or biological conditions (Pauly et al. 2004).

Maintenance of Ecosystem Productivity

An important perspective that comes from considering ecosystems is maintenance of the productivity of the biological system, including primary and secondary production, benthic processes, and effects of human activities on the carrying capacity of ecosystems (Pauly and Christensen 1995).

Balancing Ecosystem Structure

Trophic balance (e.g., the production and standing stock at sequential trophic levels from primary and secondary producers to consumers) has been emphasized as a potential indicator of ecosystem-level overfishing. Overharvesting of predators can cause cascading effects down the food chain, as can overharvest of prey species (Pauly et al. 1998).

Accounting for Climate Variability

Climate variability can be expressed as low frequency (e.g., decadal) scale trends, high-frequency (e.g. inter-annual) trends or variation without trend. In the extreme, significant low-frequency variability may result in regime changes in biological communities and ecosystems influenced by such variability.

Use of Adaptive Approaches

Adaptive approaches are considered a necessary element of ecosystem approaches because of the lack of knowledge regarding critical relationships among biological components and between biological and physical variables. Elements of an adaptive approach include the consideration of multiple causative effects for observed changes in the ecosystem, the incorporation of scientific approaches within an adaptive approach, so as to learn about critical ecosystem processes, and the use of management techniques that reverse the burden of

proof in deliberating about the impacts of harvesting effects on ecosystem attributes.

Provisions of the Magnuson-Stevens Act

The Magnuson-Stevens Fishery Conservation and Management Act (USDOC 1996) provides guidance on strategic goals as well as a number of specific standards under which proposed management programs must be evaluated. Some or all of these pertain to ecosystem issues, as identified above. The 10 national standards as provided in section 301 of the MSFCMA are:

- (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 upon 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, fish resources, and catches.*
- (7) *Conservation and management measures shall, where practicable, minimize costs 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 on such communities.*

- (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.
- (10) Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

In addition to the national standards, the MSFCMA specifies in its *Contents of Fishery Management Plans* that essential fish habitat be described:

- (7) describe and identify essential fish habitat for the fishery based upon the guidelines established by the secretary under section 305(b)(1)(A), minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat.

In developing its guidelines for defining essential fish habitat (USDOC 2002), it is stipulated that:

FMPs should identify habitat areas of particular concern within EFH. In determining whether a type, or area of EFH is a habitat area of particular concern, one or more of the following criteria must be met:

- i. The importance of the ecological function provided by the habitat.
- ii. The extent to which the habitat is sensitive to human-induced environmental degradation.
- iii. Whether, and to what extent, development activities are, or will be, stressing the habitat type.
- iv. The rarity of the habitat type.

FMPs should analyze how the cumulative impacts of fishing and non-fishing activities influence the function of EFH on an ecosystem or watershed scale. An assessment of the cumulative and synergistic effects of multiple threats, including the effects of natural stresses (such as storm damage or climate-based environmental shifts) and an assessment of the ecological risks resulting from the impact of those threats on EFH, also should be included.

Analysis of Existing MSFCMA Provisions with Respect to Ecosystem Objectives

Mapping of the various ecosystem-related goals and objectives into the NS and EFH provisions of MSFCMA is done in Table 1. For each ecosystem objective or sub-objective, the relevance of each of the 10 national standards and the EHF provisions are evaluated on a four level scale:

- (a) Direct relevance of the ecosystem objective to the NS or EFH.
- (b) Indirect relevance of the ecosystem objective to the NS or EFH.
- (c) Some relationship to the NS or EFH.
- (d) No relevance to the NS or EFH.

While this classification is highly subjective, it is proposed as a method to evaluate where existing provisions adequately address ecosystem objectives of concern, and where the current provisions may not apply. The purpose of this exercise is primarily to stimulate debate on (1) the appropriateness of the various proposed ecosystem principles and objectives in the context of management, and (2) the necessity or even the ability to address certain ecosystem objectives within the context of a fisheries or more broad-based marine ecosystem management program.

Below, each of the categories of ecosystem-related principles or objectives is evaluated in terms of the relevance of various MSFCMA provisions.

Conserve and Manage Species

The MSFCMA pertains primarily to the conservation of fishery target species. Given the precedence of NS-1 (prevent overfishing) and the use of best scientific data, these provisions are directly relevant to the goal of conserving target stocks. The provisions that allow for variations in fisheries, fish resources and catches, for minimizing bycatch and for designation of EFH are also primarily established for target stocks. Under NS-1 guidelines, assemblages of target stocks can also be managed directly, and the proposed revisions on NS-1 will potentially allow more flexibility to manage assemblages of linked stocks. Non-target stocks of fish and invertebrates can also be managed under MSFCMA provisions, but to date the incorporation of non-target species into FMPs has varied widely. For example, groundfish FMPs in Alaska include over 100 species, including many non-target species of little or no commercial value. To the contrary, the groundfish FMP in New England includes 19 stocks and fewer species, whereas the gear is capable of catching over 200 extant species. PET species are not directly managed under MSFCMA, but many of the measures used to conserve and rebuild these stocks are codified in existing FMPs (e.g., stellar sea lion closures in Alaska, rolling harbor porpoise closures in New England). The use of HAPC to protect rare habitats (including non-target species such as corals) is consistent with goals to conserve biodiversity as an element of an ecosystem approach.

Minimize Bycatch

The objective of minimizing bycatch is particularly relevant under MSFCMA in order to address target species management. In particular, strategies to minimize regulatory discards of target species are addressed with gear, time, and area provisions. The minimization of non-target species bycatch is more problematic, particularly where biological communities are productive and diverse. Again, bycatch minimization for PET species is primarily handled outside of MSFCMA, but some regulations serve dual purposes (e.g., harbor porpoise closures in New England are used to reduce mortality on groundfish stocks as well).

Consider Tradeoffs

Tradeoffs in ecosystem approaches involve developing alternative management scenarios that may have differential impacts among various fishing sectors, and, when considered, between fishing and non-fishing sectors. MSFCMA provisions allow for consultation in non-fishing management venues, particularly in the context of providing comments on non-fishing related threats to resource species. Within the fisheries sectors, the councils can balance fisheries interests when there are conflicts among FMPs, but these inter-FMP tradeoff analyses are generally not cast as a search for a global optimum of benefits, but rather maintenance of near-status quo allocations, consistent with the need for conservation of the resources. Since overall effort management among FMPs is not generally considered, there have been in the past numerous cases of effort flowing from regulated to non-regulated stocks, with the result being a scenario of sequential depletion. Many of the provisions of MSFCMA provide management processes that are transparent, and that emphasize fairness and equity. Cumulative impacts of multiple fisheries and non-fishing effects are stipulated in the guidelines implementing EFH, but there is no complementary requirement in non-fishing sector management for other marine uses.

Accounting for Feedbacks

Predator-prey feedbacks and effects of fishing gear on benthic habitats for target species are anticipated under MSFCMA provisions, but are handled in different ways by the various Councils. In Alaska, harvesting of pelagic prey species (e.g., capelin) is not allowed, which is the most restrictive of potential options. Elsewhere, predator-prey systems are managed using precautionary setting of measures, or by assuming that the links are accounted for in natural mortality rates calculated for prey species. The irreversibility of harvesting impacts is accounted for in the threshold biomass and control rules under

NS-1. Harvest-induced regime changes are not addressed directly under these provisions.

Boundaries of Ecosystems

The establishment of management units includes both the requirement to manage stocks throughout their ranges and to manage stocks of interrelated species. This, management units for migratory species may involve joint Council plans. However, these management units are primarily related to target species, and thus non-target species, and ecosystem processes are not directly accounted for in the definitions of management units.

Ecosystem Productivity and Structure

Ecosystem productivity and structure are generally not addressed directly in management under MSFCMA. In particular, balanced structure of fish components of the ecosystem may be an emergent property resulting from conservative application of single-species management principles. However, such a "piece-wise" balancing of trophic components may create a sub-optimal series of benefits given predator-prey interactions that may occur. Ecosystem productivity may be influenced by harvesting (e.g., benthos), but climate and non-fishing human effects are likely more important as drivers at low trophic levels.

Climate Variability

Climate variability may have important implications for the development of harvest strategies, particularly if recruitment of target species is climate sensitive. The development of harvest control strategies that are robust to such variations (low, high frequency, trended, or non trended) is possible and has been used in some cases in FMPs.

Adaptive Approaches to Management

Adaptive approaches to management are particularly relevant to situations where uncertainty about causal factors may result in highly uncertain management programs (Sainsbury 1991). For example, when stocks have been chronically overfished, it may not be possible to establish Bmsy with much confidence owing to uncertainty in density dependent responses. In these cases, scientifically directed adaptive approaches may be used by management to help clarify management options. Adaptive approaches can be used under some of the existing MSFCMA provisions, and proposals for revisions of NS-1 could potentially allow greater uses of adaptive management.

In addition to the ecosystem considerations above, it is instructive to apply the same analysis to NOAAs stated principles for

an ecosystem approach (Table 1; Sissenwine and Murawski 2004). Those principles are that an ecosystem approach is adaptive, regionally directed, uses ecosystem knowledge, accounts for uncertainty, considers multiple influences, and seeks to balance diverse objectives. Many of the current provisions of the MSFCMA are relevant to these principles, as discussed above.

Strategies to Address Ecosystem Issues

As discussed above, a number of the provisions of MSFCMA are directly relevant to the generally recognized objectives of ecosystem approaches to management. In particular, provisions dealing with target species conservation, use of best scientific data, development of open stakeholder-transparent processes, and incorporation of essential fish habitat provisions provide very significant authorities to address issues of ecosystem concern. While the MSFCMA would appear to allow greater consideration of non-target species, the provisions have been applied in very different ways by the Councils, and more consistency in application seems warranted.

Several of the issues relevant to ecosystem objectives appear to be emergent properties of a conservative regional fishery management system based primarily on single species or fishery-by-fishery approaches. These include biodiversity protection, and trophic balance/structure. However, since these are important considerations and it is not a given that these properties will be satisfied by traditional focus on species and fisheries, monitoring of them seems important (Sainsbury and Sumaila 2004). For example, routine calculation of indices such as diversity metrics (Rice 2000), slopes of size spectra (Rice and Rochet 2005), FIB (“fisheries in balance”) indices (Gislason 2003), etc., may provide insights into how management approaches in aggregate address these considerations. Also, routine reporting on non-target species abundance indices (e.g., from trawl survey catches) would provide detection of potential problems before species reach thresholds for PET status.

There are a number of strategies that can be pursued in order to better incorporate ecosystem approaches into fisheries, including the following:

- *Status quo* National Standards and other applicable statutes of the MSFCMA;
- Implementation of a specific National Standard for Ecosystems;
- *Status quo* National Standards with an umbrella Fishery Ecosystem Plan (FEP);

- Re-casting National Standards and EFH around Ecosystem Objectives; and
- Development of wide-ranging EAM plan including non-fisheries sectors.

In addition to these basic options, one could pursue strategies that mixed one or more of them.

Many have argued that since ecosystem considerations already are being pursued by a number of the Councils, that existing statutes are sufficient to provide authority for doing so. While all Councils *do* incorporate a number of ecosystem principles within their existing FMPs, under the *status quo* strategy, we can expect that the form of ecosystem implementations as well as the time frames for adopting more formal ecosystem provisions will be very different among the Councils. Although regional differences will always require flexibility in form and timing, a *status quo* approach may not be optimal from the perspective of forming a consistent national policy.

Re-casting the existing National Standards around general ecosystem principles is probably not practical. The existing national standards incorporate complex implementing guidelines that would have to be fundamentally re-written to better incorporate ecosystem concerns. Similarly, by imbedding ecosystem principles only in FMPs, some issues such as reconciling competing fisheries would still need an overview that crossed FMPs.

While the adoption of a specific National Standard for ecosystem issues would account for these issues explicitly, and in one place, in reality, many of the existing NS address some issues that would be redundant with an ecosystem national standard.

Umbrella fishery ecosystem plans (FEPs, USDOC 1999) have substantial utility for addressing EAF using the MSFCMA. Issues particularly suited for an FEP include identifying existing data holdings and their gaps, developing optimal fishing strategies for competing fisheries within an ecosystem, clarification of cumulative fishing and non-fishing impacts, and incorporating effects of climate change on ecosystem productivity.

Some ecosystem issues affecting fish productivity are not currently addressed under existing fishery provisions, and would not be so even with an umbrella ecosystem plan. In particular, these involve non-fishing sector tradeoffs. Unless Magnuson-Stevens is fundamentally re-written to account for

non-fishing sectors, then the ability to address EAM within MSFCMA will be limited. New initiatives within the executive branch hold the promise for coordinating activities of federal resource agencies with broad mandates in the oceans. The development of these forums should be closely monitored within the fisheries sectors.

Last, many of the provisions of MSFCMA were developed to allow rebuilding of depleted stocks, and the mechanics for doing so are specified in the guidelines in detail. With its focus on stock rebuilding, issues of optimality, particularly for rebuilt resources and ecosystems are less well described. For example, while fishing all stocks at their single-species optima may result in no overfishing of target stocks, the resulting stream of cumulative benefits for a regional ecosystem may not be maximized. Maximum benefits may result when interactions among stocks are better considered. Thus, the provisions and mechanisms under MSFCMA should be reviewed with respect to attaining maximum societal benefits consistent with the conservation of target and non-target species.

References

- AQORAU, T. 2003. Obligations to protect marine ecosystems under international conventions and other legal instruments. pp. 25-40 In: *Responsible Fisheries in the Marine Ecosystem* (eds. M. Sinclair and G. Valdimarsson). Food and Agriculture Organization of the United Nations and CAIB Publishing, Cambridge, MA.
- ALVERSON, D. L., M.H. FREEBERG, S.A. MURAWSKI, AND J.G. POPE. 1994. A global assessment of fisheries bycatch and discards. FAO Fisheries Technical Paper. No 339. Rome, FAO. 1994. 233p.
- BODAL, B. 2003. Incorporating ecosystem considerations into fisheries management: Large-scale industry perspectives. pp. 41-46 In: *Responsible Fisheries in the Marine Ecosystem* (eds. M. Sinclair and G. Valdimarsson). Food and Agriculture Organization of the United Nations and CAIB Publishing, Cambridge, MA.
- BROWMAN, H.I., AND K.I. STERGIU. 2004. Perspectives on ecosystem-based approaches to the management of marine resources. *Marine Ecology Progress Series* 274:269-270
- COLLIE, J.S., S.J. HALL, M.J. KAISER, AND I.R. POINER. 2000. A quantitative analysis of fishing impacts on shelf seas benthos. *Journal of Animal Ecology*. 69: 785-799.
- CONSTABLE, A.J., W.K. DE LA MARE, D.J. AGNEW, D.J. EVERSON, AND D.S. MILLER. 2000. Managing fisheries to conserve the Antarctic marine ecosystem: practicable implementation of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). *ICES Journal of Marine Science* 57: 778-791.
- COOK, R. 2003. The magnitude and impact of bycatch mortality by fishing gear. pp. 219-233 In: *Responsible Fisheries in the Marine Ecosystem* (eds. M. Sinclair and G. Valdimarsson). Food and Agriculture Organization of the United Nations and CAIB Publishing, Cambridge, MA.
- DAYTON, P.K., S. THRUSH, AND F.C. COLEMAN. 2002. Ecological effects of fishing in marine ecosystems of the United States. Pew Oceans Commission, Arlington, VA. 44 pp.
- DONE, T.J., AND R.E. REICHEL. 1998. Integrating coastal zone and fisheries ecosystem management: Generic goals and performance indices. *Ecological Applications* 8(1): S110-S118.

- GARCIA, S.M., A. ZERBI, C. ALIAUME, T. DO CHI, AND G. LASSERRE. 2003. The ecosystem approach to fisheries. Issues, terminology, principles, institutional foundations, implementation and outlook. FAO Fisheries Technical Paper 443. Rome, 71 p.
- GISLASON, H. 2003. The effects of fishing on non-target species and ecosystem structure and function. pp. 255-274 In: *Responsible Fisheries in the Marine Ecosystem* (eds. M. Sinclair and G. Valdimarsson). Food and Agriculture Organization of the United Nations and CAIB Publishing, Cambridge, MA.
- HALL, S.J., AND B. MAINPRIZE. 2004. Towards ecosystem-based fisheries management. *Fish and Fisheries* 5:1-20
- ICES 2000. Report of the Working Group on Ecosystem Effects of Fishing Activities. ICES CM 2000/ACME:02
- KAISER, M.J., J.S. COLLIE, S.J. HALL, S. JENNINGS, AND I.R. POINER. 2004. Impacts of fishing gear on marine benthic habitats. pp. 197-217 In: *Responsible Fisheries in the Marine Ecosystem* (eds. M. Sinclair and G. Valdimarsson). Food and Agriculture Organization of the United Nations and CAIB Publishing, Cambridge, MA.
- KELLEHER, K. (in press). Discards in the world's marine fisheries: An update. FAO Fisheries Technical Paper 470. 134 pp.
- LARKIN, P. 1996. Concepts and issues in marine ecosystem management. *Reviews in Fish Biology and Fisheries* 6: 139-164.
- LINK, J.S., J.T.K. BRODZIAK, S.F. EDWARDS, W.J. OVERHOLTZ, D. MOUNTAIN, J.W. JOSSI, T.D. SMITH, AND M.J. FOGARTY. 2002. Marine ecosystem assessment in a fisheries management context. *Canadian Journal of Fisheries and Aquatic Sciences* 59: 1429-1440.
- MACE, P.M. 2004. In defence of fisheries scientists, single-species models and other scapegoats: confronting the real problems *Marine Ecology Progress Series* 274:285-291
- MURAWSKI, S.A. 2000. Definitions of overfishing from an ecosystem perspective. *ICES Journal of Marine Science* 57: 649-658.
- PAULY, D., AND V. CHRISTENSEN. 1995. Primary production required to sustain global fisheries. *Nature* 374: 225-257.
- PAULY, D., V. CHRISTENSEN, J. DALSGAARD, R. FROESE, AND F. TORRES, JR. 1998. Fishing down marine food webs. *Science* 279: 860-863.
- PAULY, D., R. WATSON, AND V. CHRISTENSEN. 2003. Ecological geography as a framework for a transition toward responsible fishing. pp. 87-101 In: *Responsible Fisheries in the Marine Ecosystem* (eds. M. Sinclair and G. Valdimarsson). Food and Agriculture Organization of the United Nations and CAIB Publishing, Cambridge, MA.
- PEW OCEANS COMMISSION. 2003. America's Living Oceans: Charting a Course for Sea Change. A Report to the Nation. May 2003. Pew Oceans Commission, Arlington, Virginia.
- POPE, J.G., D.S. MACDONALD, N. DAAN, J.D. REYNOLDS, AND S. JENNINGS. 2000. Gauging the impact of fishing mortality on non-target species. *ICES Journal of Marine Science* 57: 689-696.
- RICE, J.C. 2000. Evaluating fishery impacts using metrics of community structure. *ICES Journal of Marine Science* 57: 682-688.
- RICE, J.C. AND M.J. ROCHET. 2005. A framework for selecting a suite of indicators for fisheries management. *ICES Journal of Marine Science* 62: 516-527
- SAINSBURY, K.J. 1991. Application of an experimental management approach to management of a tropical multispecies fishery with highly uncertain dynamics. *ICES Marine Science Symposium* 193: 301-320.
- SAINSBURY, K.J., A.E. PUNT, AND A.D.M. SMITH. 2000. Design of operational management strategies for achieving fishery ecosystem objectives. *ICES Journal of Marine Science* 57: 731-741.
- SAINSBURY, K., AND U.R. SUMAILA. 2003. Incorporating ecosystem objectives into management of sustainable marine fisheries, including 'best practice' reference points and use of marine protected areas. Pp. 343-361 In: *Responsible Fisheries in the Marine Ecosystem* (eds. M. Sinclair and G. Valdimarsson). Food and Agriculture Organization of the United Nations and CAIB Publishing, Cambridge, MA.
- SISSEWINNE, M.P., AND P.M. MACE. 2003. Governance for responsible fisheries: an ecosystem approach. pp. 363-390 In: *Responsible Fisheries in the Marine Ecosystem* (eds. M. Sinclair and G. Valdimarsson). Food and Agriculture Organization of the United Nations and CAIB Publishing, Cambridge, MA.
- SISSEWINNE, M.P., AND S.A. MURAWSKI. 2004. Moving beyond 'intelligent tinkering': advancing an ecosystem approach to fisheries. *Marine Ecology Progress Series* 274: 291-295.
- USCOP. 2004. An Ocean Blueprint for the 21st Century Final Report of the U.S. Commission on Ocean Policy. 676 pp.
- USDOC. 1996. Magnuson-Stevens Fishery Conservation and Management Act. NOAA Technical Memorandum NMFS-F/SPO-23. 121 pp.
- USDOC. 1999. Ecosystem-based fishery management. A report to Congress by the Ecosystem Principles Advisory Panel. U.S. Department of Commerce, NOAA, NMFS, Silver Spring, MD. 54 pp.
- USDOC. 2002. Magnuson-Stevens Act Provisions, Essential Fish Habitat (EFH) Federal Register Vol. 67, No. 12 / Thursday, January 17, 2002 <http://www.nmfs.noaa.gov/habitat/habitatprotection/efhfinalrule.pdf>
- WITHERELL, D., C. PAUTZKE, AND D. FLUHARTY. 2000. An ecosystem-based approach for Alaska groundfish fisheries. *ICES Journal of Marine Science* 57: 771-777.



INVITED PAPER

Use of Scientific Review by the Regional Fishery Management Councils: The Existing Process and Recommendations for Improvement

DAVID WITHERELL

DAVID WITHERELL
Deputy Director
North Pacific Fishery
Management Council
605 West 4th Avenue
Anchorage, Alaska 99501
David.Witherell@noaa.gov

The views and opinions expressed in this paper are the author's alone, and should not be interpreted as those of the NPFMC or any of the regional fishery management councils.

Abstract

Scientific review is essential for successful fisheries management because it ensures that the best available scientific information and advice is provided to fishery managers. However, the process for scientific review differs among the fishery management councils. An overview of these processes used by each of the regional fishery management councils is provided in this paper. Based on these reviews, I conclude that the scientific review process currently used by the regional fishery management councils is rigorous overall, but a few modifications would further strengthen this process. I recommend that:

- Councils retain appointment authority for SSC, but existing membership should have a role in nominating/recruiting new members.
- SSC members should receive honoraria (compensation) for their service.
- SSC members should not be subject to term limits.
- SSCs should meet concurrently with Council meetings, and at the same locale.
- Councils should adopt acceptable biological catch (ABC) limits determined by their SSCs, and set total catch limits (or control effort) such that catch would be at or below ABC. However, Councils should be allowed flexibility to exceed these levels on a short term basis.
- Councils should provide written rationale for their decisions, including how scientific information was incorporated.
- Each Councils SSC should provide peer review of all analyses (e.g., NEPA, RIR, RFA analyses) and stock assessments, and make the determination that best available scientific information is provided prior to Council decision-making.
- SSCs should develop research priorities and identify data needs for effective management.
- Independent scientific reviews, in addition to SSCs reviews, should be considered in cases of extreme controversy among scientists in interpretation of scientific information.
- Opportunity should be provided for regional or national SSC meetings, where members from different regions could discuss best practices and seek to identify analytical and research needs.

Introduction

Scientific information is essential for successful management of fisheries. This is especially true for marine fisheries, where policy decisions can have substantial social, economic, and environmental consequences. Scientifically informed decisions are the foundation of laws governing fishery management laws in the United States.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), which is the governing law for managing fisheries in the United States, established eight regional fishery management councils to develop regional fishery management plans (FMPs) and management measures to regulate fisheries in the Exclusive Economic Zone (3-200 nm). The MSA requires that conservation and management measures be based upon the best available scientific information; this is National Standard 2 of the MSA. Each regional fishery management council is required to establish a Scientific and Statistical Committee (SSC) to ensure that the best scientific information available is used. Specifically, Section 302 of the MSA states that “Each Council shall establish and maintain, and appoint the members of a scientific and statistical committee to assist it in the development, collection, and evaluation of such statistical, biological, social, and other scientific information as relevant to such Council’s development and amendment of any fishery management plan.” In addition to the SSC, many of the Councils also rely on other scientific advisory bodies to review and synthesize scientific information, such as technical monitoring groups or stock assessment review panels.

Improving the process of incorporating science into decision-making for fisheries has been the topic of several recent laws and studies. The U.S. Commission on Ocean Policy noted that the regional fishery management councils currently incorporate science-based, peer-reviewed information in the development of FMPs, but offered a number of recommendations to strengthen the council SSCs and the use of scientific information in management of our nation’s fisheries. Specifically, the Commission recommended that SSC members should meet more stringent scientific and conflict of interest requirements and receive compensation, SSCs should have the final authority to set allowable catch limits, there be an additional independent review process for scientific information relied on by SSCs, and default measures should be used to ensure timely action by the SSCs, the fishery management councils, and NOAA Fisheries. Based on the findings and recommendations of the U.S. Commission on Ocean Policy, the President’s U.S. Ocean Action Plan of 2004 directed NOAA

to establish guidelines and procedures for the development and application of scientific advice for fishery management decisions, in consultation with the Regional Fishery Management Councils, Interstate Fishery Commissions, stakeholders, and other agencies as appropriate.

The National Research Council recently completed a study on improving the use of the ‘best scientific information available standard in fisheries management (NRC 2004). The National Research Council recommended that NOAA Fisheries should implement guidelines on the production and use of scientific information in the preparation of FMPs and supporting documents. To ensure the best scientific information is used, they recommended that the guidelines be based on criteria of relevance, inclusiveness, objectivity, transparency and openness, timeliness, and peer review. Further, the National Research Council recommended that NOAA Fisheries establish an explicit and standardized peer review process, require the fishery management councils to justify their use of scientific information and determine whether a plan adheres to National Standard 2, improve communication of scientific findings and uncertainty, and implement a plan to systematically improve the quality of scientific information used for fishery management decisions.

In this paper, I review the structure and utilization of SSCs by the different regional fishery management councils. Further, I provide additional details and discussion of the scientific review process in the North Pacific. Additionally, I offer suggestions on how to amend the MSA, or establish guidelines, to improve scientific advice for fisheries management.

Methods

To gain an understanding of the existing process, I surveyed each regional fishery management council as to the composition and utilization of its scientific and statistical committee and the use of other independent scientific reviews. In addition, I provided each Council with an opportunity to explain other mechanisms to ensure that the best available scientific information is used. In some cases, I augmented these surveys with personal inquiries. Further, I researched readily available summary literature and regional Council internet sites describing other scientific bodies and procedures used by each regional council to review scientific information. I reviewed the procedures used by the North Pacific Fishery Management Council, based on written reports and meeting records, as well as my personal experience and informal discussions with several SSC members.

Results

Each regional fishery management council has developed its own scientific review process to suit its individual needs. In most cases, there are multi-level reviews of scientific information before it reaches the Council for a policy decision. Each of the Councils appoint and maintain a SSC. Some Councils utilize their SSC intermittently when a special need arises, whereas SSCs of other Councils meet regularly to review all scientific information used by the Council. A comparison

of SSC structure and process among the regional councils is provided in Table 1. Current SSC membership is listed in Table 2. In addition, most Councils also maintain other scientific advisory bodies to review stock assessments or other technical information, as detailed in Table 3. A more detailed review of the scientific review process used by each region follows.

Table 1.

Current Structure and Practices of Regional Fishery Management Council Scientific and Statistical Committees

	North Pacific	Western Pacific	Pacific	Gulf of Mexico
Composition	N= 15: no specific apportionment of representation, but consists of state and NMFS staff and academics. Includes fishery biologists, economists, social scientists, seabird and marine mammal ecologists, population dynamics experts.	N= 16: representatives currently include 3 state/territorial, 3 NMFS, 2 regional organizations, 2 others (consultant, retired academic). Includes fishery biologists, population dynamics experts, social scientists, economists.	N= 16: SOPs specifies representatives to include 4 state, 5 NMFS, 1 Treaty Indian Tribe, 6 'at-large' (allows private consultants). Includes fishery biologists, population dynamics experts, social scientists, economists.	N=55: Standing SSC of 14 includes fishery biologists, economists, social scientists, and experts in population dynamics, marine law, and state regulations. Special SSCs for each fishery meet along with the standing SSC, depending on the issue.
Appointment	Members nominated by the SSC and approved by the Council. All serve 1-year terms, but no term limit.	Agency reps nominated by agencies; SSC nominates other members. Council has final appointment authority.	Agency reps nominated by agencies with indefinite terms. At-large reps appointed for 3-year terms through open nomination process. SSC recommends and Council appoints members.	SSC members nominated by Council and others. 2-year terms with unlimited reappointment.
Meeting Frequency	Meets 5 times per year, concurrent with Council meetings, for 3 days.	Meets for 3 days, 3 times per year, a week prior to each Council meeting.	Meets 5 times per year, concurrent with Council meetings for 2-3 days. Subcommittees meet when requested, about 6 times per year.	Meets 3-6 times per year, for multi-day sessions; meetings are independent from Council meetings.
Scope of Recommendation	Reviews all scientific and technical aspects of amendment analyses, stock assessments; provides research recommendations.	Reviews all scientific and technical aspects of all issues, including stock assessments and allocation issues.	Reviews all scientific and technical aspects of amendment analyses, stock assessments; provides research recommendations.	Reviews all scientific and technical aspects of every FMP amendment and stock assessments.
Public Testimony	Open meetings with high public attendance; oral testimony common.	Open meetings with public attendance; oral testimony common.	Open meetings with public attendance; oral testimony common.	Open meetings with public attendance; oral testimony common.
Reports and Minutes	Both verbal and written reports are presented to Council. Also available on Web.	Both verbal and written reports are presented to Council. Also available on Web.	Both verbal and written reports are presented to Council. Also available on Web.	Written reports are presented to Council. Not currently available on Web.
Council Use of SSC Recommendations	Council follows SSC advice whenever possible or feasible. Council always follows SSC catch limit recommendations (always a single number for each stock or complex).	Council follows SSC advice whenever possible or feasible. Council always follows NMFS/SSC catch limits where applicable (lobster, precious corals).	Council follows SSC advice whenever possible or feasible. Council always follows SSC catch limit recommendations for single catch limit value, and within the SSCs range of values for ABC and OY (Council generally selects mid-point).	Council follows SSC advice whenever possible or feasible.

Table 3.

Other Scientific Review Committees, in Addition to the SSCs, Used by Regional Fishery Management Councils

	North Pacific	Western Pacific	Pacific	Gulf of Mexico	Caribbean	South Atlantic	Mid-Atlantic	New England
Stock Assessment	Plan Teams	Plan Teams	Technical Teams, Stock Assessment Review Panels	Stock Assessment Advisory Panels; SEDAR Panels		Stock Assessment Advisory Panels; SEDAR Panels	Stock Assessment Workshop/ Stock Assessment Review Committee	Stock Assessment Workshop/ Stock Assessment Review Committee
Ecosystem	Ecosystem Committee (policy and science); Plan Teams	Plan Teams		Ecosystem Management Committee; Ecosystem SSC	Habitat Advisory Panel	Habitat and Coral Advisory Panels (policy and science)	Ecosystem Committee (policy)	
Management	Plan Teams	Plan Teams	Technical Teams; Habitat Committee				Monitoring Committee; ASMF Technical Committees	Plan Development Teams
Socio-economics			Economic Subcommittee	Socio-Economic Panel		Socio-Economic Subcommittee		Social Science Advisory Committee
Independent Reviews	Independent reviews have been conducted for controversial scientific issues	Occasionally for controversial scientific issues (e.g., lobster harvest model)	Independent stock assessment reviews	Independent stock assessment reviews with SEDAR Process	None to date	SEDAR Process CIE review of stock assessments	Rarely (once in last 10 years)	Sometimes. Most recently, an independent review of new management reference points for groundfish stocks

Caribbean	South Atlantic	Mid-Atlantic	New England
N=12: membership includes local fishery agencies, NMFS, academia, and environmental groups. Includes fishery biologists, population dynamics experts, oceanographers, social scientists, economists.	N= 21: membership consists of academic faculty, state and NMFS staff, and private sector individuals. SSC has Biogical Subcommittee and Socio-Economic Subcommittee. Includes economists, social scientists, and population dynamics experts.	N= 13: membership includes state fishery agencies, NMFS, academia, and environmental groups. Includes fishery biologists, population dynamics experts, oceanographers, social scientists, economists.	N=9: membership includes state fishery agencies, academia, environmental groups, and retired NMFS employees (current NMFS employees not allowed on SSC). Includes fishery biologists and population dynamics experts.
SSC members nominated by Council and others. 2-year terms with unlimited reappointment.	SSC members nominated by Council, staff, and SSC members. There are no fixed terms.	SSC members nominated by Council and others. 2-year terms with unlimited reappointment.	SSC members nominated by Council and others. 3-year terms with unlimited reappointment.
Meets twice per year at request of Council chair; meetings are independent from Council meetings.	Meets twice per year, once jointly with the Council and once separately.	Meets only rarely (once or less per year) at the request of the Council or staff.	Meets once or twice per year at the request of the Council, staff, or Plan Development Team.
Reviews all scientific and technical aspects of FMP amendments, monitoring projects, and other programs.		Reviews stock assessments on occasion.	Reviews stock assessments if there is conflicting or unclear assessment advice from Northeast Stock Assessment Workshop.
SSC meetings are open, but public rarely attends.	Open meetings with public attendance; oral testimony allowed.	Open meetings with public attendance; oral testimony allowed.	Open meetings with public attendance; oral testimony allowed.
Both verbal and written reports are presented to Council.	Both verbal and written reports are presented to Council.	Both verbal and written reports are presented to Council.	Both verbal and written reports are presented to Council. Also available on Web.
Council follows SSC advice whenever possible or feasible.	Council follows SSC advice whenever possible or feasible.	SSC input is incorporated directly into the management plan. However, the Council relies on SARC process and FMP Monitoring Committees for most advice.	SSC input is incorporated into Council considerations. However, the Council relies on SARC process and Plan Development Teams for most advice.

Table 2.

Current Composition of Regional Fishery Management Council Scientific and Statistical Committees

	North Pacific	Western Pacific	Pacific	Gulf of Mexico*	Caribbean	South Atlantic
Fishery Biology & Population Dynamics	<p>Steve Hare, Ph.D. Pacific Halibut Commission</p> <p>Anne Hollowed, Ph.D. NOAA Fisheries, AFSC</p> <p>Gordon Kruse, Ph.D. University of Alaska</p> <p>Terry Quinn, Ph.D. University of Alaska</p> <p>Dave Sampson, Ph.D. Oregon State University</p> <p>Doug Woodby, Ph.D. Alaska Dept. Fish and Game</p> <p>Farron Wallace WA Dept. Fish and Wildlife</p> <p>Franz Mueter, Ph.D. University of Alaska</p>	<p>Milani Chaloupka, Ph.D. University of Queensland</p> <p>Douglas Fenner, Ph.D. Am. Samoa Dept. Resources</p> <p>Charles Daxboeck, Ph.D., BioDax Consulting Tahiti</p> <p>Richard Deriso, Ph.D. Inter-Am. Tropical Tuna Comm.</p> <p>John Hampton, Ph.D. South Pacific Commission</p> <p>Jeff Walters, Ph.D., HI Division of Aquatic Resources</p> <p>Michael Trianni CNMI Division of Fish and Wildlife</p> <p>Pierre Kleiber, Ph.D. NOAA Fisheries, PIFSC</p> <p>John Sibert, Ph.D. PFRP, University of Hawaii</p> <p>Robert Skillman, Ph.D. NOAA Fisheries, PIFSC</p>	<p>Thomas Barnes CA Dept. Fish and Game</p> <p>Steve Berkeley University of California</p> <p>Alan Byrne ID Dept. of Fish and Game</p> <p>Robert Conrad Northwest Indian Fisheries Comm.</p> <p>Ramon Conser, Ph.D. NOAA Fisheries, SWFSC</p> <p>Martin Dorn, Ph.D. NOAA Fisheries, AFSC</p> <p>Kevin Hill, Ph.D. NOAA Fisheries, SWFSC</p> <p>Tom Jagielo, WA Dept. Fish and Wildlife</p> <p>Han-Lin Lai., Ph.D. NOAA Fisheries, NWFSC</p> <p>Andre Punt, Ph.D. University of Washington</p> <p>Stephen Ralston NOAA Fisheries</p> <p>Dave Sampson, Ph.D. Oregon State University</p>	<p>Luiz Barbieri, Ph.D. FL Fish & Wildlife Res. Institute</p> <p>Robert Colura</p> <p>James Cowan, Ph.D. Louisiana State University</p> <p>Sandra Diamond, Ph.D., Texas Tech University</p> <p>Bully Fuls</p> <p>Douglas Gregory University of Florida</p> <p>Albert Jones, Ph.D.</p> <p>Andrew Kemmerer, Ph.D.</p> <p>Charles Wilson, Ph.D. Louisiana State University</p> <p>(numerous special SSCs)</p> <p>Marine Law</p> <p>James Wilkins Louisiana State University</p>	<p>Barbara Kojis, Ph.D. USVI Div. Fish and Wildlife</p> <p>William Tobias, Ph.D USVI Div. Fish and Wildlife</p> <p>Jose Rivera</p> <p>Richard Nemeth, Ph.D. University of the Virgin Is.</p> <p>Roger Uwate, Ph.D. USVI Div. Fish and Wildlife</p> <p>Ralph Boulon USVI National Park Service</p> <p>Richard Appeldorn, Ph.D. University of Puerto Rico</p> <p>James Bohnsack, Ph.D. NOAA Fisheries, SEFSC</p> <p>Walter Keithly, Ph.D. Louisiana State University</p> <p>Craig Dalgren, Ph.D. Perry Institute for Marine Sci.</p> <p>Jorge Capella, Ph.D. URB Marbella</p> <p>Vance Vincente, Ph.D.</p>	<p>James Berkson, Ph.D. Virginia Polytechnic Institute</p> <p>Carolyn Belcher University of Georgia</p> <p>Andrew Cooper, Ph.D. University of New Hampshire</p> <p>Doug Gregory University of Florida</p> <p>Dave Griffith, Ph.D. East Carolina University</p> <p>Joe Grist NC Div. Marine Fisheries</p> <p>Pat Harris, Ph.D. SC Dept. Natural Resources</p> <p>Jeff Johnson, Ph.D. East Carolina University</p> <p>Jim Kirkley, Ph.D. VA Institute of Marine Science</p> <p>Thomas Long, Ph.D.</p> <p>Robert Muller, Ph.D. FL Marine Research Institute</p> <p>Debra Murie University of Florida</p> <p>Bob Trumble, Ph.D. MRAG Americas</p> <p>Dave Whitaker SC Dept. Natural Resources</p> <p>Ron Michaels, Ph.D. Georgia Dept Natural Resources</p> <p>(7 member Biological Subcommittee)</p>
Economics	<p>Keith Criddle, Ph.D. Utah State University</p> <p>Mark Herrmann, Ph.D. University of Alaska</p>	<p>Paul Callaghan, Ph.D. University of Guam</p>	<p>Hans Radke, Ph.D.</p> <p>Cindy Thomson NOAA Fisheries SWFSC</p> <p>Michael Dalton, Ph.D. CA State University</p>	<p>Charles Adams, Ph.D., University of Florida</p> <p>Walter Keithly, Ph.D. Louisiana State University</p>		<p>Chris Dumas, Ph.D. University of North Carolina</p> <p>Sherry Larkin, Ph.D. University of Florida</p> <p>John Whitehead, Ph.D. Appalachian State U</p>
Socioeconomics & Anthropology	<p>Seth Macinko, Ph.D. University of Rhode Island</p>	<p>Stewart Allen, Ph.D. NOAA Fisheries PIFSC</p> <p>Craig Severance, Ph.D. University of Hawaii</p>		<p>(14 member Socioeconomic Panel)</p>		<p>Benjamin Blount, Ph.D. University of Texas</p> <p>Brian Chevront, Ph.D. NC Div. Marine Fisheries</p> <p>Paul Durrenberger, Ph.D. Penn State</p> <p>(10 member Socioeconomic Subcommittee)</p>
Ecologists	<p>Sue Hills, Ph.D. University of Alaska</p> <p>Ken Pitcher Alaska Dept. of Fish and Game</p> <p>George Hunt, Ph.D. University of California</p> <p>Pat Livingston NOAA Fisheries, AFSC</p>	<p>Mary Donohue, Ph.D. University of Hawaii</p> <p>James Parrish, Ph.D. Hawaii Coop. Fish. Res. Unit</p>		<p>(12 member Ecosystem SSC)</p>		

*Note: For the Gulf of Mexico Council, only the standing SSC members are listed; there are also many special issue SSCs with membership too numerous to list.

Mid-Atlantic	New England
<p>Jim Gilford, Ph.D. (retired)</p> <p>David Conover, Ph.D. SUNY</p> <p>Wendy Gabriel, Ph.D. NOAA Fisheries</p> <p>Joe Hightower, Ph.D. NC Coop. F&W Research Unit</p> <p>John Hoenig, Ph.D. VA Institute of Marine Science</p> <p>Cynthia Jones, Ph.D. Old Dominion University</p> <p>Mike Prager, Ph.D. NOAA Fisheries</p>	<p>Vaughn Anthony, Ph.D. (retired, NMFS)</p> <p>Victor Crecco, Ph.D. CT Dept. Env. Protection</p> <p>John Hoenig, Ph.D. VA Institute of Marine Science</p> <p>Desmond Kahn, Ph.D. DE Dept. Natural Resources</p> <p>Jean-Jaques Maguire Wildlife Conservation Society</p> <p>Andrew Rosenberg, Ph.D. University of New Hampshire</p> <p>Brian Rothchild, Ph.D. University of Massachusetts</p> <p>Alexei Sharov, Ph.D. MD Dept. Natural Resources</p> <p>Pat Sullivan, Ph.D. Cornell University</p> <p>Edward Gilfillan, Ph.D. Bowdoin College (retired)</p> <p>Les Kaufman Ph.D. Boston University</p>
<p>Lee Anderson, Ph.D. University of Delaware</p> <p>Jim Kirkley, Ph.D. VA Institute of Marine Science</p> <p>Mark Holliday, Ph.D. NOAA Fisheries</p>	<p>John M. Gates, Ph.D.</p> <p>Daniel Georgianna, Ph.D.</p> <p>Priscilla Brooks, Ph.D.</p> <p>Jon G. Sutinen, Ph.D.</p> <p>David Terkla, Ph.D.</p>
<p>Bonny McCay, Ph.D. Rutgers University</p>	<p>James M. Acheson, Ph.D.</p> <p>Madeleine Hall-Arber, Ph.D.</p> <p>Seth Macinko, Ph.D.</p> <p>Robert Robertson, Ph.D.</p> <p>Kevin St. Martin, Ph.D.</p> <p>Sarah Robinson, J.D., S.J.D.</p>
<p>Ed Houde, Ph.D. University of Maryland</p> <p>Tom Miller, Ph.D. Chesapeake Biological Lab</p>	

North Pacific

The North Pacific Council's SSC currently has 15 members, consisting of population dynamics biologists, ecologists, economists, and social scientists from academia and federal and state agencies, appointed on an annual basis. There are no SSC members from private businesses or other organizations. While most members are drawn from the Pacific northwest, the SSC includes members from California, Utah, and Rhode Island. For the most part, the SSC is a self-appointing body that recruits new members as they see fit, although in practice there are members who serve in "agency" seats for Oregon, Washington, Alaska, and NOAA Fisheries. Although the Council has final approval authority regarding SSC membership, recommendations of the SSC regarding its membership have always been approved by the Council. Each year, SSC members elect a chair and vice-chair from among their membership. While most chairs serve for several years, few serve for more than 3 to 4 years. The current SSC includes two former chairs, who serve with the current chair as an informal chairman's council regarding the structure and operation of the SSC.

The SSC meets for 2 to 3 days, 5 times per year (or more frequently if the Council schedules additional public meetings). The SSC chair or vice-chair remain available to the Council for 2 to 3 days following the completion of the SSC meeting, to be able to present the minutes to the Council as each agenda item is reviewed by the Council and to respond to questions that Council members may have about the meaning and intent of those minutes. The SSC meetings occur at the same locale and begin just prior to each Council meeting to facilitate public participation and input. In addition, the SSC holds occasional workshops with agency analysts and researchers to explore analytic innovations or to encourage the development of new research programs.

The SSC reviews the scientific information for most actions that come before the Council¹. The process for changing regulations begins with a proposal that may originate from the fishing industry, environmental groups, NOAA Fisheries, the Council, or other advisory groups including the SSC itself. The proposal is evaluated in subsequent meetings

¹ Before each meeting, the Executive Director (or Deputy Director) and the SSC chair discuss Council agenda items and identify those items that are most likely to require scientific review. The SSC generally does not review housekeeping items or items that are in final review. If however, the SSC requested that draft analytic documents be released after revision, the SSC is often asked to review the final draft document for compliance with SSC requests. The SSC may also be asked to review final review documents if there have been substantive changes in the documents or information included in the documents.

through discussion papers, environmental assessments, and socio-economic analyses. At each stage, the SSC provides scientific input to improve the analysis, and also makes a recommendation as to whether the analytical document is ready for public review, meaning that it meets their standard of best scientific information available.

The process for SSC review is similar in most instances. First, the SSC receives the first draft of an environmental assessment or impact statement, regulatory impact review, or other analytical document, by mail about 1 to 4 weeks prior to a meeting. At the SSC meeting, the lead analytical staff for a particular agenda item presents a summary of the analysis, and answers questions from SSC members. The public is given an opportunity to testify, and frequently several fishery participants or environmental representatives may testify on the scientific and technical details of a given analysis.

Following the staff reports and public testimony, SSC members deliberate the scientific content of a given analysis. Generally, the SSC focuses their deliberations to determine best available scientific information by examining the appropriateness of input data, the methodology applied, and the conclusions drawn from the analysis. To ease the workload for individual SSC members, the SSC chair generally assigns 2 to 3 members to be discussion leaders for each agenda item topic. These individuals also summarize the SSC discussion and deliberation, and then prepare the first draft minutes for that particular analysis or issue. All SSC members have an opportunity to review the draft minutes before they are presented to the Council by the SSC chair. The turn around time for preparing written minutes is short; in some cases the issue may have been discussed by the SSC less than one day prior to reporting to the Council. SSC members, particularly the chair and vice-chair, often work long hours to complete their minutes for distribution at the Council meeting. The minutes of the NPFMC SSC are not a formal record of deliberation, but represent a consensus opinion regarding the scientific merit of the documents under consideration. These minutes are not adopted by formal vote. The minutes also provide recommendations to improve the scientific analysis to meet SSC approval. Should analysis be deficient and major revisions be required, the SSC will recommend to the Council that it not be released for public review.

With the exception of a few very technical scientific issues (e.g., establishing overfishing definitions and setting acceptable biological catch limits), the SSC does not generally provide the Council with an explicit recommendation on which

alternative should be chosen, but rather provides guidance on relative strength of the scientific information available (i.e., uncertainty). For example, in February 2005, the SSC reviewed the revised analysis and evaluation of fishing effects on essential fish habitat, and commented that “The analysis found no evidence that Council-managed fishing activities have more than minimal and temporary effects on essential fish habitat for any FMP species. Yet, a significant proportion of the ratings for fishing effects were classified as unknown. Given this result, application of the precautionary approach is warranted.” Citing the SSC’s recommendation in their deliberations, the Council voted unanimously to prohibit bottom trawling over vast areas, and establish “marine reserves” in the areas shown to have dense deep-water coral aggregations.

There are several levels of scientific review for stock assessments of North Pacific groundfish stocks (Figure 1). Nearly all of the stock assessments are conducted by highly competent and respected NOAA Fisheries scientists from the Alaska Fisheries Science Center. These assessments are subject to internal review process at the Science Center. As a further quality control measure, one or two assessments are sent each year to the Center for Independent Experts for further peer review. Following these review processes, the stock assessments are further vetted by the Council’s Plan Teams established for each FMP. The plan teams consist of state and federal scientists and managers that meet twice annually to review the assessments, prepare stock assessment and fishery evaluation reports, and, for groundfish stocks, recommend acceptable biological catch limits. The SSC makes a final review of the stock assessments and acceptable biological catch limits (ABCs). The Council has had a long standing practice of adopting all of the SSC’s ABC recommendations, and this process was formally incorporated into the groundfish FMPs by amendments 83/75.

On occasion, an independent review by scientists outside of the SSC has been requested to get additional insights into scientific information on particularly controversial scientific issues. Recent examples of independent review include an evaluation of the harvest rate strategies used for North Pacific groundfish (Goodman et al. 2002), reviews on potential competition of fisheries with Steller sea lions (Bowen et al., 2001, NRC 2003), and a review of the evaluation of fishing activities that affect essential fish habitat (Drinkwater et al. 2004). These reviews came at a cost of time and money (approximately \$110,000 for the harvest rate review, \$140,000 for the Steller sea lion Biological Opinion review, \$500,000 for the NRC review of Steller sea lions and fisheries, and

\$130,000 for the review of fishing effects on benthic habitat). Although none of the conclusions of these peer reviews were contrary to earlier findings by the SSC on these same issues, they did provide other perspectives regarding scientific content and analytical procedures. From this standpoint, the reviews were beneficial in that they provided additional scientific guidance for analysts and the Council, and increased confidence that the best scientific information was made available.

Western Pacific

The Western Pacific Council has a 16 member SSC, consisting of scientists from NOAA Fisheries, State/territorial agencies, University faculty, Regional Organizations, and the private sector. Of the total, there are three social scientists (one anthropologist, one sociologist, one economist), and the remainder are biologists or population dynamics modelers.

SSC members are generally nominated by the SSC, Council, and agencies. Generally the agencies (NOAA Fisheries, State & Territories) nominate their SSC representatives. The Council has final appointment authority. There are no term limits.

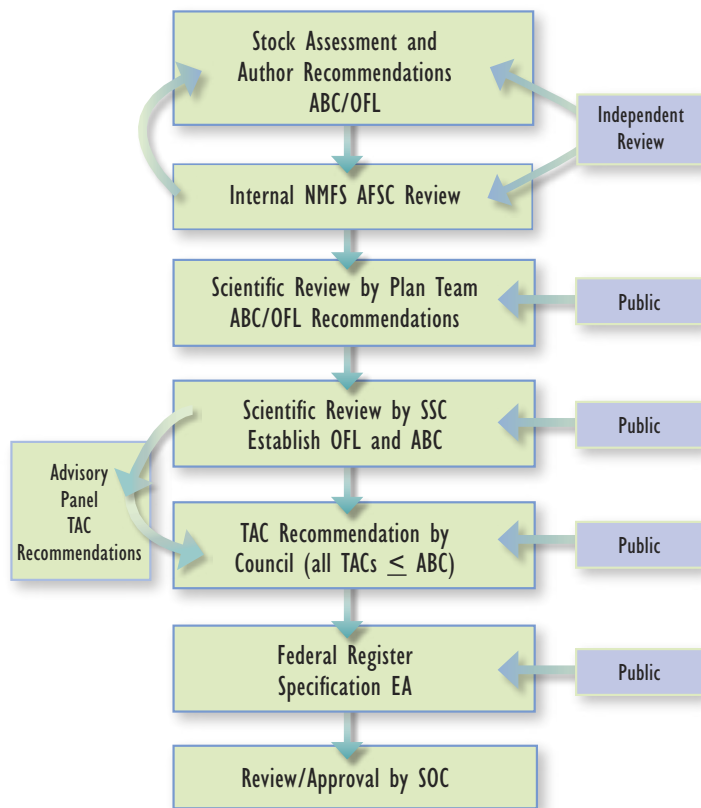
The Western Pacific Council's SSC meets three times a year. The meetings generally occur at least a week prior to each Council meeting. SSC meetings are generally attended by the public, and public testimony is allowed. The SSC presents both a written and oral report to the Council. Currently, SSC meeting minutes are not posted to web.

The SSC may comment and make recommendations on any issue, although they focus on reviewing scientific issues. They do review catch limits when applicable. Scientific review of stock assessments is limited, in part, by the limited number of stock assessments conducted on species in the Western Pacific region. The NMFS Pacific Islands Science Center has generated stock assessments for swordfish, blue marlin, blue shark, Northwestern Hawaiian Islands lobsters, and Precious Corals in Hawaii. Stock assessments for tuna species are prepared by either IATTC for the Eastern Pacific, or the Oceanic Fisheries Program of the Secretariat of the Pacific Community for the Western Pacific.

The Council generally incorporates the SSC recommendations in their entirety. The Council either concurs with an SSC recommendation or adopts the SSC recommendation as a Council action. The Council tends to look to the SSC for guidance so its recommendations generally dictate how the Council will act (but not always).

Figure 1.

Scientific Review Process for North Pacific Stock Assessments and Catch Specifications



Flow chart depicting the scientific review process for stock assessments and establishment of catch specifications in the North Pacific region. Catch specifications include the overfishing level (OFL), the acceptable biological catch level (ABC), and total allowable catch limits (TAC), where $TAC < ABC < OFL$.

In addition to the SSC, the Council also has Plan Teams for its pelagics, bottomfish, crustaceans, precious corals, and ecosystems/coral reef FMPs. The Plan Teams generally provide management advice, but may also review stock assessments when available. Outside independent reviews have been used occasionally to provide additional reviews of stock assessments and harvest rates (e.g., lobster harvest guideline model).

Pacific

The Pacific Council has a single SSC, with a 16 member composition set by a representation formula established in the Council's operational procedures. There are four state representatives (ID, WA, OR, CA), five federal representatives (2 Southwest Fishery Science Center, 2 Northwest Fishery Science Center, 1 Alaska Fishery Science Center), and 1 representative from the Treaty Indian Tribes. These members have indefinite terms and are nominated by their home agencies. In addition, there are six "at-large" members that serve 3-year terms. Current composition of the "at-large" seats is: 2 Southwest Fishery Science Center, Fisheries Research

Biologists, 1 University of Washington faculty, 1 University of California, Santa Cruz faculty, 1 California State Monterey faculty, and 1 private sector (an economist not associated with an agency or academia). The SSC operating procedures further requires that the committee consist of three social scientists, of which at least two shall have economic expertise. Currently, there are 3 economists; other expertise includes fishery biology, population dynamics, biostatistics. In addition to the standing SSC, there are six SSC subcommittees, one for each of the four FMPs (salmon, groundfish, highly migratory species, coastal pelagic species), one for MPAs, and one for economics.

Nominations for at-large seats are sought through an open nomination process. Vacancies are announced and candidates are solicited via the Pacific Council's website and via mailings to the public, agencies, and universities. The nomination period opens at least one month (and often longer) before consideration at a Council meeting and nominations are due along with Council meeting briefing materials, approximately two weeks before the meeting. Anyone can nominate an individual and individuals can self-nominate. Nominations must include a cover letter and CV. The SSC reviews nominations and evaluates qualifications of candidates in closed session and presents review results to the Council. The SSC review results are provided during Council closed session before the Council makes the appointments. The SSC chair and vice-chair serve two-year terms. Officers are elected by the SSC and approved by the Council chairman.

The SSC meets at each of the five Council meetings in a year, usually for the first two days of the meeting, but sometimes longer. The subcommittees meet as needed at the direction of the Council chair or the Executive Director. In recent years, the SSC subcommittees have met frequently, on the order of a half-dozen meetings in addition to the five Council meetings. Meetings of the SSC and SSC subcommittees are open to the public, and public comment is taken during SSC agenda topics (at the discretion of the SSC chair). There is also a public comment period for items not on the SSC agenda on the Monday of each SSC meeting. The SSC produces written reports at the Council meeting, and the SSC chair (or other SSC member) provides an oral report of their findings and responds to Council questions. Public testimony on SSC recommendations to the Council are taken after each SSC statement. SSC minutes are made available in the subsequent Council meeting briefing materials and are available on the Pacific Council's website.

The Pacific Council's SSC provides scientific review of all science and technical matters that are a component of Council decision making including harvest levels, fishery and economic models used by Technical Teams, population prediction models, harvest guidelines, Terms of Reference for stock assessment processes, and technical portions of Fishery Management Plan amendments and National Environmental Protection Act documents. Examples of special projects by category include: the SSC's marine reserves subcommittee has completed a white paper, *Marine Reserves: Objectives, Rationale, Fishery Management Implications, and Regulatory Requirements*, the groundfish subcommittee is working on terms of reference for reviewing rebuilding plans, the groundfish subcommittee and economics subcommittee jointly reviewed Groundfish Essential Fish Habitat analyses, completed an economic capacity report for the *Groundfish Strategic Plan*, and reviewed commercial fishery bycatch modeling methods, and the highly migratory species subcommittee reviewed methods for assessing sea turtle impacts in the high seas longline fishery. Additionally, each year, the salmon subcommittee reviews salmon fishery modeling, run size prediction, and harvest policy methodologies.

For specific recommendations, like harvest levels, if a single value is provided by the SSC the Council generally adopts the recommended harvest level. The SSC may provide a range of possible harvest levels derived from the stock assessment process to advise to the Council on inherent uncertainties and risk. The SSC reports to the Council the range of values, the uncertainty, and level of risk (e.g., risk-prone, risk-neutral, risk-averse).

Outside review of scientific and technical matters for the Pacific Council occurs during the Council-sponsored stock assessment review process (which has been used for coastal pelagic species and groundfish) included participation by Center for Independent Expert reviewers from outside the Pacific Council family. The SSC then reviews the results of the stock assessment process and reports to the Council. SSC statements to the Council are not subject to outside review.

In addition to the SSC, each FMP has both a technical (or management) team. Technical teams are composed of fishery managers, biologists, and statisticians from the federal, tribal, and state agencies. Technical teams monitor catch rates, recommend harvest levels, and analyze the impacts of various management measures. Models and methods used by Technical Teams are reviewed by the SSC.

Gulf of Mexico

The Gulf of Mexico Fishery Management Council has a standing SSC of 14 members, as well as a special SSC for each fishery that largely consist of biologists knowledgeable about that particular fishery. The standing SSC consists of members with expertise in population dynamics, biological anthropology, economics, marine law, and state regulatory processes. When the SSC meets to review any material, the standing SSC is convened along with one or more special SSCs, depending on fishery issues being reviewed. The Gulf Council also has a Socioeconomic Panel that consists of eight fishery economists and six anthropologists/sociologists. The panel develops management scenarios for achieving TAC and advise the Council of the socioeconomic impacts of the alternatives.

In addition to the SSC and Socioeconomic Panel, the Gulf Council also has stock assessment panels (SAPs) for finfish (16 members) and for shrimp (6 members). These SAPs, historically, had reviewed and made recommendations on stock assessments drafted by scientists at the Southeast Fishery Science Center. The SAP members are now involved in new Southeast Data, Assessment, and Review (SEDAR) panels, that develop peer-reviewed stock assessments. By changing to the SEDAR process over the past 2 years, the Council gets independent peer-reviews of all its stock assessments.

The SSC typically meets three to six times per year, often for multi-day sessions. The SSC typically meets independently, and almost never meets with Council, although the chair of the SSC does attend Council sessions on occasion.

The SSC reviews a wide variety of analytical documents. It reviews each FMP amendment at least once, as well as any other action submitted by the Council. The SSC also reviews all the stock assessments as the final peer reviewer, following the SEDAR process.

The SSC meeting reports are usually drafted by technical staff and, occasionally, supplemented by verbal reports by the SSC chair. The written SSC minutes are subsequently prepared and available upon request. Minutes are not currently available on the Council webpage, but the Council anticipates posting this information in the coming year.

As it is considering final action on amendments (or other issues) the Council considers the SEDAR workshop reports, the Socioeconomic Panel report, the Advisory Panel

recommendations and the SSC recommendations and bases its decision on all of this input. Rarely does the Council not accept an SSC recommendation. When this occurs, it most likely is related to opposing view-points between the SSC and another advisory group (SAP, for example).

There is always a record when the Council deviates from the recommendations of any advisory group. Almost all catch limits are currently part of long-term rebuilding plans and the Council aims to implement management measures (e.g., bag, size, trip limits) that will constrain the fishing within the total allowable catch (TAC) limits. The TAC limits are currently set to have at least a 50% chance to achieve that level.

Caribbean

The Caribbean Council maintains an SSC comprised of biologists, oceanographers, economists, socioanthropologists, and stock assessment experts. Most SSC members are from academia, but there are also members from the local fishery agencies and NGOs.

SSC members are nominated by council members or other interested parties. Members serve two-year terms, and if they are willing, they are usually re-elected. In the Caribbean, the community of scientists is rather small, so the SSC generally consists of the same group of 12 members. The Caribbean Council also maintains a habitat panel, composed of scientists from academia and local agencies with expertise on habitat, including coral reefs.

The SSC usually meets twice per year. They meet independently from Council meetings, however, the chairs of the SSC, Habitat Panel, and Advisory Panel attend all council meetings and sit at the table with the council members. The Council receives both verbal and written reports from the SSC. The SSC meets at the request of the Council chair. SSC meetings are open to the public, but public rarely attends.

The SSC reviews every aspect of the FMPs, monitoring projects, and programs. The Council generally incorporates the SSC recommendations by following the scientists advice whenever possible and feasible. The Council always adopts the SSC recommendations for catch limits relative to MSY when available. However, data are generally not available for most stocks in the Caribbean region. To date, the Council has not had a need to seek independent reviews, in addition to getting advice from the SSC and other advisory bodies.

South Atlantic

The South Atlantic Council's SSC is comprised of 10 university, 1 NMFS/university, 1 university/Marine Extension, 1 Sea Grant agent, 6 state, and 2 private sector representatives. The 21 member SSC has two subcommittees, a 7 member Biological Subcommittee and a 10 member Socio-Economic Subcommittee. The Biological Subcommittee is comprised of individuals with a population dynamics/fishery biology background and the Socio-Economic Subcommittee is comprised of individuals with a social, economic or anthropology background. The States of NC, SC, GA and FL each have one dedicated seat on the SSC. This ensures that each State Director has a staff member involved with the SSC review and their input helps the State Directors carry out their duties during council meetings.

SSC members are nominated by Council members and staff, and by SSC members themselves. The Council has a SSC Selection Committee whose duty is to review the credentials of nominated members and make recommendations to the Council on SSC appointments. SSC Selection Committee meetings are closed to the public because personnel issues are being discussed. The Council discussion and final appointment process is open to the public and the Council votes on each SSC appointment. SSC members serve indefinite terms.

The SSC generally meets twice each year, once jointly with the Council and once separate from a Council meeting. The subcommittees may be convened independently during the year to address specific issues. SSC meetings by the Executive Director depending on which documents, fishery management plans/amendments, or stock assessments need to be reviewed.

The South Atlantic Council does not limit the scope of the SSC review. The SSC is responsible for ensuring the Council's decisions are based on the best available science. At the request of the SSC, Council staff prepares a "road-map" that lays out the issues and identifies specific questions and issues that need to be resolved. The SSC reaches consensus and/or votes on each issue. The SSC generally provides input on a safe range for ABC rather than recommending a specific TAC. They do provide input on the relative level of impacts (biological, social and economic) at various levels within an ABC range.

All SSC meetings are open to the public and are advertised in the Federal Register, website and press releases/newsletters.

Members of the public do attend, with numbers attending depending on the issue. Allocation issues (e.g., setting annual king mackerel TAC, trip limits and bag limits) generally result in more members of the public attending. The Council's SSC does not have a formal agenda item for public testimony, however, members of the public have been allowed to comment.

SSC reports have been verbal and given by Council staff. Minutes are provided to Council members and to anyone requesting a copy through the Council office. The Council is in the process of placing all minutes on their website. More recently, the Council is working to have the written SSC reports given orally by the SSC Chair or Vice-Chair.

The Council addresses the SSC recommendations as they discuss and vote on specific measures. For instance, the SSC (and Advisory Panel) recommendations on TAC would be presented and then the Council discussion would begin. The SSC has requested that the Council provide them (the SSC) with some documentation of how the Council responded to the SSC recommendations. Minutes of all committee and Council meetings are available to the SSC and members of the public.

The Council always follows the SSC's advice when they establish ABC ranges. Only once has the South Atlantic Council set a catch limit that exceeded the SSC recommendation. This was in the 1980s for an Atlantic king mackerel TAC, and the Council's rationale for doing so was included in the minutes and the framework document that resulted from the TAC setting process.

The Council has used an independent panel in the past to address swordfish stock status. The Council used a Mackerel Stock Assessment Panel to make determinations about stock status; this was an attempt to get some "outside" and "independent" review of mackerel stock assessments. The Council has used a Shrimp Review Team to evaluate the need for closures due to winter kills of white shrimp. In the past, a Snapper Grouper Assessment Group was used to provide advice on stock status. More recently, the Council has implemented the Southeast Data Assessment and Review (SEDAR) process for independent peer reviews of its stock assessments. The review component of the SEDAR process uses scientists from the Center for Independent Experts (CIE) to review all of the stock assessments conducted in the Southeast Region.

Mid-Atlantic

The Mid-Atlantic Council uses several sources of scientific review in its decision-making. For the majority of its stock assessment advice, the Mid-Atlantic Council relies on the Northeast Fishery Science Center Stock Assessment Review Committee (SARC) process. The SARC meets twice a year to review stock assessments for the New England Council, the Mid-Atlantic Council, and the Atlantic States Marine Fisheries Commission, and is comprised of independent experts from inside and outside the United States.

In addition to the SARC, the Council has Monitoring Committees for most of its FMPs, which meet once or twice a year for each FMP to provide management advice to the Council. The Monitoring Committees review the SARC advice, as well as additional information provided by the state scientist/managers on the committee, to develop management recommendations for Council consideration. Because the Council has both a SARC and Monitoring Committees, it generally does not use the SSC for general scientific or management advice. In effect, these Monitoring Committees serve a role that is similar to the SSCs of most regional councils. As such, most issues related to SSC nominations and processes have no direct application to the Mid-Atlantic Council and its scientific review process.

Nevertheless, the Mid-Atlantic Council does have an SSC, which has met a few times over the last several years to address specific concerns related to stock assessments. The SSC has reviewed a bluefish assessment (April 1998), a tilefish assessment (March 1999), and several Atlantic States Marine Fisheries Commission analyses related to the biological reference points for summer flounder (April 2001). These meetings occur only when requested by the Council, and the SSC meetings occur independently of Council meetings. The SSC meetings are open to the public and the public can ask questions/offer comments. The SSC reports are presented by the SSC chair to the Council with a verbal and written summary report.

New England

The New England Council has two primary scientific review bodies; an SSC to provide additional review of biological issues, and a Social Sciences Advisory Committee (SSAC) to review social and economic analyses. The SSC has 11 members, all with professional backgrounds in biological sciences. The SSAC has 12 members consisting of four social anthropologists, one sociologist, one environmental

geographer, and six economists. Members of both committees are from academia, state agencies, ENGOs, or may be former employees of NMFS. In an effort to get independent reviews, the Council has not asked current NMFS employees to serve as members of these committees — NMFS scientists and social scientists provide advice to the Council through other channels in the FMP development process.

Anyone may nominate candidates to serve on the SSC or SSAC, or individuals may apply on their own. Members serve a for renewable three-year terms. Although members do not select their own replacements, they may recommend new candidates.

Both the SSC and SSAC meet on an ad-hoc basis. The SSC usually meets once or twice per year and the SSAC usually meets at least twice per year. The SSAC reviews social science analyses of major Council actions, and as a result the number of SSAC meetings is determined by the number of major actions under development. Both committees meet independently of the Council and designate a member to report findings at Council meetings. The Council usually receives both verbal and written reports from the SSC and SSAC. The public may attend SSC and SSAC meetings. Public comment is usually allowed but it is taken at the discretion of the committee chair.

Similar to the Mid-Atlantic Council, the New England Council relies on the Northeast Stock Assessment Workshop for almost all stock assessment advice. The SAW meets twice a year to review assessments and its Stock Assessment Review Committee is comprised of independent experts from inside and outside the United States.

The SSC typically meets when there is conflicting or unclear stock assessment advice or when the Council plan development teams request its assistance in resolving an issue over biological reference points. The SSC does not review management changes. Management strategies are developed by the Council and analyzed by the plan development teams (PDTs). TACs associated with management reference points are determined by the PDTs when they are not available from a SAW assessment.

SSC and SSAC recommendations may be broad in scope and as a result there is no single way that they are incorporated into management plans. For example, when the SSC was asked to evaluate two conflicting stock assessments for herring and to provide management reference points, it only provided

very general advice to the Council by ruling out some of the proposed reference points and recommending that the plan development team perform a “risk analysis” to determine appropriate management targets. In this case the Council followed the SSC advice.

The PDTs, not the SSC, set catch targets following the advice of the Stock Assessment Workshop and the Council has always accepted these targets. PDTs are always chaired by a Council staff member and their primary function is to assist the Council and its committees to develop management actions. The PDTs consist of technical people from the Council staff, NMFS, states and occasionally academic institutions. Typically, each PDT has one to three biologists, one or two economists, a NMFS regional office plan coordinator, and usually a social scientist capable of completing the social impact analysis. In some cases, the chair of a species advisory panel attends PDT meetings to provide advisory panel input. PDTs work directly for Council committees and produce decision documents and regulatory analysis including NEPA documents. PDTs are not formal peer review groups because they usually lack sufficient depth in a particular area such as biology, economics, etc.

The Council sometimes seeks independent reviews in addition to getting advice from the SSC and other advisory bodies. Most recently, the Council requested an independent review of new management reference points that were substantially different from earlier reference points. This independent review was requested because the SSC did not have the time and resources to undertake a comprehensive review of reference points for 19 stocks. Also user groups had requested that Secretary of Commerce provide a review by experts that were entirely independent of any past association with NOAA fisheries.

Discussion

My evaluation of the scientific review process currently used by the regional fishery management councils indicates that the need for a more robust process is, for the most part, one of perception and not of reality. In most cases, scientific information, and particularly stock assessment information, is rigorously reviewed prior to policy decisions being made by the regional fishery management councils. All of the Councils have a scientific review process that includes committees to review stock assessments and/or other analyses (i.e., Plan Teams, Stock Assessment Review Committees, SEDAR Panels, Stock Assessment Panels, Monitoring Committees,

Social Science Advisory Committees, etc.), along with an SSC. Nevertheless, additional changes should be considered to strengthen this process. The U.S. Commission on Ocean Policy had a number of specific recommendations regarding scientific advice to management, and based on my review of the regional fishery management council’s existing scientific review process, I offer the following comments for each recommendation:

SSC Membership and Compensation

The Commission recommended that SSC members be nominated by each Council, candidate qualifications be reviewed by an independent review process (by a credible, scientific organization), and SSC members ultimately be approved by the NOAA Administrator. Further, the Commission recommended that SSC members serve fixed terms, and that members (or their home institutions) be compensated for time spent on Council business.

Highly qualified and respected scientists are currently members of the SSCs. It is not clear that any independent scientific organization will be better able to evaluate the qualifications of potential SSC members than the existing process. Moreover, it is not clear that transferring appointment authority to the NOAA Administrator will improve SSC composition and ultimately scientific advice. One could certainly argue that the NOAA Administrator would be in a conflicted position in approving SSC members that review stock assessments and analyses, of which a majority is prepared by NOAA personnel.

Presumably, the Commission’s recommendation is to address a perception that SSC members may not be qualified or may have some conflict of interest. Yet the Commission provided no guidance on what qualifications would be acceptable. For example, would SSC membership require a Ph.D., minimum number of scientific publications, a non-NOAA agency scientist, or some other criteria? Nearly 90% of the members on standing SSCs across the country have a Ph.D., and the number of publications prepared by all members is likely numerous. As far as I know, conflict of interest has never been a serious issue with SSC members; only a handful of SSC members across the country have worked outside of their role as SSC members, either directly or indirectly, for fishery interests, environmental organizations, or other groups with a stake in the outcome. There may be a few SSC members with family or friends that derive income from fisheries or advocacy groups, but this number is probably small. Both SSC qualifications and conflict of interest appear to be non-issues, and there

is no explanation provided for this recommendation by the U.S. Commission on Ocean Policy. **I recommend that SSC appointment authority should remain with the Councils. However, SSC members should have a role in nominating new members, as they are in the best position to evaluate strengths and weaknesses of their committee, and recruit the most knowledgeable and qualified candidates.**

Compensation of SSC members for their time (preparation time and meeting attendance days) is currently not authorized by the Magnuson-Stevens Act. SSC members are reimbursed for travel, lodging, and meals during meetings, but are not compensated for their time. In the absence of pay for services, one may question why a scientist would volunteer his or her time to serve on the SSC. The incentives for members vary, however in regions where scientific advice greatly influences management, SSC members realize the impact of their recommendations and this provides incentive to actively participate on the SSC. I believe that is the primary motivation for members of the North Pacific Council's SSC. There is also a desire by many scientists to keep up to date with applied research and changes affecting fisheries. SSC membership may also be within the job duties for federal and state agency positions. Nevertheless, it is a very large commitment to become an SSC member, involving days of preparation before the meeting, as well as time away from work and family. While it is not practicable to pay for preparation time, **I recommend that all SSC members, including federal scientists, receive at least an honoraria (or some other type of compensation) for their time spent at SSC meetings.** A small amount of compensation may be enough incentive to attract additional qualified scientists that would otherwise be disinclined to make the commitment necessary for active SSC membership. It is unlikely that some nominal honorarium would create a perception of "conflict."

Currently, none of the regional fishery management council SSCs have term limits. While the concept of term limits may offer the potential benefit of new membership and consequently new perspectives, the long-term experience of some SSC members contributes to the overall knowledge, understanding, and collective memory of the committee. It is also very difficult to recruit and maintain SSC members with research backgrounds that are tangential to fisheries (e.g., those with backgrounds in marine mammals, seabirds, anthropology, and particularly economics). Additionally, the pool of knowledgeable and qualified scientists may be small in some regions (e.g., the Caribbean). Thus, adoption of term

limits may actually result in a less qualified scientists serving on the SSC — the exact opposite effect envisioned by the U.S. Commission on Ocean Policy. Our experience in the North Pacific is that there is enough turn over of SSC membership (about 1 member per year) to gain fresh perspectives, while simultaneously benefiting from experience of long term membership. For this reason, **I recommend against adoption of term limits for SSC members.** The Council would retain authority to appoint members and replace members if there is not enough turnover to gain new perspectives, or if additional expertise is needed.

SSC Role in Setting ABC Limits

The Commission recommended that the SSC should determine the allowable biological catch based on the best scientific information available. Further, they recommended that the MSA be amended to require that Councils set harvest limits at or below the SSC's allowable biological catch. In the event that the SSCs cannot determine acceptable biological catch within a set time, it should be done by the NMFS regional science director. Lastly, once an ABC is determined, the Councils should propose a management plan, and if it is not implemented in a timely fashion, NMFS should prohibit all fishing on that stock until NMFS is able to review the adequacy of the management plan.

On its surface, this recommendation seems to be a reasonable way to address the perception that "the fox is guarding the hen house" (i.e., that conservation may take the back seat to socioeconomic considerations). However, fisheries cannot be managed by science alone; there will always be policy choices, tradeoffs, and scientific uncertainty to consider. This is true even in the case of establishing maximum acceptable biological catch limits. For example, even when catch limits are established based on robust data and models, uncertainty associated with biomass estimate parameters (e.g., survey catchability) or harvest rate parameters (e.g., natural mortality rate) make it impossible to scientifically determine an absolutely 'correct' amount of fish removals. The experience with groundfish management on the west coast illustrates this point (Ralston 2002). There are biological risks associated with any level of ABC (above zero), and these risks are balanced with social and economic factors of the fishery.

By granting the SSC final authority to determine the allowable biological catch, public pressure to increase or decrease catch limits may be transferred from the Council to the SSC. However, scientists may be less susceptible to pressure than Council appointees in particular (Ginter 2004). In the North

Pacific, where the SSC does determine maximum allowable catch levels, both the fishing industry and conservation groups testify at SSC meetings, but all arguments need to be scientifically based to affect the SSC decisions. Most of the Councils already appear to follow the SSC's recommendations on scientifically based catch limits (e.g., ABC, MSY, OY). **I recommend that all Councils make it a policy to adopt maximum ABCs determined by their SSC, and set catch limits at or below the ABCs. However, there may be unforeseen situations in which a catch limit may need to be set higher than ABC on a short-term basis (say one year), so flexibility must be built into any guidelines developed for the Councils.** For example, based on new scientific information, the SSC could recommend that ABCs be established for each regulatory area within the species' distribution, yet the management system may be unable to accommodate such a change in a timely fashion. One could envision other scenarios that would require some flexibility in this rule.

Proposals to further separate science from management (i.e., separating conservation from allocation decisions), such as suggested by the Pew Ocean Commission (2003) should be viewed with caution. With the possible exception of annual catch limits, virtually all other management actions involve aspects of both conservation and allocation, aspects which are impossible to separate. Even catch limits themselves have a strong allocation component because it involves dictating when and where fish can be caught. Other actions that appear at first to be strictly conservation measures (e.g., habitat area closures, bycatch reduction, size limits, bag limits, etc.), clearly have a strong allocation component, as the regulations basically make fish more difficult to catch by one group or sector and make the fish more available to other sectors. It would be impossible for an SSC to make scientific data-based decisions on issues other than catch limits because the issues involve more than just biological science. Council decisions involve weighing all the analytical scientific information, public testimony, advisory panel advice, personal experience, and other information, and then each Council member makes an informed decision (i.e., a vote) as to what alternative best achieves the goals and objectives of the FMP and the Magnuson-Stevens Act national standards, as well as meets legal requirements. Although decisions cannot be made on science alone, scientific advice is a critical and integral part of the decision-making process. **Rather than separating conservation from allocation decisions — which would be impossible — I recommend that Councils further integrate science into decision making and provide rationale for their decisions, including how scientific information was used.** The

National Research Council (NRC 2002, 2004) also recommended that the fishery management councils explain their treatment of scientific information to improve outside perceptions of how the agency conducts its scientific work.

Independent Reviews and Research Priorities

The Commission recommended that a process should be developed for independent review of the scientific information relied on by the SSCs. Additionally, the Councils and SSCs should develop an annual, prioritized list of management information needs (research priorities) and provide it to NMFS for incorporation into designing research, analysis, and data collection programs.

Independent peer review is a fundamental procedure to ensure quality control of scientific information, but it is unclear why the existing SSC peer review process was deemed inadequate by the Commission. The Commission offered no explanation as to the need for additional review beyond SSCs (or Monitoring Committee in the case of the Mid-Atlantic Council). Most of the SSCs across the country appear to meet the OMB guidelines for peer review, as well as the guidelines set forth by the National Research Council (NRC 2004). The NRC noted that key elements of peer reviews should include:

- The review should be conducted by experts who were not involved in the preparation of the documents or the analysis contained in them;
- The reviewers should not have conflicts of interest that would constrain their ability to provide honest, objective advice;
- All relevant information and supporting materials should be made available for review; and
- A peer review should not be used to delay implementation or measures when a fishery has been determined to be overfished.

With only minor exceptions, peer reviews done by regional fishery management council SSCs incorporate all of these elements. The process is open, and all analytical documents and supporting materials provided to SSCs are available to any interested publics. Regarding conflict of interest elements, there may be a few instances when a contributor to a stock assessment or other analyses is also an SSC member. In the case of the North Pacific Council, SSC members from NOAA Fisheries may have been part of an internal stock assessment review or assisted in some other way with the annual stock assessment report or fishery evaluation. Additionally, other SSC members have contributed material from research

projects that has been incorporated into amendment analyses. While these members have not found it necessary to recuse themselves from the SSCs discussion and deliberations, these members do disclose if they have participated in the analysis in some way. As such, conflict of interest has not been raised as an issue with SSC members.

The Information Quality Act, also known as the Data Quality Act, was enacted in 2000 to ensure standards of information used in national policy-making. Based on the OMB guidelines for implementing this Act, further independent scientific peer review, in addition to SSC review, may be required. The guidelines apply when scientific information is influential, include precedent-setting methods or models, result in conclusions that are likely to change prevailing practices, or is likely to affect policy decisions that have significant impact.

OMB Guidelines require that agencies conduct a peer review of all influential scientific information that the agency intends to disseminate. Influential scientific information is defined as that which will have a clear and substantial impact on important public policies or private sector decisions. Given that many changes to fisheries regulations would result in substantial impacts, peer review may be required. Fortunately, the guidelines allow agency discretion on the form of peer review for most actions, and regional council SSCs should be deemed satisfactory because they appear to meet the guidelines for most scientific reviews. The guidelines require a more rigorous form of peer review for highly influential scientific assessments (defined as having an impact of more than \$500 million or if the assessment is novel, controversial, precedent-setting, or has significant interagency interest). For highly influential assessments, the guidelines specify that scientists employed by the sponsoring agency (e.g., NOAA Fisheries) are not permitted to serve as reviewers. Additionally, the guidelines specify that agencies shall avoid repeated use of the same reviewer on multiple assessments, unless their participation is essential and other reviewers cannot be obtained. In summary, it appears that Council SSCs can and should be used as an “alternate procedure” (as opposed to a National Academy of Sciences review) for peer review of most fishery related actions. For the highly influential scientific assessments, peer reviews by the National Academy of Sciences, Center for Independent Experts, or other scientific peer review body may be required.

Although additional peer review has occasionally been requested by a few of the Councils prior to taking action, and as a consequence causing a delay of potential regulatory measures,

this is a rare occurrence. The Councils all understand that strong science is the basis of good management practices, but each region has approached the scientific review process differently. Given the new OMB guidelines, peer review of most analyses prepared for fisheries management will be required. **I recommend that all Councils make it a policy to utilize their SSCs for peer review of all analytical documents (stock assessments, analysis for NEPA, RIR, RFA, etc.), and not to make final decisions until the scientific information passes muster (i.e., is deemed the best available scientific information) by their SSC. In most cases, there is no need for additional outside independent review.** Outside peer reviews are very expensive (\$100,000+ per review), and may result in lengthy delays (it may be difficult to find qualified independent reviewers with adequate time available). There will be some instances, involving controversial science issues, where additional peer review may be warranted, but these should be considered on a case-by-case basis relative to OMB guidelines and other considerations.

Some SSCs and other scientific advisory bodies assist their Councils in developing research priorities. In the case of the North Pacific, research needs are identified on an annual basis by the Plan Teams and further developed and prioritized by the SSC. The Council then forwards the list of research priorities to the various scientific research institutions in the region (NMFS, Sea Grant, Universities, North Pacific Research Board, etc.). The usefulness of this exercise has never been evaluated, but the list of research is used by the NMFS Science Center for budgeting and planning purposes, and may also be useful for university researchers seeking grant monies. **I recommend that Councils, through their SSCs, take responsibility for identifying research priorities and information they need for effective decision-making.**

Other Recommendations

My experience with the North Pacific Fishery Management Council is that the scientific review process provided by the Plan Teams and SSC is strongly supported by all stakeholders. Once the SSC approves an analysis or recommends an ABC, everyone understands that this represents the best scientific information available. The only exception is those rare cases when there are extreme differences of opinion within the scientific community (e.g., effects of fishing on essential fish habitat or Steller sea lions), in which case it may be desirable to request an additional independent review.

In my opinion, a major part of the North Pacific Council's success is due to the fact that SSC meetings are held

concurrently (starting a day or two earlier) with Advisory Panel and Council meetings. Fishery participants, Council members, Advisory Panel members, and interested members of the public will generally attend a portion of each SSC meeting. The public enhances its understanding of the science involved in each analysis, and gains an appreciation for the scientific review process. Additionally, SSC members can learn more about the fisheries by attending portions of the other meetings, as well as having open dialog with fishery participants and representatives of environmental organizations. **I would recommend that all Councils consider scheduling SSC meetings to be held at the same time and locale as Council meetings.** An added benefit of scheduling these meetings together is that the SSC Chair (or designee) can report to the Council while the deliberations are still a fresh memory, and the Council members have an opportunity for questions and to seek clarifications of the SSC's report.

Scientific reviews are handled differently by each regional council, and each SSC has developed its own process for reviewing analyses and providing advice to the Council. There may be much to gain by sharing information among all SSCs across the country. SSC members can learn from each others experience, and thus better standardize what constitutes an adequate peer review, best available scientific information, and research and data needs for improving scientific analyses. **I recommend that opportunity should be provided for regional or national SSC meetings, where members from different regions could discuss best practices and seek to identify analytical and research needs.** A national workshop with all members of standing SSCs (there are about 110 members) could provide substantial improvements to the process for about the cost of one peer review by the Center for Independent Experts.

Conclusion

The structure, process, and use of SSCs by the regional fishery management councils differs somewhat among the regions. The flexibility provided under the Magnuson-Stevens Act has allowed the councils to adapt to their regional needs and conditions. However, based on my review of the scientific review process used by the Councils, I suggest that some standardization among the regions could potentially improve efficiencies, improve quality control, make the process more robust, increase transparency in the decision process, and increase awareness that the Councils base decisions on the best available scientific information.

The U.S. Commission on Ocean Policy recommendations point out some useful ways to improve the scientific process. I agree with many of these recommendations. The changes I propose would standardize the scientific review process across regional fishery management councils, while still providing flexibility necessary to address regional specific issues. Criticism of the Council's use of science should be taken very seriously, and steps must be taken to increase the public's confidence in Council stewardship.

Acknowledgments

I thank all of the regional council staff who graciously responded to my queries: Don McIsaac and Dan Waldeck (PFMC), Paul Dalzell (WPFMC), Wayne Swingle (GMFMC), Miguel Rolon (CFMC), Chris Moore (MAFMC), Chris Kellogg (NEFMC), and Gregg Waugh (SAFMC). These individuals drafted much of the descriptive text contained in their respective regional sections, reviewed the draft paper for accuracy, and provided thoughtful comments. I also thank Diana Evans, Chris Oliver, Rich Marasco, and Keith Criddle for their reviews and helpful suggestions to improve the paper.

References

- BOWEN, D., J. HARWOOD, D. GOODMAN, AND L. SWARTZMAN. 2001. Review of the November 200 Biological Opinion and Incidental Take Statement with Respect to the Western Stock of Steller Sea Lion, with Comments on the Draft August 2001 Biological Opinion. Prepared for the North Pacific Fishery Management Council. October 2001.
- DRINKWATER, K., A. AGLIN, K. FRANK, T. KOSLOW, P. PEPIN, AND P. SNELGROVE. 2004. Review on Evaluation of Fishing Activities That May Adversely Affect Essential Fish Habitat (EFH) in Alaska: Draft of Appendix B. Summary Report. Center for Independent Experts. 2004.
- GINTER, J. 2004. Fisheries Governance. p.152-157 In: Witherell, D. ed. Managing Our Nation's Fisheries: Past, present and future. Proceedings of a conference on fisheries management in the United States held in Washington, D.C. November 2003.
- GOODMAN, D., M. MANGEL, G. PARKES, T. QUINN, V. RESTREPO, T. SMITH, AND K. STOKES. 2002. Scientific Review of the Harvest Strategy Currently Used in the BSAI and GOA Groundfish fishery Management Plans. Prepared for the North Pacific Fishery Management Council. November 21, 2002. 140 p.
- RALSTON, STEPHEN. 2002. The Groundfish Crisis: What Went Wrong? In Ecological Observations for the Monterey Bay National Marine Sanctuary, 2002.
- NATIONAL RESEARCH COUNCIL. 2002. Science and Its Role in the National Marine Fisheries Service. National Academies Press, Washington, D.C.
- NATIONAL RESEARCH COUNCIL. 2003. Decline of the Steller Sea Lions in Alaskan Waters: Untangling Food Webs and Fishing Nets. National Academies Press, Washington, D.C.
- NATIONAL RESEARCH COUNCIL. 2004. Improving the Use of the "Best Scientific Information Available" Standard in Fisheries Management. National Academies Press, Washington, D.C.
- PEW OCEAN COMMISSION. 2003. America's Living Oceans: Charting a Course for Sea Change. May 2003. Pew Oceans Commission, Arlington, Virginia. 144 p.
- U.S. COMMISSION ON OCEAN POLICY. 2004. An Ocean Blueprint for the 21st Century, Final Report. <http://oceancommission.gov>.



INVITED PAPER

Improving the Scientific Basis for Management by Separating Conservation and Management Decisions

LEE CROCKETT

LEE CROCKETT
Executive Director
Marine Fish
Conservation Network
600 Pennsylvania Ave., S.E.
Suite 210
Washington, D.C. 20003
lcrockett@conservefish.org

The views expressed in this paper do not necessarily represent those of the members of the Marine Fish Conservation Network.

Introduction

Scientists nationwide have repeatedly warned that continued overfishing on already-depleted fish stocks increases the risk of a severe and prolonged population collapse.¹ Nevertheless, many regional fishery management councils continue to ignore scientific evidence and develop management plans that fail to end overfishing and do not rebuild depleted fish stocks in a timely way. Progress towards ending overfishing, rebuilding depleted fish stocks and ensuring the long-term sustainability of our nation's fish populations has been limited due to this failure to recognize the primacy of science and to separate scientific determinations from allocation decisions. The need to separate science (i.e., conservation) from allocation decisions within the fishery management councils has been endorsed by groups as diverse as the National Academy of Science and the U.S. Commission on Ocean Policy.

History of an Idea

For nearly three decades fishery managers have struggled to develop fishery management plans that conform to conservation objectives and the legal standards of the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Faced with intense political pressure to relieve the near-term economic burden imposed by more stringent regulatory restrictions, the regional fishery management councils have too often ignored scientific advice concerning the status of fish populations, sustainable catch levels and habitats in need of protection. Not surprisingly, the result has been nationwide declines in fish populations and habitat deterioration. To address these problems, a series of independent studies have been conducted over the past two decades. The conclusions were consistent and clear: it is critical that we strengthen the scientific basis of fisheries management by separating scientific determinations from allocation decisions.

The National Marine Fisheries Service (NMFS)-sponsored "Calio Report," published in 1986, concluded that "[f]ishery management will be markedly improved by a clear separation between conservation and allocation decisions." The report also recommended that NOAA determine the allowable biological catch (ABC) using the best available science and local and regional expertise while the regional fishery management councils make the allocations which could not exceed the ABC. In 2002, the National Research Council published the results of a similar study entitled "Science and Its Role in the National Marine Fisheries Service." The report criticized the existing system and called for a review of the fisheries governance system and the use of science. It

¹ See "Improving the Use of the 'Best Scientific Information Available' Standard in Fisheries Management," National Research Council (2004) at 21 (stating that it is "important to avoid population levels that are so low that they substantially increase the probability of collapse of the fish stock").

specifically noted that the use of science in marine fisheries management decision-making is impeded by the governance system created by the Magnuson-Stevens Fishery Conservation and Management Act. Another study conducted by the Stanford University Fisheries Policy Project and published in 2003 recommended that science alone should dictate catch levels while the councils should be tasked with allocating the catch. The Pew Oceans Commission report, also published in 2003, echoed this conclusion concerning the need to separate scientific determinations from allocation decisions. In 2004, the U.S. Commission on Ocean Policy (USCOP) released its report, which paralleled many of the conclusions and recommendations of the Pew Oceans Commission. Significantly, recommendations from both Commissions flow from recognition that major fishery problems are related to governance, not inadequate science.

The most important of these recommendations include: (1) separating decisions regarding how many fish can be taken from the ocean (“assessment decisions”) from decisions about allocation of the available catch and other operational issues (“allocation decisions”); and (2) requiring regional fishery management councils to set catch limits at or below the limits recommended by independent scientists. The intent of these recommendations is to strengthen the role of science in fisheries management decisions and to insulate scientific advice from political manipulation by improving the independence of the councils’ Science and Statistical Committees (SSCs).

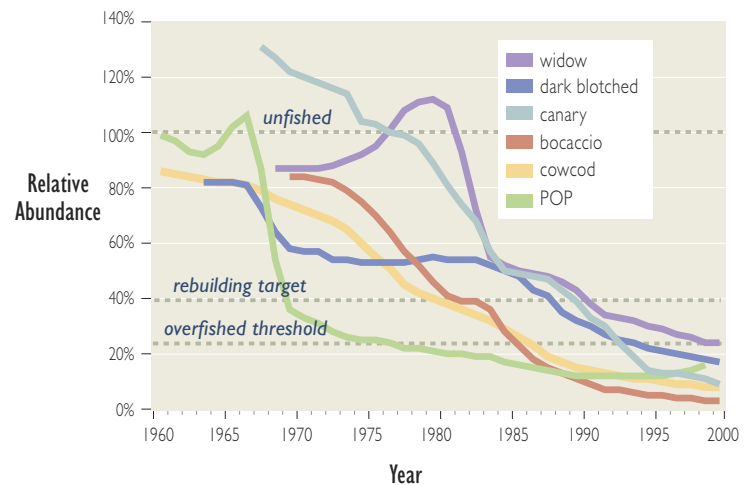
Examples Demonstrating the Need to Strengthen Scientific Basis for Fisheries Management

Pacific Rockfish

Pacific bocaccio rockfish, once the dominant groundfish caught off California, have been fished down to about 7.5% of their historic abundance.² So severe is the decline that scientists estimate that the current population is less than the total amount of Pacific rockfish caught by fishermen in 1974.³ This precipitous decline is due in large part to over two decades of persistent overfishing. Pacific bocaccio rockfish are long-lived and slow-to-reproduce, making them particularly vulnerable to overfishing. Both independent scientists and

Figure 1.

Relative Abundance of Pacific Groundfish Stocks Over Time



NMFS scientists repeatedly warned fishery managers that fishing levels on Pacific rockfish were too high, but the Pacific Fishery Management Council (PFMC) consistently ignored scientific advice. As early as 1984, Dr. Robert Francis, a NMFS scientist, explained that “groundfish species currently requiring management attention along the west coast have life history patterns that encourage overexploitation. These resources have such low rates of production and (relatively) high unexploited standing stocks that fisheries can develop and mature relying almost entirely on the standing stock (as opposed to new or surplus production) for their sustenance. These resources are ultimately harvested down to levels at which their fisheries productive capacities are destroyed.”⁴

Warnings that catch rates were too high or that Pacific bocaccio rockfish biomass was too low were issued almost annually between 1988 and 1998, and the species was formally declared overfished and in need of rebuilding in 1999.⁵ The Council, in response to fishing industry claims that stronger restrictions would create unnecessary economic hardship, rejected these warnings. Finally, in 2000, the Secretary of Commerce declared the entire Pacific groundfish fishery a disaster. Following a 2002 stock assessment, the Council was forced to close thousands of square miles of Pacific waters to bottom fishing

² Alec MacCall, 2003, “Status of Bocaccio Off California in 2003,” National Marine Fisheries Service.

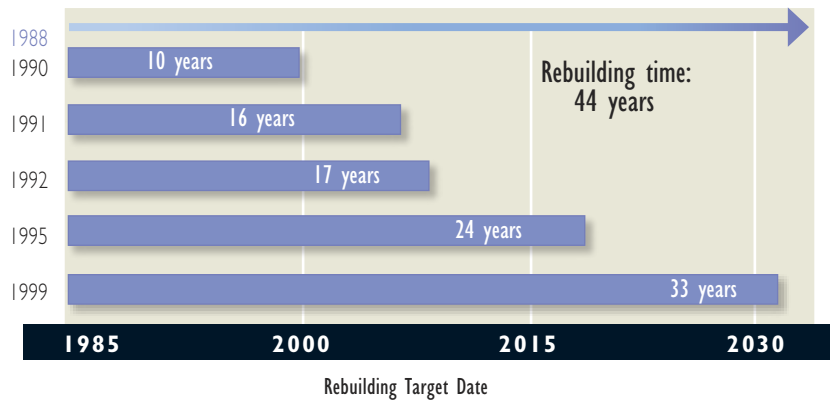
³ “Fisheries research and its application to west coast groundfish management.” Robert C. Francis, NMFS. In: Fisheries Management: Issues and Options, University of Alaska Sea Grant Report 85-2; “The Great Widow Rockfish Hunt of 1980-1982.” Don Gunderson, North American Journal of Fisheries Management, 4:465-468.

⁴ “Fisheries Research and its Application to West Coast Groundfish Management.” Robert C. Francis, NMFS. In: Fisheries Management: Issues and Options, University of Alaska Sea Grant Report 85-2.

⁵ “Status of Bocaccio off California in 2002.” Alec D. MacCall, NMFS. Available from the Pacific Fishery Management Council: www.pcouncil.org/groundfish/gfstocks/bocaccio06_02.pdf.

Figure 2.

Extension of Gulf Red Snapper Target Rebuilding Dates



to allow Pacific rockfish a chance to recover.⁶ Currently, eight species of Pacific groundfish (of 22 assessed out of 83 managed) are listed as overfished. The Council continued to permit overfishing on one of those species, lingcod, in 2002 and 2003. Figure 1 illustrates the result of this management failure.

Gulf of Mexico Red Snapper

The status of red snapper in the Gulf of Mexico was first formally assessed in the late 1980s. At that time, scientists found red snapper to be “significantly overfished” and recommended substantial reductions in fishing mortality (i.e., 60-70%) to allow depleted populations to rebuild. In response, the Gulf Council established a total allowable catch (TAC) limit of 6 million pounds for the fishery and allocated 51% of the TAC for the commercial fishery and 49% of the TAC for the recreational fishery. It also set a target rebuilding date of 2000, but rather than collecting actual landings data, the Council relied on size and bag limits to control mortality levels in the recreational fishery. These management measures did little to reduce actual mortality and the recreational portion of the TAC was exceeded year after year. In 1990, a subsequent stock assessment confirmed that the fishery was in trouble and that existing management measures were not sufficient to reduce red snapper mortality to the scientifically recommended levels.⁷

The Council responded by reducing the TAC, extending the rebuilding period to 2007 and concentrating its efforts on reducing red snapper bycatch mortality within the Gulf shrimp fishery. Although the stocks were not improving, in the years to follow the Council voted to increase the TAC from 4 to 6 to 9.12 million pounds and to extend the rebuilding period from 2007 to 2009 to 2019 to 2032⁸ (see Figure 2). For the past eight years, the Council has set the TAC at 9.12 million pounds, at least 3 million pounds (or 32.8%) higher than the catch level recommended by scientists.

In late 1990s, an independent peer review panel proclaimed red snapper stocks to be “severely overfished.”⁹ Since then, in every report to Congress red snapper has been listed as overfished and subject to overfishing. Still, there is no rebuilding plan in place that is consistent with the requirements of the law as amended by the Sustainable Fisheries Act in 1996. In fact, the last two rebuilding plans developed by the Council were rejected by NMFS for failure to comply with the law.¹⁰ NMFS commented that one of the more recent proposals was simply designed to delay new management measures until new stock assessments were completed in 2005.

Instead of lowering catch limits, limiting directed fishing mortality and rebuilding red snapper populations as quickly

⁶ In the fall of 2004, the closed areas totaled 10,800 square miles. Personal communication with Dr. Jim Hastie, Northwest Fishery Science Center, 3-01-05.

⁷ In 1990, the Reef Fish FMP was amended (Amendment 1) and set bag limits for the recreational sector, set quotas for recreational and commercial sectors and established a target rebuilding date of 2000. The Reef Fish Scientific Assessment Panel met in March of 1990 to review the 1990 stock assessment and recommended closure of directed fishery. Despite the fact that there were no viable alternatives, the Council chose not to close the fishery.

⁸ A regulatory amendment in 1995 December raised the red snapper TAC from 6 to 9.12 million lbs and extended the rebuilding target date from 2009 to 2019. Subsequent regulatory amendments in 1997 and 1998 approved and retained the status quo on the TAC. In January 1999, the Gulf Council proposed that the rebuilding target date be extended from 2019 to 2032. In June 2000, the Council left the TAC at 91.2 million lbs.

⁹ Consolidated Report on the Peer Review of Red Snapper Research and Management in the Gulf of Mexico.

¹⁰ On May 19, 2000, NMFS rejected the Gulf Council’s proposed red snapper rebuilding plan because it violated national standards 1 and 2. In July 2002, NMFS identified several shortcomings with the Gulf Council’s latest management plan including: (1) the “finding of no significant impact” (FONSI) was not supported by the environmental assessment (EA); (2) Council must develop a supplemental environmental impact statement (SEIS); (3) the Council failed to include no action alternatives or alternatives proposed by the RFSAP; (4) the Council failed to support taking the maximum allowable time for rebuilding (31 years); (5) there was insufficient rationale for maintaining the current TAC and for placing the greatest burden for rebuilding on the shrimp fishery; (6) the plan contained internally contradictory statements regarding the stocks’ ability to recover; (7) the plan lacked defined interim goals that would trigger additional action if not met; (8) there was no proposed changes to the accompanying regulations. In May 2003, NOAA reported that red snapper continues to be overfished and continues to be taken at an unsustainable rate.

as possible, the Gulf Council has focused the bulk of its management efforts on minimizing red snapper bycatch with the Gulf shrimp fishery. What's more, the Council has consistently relied on a suite of largely ineffective indirect controls to reduce red snapper mortality. Specifically, the Council has managed red snapper stocks using a combination of gear restrictions, minimum size limits and bycatch reduction devices (BRDs).¹¹ In 1998, the Council reserved 3.12 million pounds of the 9.12 million pound red snapper TAC pending proof that the experimental BRDs were at least 60% effective. The BRDs were only 24% effective, but the Council released the remaining TAC anyway.¹²

Perhaps the most astonishing management tactic to date is the Council's recent approval of a rebuilding plan ("Reef Fish Amendment 22") for red snapper that relies on an additional 50% of the commercial shrimpers in the Gulf going out-of-business rather than taking any directed management action to recover the red snapper population. The Council believes that the decline in the shrimp industry, and associated reduction in red snapper bycatch, will be sufficient to bring about the recovery of red snapper.

Today, almost two decades after the initial discovery that red snapper were severely depleted and almost a decade after the passage of the Sustainable Fisheries Act requiring rebuilding plans for all overfished species, red snapper are still being overfished and lack an adequate rebuilding plan. As is the case in many regions, political pressure and economic concerns too often outweigh sound science in fisheries management decisions in the Gulf of Mexico.

New England Groundfish

Throughout the 1980s, scientists warned the New England Fishery Management Council (NEFMC) that groundfish

were being overfished and recommended immediate reductions in fishing pressure. The Council however continued to allow fishing at unsustainably high rates, which resulted in catch levels that routinely exceeded target levels. By the mid-1990s, the Council's failure to make the necessary cuts to end overfishing and rebuild New England's severely depleted groundfish stocks led to the collapse of several key groundfish populations including Georges Bank haddock and Southern New England yellowtail flounder.¹³ By 1994, 80% of adult cod were caught by fishermen and Georges Bank cod was in danger of "imminent collapse."¹⁴ Since then, Georges Bank haddock, redfish and Georges Bank yellowtail flounder have made modest recoveries while Southern New England yellowtail flounder stocks have shown virtually no signs of recovery since the early 1990s. Currently, 12 of the 20 managed groundfish stocks are classified as overfished and eight of the twenty are subject to overfishing. Meanwhile, seven species are designated as overfished and experiencing overfishing.¹⁵

The New England Council typically uses a bar graph showing overall groundfish biomass over time to claim that significant progress is being made in rebuilding depleted groundfish populations in the region. Examining the relative progress of different New England groundfish species under the current management regime by separating those populations still subject to overfishing from those that are not currently experiencing overfishing leads to a different conclusion. For four of the 12 overfished groundfish populations, where the Council set and followed science-based catch limits, the stocks are indeed recovering (see Figure 3). For the other eight overfished groundfish species, however, the Council has failed to adhere to scientifically based limits, and those populations are slow to rebuild and remain well below healthy population levels (see Figure 4).

¹¹ Reef Fish Amendment 22, Gulf red snapper rebuilding plan (page xii, page 5).

¹² Reef Fish Amendment 22, Gulf red snapper rebuilding plan states that BRDs are only 40% effective. The 24% number came from the 1998 study of BRD effectiveness when they were deciding whether or not to release the reserve TAC. NMFS looked at the role of BRD placement in the nets and determined that better placement would achieve a 40% reduction and changed the regulations accordingly. New analysis as of March 2005 shows BRD red snapper reduction is only 11.7%. ("Status of BRD Performance in the Gulf of Mexico", Dan Foster, Harvesting and Engineering Division, NOAA Fisheries – 3/05). A 2004 study also shows that the overall effectiveness of the BRDs is likely reduced by the economic incentive to maintain shrimp catch and measures undertaken to improve shrimp retention. Foster also notes that "industry wide use in the western and central Gulf of Mexico since 1997 (1866 tows) falls short of the mandated 44% reduction red snapper fishing mortality from shrimp trawls."

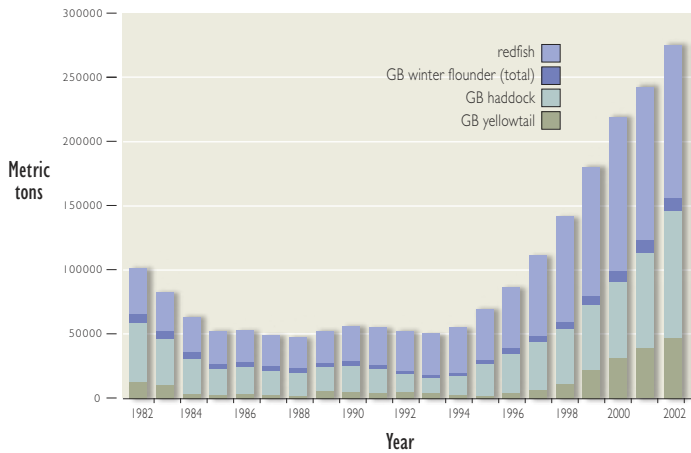
¹³ Fishery managers were forced to close nearly 6,500 square miles of fishing grounds off New England to all groundfish fishing. 59 Fed. Reg. 63,926 (Dec. 12, 1994).

¹⁴ Spawning stock biomass (SSB) for Georges Bank cod was greater than 90,000 mt in 1978, but by 1994, the SSB was at an all time low at around 15,000 mt. Georges Bank cod SSB increased slightly (to approx. 30,000 mt) b/w 1995 and 2001, but overfishing continued. Between 2001 and 2002, SSB estimates decreased. (1978-2002 estimates from GARM report, 2002 estimates from NEFSC presentation to NEFMC, October 2002.)

¹⁵ See Northeast Fisheries Science Center, *Assessment of 20 Northeast Groundfish Stocks Through 2001: A Report of the Groundfish Assessment Review Meeting* (2002) at 14.

Figure 3.

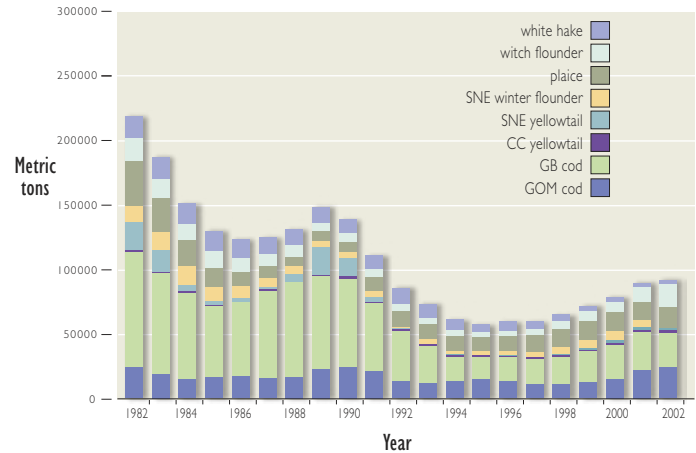
SSB of Four Groundfish Stocks - Overfishing Ended



Sustainable stock biomass over time for four New England groundfish populations upon which overfishing has ended. Source: 1982-2001 GARM Report, 2002 NEFSC biomass projections, redfish and white hake from SAW 33.

Figure 4.

SSB of Eight Groundfish Stocks - Overfishing Continues



Sustainable stock biomass over time for eight New England groundfish populations upon which overfishing continues. Source: 1982-2001 GARM Report, 2002 NEFSC biomass projections, redfish and white hake from SAW 33.

New England is perhaps the most well studied region with regard to fisheries data collection, yet despite ample scientific evidence showing that groundfish stocks are severely overfished and not rebuilding, the New England Council continues to base its management decisions on economic and political considerations rather than sound science. Indeed, the NEFMC is notorious for ignoring scientific advice, and the deterioration of groundfish populations is testament to this pattern of delay and denial. In 2001, a federal court judge declared that the fishery management plan for New England groundfish violated the law because it: (1) explicitly allowed continued overfishing, (2) relied on management measures that were likely to fail, and (3) lacked an adequate plan to monitor and assess bycatch.¹⁶ Today, more than three years after the initial ruling, the amended groundfish management plan (“Amendment 13”) is still not consistent with scientific recommendations and fails to comply with statutory requirements and a federal court order.

Amendment 13 fails to prevent overfishing and relies upon a suite of indirect management measures that are unlikely to limit fishing mortality to the target level. Indeed,

Amendment 13’s “phased mortality” approach allows overfishing to continue on five groundfish species including Georges Bank cod. This, in spite of the fact that Georges Bank cod populations, which have shown virtually no improvement in more than a decade, currently hover at about 14% of the healthy population level.¹⁷ Persistent overfishing has contributed to low stock recruitment and has caused the population of Georges Bank cod to fall from more than 23 million fish in 1999 to less than 11 million fish in 2002.¹⁸ In 2002, the actual catch of Georges Bank cod was greater than 17.51 million pounds and exceeded the scientifically recommended target catch level of 5.69 million pounds by more than three times.¹⁹ In the same year, the actual fishing rate on Georges Bank cod was more than twice the target fishing rate established by NMFS scientists for that year.²⁰ Nevertheless, the Council’s amended plan authorizes fishing rates on Georges Bank cod that will result in fishing mortality ($F = 0.21$) in excess of the maximum fishing mortality threshold (F_{msy}) ($F = 0.18$) recommended by scientists.²¹

Year after year, cod landings in New England have exceeded target catch levels by 100-300%.²² This failure is attributable

¹⁶ *Conservation Law Foundation v. Evans*, 209 F Supp. 2d 1, 9-10, 13 (D.D.C. 2001).

¹⁷ Northeast Fisheries Science Center, *Assessment of 20 Northeast Groundfish Stocks Through 2001: A Report of the Groundfish Assessment Review Meeting* (2002) at 14.

¹⁸ Northeast Fisheries Science Center, *Assessment of 20 Northeast Groundfish Stocks Through 2001: A Report of the Groundfish Assessment Review Meeting* (2002) at 26, Table A7.

¹⁹ See Table 1.A, <http://www.nero.noaa.gov/ro/fso/fj02-03.pdf>.

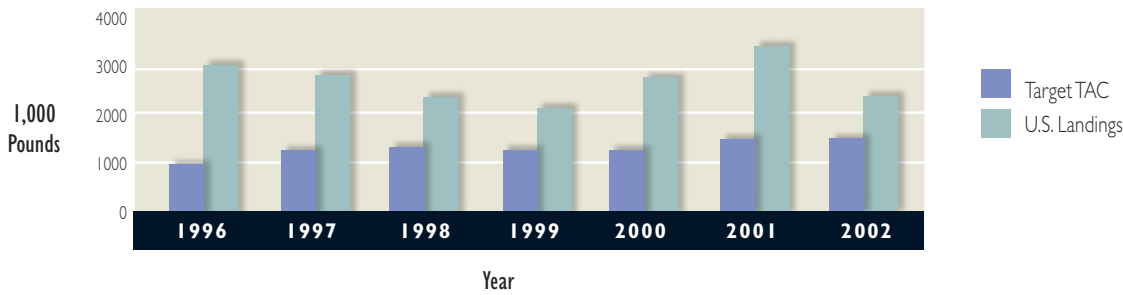
²⁰ Amendment 13 FSEIS Table 10 at I-49 and GARM Report at 14. The overall fishing mortality rate for Georges Bank cod in fishing year 2002 (0.43) (including mortality from targeted landings and bycatch) was more than twice the maximum fishing mortality threshold (0.17) for that calendar year.

²¹ Amendment 13 FSEIS at I-331, Table 81.

²² See <http://www.nero.noaa.gov/ro/fso/mul.htm>.

Figure 5.

Target Catch Versus Landings - Gulf of Maine and Georges Bank Cod



to the Council's approval of fishing rates in excess of scientific recommendations and its continued reliance on non-binding target catch levels. The management measures developed by the Council provide no backstop or accountability mechanism to ensure that the target TAC is not exceeded. Rather, the Council relies on ineffective effort controls to reduce ground-fish mortality. In 2002, the Council reduced the number of days-at-sea (DAS) fishermen were allowed to fish by nearly 40%, but Georges Bank cod catch actually went up by more than 15%. Despite the negative correlation between DAS cuts and actual mortality reductions, the Council opted, once again, to cut DAS by another 15-20% in Amendment 13. Cod mortality needs to decrease substantially (from 2002 levels), but there is no evidence to explain how additional DAS cuts will meet the target goals.²³

North Pacific

Unlike most other councils, the North Pacific Fishery Management Council (NPFMC) in recent years has adopted a pro-active and precautionary approach to fisheries management. The NPFMC relies on science-based catch limits to set the TACs for individual fisheries, and has never set a TAC at a level greater than the scientifically based recommendation for ABC. While there is still some debate regarding what constitutes a sufficiently conservative ABC, the effect of this management approach is that none of the North Pacific finfish populations are currently classified as overfished. For example, in 2005, the Council set the TAC for Bering Sea sablefish equal to the scientifically recommended ABC of 2.4 thousand metric tons (mt). Similarly, the Council followed scientific advice and did not exceed the ABC when setting the TAC for the Gulf of Alaska pollock fishery at 71.2 thousand mt.

The Council's success is due in large part to its precautionary approach to management. The NPFMC employs a tiered system, which is designed to apply greater caution to species

for which there is less scientific data and information. An example of the North Pacific Council's precautionary approach to management is its recent decision to limit the footprint of the bottom trawl fisheries in the Aleutian Islands. Scientists have observed via submersibles biologically diverse coral and sponge habitats throughout the island chain, yet very little is known about their precise distribution. Responding to the recommendations of scientists and independent peer reviewers, the council voted to protect over 60% of the fishable area as a precautionary measure and to prevent bottom trawling from spreading into new sensitive areas.

U.S. Commission on Ocean Policy Recommendations

After three years of intense investigation into the health of our oceans, the U.S. Commission on Ocean Policy released its final report on September 20, 2004. The Commission concluded that "[o]ur failure to properly manage the human activities that affect the nation's oceans, coasts, and Great Lakes is compromising their ecological integrity, diminishing our ability to fully realize their potential, costing us jobs and revenue, threatening human health, and putting our future at risk." The Commission went on to say, "[t]he message from both experts and the public alike was clear: our oceans, coasts, and Great Lakes are in trouble and major changes are urgently needed in the way we manage them."

Among the recommendations were a series of measures designed to enhance fisheries science and management to ensure the long-term sustainability of marine fish and ocean ecosystems. Specifically, the USCOP report recommended amending the Magnuson-Stevens Act to strengthen the role of the councils' Science and Statistical Committees (SSCs) and require the councils to conform their management decisions to the scientific determinations made by their SSCs. The role of the SSCs, the report explained, should be to determine the allowable biological catch (ABC), and councils

²³ Amendment 13 FSEIS Table 10 & 12 at I-49, I-51 and Amendment 13 FSEIS at I-331, Table 81.

should be bound to those determinations. The report also recommended that the Secretary of Commerce provide for an independent review process of the scientific information relied on by the SSCs.

Required by law to respond to the recommendations put forth by the Commission, the Bush administration missed a critical opportunity to reform federal fisheries management when it announced no new major initiatives to address some of the issues highlighted by the Commission. Instead, the Bush administration acknowledged several existing policies, citing advances in areas such as salmon recovery and rebuilding fish stocks. Meanwhile, the administration recently rolled back protection for 90% of the critical habitat for endangered West Coast salmon, and only 10% of all fish stocks managed by the federal government have been fully assessed by scientists and determined to be healthy. Admiral James D. Watkins, chairman of the U.S. Commission on Ocean Policy, commented that “President Bush talks of the need for fundamental change in core government operations and organizations when he speaks of the tax code, social security, and homeland security. Equally dramatic changes are needed in ocean and coastal management. The systems we currently have were created for yesterday, not for tomorrow.”

Fisheries Science and Management Enhancement Act of 2005

While the Bush administration’s response to the USCOP report was lackluster at best, Congress has heeded the call and is currently in the process of developing legislation to address some of the most pivotal recommendations made by the USCOP. The Fisheries Science and Management Enhancement Act of 2005, a bipartisan bill introduced by Rep. Rahall (D-WV), Rep. Farr (D-CA), Rep. Shays (R-CT), and Rep. Leach (R-IA) in March 2005, seeks to implement several key USCOP recommendations. Building on the strengths of the existing management process, the bill amends the Magnuson-Stevens Fishery Conservation and Management Act to: (1) broaden stakeholder representation on fishery management councils; (2) significantly reduce financial conflicts of interest among council members; (3) provide training for new council members; (4) develop cooperative research, data collection and gear modification programs; and (5) enhance the use of science in fishery management decisions.

The bill strengthens the role of science in the fishery management process by insulating scientific determinations

from political and economic pressures. It requires that each council’s Science and Statistical Committee — whose role it is to help develop, collect and evaluate the statistical, scientific, economic and social information necessary to generate fishery management plans - include a fishery and marine science subcommittee. The subcommittee, drawn from those members of the SSC who have scientific expertise in fishery biological science or marine ecology, is responsible for making scientific determinations that include biological catch and bycatch limits, habitats in need of protection, and additional species protections. Consistent with USCOP recommendations, the bill stipulates that the councils must develop management measures that are consistent with the determinations made by the fisheries and marine science subcommittee, but may provide for greater conservation in order to meet management objectives. Furthermore, the Act specifies that determinations made by each council’s fishery and marine science subcommittee of the SSC must be periodically subject to peer review by qualified independent scientists appointed by the Secretary of Commerce.

Conclusion

For almost two decades, independent reviews of our fisheries management system have yielded similar conclusions. Science-based fisheries management is too often compromised by political and economic pressures, thus our progress towards ending overfishing and rebuilding depleted fish populations has been limited. Indeed, the governance structure of federal fisheries management needs to strengthen the role of science in management by separating scientific determinations from allocation decisions. Failure to follow scientific recommendations has resulted in ecological deterioration and economic losses. The NPFMC provides an example of a system that has followed scientific advice in setting catch levels and maintained healthy fish populations. Recognizing the success of the North Pacific management regime, the USCOP outlined a model to apply that success nationally. Now it is the turn of Congress to heed the call for reform. The Fisheries Science and Management Enhancement Act of 2005 institutionalizes the USCOP recommendations by strengthening the role of science in federal fisheries management. As a panelist at the 2005 AAAS conference, Jeremy Jackson, a renowned fisheries biologist, commented, “we already know most of what we need to know. The real challenge is not the science but the interface of science, society and politics.”



INVITED PAPER

Practical Recommendations for Improving the Use of Science in Marine Fisheries Management

PAUL A. SANDIFER AND ANDREW A. ROSENBERG

PAUL SANDIFER
Senior Scientist
NOAA/NOS
National Centers for
Coastal Ocean Science
c/o Hollings Marine Laboratory
Charleston, SC.
paul.sandifer@noaa.gov

ANDREW ROSENBERG
Professor
University of New Hampshire
Durham, NH.
andy.rosenberg@unh.edu

*Both authors were members
of the U.S. Commission on
Ocean Policy.*

Abstract

The fundamental problem addressed in this paper is that the present Regional Fishery Management Council (RFMC) system does not provide a consistent and formalized mechanism to ensure that the best available scientific advice is used appropriately, and not overruled for economic, social or other reasons. We provide a variety of practical suggestions for overcoming this limitation. Key recommendations include the following:

- Council members should be appointed from more diverse slates of nominees provided by governors, provided comprehensive training, and the Councils should not be allowed to change or exceed ABC levels determined by their Scientific and Statistical Committees (SSCs).
- NOAA and Councils should aggressively embrace and implement an ecosystem approach to fisheries, taking a broad view that includes regional ecosystem delineation, ecosystem impacts of fishing, and development of regional information systems.
- Councils should routinely implement common-sense precaution in day-to-day operations of Council fishery management activities, and several examples of such precautionary actions are provided.
- SSCs should be strengthened to become the primary source of and clearinghouse for scientific information and vet all scientific information used by the Council; such strengthening should include broader responsibilities, and formal appointment, professional certification, and compensation of members.
- Peer review processes should be enhanced overall, following recommendations of the U.S. Commission on Ocean Policy and with the SSC as the primary facilitator for such reviews.
- Strong default measures should be required by NMFS to provide sufficient incentive and pressure to ensure that Councils complete fully adequate Fishery Management Plans (FMPs) in a timely fashion.
- NMFS should better respond to identified information needs of the Councils and SSCs and substantially expand cooperative research activities conducted in association with commercial and recreational fishers or other stakeholders, focusing on areas where the expertise and infrastructure available from these parties would likely provide useful input.

While some of these (and the more extensive recommendations provided in the full text) will require amendment to the Magnuson-Stevens Act, we believe that many of them could be incorporated quickly into the existing Council system without great difficulty simply by agreement among the Councils and with support from the NMFS.

Introduction

Virtually everyone involved in marine fisheries management in the United States repeats the mantra that fishery management decision-making should be science-based rather than political and that more and better scientific information is needed to undergird the management process. The premise is that the more often objective, less politicized, and better science is used, the better the resulting management decisions. This premise is not based on some notion that the science is always right, but rather that using the best, most objective scientific work will almost always give a better result than ignoring what the scientific process is telling us about resource management. Scientific advice will serve society better if it is developed objectively and not confused with other sorts of issues and concerns such as social or political impacts or allocation decisions among user groups. These other issues should similarly be addressed directly, and not confused or hidden within scientific advice.

In this paper, we outline practical options for improvements in the ways that the Regional Fishery Management Councils (RFMCs) acquire and utilize science in a transparent decision process, based in large part, but not exclusively, on the recommendations of the U.S. Commission on Ocean Policy (USCOP, 2004). Our recommendations are specifically targeted toward helping make the role of scientific information in the management of public fishery resources — whether at the federal and regional fishery management council level or the interstate marine fisheries commissions — as strong as possible and subject to the least amount of pressure or appearance of influence from various types of political processes.

The USCOP found that several aspects of the Regional Fishery Management Council and Interstate Marine Fisheries Commission systems fit well into the overall ecosystem-based management approach that the USCOP established as one of its four foundation blocks for a new national ocean policy. These included:

- A regional approach to fishery management based on geographically defined units that correlated reasonably well with our current understanding of large marine ecosystems;
- A management process that requires local participation and incorporates local knowledge;
- A fishery management plan development process that requires incorporation of scientific information; and

- At least some multi-species fishery management plans that reflect progress in the direction of ecosystem-based management.

As a result, the USCOP did not focus on wholesale changes to the Councils or replacement with a new management or science construct but instead opted for substantial strengthening of the Council structure and its processes, particularly those involving the acquisition and use of scientific information. The USCOP noted that establishing ecosystem-based management, that is, management that explicitly considers the interactions and cumulative effects of impacts of various types of human activities on marine ecosystem goods and services, will require regional coordination of management activities. Management of coastal development, pollution, and fisheries need to be fit together in a coherent manner to improve overall coastal and ocean management. Such coordination and planning could be greatly strengthened by the fishery management council system if there is a willingness on the part of the Councils to engage in coordinated planning with other sectors.

Problem Statement

Accurate, reliable scientific information is the bedrock foundation required for sustainable management of fisheries. Information must be obtained, analyzed, peer-reviewed, updated and most importantly used. However, in a number of well-documented cases of overfishing, some Councils partly or significantly disregarded or overruled valid scientific information when setting harvest guidelines, with disastrous results. This is a key conclusion of the USCOP (2004) and several other major national reviews (NAPA, 2002; NRC, 2002; Pew Ocean Commission; 2003). Expressed concerns about the potential for Councils to misuse science advice date back at least to the 1986 “Calio Report” (Hargis, et al., 1986).

The fundamental problem is that the present RFMC system does not provide a mechanism to ensure that the best available scientific advice is used appropriately, and not overruled for economic, social or other reasons. The NAPA report (2002) described the problem as follows: “Regional FMCs sometimes disregard the scientific advice provided by NMFS and their science and statistical committees in setting total allowable catches (TAC) and in deciding other aspects of FMPs. . . . The entire process is subject to intense political pressure, directly from stakeholders and indirectly through their representatives in Congress.” O’Shea (2004, unpublished), felt that it might be

“...more helpful to describe the problem as a failure of fisheries managers to set harvest limits consistent with scientific advice, resulting in over-fishing of stocks and/or delay in meeting rebuilding goals. Frequently, the failure is due to a lack of managers’ political will to implement restrictive measures, although there can be other reasons as well.”

Regardless of how one states the problem, both Ocean Commissions — each of which included members who were intimately familiar with one or more Councils, Interstate Fisheries Commissions and marine fisheries management processes in general — concluded that this was a central problem in need of resolution. Both Commissions further recognized that some Councils made much better and more consistent use of science in general and regularly complied with advice from their Scientific and Statistical Committees in particular than did others. Nevertheless, the inescapable problems are that not all Councils use science appropriately, and there is currently no formal structure to require consistent use and compliance. The NRC (2002) noted that: “The use of science in the marine fisheries management decision-making process is impeded by the governance system created by the MSFCMA [Magnuson-Stevens Fishery Conservation and Management Act] and the resulting mismatch between institutional authorities and responsibilities,” and it called upon the Congress to “initiate a review of the fisheries governance system and the use of science in governance.”

The purpose of the present paper is to provide practical suggestions for improving the utilization of science in seven areas of the RFMC process. We believe that many of these recommendations can be incorporated into the existing Council system without great difficulty. The areas are:

- Council membership, appointment and training;
- Adoption of an ecosystem approach to fisheries management;
- Application of a precautionary approach to fisheries decision-making;
- Substantial strengthening of the Scientific and Statistical Committees of the Councils, with expansion of their responsibilities;
- Enhancement of scientific peer review processes;
- Establishment and implementation of default measures as a response to inadequate fishery management plans; and
- Increased research targeted toward management information needs.

Council Membership, Appointment, Training and Authority

By the nature of their work, Council members are inundated with reams of data, scientific analyses, jargon, and mathematical models, and pummeled with differing interpretations of scientific information, yet most have little or no formal training in science. In addition, they must deal with often arcane and difficult points of law and regulation, while few have any formal training in law. Finally, most are deeply committed to the stakeholder sectors they represent. These are difficult, challenging jobs, and the better the Councils overall and Council members individually can be equipped to do them, the better the management process will be and the better the public’s trust will be served.

The USCOP (2004) made several simple recommendations that would affect the composition and performance of the Councils. First, the Commission dealt with lingering concerns over the perceived lack of balance on Councils by recommending that the Magnuson-Stevens Act (MSA) be amended to require Governors to nominate for each appointive vacancy at least two qualified persons from each of three sectors: the commercial and recreational fishing industries and the public interest sector, with the latter clearly defined to include academia, consumers, environmentalists, and others. If organizations representing these three sectors in each state would regularly communicate with their Governor’s office regarding potential nominees, Governors would likely be in a better position to submit full slates of qualified nominees for consideration by the appointing authority. In addition, the USCOP suggested that the authority to appoint Council members be moved from the Secretary of Commerce to the Administrator of NOAA. This move would place the appointment decisions with an official likely to be more knowledgeable of fisheries management issues and able to achieve a better degree of balance with respect to breadth of interests on the Councils. To improve the ability of Council members to deal with the broad range of scientific and legal issues they must confront, the USCOP recommended that Council members receive formal training prior to being allowed to vote on issues before the Council. We suggest it might also be helpful for Council members to be reminded regularly of their overarching stewardship responsibilities.

To overcome any potential distrust of government *per se*, we recommend that a formal, although relatively brief, training program be established and offered through one or more academic or private entities to ensure objectivity in presentation.

Training courses in fisheries science and management should be required of council members upon appointment, even if they have served before. These courses should not be run by NOAA or another government agency nor by any of the Councils themselves but should be developed by an outside entity with a curriculum approved by the Councils and NOAA. However, some aspects of training in federal ethics rules, expense claim filing and administrative and legal issues are still probably best done by NOAA or the Councils directly. Also, there is substantial value in perspectives from different regions being shared among councils and council members so it is not advisable for separate training courses to be offered to for each council, nor for a single entity to necessarily offer all of the training. A better approach would be to have modules on different topic areas offered by academics or consultants with specialized knowledge in specific areas. Examples from each of the regions should be used and each training session should be in workshop format rather than lectures. In addition, it may be helpful to open such training to a broader council audience, including members of advisory panels and plan teams if possible.

To make the training process as comprehensive, useful, user-friendly and easy to access as possible for Council members, we recommend that NMFS:

- Establish a “Council Program Training Committee” composed of a broad cross-section of experienced Council leaders, NMFS, state and academic fishery scientists, and others as needed to fully flesh out the elements of a desired training program and to represent the diversity of regional situations. This would then become the Statement of Work for one or probably more education contractors or consultants.
- Let a contract for performance of the Statement of Work through normal governmental processes to one or more academic, state or private entities well qualified to develop and implement the Council training course modules.
- Establish the training program in modular, workshop and web-based formats to make it easily accessible to Council members, with continuing support provided by the contractors or consultants as needed at both national and regional levels; and
- Periodically review and revise the course modules to include new information.

Implementation of an Ecosystem Approach to Fisheries Management

The idea of ecosystem-based management is not new. However, it has only been in recent years that the urgent need to move toward consideration of broader ecological consequences of resource management has gained wide acceptance (Ecosystem Principles Advisory Panel, 1999; Pikitch, et al, 2004). More recently, both Ocean Commissions have called for ecosystem-based management as a central element of ocean policy reform (Pew Ocean Commission, 2003; USCOP, 2004).

The USCOP defined ecosystem-based management as follows: “U.S. ocean and coastal resources should be managed to reflect the relationships among all ecosystem components, including human and nonhuman species and the environments in which they live. Applying this principle will require defining relevant geographic management areas based on ecosystem, rather than political, boundaries.”

The USCOP further suggested that ecosystem-based management would require agencies and practitioners to look at as many as possible of the myriad linkages among living and nonliving resources, rather than focusing on a single issue — such as a fishery management plan or an individual coastal zone permit — in isolation from everything else. It would also require consideration of human activities within the context of the broad biological and physical environment.

The USCOP called upon NOAA and other federal agencies to begin moving rapidly toward an eco-regional approach for all kinds of ocean and coastal resource management. However, the Commission fully recognized that ecosystem-based management is not an immediate or near-term destination, but a long-term journey. What is essential at this point is commitment to the journey, and it is significant that both NOAA and the Councils appear to have made such long-term commitments.

For NOAA (2004a), goal 1 in its Strategic Plan for 2005-2010 is to “Protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management.” NOAA defines an ecosystem approach to management as: “Management that is adaptive, geographically specified, takes account of ecosystem knowledge and uncertainties, considers multiple external influences, and strives to balance diverse societal objectives.” NOAA further recognizes that “The transition to an ecosystem approach to management needs to be incremental and collaborative” and realizes that

it will require multidisciplinary approaches, partnerships, and many more participants than just NOAA. Because ecosystems by definition have geographic specificity, NOAA has begun working with partners and regional stakeholders to delineate coastal and marine ecosystem by defining the scale of an ecosystem based on the spatial extent of the ecosystem characteristics and/or dynamic processes that are to be studied or influenced through management, specifying ecosystem boundaries based on discontinuities in the geographic distribution of ecosystem characteristics and based on management jurisdictions, and recognizing that this approach will lead to ecosystems specified on a hierarchy of scales with boundaries that sometimes overlap. This work is ongoing (NOAA, 2004b), and we encourage NOAA to continue to lead and facilitate a broad, national effort to delineate marine eco-regions in collaboration with other federal agencies, states, tribes and other partners and stakeholders.

More recently, many eminent scientists have signed on to a “Scientific Consensus Statement on Marine Ecosystem-based Management” (COMPASS, 2005) that states the following:

Ecosystem-based management is an integrated approach to management that considers the entire ecosystem, including humans. The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need. Ecosystem-based management differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the cumulative impact of different sectors. Specifically, ecosystem-based management:

- *Emphasizes the protection of ecosystem structure, functioning, and key processes;*
- *Is place-based in focusing on a specific ecosystem and the range of activities affecting it;*
- *Explicitly accounts for the interconnectedness within systems, recognizing the importance of interactions between many target species or key services and other non-target species;*
- *Acknowledges interconnectedness among systems, such as between air, land and sea; and*
- *Integrates ecological, social, economic, and institutional perspectives, recognizing their strong interdependences.*

In our view, NOAA should consider this definition as it further elaborates its ecosystem approach to management,

particularly the focus on continued ability of ecosystems to provide goods and services (including fisheries) important to humans.

While the RFMCs are making progress in improving the ecosystem basis for fishery management plans, they have much work to do in the broader issues of ecosystem based management (i.e., connecting with other sectors). Their immediate challenge is to move more aggressively on protection of habitats in general and essential fish habitat in particular, with much more attention to impacts on non-target species and vulnerable resources. There is ongoing action in the courts and potentially in Congress concerning wider ecosystem effects of fishing. The Councils should take the lead, working with NOAA, on these issues by fundamentally re-shaping the debate. That leadership role cannot be based on a defensive posture of attempting to minimize changes to past and current fishery management practices, but rather should be forward thinking, forceful and begin to deal with ecosystem level impacts of fishing for the long term. It is clear from recent experience that if the Councils and the agency do not vigorously pursue issues and solutions to problems, someone else will take the lead. To expand on their existing work on fishery ecosystem plans, RFMCs should prepare all new FMPs, amendments and plan revisions or updates within a broader marine ecosystem context. Such plans would take into account available information on trophic and other interspecies interactions, habitat requirements and status, effects on non-target species including but not limited to bycatch, and potential effects of fishing practices on the ability of the system to continue to provide other ecosystem goods and services such as biodiversity. This will require the RFMCs to look at fishery management plans in a much more comprehensive manner than previously.

Outside the immediate fisheries world, there is also a need to begin to connect to other sectors of marine activities including protected species issues, coastal development and pollution, watershed management, and ecosystem level science programs. One area the Councils can immediately become involved in is the development of regional information systems for management. There are urgent needs in all regions to modernize data collection for fisheries and to link these with existing environmental monitoring activities and the developing coastal and ocean observing programs.

Application of a Precautionary Approach to Fisheries Decisions

A crucial part of ecosystem-based management is the adoption and use of a balanced precautionary approach (USCOP, 2004). This has been a rich area of policy research, discussion, and controversy for some time. A considerable body of literature now exists in this area (see for example, Gerrodette et al., 2002; Rosenberg, 2002), but it is far beyond the scope of this paper to provide a review on this topic. Suffice it to say, that many responsible individuals and groups — including some RFMCs — agree that application of reasonable precaution is an essential element of their work in natural resource management. However, exactly what is meant by “precaution” in an operational sense remains a topic for lively debate and difference of opinion.

Recognizing the differing degrees of uncertainty associated with scientific findings and the potential for a strict application of the *precautionary principle* to lead to gridlock in resource use, management and conservation (e.g., see Foster, et. al., 2000), the USCOP (2004) recommended a reasonable, common-sense precautionary approach well grounded in recent literature and practice (NPFMC, Rio Declaration, 1992). This USCOP approach focuses on: (1) application of the best available information and management practices from the beginning, rather than after problems arise; (2) weighing decisions in light of both the level of uncertainty of the available information and the likelihood for serious damage or level of potential risks; and (3) continued gathering and analysis of information, with periodic re-assessment and modifications of permit conditions, fishery restrictions or other requirements as needed. The USCOP developed this definition not just for management of living marine resources, but for all marine resource use situations.

As the USCOP (2004) made clear, scientific uncertainty should neither prevent activities from proceeding if risks do not appear high, nor prevent activities from being disallowed or at least significantly restricted if risks seem great, even if conclusive evidence were lacking. Basically, this is a parent’s common-sense approach: if something looks risky, take risk-averse action; if it looks okay, proceed but carefully and then modify future actions based on the experience gained.

Here we provide some examples for application of a “precautionary approach” in the sense of the USCOP in RFMC management actions. All of these were suggested by professionals currently active in fisheries management councils or interstate fisheries commissions.

Example 1: When given a range of allowable biological catch (ABC) levels, RFMCs should choose the most conservative to the middle of the road options, *never* the high range which nearly always is a recipe for disaster. Managers can always be more liberal in future years if the resource base allows.

Example 2: RFMCs should adopt practices that would require “decisive conservation action” (i.e., harvest restrictions) at the first signs of population declines, but allow movement toward more liberal harvests only after acquisition of a clear trend of confirming data showing improving stock status (O’Shea, 2004). NMFS’ authorities may need to be expanded or clarified to allow decisive conservation actions to be taken rapidly, before situations become full-fledged resource emergencies.

Example 3: A more basic approach could be for RFMCs and NOAA to move away from managing for Maximum Sustainable Yield (MSY) and Optimum Yield (OY) and manage instead with MSY as an upper limit rather than a target, as suggested by Witherell, et al. (2000) and Quinn (2005). This could lead to managing for something more like optimum sustainable long-term yield that optimizes long-term production and value including ecological value — of the stocks.

These are provided as examples of what routine application of precaution could mean in Council operations. While only examples, each of these could be incorporated rather easily into routine Council operational protocols simply by the Councils deciding to do so.

The use of a conservative default action to avoid delay or when the information is uncertain are also applications of the precautionary approach. Allowing a long delay in preparation or approval of FMPs that would require strong management actions to address a problem such as identified or suspected overfishing or resource depletion is unacceptable. Such delays have been shown to have devastating effects on both fishery resources and the fishery, even though the reason to “go slow” is often stated in terms of reducing impacts to the industry. Protracted negotiations over management measures are often necessary to address all the viewpoints on the table. But in the meantime, protecting the resource base from further declines is essential. This can be done in a precautionary way with a default action (such as a more restrictive quota implemented

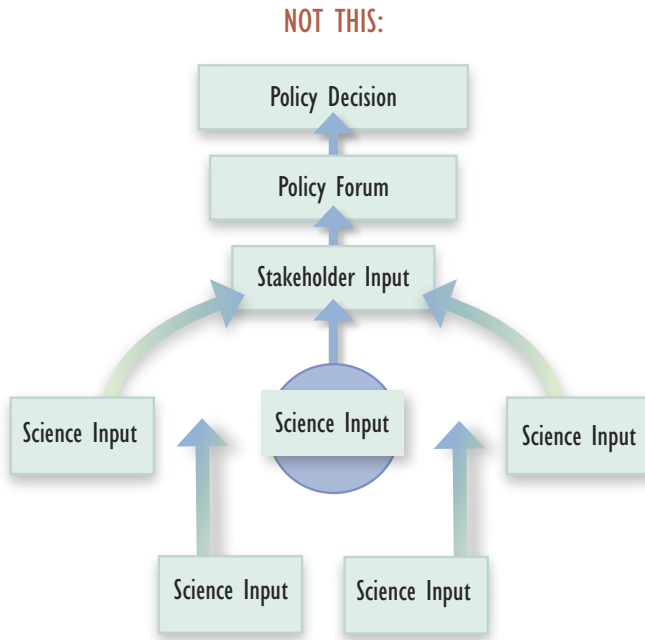


Figure 1A.
Illustration of selection of science that supports one viewpoint as opposed to full consideration of the best available information.

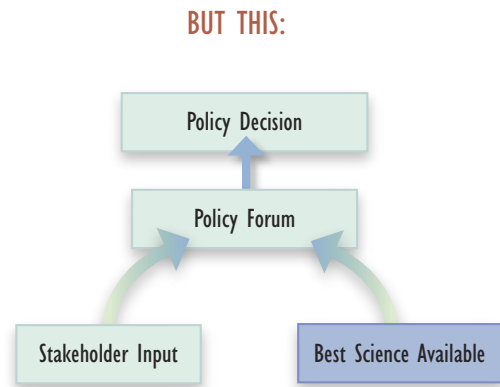


Figure 1B.
Illustration of full consideration of the best available science by the SSC in providing information to the Council for decision making.

immediately by notice action or emergency) while negotiations continue. Default actions are discussed in more detail elsewhere in this paper.

Strengthening Scientific and Statistical Committees (SSCs)

Science informs policy, but it is not policy. For society to have policy that is well grounded on science, it must first have a well-defined, dependable and transparent process for incorporation of scientific information — not the “shifting sands” of science chosen by one stakeholder group or another for political gain or short-term economic expediency (Figure 1A). If the RFMC system is to ground its management decisions firmly upon the best available scientific advice, the structure and process for providing that scientific advice must be strengthened (Figure 1B).

Deserved or not, fisheries managers continue to give the impression that they sometimes use the science “cherry-picked” by one group of stakeholders or another to support a particular view as opposed to the overall best available science (Figure 1A). Based on such perceptions, as well as the well-documented instances where Councils have overridden or ignored scientific advice to the significant detriment of public resources, the USCOP (2004) recommended a degree of separation between science and allocation decisions but with both remaining within the Council system.

Because of their expertise, Council members are the appropriate people to make decisions about allocations and other operational aspects of fisheries. However, since most are not scientists and are not generally well trained in science, they are not the most appropriate to decide on the validity of science advice or make “value judgments” about science. Even those Council members with scientific training are, in their Council activities, acting as policy makers and not scientists. In the same way that scientists are not policy makers, policy makers should not presume to be scientific authorities. Scientific determinations, along with estimations of the degree of uncertainty surrounding them, should be the responsibility of scientists, specifically the Scientific and Statistical Committees that Congress originally established to support the Councils (USCOP, 2004).

While the Magnuson-Stevens Act currently requires Councils to “establish and maintain a scientific and statistical committee” to help them evaluate scientific information, there is no procedure for ensuring that the best available science is actually incorporated into harvest decisions or that recommendations and findings of the SSCs are adhered to. In fact, the Magnuson-Stevens Act as currently written limits the SSC to an advisory role and, as pointed out above and documented in these proceedings (Witherell, 2005), there is no consistency within the Council system about how SSCs are established or used. So, the USCOP recommended that the Magnuson-Stevens Act be amended to:

- Require each Council to have an SSC;
- Establish specific technical and other requirements for its membership;
- Define SSC responsibilities and authorities for providing scientific information to the Councils, including determination of ABC; and
- Retain the SSC within the Council structure, but provide the SSC relative independence in the formulation of its science advice.

The USCOP (2004) also recommended that Council authority to override scientific advice, particularly determination of ABC, provided by the SSC be eliminated. We strongly concur and believe that this change will require amendment to the Magnuson-Stevens Act to be fully effective.

The first step in trying to determine how to practically separate scientific and allocation decisions within the Council process is to recognize that they are not completely separable — each one may affect the other. So, the “separation” must include considerable flexibility and allow for an iterative process between the allocation body (the Council) and its science arm (the SSC). This is a principal reason why retaining a strengthened SSC within the Council process is so critical — there must be regular two-way communication between the two bodies.

Recommended Responsibilities and Authorities of the SSC

In our view, the SSC should be the primary source of and clearinghouse for scientific information coming to the Councils (Figure 2). Each Council’s respective SSC should ensure that all scientific information to be used by the Council is vetted and has received adequate peer-review. The Council should not accept any scientific information for use in FMP development, amendment or implementation that has not first been passed through its SSC.

Based in part upon information provided by the South Atlantic Fishery Management Council (Mahood, personal communication, 2005), we recommend that each SSC should:

- Provide overall scientific and technical advice to the Council on the development of fishery management policy and the preparation of FMPs and amendments, including goals and objectives of such plans;
- Review and/or provide critical scientific information necessary for management decisions and plan or

amendment development, such as stock assessments, stock status, socioeconomic impacts of management measures, sustainability of fishing practices, habitat and ecosystem status, acquisition and validity of statistical data, and other relevant biological, social, economic, cultural and historical information;

- Based on the best available scientific information, determine and provide ABC (including measures of uncertainty of the ABC estimate), as needed for each fishery under the Council’s jurisdiction;
- Conduct or provide risk analyses and comparative evaluations of alternative hypotheses and management actions (e.g., see Hilborn, et al. 1993), including the potential for use of conservation equivalency options (*sensu* ASMFC) by different groups or states within a region;
- Advise and assist the Council in determining additional research and information needs and how such needs might be met;
- Approve scientific elements of plans, amendments or other work products of Plan or Amendment Development Teams before these are submitted to the Council for action; and
- Review and comment on each FMP, amendment or operational or implementing guideline, and eventually provide a formal determination whether such are “consistent with the best available scientific information” prior to the Council’s transmittal of same to the NMFS for approval and implementation.

Structuring A Strengthened SSC

As envisioned by the USCOP, the SSC members would be nominated by the respective Council and then appointed by the same appointing authority that appoints Council members. This would allow the Council to determine the kinds of personnel and expertise needed on its SSC at a given time, but maintain a clear division of authorities and responsibilities. Currently, the appointing authority for Council members is the Secretary of Commerce, although the USCOP recommended that this appointing authority for both Council and SSC members be delegated to the Administrator of NOAA to get such decision-making closer to where the action and knowledge are. Regardless of who makes them, appointments for both bodies should be made by the same authority to help ensure that the Council itself could not, or even give the appearance that it might, exert undue influence over SSC members. Although the USCOP did not get into

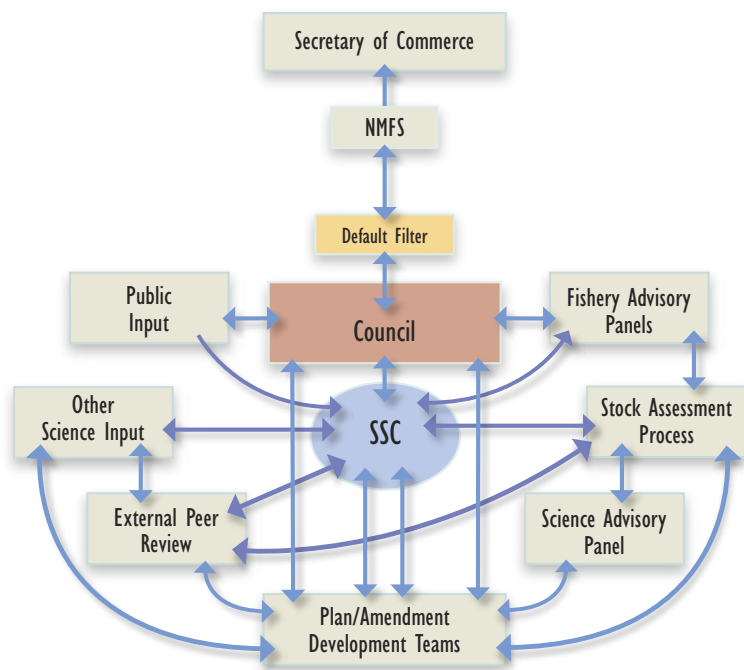


Figure 2.

Idealized Process Flow Chart

An idealized process flow chart illustrating the scientific information clearinghouse and two-way communication functions of a strengthened Scientific and Statistical Committee maintained within the Regional Fishery Management Council system.

details of organization, it would seem logical that the SSC, as a scientific body whose primary responsibility is to provide the best available scientific and technical information to the Council, should come below the Council in an organization or process flow chart (Figure 2). The purposes of this somewhat complicated and idealized chart are to demonstrate how all scientific information — whether from assessment teams, external scientists, or other sources — could flow through and be evaluated by the SSC and to show the need for continuing two-way communication throughout the information-to-decision processes. Note that the SSC does not necessarily “do” an assessment, but rather validates the results or recommends alternative scientific bases for policy. Similarly, the SSC should validate the scientific efficacy of the scenario analyses produced by plan development teams. However, the SSC should not render judgment on which scenario is the best policy for the fishery. That is the job of the Council itself.

To ensure that each SSC had the best qualified and experienced fisheries and social scientists available for its work, and to ensure that their deliberations were as removed as possible from political influence, the USCOP recommended that nominees must have suitable technical credentials and freedom from conflicts of interest that might affect their judgment. Again, the USCOP did not provide great details in this regard, but suggested that the Councils and NOAA should work with a credible scientific organization to develop an appropriate process for vetting the scientists’ credentials.

The most likely candidates for nomination to SSCs would be the knowledgeable and capable federal, state and academic

scientists who have already been engaged in these kinds of activities, but they could also include any other competent individuals who meet the certification criteria and areas of expertise the Council needs. The appointment and certification processes we outline below would provide a significant new level of assurance to fishing interests of all kinds, environmentalists, the academic community, the Congress, and the public at large that the Councils would be getting the best available scientific information untainted by special interest considerations.

Nomination and Appointment: SSC members would be nominated from a pool of certified candidates by the Council, but each member would be appointed on his/her own by either the Secretary of Commerce or, if the Congress agreed with the recommendation of the USCOP, the Administrator of NOAA. In this way, the Council could be assured of getting the expertise needed, but the Council could not pressure or remove a member. He/she could only be removed by the appointing authority for cause (such as failure to do the job; conflict of interest; criminal activity; loss of certification, etc.), and thus would be insulated, at least to a degree, from political whims.

Certification: For nominees to the SSC, we propose a three-part certification process built upon the well established and recognized “Certified Fishery Professional” program of the American Fisheries Society (AFS), with a few added elements to meet the particular needs envisioned here. According to the AFS (2005), fisheries professionals “promote conservation — optimization of benefits for society while maintaining

the integrity, diversity, and sustainability of aquatic systems — through research, education, management and administration.” The AFS (2005) goes on to say that “Certification is widely practiced by professions as one means of setting standards and guidelines for professional competence.... The specific objectives of certification are as follows: (1) to provide governmental and nongovernmental agencies and organizations, private firms, courts, and the general public with a definitive standard of experience and education for fisheries professionals; and (2) to foster better recognition of fisheries professionals as well-educated and experienced, acting in the best interest of the public.”

To be completely responsive to the needs of the Councils, professional certification standards would also need to be developed (or adopted if already existing) for SSC members representing various social science disciplines such as economics, sociology, and anthropology, for example, and for natural scientists who deal with protected species, seabirds, ecosystems, and perhaps other areas not routinely included in the general definition of fisheries science. This could perhaps be undertaken by the AFS working with other professional societies or by another more broadly based scientific organization such as the National Research Council of the National Academy of Sciences. Once developed, the process should be vetted through review by the National Academy of Sciences.

As we have envisioned it, the certification process for SSC members should include three elements:

- **Technical competence:** Demonstrated via education, scholarly contributions such as sponsored research and refereed publications or teaching, relevant work experience and levels of professional responsibility, and professional certification. The AFS has established basic educational and experience qualifications for its “Certified Fisheries Professional” status as follows: BS/ BA degree or equivalent plus five years of full-time qualifying experience post degree; MS/MA or equivalent degree plus four years of full-time qualifying experience post baccalaureate degree; and Ph.D. or equivalent plus two years of qualifying experience post baccalaureate degree. Qualifying experience generally requires that the professional have a fair degree of freedom to use independent judgment in action. In addition, there are some specific course and modest continuing education requirements. The AFS has an excellent set of technical standards for professional certification that are widely

accepted in the field (AFS, 2005), and we expect that most of the persons Councils would consider for appointment to an SSC already have such certification or would easily meet its requirements.

- **Conflict of interest standard:** The purpose of a conflict of interest standard for SSC members is to ensure that members, who will be responsible for providing the scientific base upon which allocation and other operational fisheries decisions will be made, are as impartial as possible and free from influences based on vested interests in the fishery resources. While there is much room for discussion on what might or might not constitute a conflict of interest, at the very least such a standard should prohibit any nominee or member of a nominee’s immediate family from receiving compensation or other direct or indirect funding from any entity with a vested interest in the resources being or likely to be managed by the Council for at least some minimum period of time (e.g., 3 to 5 years). In addition, nominees should probably also not have a “history of advocacy” (e.g., lobbying) for a specific viewpoint on a subject relevant to matters likely to be determined or reviewed by the SSC (CIE, 2005). Basically, the nominee should have no perceived conflict of interest which might affect a perception of impartiality.
- **Independence of judgment and action:** This would involve a formal certification or declaration by the nominee’s employer (unless he/she is self-employed) that the nominee would be allowed to utilize their best personal professional judgment in making decisions on the SSC without being subjected to any pressures or punitive actions from the employer. In addition to its certification requirements, the AFS has a detailed “Standard of Professional Conduct,” to which every member is expected to adhere. Among other things, this standard requires an AFS member to “reject attempts by employers and others to coerce or manipulate professional judgment and advice. The member should exercise professional judgment without regard to personal gain, and refuse compensation or other rewards that might be construed as an attempt to influence judgment.”

Terms, Rotation, and Compensation: The USCOP (2004) recommended that members be appointed for fixed terms to allow for some rotation and to make room for new expertise

that may be needed. A practical option would be for appointments to be made for 3- to 4-year terms, renewable once, with allowance for longer service in exceptional circumstances where the individual possesses unique knowledge, capabilities, or experience. Finally, because we believe that the duties of strengthened SSCs will require more time and work by the members, it is critical that they (or their home institution in the case of state agencies) be fully compensated for time spent on SSC duties. This way, non-federal organizations (such as states) could allow top people to serve, because they would be provided some level of financial resources to “back-fill” for the person who would now be considerably dedicated to SSC activities. Such compensation might also make it financially possible for other scientists associated with academia, private entities or the public at large to serve. The South Atlantic Fishery Management Council has used “Council Liaison Grants” to states for a number of years to help make it possible for state scientists to participate at an appropriate level of activity. This approach might be explored by NOAA and the Council system at large as one mechanism for supporting state participation in strengthened SSCs.

Peer Review

While, the USCOP (2004) noted improvements made by the NOAA and the NMFS in its peer review process and applauded such things as the agency’s creation and use of a “Center for Independent Experts” (CIE, 2005), it determined that there remained considerable need for additional peer review related to the use of science in fishery management. Interestingly, the USCOP was not alone in this determination. The NRC (2004) reached similar conclusions for NMFS and Council science processes. It is probably fair to say that improvements in peer review processes are needed in most areas of ocean management, and the Office of Management and Budget (OMB, 2004) found a need for strengthening peer review processes in federal agencies in general. The OMB (2004) defined and described peer review as follows:

Peer review is one of the important procedures used to ensure that the quality of published information meets the standards of the scientific and technical community. It is a form of deliberation involving an exchange of judgments about the appropriateness of methods and the author’s inferences. Peer review involves the review of a draft product for quality by specialists in the field who were not involved in producing the draft. ... The peer reviewer’s report is an evaluation or critique that is used by the authors of the draft to improve the product. ... Peer review should not be confused with public comment and other stakeholder processes.

The selection of participants in a peer review is based on expertise, with due consideration of independence and conflict of interest. Furthermore, notice-and-comment procedures for agency rule-making do not provide an adequate substitute for peer review.

The USCOP briefly described three distinct procedures for peer review of the scientific information utilized by SSCs. These are:

- “A standard annual review by regional scientists to certify that the correct data and models are being used.” In our view, this could probably be handled through the SSC, (that is, with the SSC arranging for the peer review but not necessarily conducting it), especially if the SSC’s activities were augmented by a regional Science Advisory Panel.
- “An enhanced review to evaluate the models and assessment procedures. To ensure that these reviews are independent, a significant proportion of the reviewers should come from outside the region and be selected by a group such as the Center for Independent Experts. These types of reviews should be conducted on a three- to five-year cycle, or as needed, to help ensure that the latest methods and approaches are being used.” For example, we recommend that the SSC and CIE each provide 50% of the reviewers for these regular assessments of methods and models, with the CIE concentrating on getting the best reviewers from across the country or internationally and the SSC concentrating on reviewers with both technical competence and region-specific knowledge.
- “An expedited review to be used when results are extremely controversial or when the normal review process would be too slow. In these cases, all reviewers should be selected by a group such as the Center for Independent Experts.” We believe that this would be essential to ensure objectivity of reviews and findings when there is likely to be a major controversy over the findings, especially when the results might require draconian reductions in fishing activities.

Finally, fishing sector organizations and entities cannot, by definition, provide peer review, since they have vested interests in the outcome. They may be knowledgeable, but they are not objective. Their input should be provided as stakeholder comments.

Default Measures

The primary purpose of strong default measures is to provide sufficient incentive and pressure to ensure that proper action is taken in a timely fashion. Default measures are most successful when they have their intended effect without having to be implemented. This has been the case with the fishery closure default measure in place for FMPs developed by the Atlantic States Marine Fisheries Commission (ASMFC) pursuant to the Atlantic Coastal Fisheries Cooperative Management Act.

The USCOP (2004) recommended implementation of default measures in two circumstances:

- If the SSC could not determine ABC within the necessary time frame for completion and approval of an FMP, then the USCOP recommended that the NMFS Regional Science Director should be required to step in and do it. This would prevent delay in implementing a plan simply because the SSC scientists could not come to agreement on an appropriate science-based ABC limit.
- If ABC is determined by either the SSC or a NMFS Regional Science Director, but the Council is then unable or unwilling to submit a complete FMP to NMFS in time for review and decision regarding adequacy of the plan, there should be a very restrictive default measure that would not allow delay to be rewarded by unrestricted or continued fishing for an indefinite period. The Commission recommended a simple default: no fishing on the stock in question until the FMP was completed and approved.

Currently, the only basis NMFS has for rejecting a plan is for failure to meet one or more of the national standards in the MSA or other applicable federal law. Further, if NMFS rejects a plan, the MSA requires that the agency itself develop a Secretarial Plan. This is not only a highly unlikely response, but one that would probably take a significant amount of time and effort, resulting in considerable additional delay in getting a satisfactory FMP in place for the fishery in question. Because of this situation, it appears that in some cases NMFS has been willing to accept inadequate plans with the view that “something is better than nothing.”

We recommend that NMFS be provided more and clearer authority, options and direction for actions with regard to FMPs. Specifically, NMFS should be empowered to:

- Accept an FMP (or amendment) as fully adequate, in which case fishing is conducted as specified in the FMP.
- Conditionally accept plans determined to be barely adequate in terms of the letter of the law, but questionable as to likely effectiveness in conserving stocks or meeting rebuilding targets. In such instance, NMFS should be able to accept the plan conditionally, and specify a time frame by which the Council must correct deficiencies or have the fishery shut down. If the stock(s) was in reasonable shape, NMFS could allow the plan to be implemented during a short period (e.g., 3 to 6 mos) during which corrections are made to the plan. At the end of the “conditional approval” period, either the plan is improved to fully acceptable status, or it is rejected and the fishery closed until acceptable measures are developed.
- Reject one to a few elements of the plan but not the entire plan. In this type of case, fishing would be allowed only under the most restrictive option in the plan (or if no such options were in the plan, then NMFS should establish the short-term restrictions) until the specific areas of deficiency were rectified. For example, the fishery might be operated under a bycatch-only rule, with no directed fishery at all, or the directed fishery might be very limited. There should also be a short period (e.g., 3 to 6 mos) for resolution of the issue.
- Deny a plan or amendment as inadequate, in which case the fishery should be completely closed as recommended by the USCOP (2004). Such closure should remain in effect until the plan was revised and judged fully adequate by NMFS.

Implementation of these recommendations will require amendment of the MSA.

Enhanced Research

In general, the USCOP (2004) recognized that the U.S. needs much expanded and strengthened marine research in many areas, including fisheries, and recommended an overall doubling of the nation’s federal investment in ocean-related research. Additional resources are certainly needed to improve both collection and analysis of scientific data on stock status, habitats, ecosystem relationships and many other areas. The Commission also recommended that the Councils and their SSCs should annually develop prioritized lists of research needed to fill gaps and provide better information for fishery

management. NMFS should develop a regular process to address the lists of prioritized research needs submitted by the RFMCs, and incorporate them into ongoing work, or it should design, undertake or fund additional studies to meet these needs. Finally, the USCOP felt very strongly that several ongoing experiments in cooperative research involving NOAA and fishermen or other knowledgeable stakeholders should be expanded. This finding was predicated upon the belief that scientific advice that becomes the basis for fishery management plans is much more likely to be accepted and followed when both managers and stakeholders have confidence in the findings. We recommend that such cooperative research programs be carefully designed to take advantage of the expertise and infrastructure of fishermen, but at the same time be limited to those areas of research where such expertise and infrastructure could make the most effective and important contributions. In addition, an appropriate competitive external evaluation process should be developed by NOAA to ensure that the best players are selected to do the work. Further, NMFS needs to identify additional funding to support such collaborative efforts in every fishery management region, and implement them on an expanded basis as part of the agency's base-funded activities at the earliest opportunity.

Conclusions

At the last Managing Our Nation's Fisheries Conference, Sen. Stevens, one of the authors of the Magnuson-Stevens Act, remarked that the MSA "...is not an Act to protect fishermen, boat owners, processors, consumers, or state and national prerogatives. It is an act that protects the basic reproductive capacity of our fisheries to assure that the resource will be available to Americans for generations to come" (Stevens, 2004). He went on to talk about having a national debate with the goal of "...extending this bill [MSA] so that it lasts another twenty-five years. That should be our goal. Not to criticize it, but to improve it and to make it work even better." We could not have put it better. Our intent in this paper has been to offer some practical suggestions for ways fishery management under MSA might be improved in the near future, based on what we have learned from both the successes and mistakes of the past. We also suggest that, to the degree possible, the Councils and Interstate Marine Fishery Commissions rapidly incorporate these recommendations into their standard operating procedures. While some of these will require Congressional action through amendment of the MSA, many could be implemented through positive and aggressive action by the Councils, Commissions and NMFS without formal legislative direction.

As stated in the summary of the fisheries governance discussion at the last Managing Our Nation's Fisheries Conference (Ginter, 2004): "The greater the public perception is that Council decisions are scientifically and rationally based, the less likelihood there is that stakeholders will mount 'end runs' on Council decisions." We believe that enactment of our recommendations, especially those dealing with use of a precautionary approach, strengthening of the SSCs, and implementing strong default actions, would provide marked improvements in the use of the best available scientific information in marine fishery management, enhanced acceptance of the scientific information used to support management decisions by all interested parties, increased public confidence in the Council management system, and measurable progress toward improving the status of exploited stocks and the ecosystems upon which they depend.

Acknowledgments

We thank the members of the U.S. Commission on Ocean Policy; all USCOP staff members, especially Dr. Thomas Kitsos, Mr. Malcolm Williams, and Mr. Frank Lockhart; participants in a 2004 Workshop on Separating Conservation and Allocation Decisions sponsored by the Center for Sea Change; several reviewers; and numerous others in the fisheries and environmental sectors who have advised us and helped us clarify our ideas.

References

- AMERICAN FISHERIES SOCIETY, 2005.
http://fisheries.org/html/Professional_Development/Certification/Revised_Certification).
- CENTER FOR INDEPENDENT EXPERTS. 2005.
http://www.rsmas.miami.edu/groups/cie/
- COMPASS. 2005. Scientific consensus statement on marine ecosystem-based management. Unpublished. 8 pp.
- ECOSYSTEM PRINCIPLES ADVISORY PANEL. 1999. Ecosystem-based fishery management: a report to the Congress by the Ecosystem Principles Advisory Panel. National Marine Fisheries Service, NOAA, Washington, D.C.
- FOSTER, K. R., P. VECCHIA, AND M. H. REPACHOLI. 2000. Science and the precautionary principle. *Science* 288:979-981.
- GERRODETTE, T., P. K. DAYTON, S. MACINKO, AND M. J. FOGARTY. 2002. Precautionary management of marine fisheries: moving beyond burden of proof. *Bull. Mar. Sci.* 70(2):657-668.
- GINTER, J. 2004. Fisheries governance. p. 152-157. In: Witherell, D., ed. *Managing Our Nation's Fisheries: Past, Present and Future*. Proceedings of a conference on fisheries management in the United States held in Washington, D.C., Nov. 2003.
- HARGIS, W. J., ET AL., 1986. NOAA Fishery Management Study ("The Calio Report"). Silver Spring, MD. National Oceanic and Atmospheric Administration, 30 June 1986.
- HILBORN, R., E. K. PIKITCH, AND R. C. FRANCIS. 1993. Current trends in including risk and uncertainty in stock assessment and harvest decisions. *Can. J. Fish. Aquat. Sci.* 50:874-880.
- MAHOOD, R. 2005. South Atlantic Fishery Management Council's Scientific and Statistical Committee Policy. Personal communication.
- NAPA. 2002. Courts, Congress and Constituencies: Managing Fisheries by Default. A report by a panel of the National Academy of Public Administration for the Congress and the U.S. Department of Commerce National Marine Fisheries Service. Washington, D.C. 160 pp.
- NOAA. 2004a. New priorities for the 21st century — NOAA's strategic plan. Updated for 2005-2010. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Washington, D.C. 28 pp.
- NOAA. 2004b. Final summary report: NOAA workshop on delineation of regional ecosystems. 31 Aug.-1 Sept. 2004. Charleston, SC.
- NRC. 2002. Science and its role in the National Marine Fisheries Service. National Research Council. National Academies Press, Washington, D.C.
- NRC. 2004. Improving the use of the "best scientific information" standard in fisheries management. National Research Council. National Academies Press, Washington, D.C.
- NORTHWEST FISHERY MANAGEMENT COUNCIL. Definition of precautionary approach.
- OMB. 2004. Final Information Quality Bulletin for Peer Review. Office of Management and Budget. 45 pp. Washington, D.C.
- O'SHEA, J. V. 2004. Improving U.S. fisheries management through better use of scientific advice. Discussion paper for Center for Sea Change Workshop on Separating Conservation and Allocation Decisions. July 26-27, 2004. Washington, D.C. Unpublished.
- PEW OCEAN COMMISSION. 2003. America's Living Oceans: Charting a Course for Sea Change. Pew Oceans Commission. Arlington, VA.
- PIKITCH, E. K., C. SANTORA, E. A. BABCOCK, A. BAKUN, R. BONFIL, D. O. CONOVER, P. DAYTON, P. DOUKAKIS, D. FLUHARTY, B. HENEMAN, E. D. HOUDE, J. LINK, P. A. LIVINGSTON, M. MANGEL, M. K. McALLISTER, J. POPE, AND K. J. SAINSBURY. 2004. Ecosystem-based fishery management. *Science*. 305: 346-347.
- Quinn, T. J. 2005. Precautionary harvest control rules: how quickly can stocks rebuild? Abstracts, AAAS 2005, p. A39.
- RIO DECLARATION. 1992. Rio Declaration on Environment and Development. 13 June 1992. (U.N.Doc./CONF.151/5 Rev.1).
- ROSENBERG, A. A. 2002. The precautionary approach from a manager's perspective. *Bull. Mar. Sci.* 70:577-588.
- STEVENS, T. 2004. Senator Ted Stevens. p. 11-13. In: Witherell, D. *Managing Our Nation's Fisheries: Past, Present and Future*. Proceedings of a conference on fisheries management in the United States held in Washington, D.C., Nov. 2003.
- USCOP. 2004. An ocean blueprint for the 21st century. Final report of the U.S. Commission on Ocean Policy. Washington, D.C.
- WITHERELL, D. 2005. Use of scientific review by the regional fishery management councils: the existing process and recommendations for improvement. These proceedings.
- WITHERELL, D. C. PAUTZKE, AND D. FLUHARTY. 2000. An ecosystem-based approach for Alaska groundfish fisheries. *ICES Journal of Marine Science* 57:771-777.



INVITED PAPER

How Legislated Criteria for Individual Transferable Quotas Could Defeat the Purpose of Transforming Fishermen from the Fox Raiding the Henhouse into the Farmer Guarding the Henhouse

RICHARD B. ALLEN

RICHARD ALLEN
is a commercial fisherman
and independent fishery
conservationist based in
Wakefield, Rhode Island.
www.FisheryConservation.com
rba@FisheryConsulting.com

Abstract

This paper examines the ways in which proposed national standards might affect the results of individual transferable quota (ITQ)¹ management by modifying the characteristics that make ITQs effective. The paper also responds to the conference organizers' question concerning other forms of "dedicated access privileges" that might provide similar (or superior) benefits. Whereas the debate over IFQ criteria requires reference to the fundamental concepts on which IFQs are built, I have divided this paper into two sections. Section 1 deals directly with proposed IFQ criteria and my conclusions concerning the impacts of those criteria on the ability of ITQ programs to deliver the benefits that are expected of them. Section 2 provides more details on the conceptual and theoretical foundations for ITQs, which help in understanding how proposed IFQ criteria might affect their performance. Section 2 of the paper attempts to lay out a logical progression of arguments that support some set of "ownership" rights to fish as a means to obtain "the greatest overall benefits to the Nation from our fishery resources." I will also introduce a powerful argument in favor of secure, long-term property rights that has not previously been considered in the context of fishery management. Without property rights, fish are just fish; with property rights, fish become capital that can contribute to economic growth beyond the fisheries. The capital value of fish also creates an incentive to conserve the capital stock, rather than simply using the fish for its consumptive value. Our task in this session of this conference is to consider whether existing and proposed national standards for IFQs will increase the benefits to the Nation from our fishery resources, or will serve as another example of well-meaning but counter-productive fishery policy. Specifically, the public policy question that we are addressing today is whether Congress should place additional bounds on the characteristics of each and every future ITQ program, or whether we should continue to give the regional fishery management councils the flexibility to design ITQ programs that fit their fisheries.

¹ I will generally refer to ITQs rather than IFQs, in the belief that individual quota systems will generally be transferable. I don't imply any distinction between the two by using one term or the other. I will refer to IFQs in situations where common usage seems to prefer that term, such as the proposed IFQ criteria.

SECTION I. COMMENTS ON PROPOSED NATIONAL IFQ STANDARDS

Introduction

U.S. fishery stakeholders are having this discussion about IFQ criteria because traditional approaches to fishery management have produced results that are not generally considered to be satisfactory. Our collective dissatisfaction with the traditional approach does not arise solely from stock depletion. Even where fish stocks are not overfished, concerns for fishing vessel safety and for needless economic waste stimulate calls for change. Our fishery management system also faces continuing controversy surrounding the allocation of fish among sectors of the commercial fisheries, between recreational and commercial interests, and between consumptive users and non-consumptive users. The potential for dealing with many of these issues through market-based approaches will depend on the restrictions that are placed on transferable fishing rights.

The question of whether the U.S. will continue to use individual fishing quotas as a fishery management tool has been answered in the affirmative after more than ten years of debate, a Congressional moratorium, and numerous studies. The President's Ocean Action Plan has responded to the report of the U.S. Ocean Policy Commission by directing NOAA to "Work with Regional Fisheries Councils to Promote Greater use of Market-based System for Fisheries Management. The Administration continues to support and will promote the use, as appropriate, of dedicated access privileges, such as individual fishing quotas (IFQs), for improving fisheries management."

The question we face now is whether the opponents of ITQs will try to legislate IFQ standards that will essentially strip them of the characteristics that make them effective in conserving fisheries in an economically sensible way. And perhaps more importantly, whether legislated national standards will actually prevent the real discussion of these issues that needs to take place at the local level. Readers may recall that language in an appropriation act was once interpreted to mean that ITQs could not be discussed at any fishery management council meeting. Legislated national standards would place similar bounds on local discussions of key issues.

We also need to consider whether ITQs are the ultimate fishery management tool, or whether "stewardship rights" to uncaught fish hold even more promise for achieving the greatest overall benefits from our fishery resources. In response to the conference organizers request for other forms of dedicated

access privileges, I offer one promising extension of the IFQ concept in an appendix that describes "Population Stewardship Shares."

Implications of IFQ Criteria

Each of the characteristics that create the conservation incentives associated with ITQs will be modified by legislative standards. For that reason, those of us who believe that strong ownership characteristics lead to improved stewardship are afraid that the opponents of ITQs will insist on IFQ criteria that destroy most of the positive incentives that would otherwise be expected. We also believe that a number of the proposed standards are internally inconsistent. That is, they conflict with other proposed standards or with other concerns that their proponents express. I will comment on the troubling elements of the proposed standards.

Sensitivity to "Rights" and "Ownership"

The most contentious of the proposed IFQ standards is already incorporated in the law and is included in every proposed piece of legislation related to IFQs. The law specifically states that IFQs "shall not create, or be construed to create, any right, title, or interest in or to any fish before the fish is harvested." The law also defines an IFQ or other limited access system authorization as a permit subject to revocation at any time without compensation to the holder.

It's worth considering the implications of specifically defining IFQs as not being property rights. The specific prohibition against creating any right, title, or interest in or to any fish before the fish is harvested is counterproductive because the cause of overfishing is often attributed to the fact that no fisherman has any incentive to leave fish in the water if they will be taken by others. In effect, the law says that we may allow you to catch fish, but we won't allow you to conserve fish. The essence of conservation is leaving fish in the water, but the incentive to leave fish in the water is diminished if those who leave the fish have no future claim to them.

It is ironic that the legislative prohibition against property rights to uncaught fish coincided with the publication of an innovative conservation proposal that is based on creating value in uncaught fish — shares of the fish stock, rather than

shares of the catch. As if to flaunt a law that he surely had no knowledge of, in 1996 Canadian fishery scientist Stratis Gavaris published an article titled “Population stewardship rights, decentralized management through explicit accounting of the value of uncaught fish” (Gavaris 1996). Gavaris and other fishery scholars have suggested that fishermen or groups of fishermen would have more ability and incentive to invest in conservation if they had secure property rights to a portion of the fish stock. If fishermen were responsible and accountable for the underlying biomass that produces the catch, rather than simply being told how much to catch, they would exercise stewardship over that stock. Gavaris’ shareholders would build value by building the biomass of their stock. The prohibition against creating right, title, or interest in uncaught fish is one of those self-defeating policy provisions that have plagued fishery management. More details on this innovative form of dedicated access privileges is provided in Appendix I.

New Entrants and Small Boat Owners

Those who insist that quota shares must be defined so as not to create any long-term, secure property right seem to ignore the effect of that definition on the ability of new entrants and small boat owners to acquire quota shares in competition with those who have more access to capital. Access to capital for those without deep pockets is provided by lending institutions. Lending institutions will loan money to anyone who demonstrates their ability to pay the money back, but they also like to have some security for their loans. A quota share, or limited license, that is designed not to be a secure asset won’t provide acceptable security for a loan. By defining IFQs as insecure permits, the law plays into the hands of those with deep pockets, to the disadvantage of new entrants and small boat owners.

Canadian fisherman and scholar Stuart Beaton has studied this issue as it relates to generational succession in the Canadian lobster fishery. Beaton has come to the conclusion that increasing control over lobster licenses by lobster dealers (through trust agreements) is a result of the inability to finance expensive lobster licenses through normal financing channels (Beaton 2004). The inability to finance Canadian lobster licenses results from their legal status as annual permits in which the fisherman has no long-term security. This is fine for those who have plenty of cash and faith in the longevity of the system, but not so good for young people whose energy and skill might make it possible for them to outbid an absentee owner if the fishing license could be financed through traditional means.

The Magnuson-Stevens Act currently includes a provision under which 25% of the fees collected in IFQ programs may be used to aid in financing the purchase of individual quota by fishermen who fish from small vessels and for the first time purchase of quotas by entry level fishermen. One has to ask, however, whether a government loan program for an insecure asset passes the due diligence test. Or, does the fact that a government loan program will make loans on quota shares mean that the government really does consider a quota share to be a secure asset?

I understand the concern for new entrants and small boat fishermen, but I don’t understand where the fish will come from to allocate to these folks when the primary problem for most fisheries is too many boats chasing too few fish. If the fishery is in the process of buying out its excess capacity through quota trading, adding new entrants and more small boat fishermen makes the problem worse. The success of fishery management for the public is not measured by the number of new entrants into a fishery, or the number of small boats in the fishery, but whether the fishery is being sustainably managed at the least cost and least impact to the public and to other public resources.

Sunset Provisions

Sunset provisions are another contentious issue. Here again, a sunset requirement for ITQ programs would contradict the prevailing wisdom that fishery conservation has suffered because fishermen’s time horizons are too short. Eggertsson (in Acheson 2003) tells us that “short-term control shortens the time horizon,” a conclusion that is implied by the observations of eighteenth Century agricultural researcher and political reformer Arthur Young concerning land reform in France: “give a man the secure possession of a bleak rock, and he will turn it into a garden; give him a nine years’ lease of a garden, and he will convert it into a desert.” (Young 1909)

Jim Acheson stresses the long time horizon of Maine’s lobster fishing communities in his explanations of the relative success of lobster management in Maine:

I see little to distinguish what in the literature is called a conservation ethic from a low discount rate. The first stresses a culture of conservation; the second places value on future rewards. The essence of both is the willingness to sacrifice present gains for future rewards. The data on the Maine lobster industry lead to two observations concerning these concepts. First, a conservation ethic or low discount rate is crucial for the development of institutions to conserve resources. Second, the higher the probability

that people will be able to harvest all or most of a resource in the future, the more willing they will be to devise rules to conserve those resources. (Acheson 2003)

Anthony Scott (2000) explains the importance of long-term rights in this way:

Duration is valued because it allows the right holder to get the pay-off in later years from the investments he has made in the earlier years. Indeed, if a right's duration is short, and is not necessarily renewable, the holder will avoid any long-run improvements or investments. In a fishery, it (long duration) encourages the right-holder to make costly changes in the size and age structure of the fishstock that may result in larger and more profitable catches even if there must be an extended waiting period.

If those who believe that fishery conservation is enhanced by a long time horizon are correct, sunset provisions detract from the conservation incentive.

Auctioning Fishing Opportunity

My belief in the conservation incentive that is created by a long time horizon also affects my position on using auctions as a means of allocating fishing rights. I don't see how an auction system can create that long time horizon.

My initial resistance to auctions was based on my feeling that auctions would be too disruptive to fishing families and fishing communities. An auction might be appropriate as an initial allocation mechanism in an underutilized fishery in which there has not been any significant investment and the offer of exclusivity might attract investors. But it would not be appropriate for Congress to require auctions in the bulk of fisheries where capital is already over-invested in harvesting capacity.

I am also concerned that auctions would drain fishing revenue from local communities into the federal treasury, although the auctions could be run by, and the revenue distributed to, local communities (Macinko, personal communication). I also have a fundamental belief that the private sector can use the economic rent from fishery resources in ways that will provide more benefit to the public than will the government.

Those who have proposed auctions as the appropriate method of distributing fishing allocations should be challenged to point out examples where auctions have been successful in obtaining the greatest overall benefits from the sustainable harvesting of fishery resources. Alternatively, they should

put forth a detailed proposal that might reasonably achieve that objective.

I would expect that an auction that was designed to be sensitive to social concerns would be so twisted by regulatory restrictions and interest group capture that the result would be worse than the present situation and worse than other allocation alternatives based upon existing participation in the fishery.

Most importantly, I don't believe that auctions would allow the asset value of fishery resources to assume their life as capital that would contribute to broader economic development of fishing communities and coastal regions, as is explained in the more detailed basis for my arguments in Section 2 of this paper.

Excessive Share

Attempts to define "excessive share" are also troublesome. The law as it is written requires IFQ plans to "prevent any person from acquiring an excessive share of the individual fishing quotas issued, and consider the allocation of a portion of the annual harvest in the fishery for entry-level fishermen, small vessel owners, and crew members who do not hold or qualify for individual fishing quotas." NMFS is apparently working on more specific guidelines as to what constitutes an excessive share.

Any excessive share determination depends on the specific fishery. Some fisheries might naturally have only have one or two boats without any limited entry or ITQ system if the bio-economics of the fishery dictates that level of effort. We have fisheries on the Atlantic coast that come and go, sometimes supporting a few boats, sometimes not. During that ebb and flow, there are periods when a fishery will only have one boat. That's not a problem in and of itself. An artificial concentration limit could be harmful, particularly in cases where a fishery is overcapitalized when the rule goes into effect, and the appropriate number of participants is not obvious. Excessive share is an issue that should be left to the Councils and to the Justice Department. For most fishery products, the producers can't affect the price to consumers because their product competes with so many similar products. In the case where monopolistic practices are a potential problem, I favor letting the anti-trust folks in the Justice Department take care of it.

Excessive share has another interesting aspect that runs against the popular point of view. By any measure, the

allocation of quota shares or limited entry permits to active fishermen will result in a high degree of concentration of those access privileges when compared to the public ownership that most people accept as the current status.

For example there are currently about 300 million Americans and about 300 limited access scallop permits. For 300 million Americans the 300 limited access vessels are a statistically small number of participants harvesting a fixed public resource. What difference to 300 million Americans does it make if there are 300 owners, 30 owners, or 3 owners harvesting the fixed scallop resource — all of them are infinitesimally small number of participants compared to the total public. What matters to the 300 million Americans is whether the resource is being managed renewably and whether the use of nonrenewable resources (fuel) and other public inputs (paint, steel, dock space, etc.) are being minimized by maximizing efficiency so the costs to the public (both for the finished product and public inputs) are minimized to the extent possible. Only by allowing Regional Management Councils the flexibility of designing ITQ plans that will maximize efficiency while respecting fishery mortality can these objectives for 300 million Americans be met. Excessive share concerns would seem to be based more on jealousy than on concern for the public interest.

One way to achieve the goals of efficiency, while having wide spread ownership in a fishery may be to rethink the antipathy of some (i.e., Greenpeace) to public corporate ownership of harvesting vessels and harvest rights. Rather than discouraging corporate control of fishing privileges, one way to maintain broad ownership of those privileges would be to encourage publicly owned corporations to get into the fisheries. That would combine the conservation incentive of ownership with a continuing ability for the public to participate in that ownership and with returns from the resource being reflected in corporate dividends.

Cost Recovery and Collection of Resource Rent

I agree with cost-recovery for fishery management services in all fisheries, not just those with ITQ programs. Fishery participants should pay the cost of fishery management services that contribute to their profitability. Cost recovery should be accompanied by competition in the provision of fishery management services between the private sector and government agencies. Most countries that require cost recovery also allow competition in the provision of fishery management services.

There is some likelihood that the total costs of management for an ITQ fishery will be less than they would be under a different management system, particularly after the fishery rationalizes. ITQ fisheries tend to require less continuing management activity by the government. ITQs let the industry manage its business under a program that assures conservation while relieving the government of the cost of constant allocation battles disguised as conservation.

I see the collection of resource rent, meaning fees beyond those that would cover the cost of management, as being likely to drain fishing revenue out of fishing communities and into the federal treasury. Even if the fees were shared with the states or localities, I question whether the government will spend fishing revenue in ways that will benefit the public more than they would benefit by leaving the economic rent in the local economy to be invested and spent on goods and services.

Referenda

I don't believe that ITQ systems should be subject to any referendum unless all fishery management plans are subject to referenda, and I don't believe that would be good public policy. There is a tendency to think of ITQ programs as fundamentally different from fishery management plans that are thought to be conservation oriented. People with experience in the management system recognize that many existing fishery management plans are the result of using conservation measures to allocate fishery resources. In *Capturing the Commons*, James Acheson writes that: "virtually every lobster conservation or management rule came about as the result of a fight between various factions over control over the resource." (Acheson 2003)

Whereas ITQ plans make allocation explicit, we can expect individuals to use their referendum vote to become, in essence, "judges in their own cause" (Madison 1787). Fisheries tend to follow the 80-20 rule, under which we would expect 20% of the fishermen to catch 80% of the fish. For that reason, we can expect referenda to result in the "tyranny of the majority" — the 80% will vote down any ITQ proposal that does not redistribute catch shares from the highly productive 20% to the less productive 80%. Unless referenda votes are weighted by catch, ITQ plans may be held hostage by those who seek to obtain a larger share of the catch through the allocation process.

Acheson also points out another truism that is important to keep in mind when considering referenda: fishermen fight

almost every new fishery management measure, but after a few years they are likely to defend it as the savior of their fishery. Certainly this has been the case with the ITQ programs that are already in place in the U.S. — many of those who fought against the surf clam and halibut programs are now ITQ advocates.

From a public policy perspective, the most damning attribute of referenda is that they ignore the public interest in a fishery management system that produces the greatest overall benefits to the Nation. There is no reason to expect that fishery participants will necessarily vote for an ITQ system that will best serve the public interest. Prior to the allocation of fishing rights, fishery participants can be expected to use the plan development process for “rent-seeking.” The characteristics of ITQs that meld the individual interest with the public interest become operative after the allocations are made, not before.

Quota Shares Held for Conservation

The question of holding quota shares and not catching the fish that the quota would allow is an interesting one from both a legal standpoint and a practical one. Some would argue that the requirement to obtain optimum yield precludes someone from leaving their allowed catch in the water. Under this reasoning, the government would have some obligation to ensure that all quota holders caught their allotment. Obviously, this would eliminate the possibility of conservation groups buying quota for the purpose of conserving the stock by not taking their quota share. But could they contract with a quota holder not to take his share?

Senate bill 1106, the Fishing Quota Act of 2003 appeared to prohibit the holding of shares for conservation purposes with language that required fishing quota plans to “contain criteria that would govern limitation, revocation, renewal, reallocation, or reissuance of fishing quota, including: ... (ii) revocation and reissuance of fishing quota if the owner of the quota cease to substantially participate in the fishery.”

It isn't clear, however, that a legitimate calculation of optimum yield would conclude that fish left in the water by someone who had paid for their quota share prevented the realization of optimum yield. If a quota holder valued conservation as highly as someone else valued consumption, it would be hard to make a case that optimum yield was not being achieved.

The practical question is whether any quota holder could have much of a long-term impact by not taking his share. The fish left in the water would show up in the next stock assessment

as a lower fishing mortality rate and a higher biomass, which would increase the total allowable catch. That larger TAC would be distributed to all of the shareholders in a catch share system. (Although not in a system based on biomass allocations, as is explained in Appendix.)

Transferability

Divisibility and transferability are key features of ITQs that give them the potential to resolve many troublesome issues in fishery management. The ability for an overcapitalized fishery to restore profitability while conserving the stock is just a starter. Bycatch problems, sector allocation disputes, and the interests of non-consumptive users can all be more easily addressed with freely transferable quotas. Restrictions on transferability would eliminate many of these opportunities.

Conclusions

Clearly the discussions of ITQs have followed the almost universal adoption of limited access fishery management plans (both abroad and now in the U.S.). If open access to fisheries is no longer an acceptable fishery management option, all limited access programs should be considered on their merits. Currently, IFQ programs are in the spotlight, while less effective and more troublesome limited access programs escape the same scrutiny. Many of the criticisms of ITQs apply equally or more so to all limited access programs, yet the proposed national standards for IFQ programs apply only to fishing quota programs. All fishery stakeholders should demand a comparative evaluation of limited access options. It is now well-documented that ITQs lead to many benefits in safety, efficiency of harvest, freedom of action, and wise use of capital and financial assets.

Until recently, the broadest public policy question related to ITQs has been whether the public can rely on the government, working through a command and control system, to obtain the greatest overall benefits from its fishery resources. Public policy is clearly moving toward the view that the public will obtain more benefits from these resources, at lower cost, by sharing ownership with those who naturally have more of a direct interest in, and a greater reliance on, the sustainability of those resources. We must now assure that the potential benefits of this policy shift are not jeopardized by misguided national standards.

SECTION 2. THE CONCEPTUAL AND THEORETICAL BASIS FOR A MINIMUM OF NATIONAL IFQ STANDARDS

The Nature of the Problem

Many economists and industry observers believe that the “fisherman’s problem” (McEvoy 1986) stems from the fact that no one owns the fish in the ocean. Fishery resources have not been conserved, they say, because no fisherman has the ownership rights that would allow him to leave fish in the water as they become scarce — others will simply take the fish that he leaves. In contrast, when privately owned resources become scarce, their price goes up, reducing demand. Private owners also take steps to conserve those resources when they expect their possession to become even more valuable in the future. Harvard economist Robert Stavins has noted that, contrary to what one might expect: the so-called non-renewable resources seem to be better conserved than many renewable resources. He writes that: “the reason why some resources — water, forests, fisheries, and some species of wildlife — are threatened while others — principally minerals and fossil fuels — are not is that the scarcity of nonrenewable resources is well reflected in market prices. This is much less the case for the renewable resources, which, in fact, are characterized by being open access or common property resources.” (Stavins 1992)

One of the best descriptions of the basic causes of overfishing and the poor economic performance of fisheries was published in the 1969 report of the Commission on Marine Science, Engineering and Resources, titled “Our Nation and the Sea, A Plan for National Action.” (Stratton 1969) The fact that we have not addressed many of these fundamental concerns some 35 years later is testimony to their contentious nature.

Not all scholars subscribe to the hypothesis that lack of ownership rights is at the root of the overfishing problem. Seth Macinko and Daniel Bromley provide a comprehensive explanation of the contrarian view in their report to the Pew Charitable Trusts, titled “Through the Looking Glass” (Macinko and Bromley 2001). Macinko and Bromley assert that the public has owned the fishery resources within the 200-mile limit since 1976. If they are correct, we have to ask why the owners of these resources have not managed them better.

Macinko and Bromley’s answer to that question serves as the guiding principle behind much of the political pressure that is focused on fishery management reform by environmental organizations — the fundamental problem with fishery

management over the last 28 years, they conclude, has been the “inability of fisheries managers to resist political pressure from several sources.” With more political will, they imply, we could have avoided the fishery management failures that created this debate. Most environmental organizations believe that stronger laws are the answer to fishery management failure. This reliance on forceful regulation is what political scientists and economists call the “command and control” approach, as contrasted with market-based solutions to public policy issues.

In fairness to Drs. Macinko and Bromley, their recommendations go far beyond giving the government more will power. They agree, for example, that: “zero-priced inputs (in this case fish) in an industry will always result in distorted levels of investment in that industry.” This is, in essence, a different way to phrase the case made by Stavins that non-renewable resources have been better conserved because their scarcity is reflected in market prices. The extent to which the consumption market reflects the true value of resources can be debated, but the creation of a market for harvest rights would at least move fishery resources away from the zero-price category and eliminate that source of overcapitalization. If non-consumptive users were also allowed to participate in the market for quota shares, the market would also reflect the value of fish for non-consumptive uses.

“Through the Looking Glass” provides a useful foil because it questions many of the popular ideas concerning ITQs, while supporting variations on the theme. For example, Macinko and Bromley don’t dispute the desirability of a market for harvest shares; they propose a government-run auction of catch shares as the appropriate form for the market. In essence however, their report to the Pew Charitable Trusts is a call for greater command and control by government — if the publicly owned aquatic resources of the United States are managed badly, they write, “the fault does not lie with the lack of property rights, but rather with flawed management objectives and processes.” Aristotle may have had a better grasp of the problem when he wrote: “that which is owned by everyone is taken care of by no one.”

Stronger laws and more political will may be helpful in preventing the depletion of fish stocks, but fisheries where political will was not lacking have still suffered from economic

and social problems, notably safety concerns and tremendous waste of capital, labor, and other inputs. The halibut derby was probably the best example of a poorly performing fishery based on a healthy stock. There is little doubt that halibut and sablefish conservation were improved by the ITQ system, but conservation was not the driving force behind it. Command and control systems cannot deal effectively with problems that are essentially economic and social in nature. The political will to conserve that has been evident in New England in recent years has led to stock rebuilding, but has not eliminated our fishery management problems. More abundant stocks have simply created new and different fishery management problems. Command and control approaches are not likely to lead to the best resolution of these problems.

Looking at the question another way, we can ask whether the interests of the public owners of the resource can best be served by giving fishermen more of an ownership interest in those resources. It's an idea that is widely accepted in all aspects of our lives, including the fishing industry. We expect private homes to be taken care of better than public housing, and owner/captains to take better care of boats than hired captains. Harvard president Lawrence Summers captured the essence of the ownership argument when he remarked that: "no one has ever washed a rented car."

There is no denying the fact that fishermen without ownership rights have approached fishery resources with a Robin Hood spirit, leading to skepticism concerning fishermen as trustees of public resources. But we must ask whether the conflict of interest that leads to accusations of the fox raiding the henhouse can be transformed into a confluence of interests that will be seen as the farmer guarding the henhouse? I believe that we can, and I believe that ITQs are a proven way to do that. My conclusions are not based solely on academic theory and platitudes — I've listened to fishermen in pubs in Australia talk about the importance of conservation in protecting the value of their quota shares, a clear indication of the mindset that accompanies secure, long-term fishing rights. The fact that we are here today is an indication that more and more people in this country share that belief.

Now we have to ask, if ITQs can create a conservation incentive, what are the characteristics of an ITQ program that will accomplish that objective? Will ITQs be more successful in producing benefits for the Nation if we strengthen their ownership characteristics, or if weaken those attributes? Whatever the apparent purpose of national IFQ standards,

their effect will be to modify the incentives that guide the actions of ITQ holders.

The characteristics of ITQs that are the most important to their success are also the most controversial. This is because they revolve around the central issue of ownership, and the degree to which the public owners of the resource are willing to delegate or devolve some of their ownership rights to private entities, in the belief that such an arrangement will produce greater overall benefits. Ownership, of course, has become a hot-button issue in a broader realm than fisheries. It's one of those seemingly positive words that now make a lot of people cringe, like efficiency, or profits. David Boaz does a good job of explaining the traditional admiration for ownership in an article on the Cato Institute website (Boaz 2005). Boaz writes that:

People have known for a long time that individuals take better care of things they own. Aristotle wrote, "What belongs in common to the most people is accorded the least care: they take thought for their own things above all, and less about things common, or only so much as falls to each individually." And we all observe that homeowners take better care of their houses than renters do. That's not because renters are bad people; it's just that you're more attentive to details when you stand to profit from your house's rising value or to suffer if it deteriorates.

Just as homeownership creates responsible homeowners, widespread ownership of other assets creates responsible citizens. People who are owners feel more dignity, more pride, and more confidence. They have a stronger stake, not just in their own property, but in their community and their society....

*The many benefits of an ownership society are not always intuitively obvious. The famous Harvard economist John Kenneth Galbraith wrote a bestselling book in 1958 called *The Affluent Society*, in which he discussed the phenomenon of "private opulence and public squalor" — that is, a society in which privately owned resources were generally clean, efficient, well-maintained, and improving in quality while public spaces were dirty, overcrowded, and unsafe — and concluded, oddly enough, that we ought to move more resources into the public sector.*

Even anthropologist James Acheson, while claiming that: "market solutions cannot be used to govern common-pool resources, including the lobster," nevertheless writes that "secure property rights give the 'owners' of resources incentive to conserve them and use them efficiently. Many of the rules devised for the lobster industry give fishermen property rights over the resource (such as territorial rules), and thus

motivate fishermen to conserve.” (Acheson 2003) Acheson has made a career out of documenting the extralegal system of property rights that exists in the Maine lobster fishery, and he isn’t bashful about expressing his admiration for that system: “For the present,” he writes, “we are witnessing the unparalleled success of an industry in which people are determined to capture the lobster commons for themselves and future generations.”

So the ITQ issue first focused on the question of whether more and better government regulation could produce the greatest overall benefits to the Nation from its fishery resources, or whether private property rights and a market for harvesting rights could do a better job. In terms of national policy and popular opinion, there is an emerging preference for explicit, market-based fishery allocation systems over indirect allocation by regulation. The reasons include better conservation, improved economic benefits, and enhanced crew safety.

With more general acceptance of the basic idea of market allocation systems, the debate has now become more focused on the details of such a system. All ITQ systems are not created equal. The contrast between the details of the surf clam ITQ plan and the halibut ITQ program demonstrate the range of possibilities that exist within the ITQ framework. The big public policy question that we are addressing today is whether Congress should place additional bounds on the characteristics of each and every future ITQ program, or whether we should continue to give the regional fishery management councils the flexibility to design ITQ programs that fit their fisheries.

We also have continuing questions about both the degree to which the public should be compensated for the use of its resources, or for its management of those resources, and the mechanism through which that compensation should be collected. The law already specifies fees for ITQ fisheries; others have suggested auctions of specified fishing opportunities.

Fish as Assets and Capital

The ITQ debate has not touched at all on the potential for secure fishing rights to stimulate the economies of coastal communities in ways that are not at all connected to fishing. The most valuable asset potentially available to fishing communities is the fishery resource. If fishermen do not have

secure title to the fishery resource, they are in essentially the same position as the shantytown squatters that are of such concern to economic development researchers like Hernando de Soto.² De Soto explains the poor economic conditions in developing and former communist countries as resulting from a lack of “access to a legal property rights system that represents their assets in a manner that makes them widely transferable and fungible, that allows them to be encumbered and permits their owners to be held accountable. So long as the assets of the majority are not properly documented and tracked by a property bureaucracy, they are invisible and sterile in the marketplace.” (de Soto 2000)

De Soto documents the huge dollar value of assets held by the poor in developing countries. He calls those assets “dead capital” because the lack of secure property rights does not allow those assets to spur economic development. The capital that is inherent in an asset “requires a process for fixing an asset’s economic potential into a form that can be used to initiate additional production.” “Assets in developing and former communist countries primarily serve only their immediate physical purpose,” de Soto writes, because the lack of a formal property system prevents those assets from being used to produce surplus value over and above their physical use. “In the West, however, the same assets also lead a parallel life as capital outside the physical world. They can be used to put in motion more production by securing the interests of other parties as ‘collateral’ for a mortgage, for example, or by assuring the supply of other forms of credit and public utilities.”

DeSoto’s thesis is that the titling of previously untitled assets is the key to promoting economic development of society as a whole. De Soto’s examples from developing countries bring to mind the poor counties of eastern Maine, whose leaders resist turning their sizable fishery assets into productive capital, all the while struggling to find an economic engine to improve their standard of living. De Soto explains that:

Secure property rights... encourage holders to invest in their property because of their certainty that the property will not be usurped. From a strictly economic standpoint, therefore, the true purpose of property rights is not to benefit the individuals or entities holding those rights, but to give them the incentive to increase the value of their assets by investing, innovating, or combining them advantageously with other resources, something which would have beneficial results for society.

² Hernando de Soto is the President of the Institute for Liberty and Democracy (ILD), headquartered in Peru and regarded by The Economist as the second most important think tank in the world. De Soto was named one of the five leading Latin American innovators of the 20th Century by Time. De Soto’s research has attempted to discover why capitalism brought prosperity to the West but has not been similarly successful in underdeveloped and former communist countries.

Although he never mentions fish, de Soto's books can be read as a rebuttal to those, like Jim Acheson, who believe that traditional, extralegal property arrangements are preferable to more formalized property rights. De Soto traces the development of property rights in the western world and specifically addresses the need for a transition from localized extralegal arrangements to a more formal system:

Shifting the recognition of ownership from local arrangements into a larger order of economic and social relationships made life and business much easier. People no longer needed to rely on burdensome parochial politicking to protect their rights to assets. Formal property freed them from the time-consuming local arrangements inherent to closed societies. They could now control their assets. Even better, with representations in hand, they could focus on their assets' economic potential.

Ironically, modern governments have often torn down traditional systems of property rights in fisheries, however imperfect, without bringing fisheries into the broader formal property system. Property rights are not an alien concept in many fishing communities. The question is whether formal property rights are better than the existing extralegal arrangements.

Greatest Overall Benefits to the Nation

De Soto stresses the fact that property rights benefit the overall society, not simply the individual who holds the rights at a particular point in time. He calls ownership "the architecture upon which the market economy is built" (de Soto 2004). Anthony Scott alludes to the same point when he says that "fishermen (and fishery managers) have given little thought to the losses of the *rest of the economy* arising in the wasteful and costly ways that competing fishermen have been induced to adopt." And Eggertsson (in Acheson 2003) cautions that uncertain control (insecure rights) discourages potentially profitable projects, implying that the standard of living of the public owners of the resource will be lower than it would be if those profitable projects could be carried out.

The impact of wasteful fishery management programs on the rest of society is an issue that demands particular consideration as policy makers contemplate referenda requirements for IFQ programs.

The impacts of wasteful fishery management systems on the rest of society are easy to ignore, because they appear to be costs borne solely by fishermen. But they have the result of draining fishing revenues away from coastal communities that

desperately need to retain as much fishing income as they can. New Bedford sea scallop permit-holders are sending millions of dollars to Gulf of Mexico shipyards to build new boats, while New Bedford harbor is filled with existing boats that are fishing less than 100 days per year. Clearly, those millions of dollars could be invested more productively at home in New Bedford. The boat owners are still making attractive returns, but the fishery is not making the contribution that it could to the regional economy.

The waste required by inefficiency regulations is insidious, because it tends to be seen as a positive contribution to coastal communities, rather than the drain that it really is. For example, Maine residents know that the working waterfront is being taken over by outsiders, but they don't question why that is happening at a time when the lobster fishery is producing record landings. The inability to use valuable fishery assets as capital explains why the residents of fishing communities have not remained competitive with people from "away" who have had the opportunity to accumulate assets in their businesses (upon which to finance the acquisition of Maine real estate) while Maine commercial fishermen have not been able to accumulate fishing assets in the course of their business (as a basis for financing other investments).

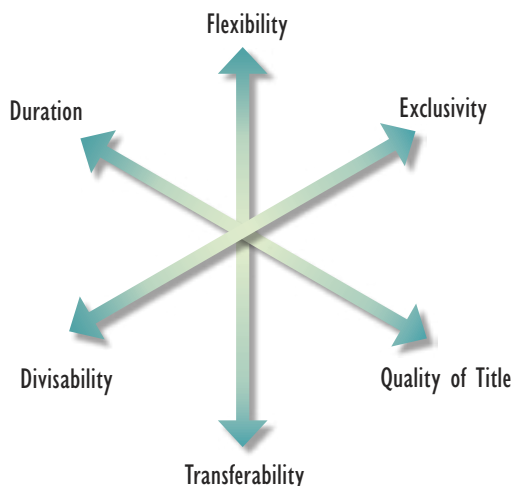
What is a Property Right?

Property is obviously more complex, and has a greater role in our society, than is indicated by Macinko and Bromley's definition of property as the "income (or benefit) stream that can be associated with a particular setting or circumstance." Anthony Scott (Scott 1988) and Ragnar Arnason (Arnason 2000) provide a much richer description of property and ownership. In his 1988 description of the "Conceptual Origins of Rights-based Fishing," Scott lists six characteristics of ownership, including duration, divisibility, transferability, quality of title, exclusivity, and flexibility (Figure 1). He portrays these characteristics as arrows whose length depends on the strength of the characteristic.

In a more recent discussion of property rights, Scott focuses on the powers that generally attach to property rights. He identifies (a) the power to use the thing (or manage it); (b) the power to dispose of it (to sell it or grant it); and (c) the power to take its yield (e.g. as a crop, rent or royalty) (Scott 2000). He then asks us to "consider the fisherman in his role as the owner of a fishing vessel. He has all three powers over it: he can run it, sell it and take the profit from doing these things. But now consider the same fisherman in his role as

Figure 1.

Conceptual Origins of Rights-based Fishing



From Scott, Anthony. "Conceptual Origins of Rights-based Fishing." NATO Advanced Research Workshop on Scientific Foundations for Rights-based Fishing Ed. P.A. Heher, R. Arnason, and N. Mollett. Reykjavik, Iceland: Kluwer Academic Publishers, 1988. 11-38.

occupier of the fishery itself. This role does not give him powers to manage it or dispose of it. All he has is the third power, the law of capture: the power to take and keep the fish he catches. The absence of the first two powers deprives him of any incentive [or power] to look after the fishery."

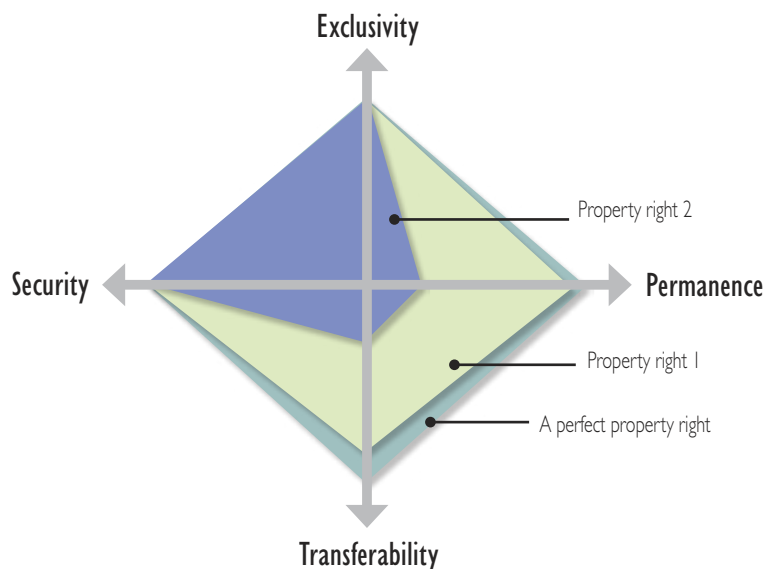
Arnason simplifies the ownership characteristics somewhat, identifying four: exclusivity, security, permanence, and transferability (Figure 2). Other authors have similarly identified multiple characteristics of what we think of as ownership. The more sophisticated description of ownership makes it clear that fishing rights such as ITQs can't simply be classified as being property rights or not being property rights. Any individual fishing quota, "individually specified catching opportunity," (Macinko and Bromley 2001) or "dedicated access privilege" (U.S. Commission on Ocean Policy 2004) confers one or more of the characteristics of property rights and ownership to some extent. Any of these allocations creates "the legal ability to command the collective authority of the state to protect one's interest in a particular stream of benefits arising from specific settings and circumstances" — the Macinko/Bromley definition of a property right. The fact that the claim may be a subsidiary claim of shorter duration than the public ownership claim from which it emanates does not diminish its status as an enforceable property right. Neither does the method by which the claim is obtained, whether by administrative due process or public auction.

The nature of a property right is important to the incentives that are created for the holder of those rights. In his book *Capturing the Commons*, anthropologist James Acheson quotes economist Thrainn Eggertsson on the incentives created by the characteristics of ownership rights: "short-term control shortens the time horizon; uncertain control discourages potentially profitable projects; lack of control incites costly races for possession; restricted control allocates assets to inferior uses." (Acheson 2003)

Other than the fact that some people just don't take care of things whether they own them or not, the most serious challenge to the assumption that property rights to fish may not assure their conservation arises from "the iron law of the discount rate," which Macinko and Bromley stress in their paper. The theoretical demonstration that a private owner might find it more advantageous to liquidate a renewable resource rather than conserve it is generally attributed to Colin Clark's 1973 paper titled "Profit maximization and the extinction of animal species" (Clark 1973). Harvard ecologist E. O. Wilson has gotten considerable mileage out of Clark's conclusion concerning the economics of harvesting whales: "The disconcerting answer for annual discount rates of more than 21 percent: Kill them all and invest the money." (Wilson 2002)

Figure 2.

Property Rights as a Means of Economic Organization



Arnason, R. "Property Rights as a Means of Economic Organization." FishRights99: Conference on the Use of Property Rights in Fisheries Management Ed. Shotton, R. Fremantle, Australia: FAO, 1999.

Table 1.

Comparison of Fish Stock Investments

Year	Biomass	Catch	Price	Annual Fishing Revenue	Liquidation Value	Alternative Return
0	50000	7500	\$2,000.00	\$15,000,000	\$100,000,000	\$6,000,000
1	50000	7500	\$2,000.00	\$15,000,000		\$6,000,000
2	50000	7500	\$2,000.00	\$15,000,000		\$6,000,000
3	50000	7500	\$2,000.00	\$15,000,000		\$6,000,000
4	50000	7500	\$2,000.00	\$15,000,000		\$6,000,000
5	50000	7500	\$2,000.00	\$15,000,000		\$6,000,000
6	50000	7500	\$2,000.00	\$15,000,000		\$6,000,000
7	50000	7500	\$2,000.00	\$15,000,000		\$6,000,000
8	50000	7500	\$2,000.00	\$15,000,000		\$6,000,000
9	50000	7500	\$2,000.00	\$15,000,000		\$6,000,000
				\$150,000,000	Ten-year return	\$60,000,000
$r = 0.3$	$K = 100000$	$F = 0.150$	Rate of return on alternative investment = 0.06			

Comparison of return on fish stock investment from sustainable harvesting compared to liquidating the fish stock and putting the proceeds in an alternative investment at six percent return.

It is certainly true that a profit-maximizing owner of a fish stock might consider liquidating the stock and putting the money into a more lucrative investment if the growth rate of the fish stock did not match the interest rate on other investments. But Clark's conclusion should actually lead to much more optimism. Most fishery resources have growth rates that exceed any imaginable alternative investment. Frisk, Miller and Fogarty (2001) provide a list of potential population increase values for North Atlantic and North Sea groundfish that demonstrate the attractiveness of an investment in fishery conservation. Table 1 contrasts the return on investment from sustainable harvesting of a fishery resource compared to liquidating the fish stock and investing the proceeds in an alternative investment paying six percent, the upper bound of Treasury notes and corporate bonds on February 25, 2005. The example uses a fish stock with an intrinsic growth rate (r) of 0.3, which is the lower bound of the comparable potential population increase (r') values for teleost fish listed by Frisk, Miller and Fogarty (2001).

Of particular interest is the fact that the potential to increase stock productivity is greater when fish stocks are depleted, making it more and more likely that a private investor would step in to conserve a depleted stock if its current owner did not recognize the higher value that could be obtained through conservation. The noteworthy aspect of this conclusion is that the fishery management structure would have to be structured to allow a private investor to buy rights to fish, and to have the choice of leaving his fish in the water, in order for the conservation incentive to be realized. The "iron law of the discount rate" would seem to assure the sustainable management of most fishery resources in private hands, contrary to what we have seen under government control.

It would be a mistake, however, to assume that prevailing investment returns alone determine an individual's discount rate. Columbia Business School professor and Pew Oceans Commission member Geoffrey Heal (2001) points out that we choose a discount rate, rather than calculate it. Similarly, in his discussion of the connection between a conservation ethic and a low discount rate, Acheson (2003) enumerates a number of factors that make people more or less willing to invest in conservation rules, all focused on their expectations of receiving benefits in the future. Willingness to conserve is directly related to one's expectation of continuing benefits. Conversely, uncertainty about the future flow of benefits makes one less willing to invest in conservation.

Heal summarizes his philosophy with the statement that: "America needs a new generation of environmental policies explicitly recognizing the economic value of the environment and drawing on this, where appropriate through markets, to provide conservation incentives. These will supplement and eventually substantially replace our current reliance on command and control systems" (Heal website). The extent to which ITQs will be used to create market incentives to replace our current command and control system of fisheries management is the crux of the IFQ standards debate.

Readers may also be interested in a series of articles on ITQs that was written by James O'Malley and me and published in *Commercial Fisheries News* in 2001. Those articles can be accessed at <http://www.lobsterconservation.com/ifqcolumn1/>. More information on stock stewardship shares can be found in Appendix I or at <http://www.lobsterconservation.com/introductiontosss/>.

References

- ACHESON, J. M. 1988. *The Lobster Gangs of Maine*. Hanover: University Press of New England.
- ACHESON, JAMES. 2003. *Capturing the Commons*. Lebanon, NH: University Press of New England.
- ARNASON, R. "Property Rights as a Means of Economic Organization." *FishRights99: Conference on the Use of Property Rights in Fisheries Management* Ed. Shotton, R. Fremantle, Australia: FAO, 1999.
- BEATON, STUART. "Intergenerational Succession in the Inshore Fisheries of Atlantic Canada." *MBA Dissertation* Launceston, Tasmania, Australia: Australian Maritime College, 2004.
- CLARK, C. W. "Profit maximization and the extinction of animal species." *Journal of Political Economy* 81 (1973): 950-961.
- DE SOTO, HERNANDO. 2000. *The Mystery of Capital; why capitalism triumphs in the West and fails everywhere else*. New York: Basic Books.
- EGGERTSSON, THRAINN. "Economic Perspectives on Property Rights and the Economics of Institutions." *Beijer International Institute of Ecological Economics* Sweden: The Royal Swedish Academy of Sciences, 1993.
- GAVARIS, STRATIS. "Population stewardship rights: Decentralized management through explicit accounting of the value of uncaught fish." *Canadian Journal of Fisheries and Aquatic Sciences* 53.07 (1996): 1683-1691.
- GORDON, H. SCOTT. "The Economic Theory of a Common Property Resource: The Fishery." *Journal of Political Economy* 62 (1954): 124-142.
- MACINKO, SETH AND DANIEL W. BROMLEY. "Through the Looking Glass; Marine Fisheries Policy for the Future." 2001.
- MADISON, JAMES. "The Federalist Papers Number 10." *The Federalist Papers* Ed. Clinton Rossiter New York: Penguin Books USA, 1787. 77-84.
- McEVOY, A. F. 1986. *The Fisherman's Problem: Ecology and Law in the California Fisheries, 1850-1980*. Cambridge: Cambridge University Press.
- O'MALLEY, J. D. AND R. B. ALLEN. "Time to Plan for ITQs." *Commercial Fisheries News* Stonington, ME: Compass Publications, 2001.
- SCOTT, ANTHONY. "Conceptual Origins of Rights-based Fishing." *NATO Advanced Research Workshop on Scientific Foundations for Rights-based Fishing* Ed. P. A. Heher, R. Arnason, and N. Mollett Reykjavik, Iceland: Kluwer Academic Publishers, 1988. 11-38.
- STAVINS, ROBERT. "Comments on "Lethal Model 2: The Limits to Growth Revisited II by William D. Nordhaus." Brookings Institution, 1992.
- STRATTON, J. A. "Our Nation and the Sea: A Plan for Action." Washington, D.C.: Commission on Marine Science, Engineering and Resources, 1969.
- SWANSON, T. "The economics of extinction revisited and revised: A generalized framework for the analysis of the problems of endangered species and biodiversity losses." *Oxford University Papers* 46. Special Issue on Env (1994): 800-821.
- U.S. COMMISSION ON OCEAN POLICY. "Preliminary Report of the U.S. Commission on Ocean Policy Governor's Draft." Washington, D.C.: 2004.
- WILSON, E. O. "What is Nature Worth?" *San Francisco Chronicle* San Francisco: 2002.
- YOUNG, ARTHUR, *Arthur Young's Travels in France*. George Bell and Sons. 1909. Ed. Matilda Betham-Edwards. Library of Economics and Liberty. 6 February 2005. <http://www.econlib.org/library/YPDBooks/Young/yngTF0.html>

Beyond ITQs — Conceptual Partial Populations and Population Stewardship Shares

Conceptual Partial Populations and Population Stewardship Shares Can:

- Replace the “race for fish” with a “race to conserve;”
- Transform group punishment into community incentive;
- Eliminate Lowest-Common-Denominator management;
- Convert “winner-take-all” political battles into win-win scenarios;
- Create both responsibility and accountability among fishery participants;
- Make fishery conservation a worthwhile investment.

Why Fisheries Fail

Failures in resource management, including fisheries, are often attributed to the presence of “externalities” — the fact that the cost of one person’s actions are often spread out among many other people, while the person that imposes the cost gets all the benefit. When one person increases his fishing effort, for example, that person gets all the benefits of catching more fish, but all of the other harvesters share in the cost associated with having less fish in the ocean.

In searching for solutions to environmental problems, economists seek to internalize the costs and benefits associated with the use of natural resources. If resource harvesters pay the full costs associated with their activities, and reap the full benefits, they will attempt to minimize costs and maximize benefits. Population stewardship shares and conceptual partial populations have the potential to simplify and improve fishery management, in part because they internalize costs and benefits associated with fishing.

Stratis Gavaris, Conceptual Partial Populations, and Elementary Management Units

In a 1996 article in the Canadian Journal of Fishery Science, Stratis Gavaris suggested that the fish stock could be partitioned into “conceptual partial populations” that are “entrusted to the care of individuals or groups of fishers operating under common rules...” He called these groups of fishers elementary management units or EMUs. According to Gavaris, EMUs would “earn a share of recruiting year-classes according to the

relative magnitude of the spawning potential of their partial population, which reflects their success at stewardship of the population share entrusted to their care.” Thus the term population stewardship shares.

The difference between an individual or state-by-state quota or a sector TAC (Total Allowable Catch) and a population stewardship share is that a population stewardship share is a share of the population itself, not a predetermined catch share of an overall TAC for the stock. The holder of a stock stewardship share would be responsible for the impact of his catch on his share of the resource, and his population share would be tracked like a bank account. Under an ITQ system, the quota holder is only responsible for keeping his catch within his share of a TAC that is centrally determined. No ITQ holder can conserve more than is required by the universal standard.

Eliminating the “Lowest Common Denominator” Approach

Individual and state by state quotas and sector shares of an overall TAC do not provide an incentive for the quota holder to be more conservative than the standards that went into the calculation of the TAC. With apportioned TACs, if one share holder were to leave a portion of his share in the water to conserve, the benefits of that conservation would be distributed among all share holders, diluting the benefits to the share holder that did the conserving. By basing each share holder’s future share of the recruitment into the fishery on the spawning potential of its conceptual partial population, Gavaris creates a “race to conserve” rather than the “race for fish” that is generally associated with TAC management. Each quota holder would reap the benefits of his success and pay the price for his failure. This contrasts with the “group punishment” character of the present system, which requires all fishery participants to cut back when stock assessments demonstrate that “someone” is catching too much and conserving too little.

More or Less Complex?

Given the unmanageable complexity of our current approach to fishery management, the question immediately arises whether a system of population stewardship shares would be more or less complex. In fact, population stewardship shares could simplify fishery management.

Much of the complexity of the current system arises from a mismatch between the natural complexity of the fishery and the artificial complexity of the fishery management system. Gavaris attributes part of the failure of the Canadian system to “limited scope and flexibility to accommodate local circumstances or to permit diverse implementations of the strategy.”

Fishery Models, Stock Assessments, and Management Guidance

The first step in simplifying fishery management is to recognize that there are two distinct scientific components of fishery management. One (stock assessment) is essentially backward-looking and the other (characterized by egg- and yield-per-recruit models) is forward-looking. The management system generally fails to make a distinction between these two components, as is reflected in statements to the effect that a decision on a management strategy must wait for the latest stock assessment. The problem with this approach is that management is always behind the curve, responding to what has already happened, rather than planning in advance how to best use the available fish.

Political Advantages

Population stewardship shares do not require artificial lines in the ocean and they do not require complete agreement on management policies. They can apply to any level of allocation, from individuals to sectors to states to nations. Fisheries that currently use catch shares of one form or another could simply convert catch shares into population stewardship shares. Even in situations where the TAC is allocated to large groups, the use of population stewardship shares would make the impact of the fishery more apparent. Catch reporting provides information on how a share holder is managing its conceptual partial population. The management unit can choose whether to use quotas, trip limits, days at sea, or other management tools, but its success will be measured by the quantity and size distribution of its removals from its partial population. Rather than the current “winner-take-all” approach to management, competing management philosophies need not fight to the finish — each can demonstrate its benefits as a distinct management unit, without drawing more lines in the ocean.

Everyone understands why banks don't debit the accounts of all customers when one has an overdraft. And everyone doesn't get a credit when one person makes a deposit. Some folks let their interest accumulate and compound, while others don't. Why shouldn't fish be managed with the same logic?



INVITED PAPER

Balancing Flexibility and Safeguards in IFQ Programs: A Plan for Action

DOROTHY M. LOWMAN

DOROTHY LOWMAN is a fishery consultant who has also served as staff on several different regional fishery management councils over the past twenty years. dmlowman@earthlink.net

The views and opinions expressed in this paper are the author's alone, and should not be interpreted as those of any of her clients, including Environmental Defense.

Abstract

National ocean policy now includes a recognition that properly designed IFQs and other dedicated access privilege (DAP) programs are important tools that can promote long-term sustainable fisheries that support fishery-dependent coastal communities and healthy ocean ecosystems. I review recommendations and concerns that have surfaced over the past few years during the debate over IFQ national standards. I conclude that many of the process and evaluation, program design and initial allocation concerns that have been expressed in this vigorous debate are already addressed in at least broad terms within existing legislation.

I suggest some specific revisions to the Magnuson-Stevens Act that I believe are necessary to assure that councils have the ability to design dedicated access programs that best meet fishery-specific biological, economic and social objectives. These include:

- Defining and reaffirming authorization for the full range of dedicated access privilege programs available for management of U.S. fisheries;
- Removing the 3 percent cap on fee assessment contained in Sec304(d);
- Authorizing the use of auctions to allocate quota share;
- Modifying Sec303(b)(7) and Sec402(a) to allow economic data to be collected from processors subject to the same confidentiality requirements that apply to harvesters; and
- Adding a new provision to the Magnuson-Stevens Act allowing quota holders to take legal action against private parties whose unlawful actions harm fishery and marine resources.

Beyond these revisions, I believe that any further guidance regarding IFQs should be through administrative guidelines, rather than additional legislative mandates. I recommend that NOAA Fisheries immediately begin developing a set of national guidelines to assist the councils in developing, implementing and evaluating DAP programs. The recommendations contained in the NRC report to Congress, the U.S. Commission on Ocean Policy and other issues that have emerged during the national debate on IFQs should be taken into account when developing these guidelines. In addition, NOAA Fisheries should appoint and consult with an advisory group with representation from all eight regions when developing draft guidelines.

Table 1.

Characteristics in Fisheries for Which IFQ Programs are Currently Being Developed or Considered

Characteristic	West Coast Trawl Groundfish	Gulf of Mexico Red Snapper	Gulf of Alaska Groundfish	Bering Sea/ Aleutian Islands Crab
Number of vessels/permits	170	130 class one; 350 class two	850 unique vessels (some with more than one gear)	275
Annual ex-vessel value	Approx \$45 million (includes approx. \$20 million in the whiting fishery)	\$10-15 million annually	Approx \$65 million	Approx \$125 million
Multi-species program being considered?	Yes	Initially no, may be expanded	Yes	Mostly single species
Currently a derby fishery?	No	Yes	Yes	Yes
Fishery on same stocks?	For some species; also other commercial fisheries on some stocks	Yes (equivalent to commercial harvest)	None (except halibut)	No
Gear types being considered as part of program?	Bottom trawl and mid-water trawl (whiting)	Primarily bandit rigs (20 hooks per line); some longliners	Trawl, longline, pot, jig	Pot
Isolated communities?	No	No	In excess of 50; Some with no or minimal involvement in the fisheries; others almost entirely dependent.	Yes, issue is with processing in communities — approximately 9-10 have some significant crab processing history
Bycatch a concern?	Yes	Yes	Yes	No

Introduction

On December 17, 2004, the Administration announced their U.S. Ocean Action Plan, in response to the report of the U.S. Commission on Ocean Policy. Promoting greater use of market-based systems for fisheries management is highlighted in the action plan as an important initiative for achieving sustainable fisheries. This strategy is consistent with the recommendations of the U.S. Commission on Ocean Policy which advocated that “every federal, interstate and fishery management entity should consider the potential benefits of adopting such (dedicated access privileges) programs”.

Now, two years after the moratorium on IFQ programs has expired, national ocean policy includes a recognition that by changing incentives IFQs and other dedicated access privilege systems can help provide long-term sustainable fisheries that support fishery-dependent coastal communities and healthy ocean ecosystems. We are not alone in acknowledging that properly designed dedicated access programs can provide significant conservation, economic, safety and community benefits. Over 75 IFQ programs have been implemented around the world, including four in the United States.¹

Much of the discussion over the past two years has focused on what national guidelines are needed to shape the design of IFQ programs and safeguard against undesired distributional effects and other impacts. This paper will examine recent

recommendations as well as draft legislation proposed during the 108th Congress with respect to the following:

- How do proposed “IFQ criteria” relate to provisions already contained in the Magnuson-Stevens Act?
- What changes in law are necessary to assure that regional fishery management councils can design the dedicated access program that best meets the conservation, economic, and social needs of a specific fishery?
- What issues are better addressed through NOAA Fisheries guidelines than through congressional mandates?

The Need for Flexibility

As IFQs and other forms of dedicated access privileges are considered, flexibility is essential if regional fishery management councils are to develop programs that can best meet fishery-specific objectives and take into account the biological, economic and social characteristics of a given fishery.

Even a cursory look at some of the differences between U.S. fisheries where IFQs are in the process of being implemented or considered illustrates this diversity among fisheries (Table 1). This diversity is also evident in the objectives that guide the development of a given IFQ fishery, as illustrated in Table 2.

¹ IFQ programs for Alaska halibut and sablefish, Mid-Atlantic surf clam and ocean quahog, and South Atlantic wreckfish have been implemented; and a Bering Sea/Aleutian Islands crab rationalization program will be implemented soon. In addition to these IFQ programs, other U.S. dedicated access privilege programs are in place. These include the West Coast Fixed Gear Sablefish Permit Stacking Program (considered closed enough to an IFQ program that its implementation required an exemption from the IFQ moratorium), Pacific whiting fishery (at-sea catcher/processor coop), the Bering Sea pollock fishery in the North Pacific (co-op); Alaska’s Community Development Quota program, and the Chignik salmon fishery (co-op).

Table 2.

Examples of IFQ Program Objectives

Objective	Halibut/ Sablefish	Wreckfish	Surf Clam/ Ocean Quahog	West Coast Trawl/Groundfish	Gulf of Mexico Red Snapper	Gulf of Alaska Groundfish	BSAI Crab
Reduce overcapitalization	x	x	a	b	x	x	x
Maximize efficiencies			x		x	x	x
Stabilize fishery	x	x		x	x	x	x
Conserve resource	a	x	x	x	x	x	x
Improve safety			a		x	x	x
Simplify regulation					x		
Protect fishery participants	x					x	x
Minimize ecological impact				x		x	x
Reduce bycatch				x	x	x	x
Minimize adverse impacts or enhance opportunities for communities				x		x	x
Increase flexibility				x	x		
Reduce gear/user conflicts						x	
Promote cost-effective management/adequate monitoring				x	x	x	
Promote individual accountability				x			
Increase net benefits from the fishery				x	x	x	x

a While not specified as an official objective, this outcome is important to the program.

b The west coast trawl groundfish fleet has recently completed an industry-financed buyback which reduced the fleet by approximately 35 percent. Therefore, while long-term capacity management is an important goal, immediate reduction of overcapacity is not a high level objective.

The National Research Council emphasized the importance of flexibility when they recommended that:

Congress should recognize that the design of an IFQ or other limited entry system in relation to concentration limits, transferability, distribution of quota shares and other design questions will depend on the objectives of a specific plan, requiring flexibility for regional councils in designing IFQ programs. Regional councils should have flexibility to adjust existing IFQ programs and develop new ones.²

The U.S. Commission on Ocean Policy concurred with this need for flexibility when they recommended that, in addition to affirming that fishery managers are authorized to institute dedicated access privileges, Congress should:

...direct National Marine Fisheries Service to issue national guidelines for dedicated access privileges that allow for regional flexibility in implementation.³

The real question then becomes how to assure that maximum flexibility is maintained while providing a framework to ensure that a council has considered all reasonable design alternatives, fully assessed the biological, economic and social impacts of the proposed plan, and developed a plan that is likely to meet the council's objectives.

Balancing Flexibility and Safeguards: A Common Theme in U.S. Fisheries Management

The recent recommendations stating that regional councils are the most appropriate authorities to design IFQ programs

² Sharing the Fish: Toward a National Policy on Individual Fishing Quotas, NRC (1999), pg. 6.

³ An Ocean Blueprint for the 21st Century. Report of the U.S. Commission on Ocean Policy (2004), pg. 290.

are consistent with decisions throughout the history of the Magnuson-Stevens Act.⁴ When Congress first authorized the Magnuson Fishery Conservation and Management Act in 1976, the architects of the Act recognized the importance of regional flexibility in developing fishery management plans. At that time, regional management was a relatively untested and innovative concept. Throughout the years, the basic fishery management framework involving federal and state managers as well as stakeholder representatives has been maintained.

Over time, the Magnuson-Stevens Act has been amended numerous times as fisheries first became fully “Americanized” and then in some cases over-utilized by domestic fisheries. Many of these amendments have strengthened safeguards and have recently legislated more stringent obligations regarding conservation of the resource and protection of habitat. Of particular importance were the revisions contained in the Sustainable Fisheries Act (SFA) which added three new standards related to considering opportunities for and impacts on fishing communities, minimizing to the extent practicable bycatch and bycatch mortality, and promoting human safety. The SFA also included significant requirements to end overfishing and rebuild stocks and protect essential habitats. With respect to IFQs, SFA identified new requirements for IFQ programs proposed after expiration of a moratorium on new programs. During the moratorium, SFA also outlined the issues to be considered by the National Research Council (NRC) as they developed recommendations regarding IFQ national policy.

Today, regional fisheries management councils continue to be authorized to design fishery management plans that utilize a diverse set of management tools to address fishery-specific objectives, provided that they also meet procedural requirements and are consistent with the national standards of the Magnuson-Stevens Act as amended by the SFA. Since October 2002, IFQs have been once again included among these tools and three Councils are currently exploring IFQs or other DAP alternatives for fisheries under their jurisdiction.

Recent Discussion on IFQ Criteria: Common Themes and Diverse Solutions

While the use of IFQs is now once again authorized under the Magnuson-Stevens Act, the debate over how much national

oversight is needed continues. Since the moratorium expired in October 2002:

- Draft legislation with provisions for IFQ national standards has been introduced in both houses of Congress.
- Two GAO reports requested by the Senate Commerce committee have evaluated issues related to quota consolidation, new entry and community protection and impacts on processors in existing IFQ programs.
- The U.S. Commission on Ocean Policy, the Pew Oceans Commission and the White House’s Ocean Action Plan have all endorsed dedicated access privileges as important management tools and have provided recommendations on criteria to guide development of such programs.

These post-moratorium activities build on at least four hearings on IFQ issues held by the subcommittees and full committees of both the House and the Senate during the moratorium period, the findings of the National Research Council study mandated by the Sustainable Fisheries Act of 1996⁵ and numerous regional and national workshops on the topic of IFQs and other forms of dedicated access privileges.

When I step back and look at the issues and proposals that have been articulated through this extensive national debate, I find that they can be categorized as primarily focused on process and program evaluation, program design or initial allocation. Tables 3 through 5 summarize the provisions recommended by the U.S. Commission on Ocean Policy (USCOP), the Pew Ocean Commission, the National Research Council, as well as those contained in the most recent draft legislation that was introduced in the House and Senate during the 108th Congress⁶ with respect to these three categories.

I have deliberately separated proposals related to initial allocation from other design element recommendations. While it is true that decisions regarding to whom, why and how initial shares are allocated can have an impact on the shape of the fishery, they remain one-time decisions. Too often, the debate seems to focus heavily on initial allocation at the expense of overall program design.

⁴ It is important to recognize the difference between the principle of regionalism (which applies regional expertise and accommodates regional concerns to result in more effective management) and the governance issues that have become associated with the regional councils (e.g., conflicts of interest, politicization of science).

⁵ Sharing the Fish: β Toward A National Policy on Individual Fishing Quotas, NRC, 1999.

⁶ HR2621 introduced by Congressman Allen and others on June 26, 2003 and S2066, introduced by Senator Snowe on February 11, 2004.

Table 3.

Recommendations Regarding Process and Evaluation Related Issues and Criteria^a

Process Related Issue/Criteria	OAP	USCOP	PEW	NRC	S2066	HR2621
Affirm authorization for use of DAP/IFQ systems	x	x	x	x	x	x
Congress to mandate IFQ-specific national standards and criteria	xb		x		x	x
NOAA fisheries to develop IFQ-specific national guidelines	x	x				
Establish control date or other mechanism to avoid speculative behavior				x		
Inclusive and transparent design process with all stakeholders represented		x		x		
Referendum requirements					xc	xd
Objectives must be specified (conservation, economic, social)		x		x	xe	xf
Implement a central registry system				x		
Pre and Post Evaluation						
Data collection protocols must be specified		x				
Periodic Review of program, with modification procedures required		x	x	x	x	x
Ongoing collection of economic and social data necessary to assess performance and impacts of IFQ programs				x		

^a OAP=Ocean Action Plan, USCOP= U.S. Commission on Ocean Policy, Pew=Pew Commission, NRC= National Research Council (Sharing the Fish)

^{xb} Unspecified what standards might be proposed. Ocean Action Plan states that Administration will proposed legislation in 109th Congress that will “strike a balance between assuring flexibility in development of IFQ programs and the need to observe certain protections.”

^{xc} Prior to Secretarial approval and implementation, must be approved by a two-thirds majority vote of eligible permit holders through a referendum process.

^{xd} Two referendum process. First is to determine support for development of a DAP fishing quota program. Requires a two-thirds majority of eligible permit holders. Second referendum determines whether to submit specific program for approval and implementation. Requires two-thirds majority of both eligible permit holders and crew members who derives at least 75 percent of income from fishery where individual quota program is proposed.

^{xe} Must improve conservation, including reduction of bycatch.

^{xf} Must provide “additional and substantial conservation benefits to the fishery”.

Table 5.

Initial Allocation Related Provisions^a

Initial Allocation Related Issue/Criteria	USCOP	PEW	NRC	S2066	HR2621
Specify recipient groups eligible for initial allocation; Consider groups beyond vessel owners	x	x	xb	xc	xd
Consider other criteria than catch history for initial allocation ^e		x	x	x	x
Provide authority for auctioning initial quota shares		x	x		

^a USCOP= U.S. Commission on Ocean Policy, PEW=PEW Commission, NRC= National Research Council (Sharing the Fish).

^{xb} Consider whether to allocate to crew, skippers, other stakeholders as determined by Council.

^{xc} Consider entry-level fishermen, small vessel owners, skippers, crew, and fishing communities.

^{xd} Must allocate a portion of annual harvest for new entrants.

^e Among suggested criteria are conservation commitments or performance, dependence on fishery, present and historic participation.

Table 4.

Recommendations Regarding Program Design Related Issues and Criteria^a

Program Design Related Issue/Criteria	USCOP	PEW	NRC	S2066	HR2621
Privilege, not a right	x	x	x	x	x
Transferability allowed; provisions restricting transferability decision of Council	x	xb	xc	x	xd
Caps on consolidation to prevent excessive share accumulation	x	x	x	x	xf
Limited Duration for program as a whole				xg	
Quota assignments for limited amount of time	xh	x			xi
Require fees for cost recovery	xj	xk	xl	xm	xn
Rent recovery beyond costs of management		x	x		x
Mitigate impacts on communities	x	x	x	x	x
Consider co-management, community-based strategies and cooperative arrangements	x		x	x	
Require that quota be partitioned into categories (area based, vessel size categories, etc.)		x			x
Provide opportunities for new entrants		x	xo	x	x
Criteria for reallocation of quota				xp	x
Adequate enforcement and monitoring			x	x	x

a USCOP= U.S. Commission on Ocean Policy, Pew=Pew Commission, NRC= National Research Council (Sharing the Fish).

- xb No transfer allow between categories of quota.
- xc Transferability should generally be unrestricted; Council may decide some constraints necessary to maintain character of the fishery.
- xd Transfers allowed only in case of hardship.
- xe With exception of HR2621, cap level to be specified by Council on fishery by fishery basis.
- xf Defines as 1% but Council can raise up to 5% with justification; for fisheries with less than 20 participants, 15%.
- xg Limit to 10 years, but Council can extend for successive 10 years after review.
- xh Recommendation is somewhat contradictory as it suggests that one reason for limiting duration assignment is to provide stability to fishermen for investment decisions; this is usually an argument against limited duration (see NRC, p 201).

- xi Requires that assignment expire every 7 years; reallocation based on performance of quota holder.
- xj User fees based on percent of quota shares held to be used to support eco-system based management. Waivers or phase in allowed until fishery declared recovered or profits increase.
- xk Funds (from auction royalties) first go to fund buybacks and community economic development, then cost recovery, then improved research, management and enforcement.
- xl If Magnuson-Stevens amended to allow rent capture beyond administration costs, dedicated funds should be considered.
- xm Fees must be proportional to amount of quota held and be used for costs related to fishing quota system.
- xn Initial allocation fees, annual use fee based on percentage of ex-vessel value, transfer fees.
- xo Must assure that provisions for new entry do not expand total amount of quota share.
- xp Must reallocate quota if quota holder ceases to "substantially participate" in fishery.

Facilitating the Use of Dedicated Access Privileges: What Needs to Be Done

All truth passes through three stages: First, it is ridiculed. Second, it is violently opposed. Third, it is accepted as being self-evident.

ARTHUR SCHOPENHAUER

I believe that we are finally in the third stage with respect to understanding that IFQs and other forms of dedicated access privileges can put an end to incentives that cause fishermen to overcapitalize and race for fish, allowing them to instead focus on minimizing costs and timing deliveries to maximize the value received for the fish that is harvested. Properly designed IFQ programs, coupled with effective monitoring, can provide significant conservation benefits.

Dedicated access privileges have been endorsed as an important management tool in all major reviews of national ocean policy. I suggest that the national debate over the past several years has more than adequately identified issues and concerns. Now it is time for action. In recommending a course of action, I turn back to the three questions identified in the introduction to this paper.

How do proposed “IFQ criteria” relate to provisions already contained in the Magnuson-Stevens Act?

When the general issues and criteria described in Tables 3-5 are compared to provisions in the Magnuson-Stevens Act, we find that many of the process, evaluation, program design and initial allocation concerns are already addressed in at least broad terms. Specifically the Magnuson-Stevens Act:

- Authorizes the use of IFQs, but others forms of dedicated access privileges are not specifically addressed (Sec 303 (d)(5));
- Requires that any IFQ program developed by a Council and approved by the Secretary establishes review and revision procedures and requirements (Sec 303 (d)(5) (A));
- Stipulates that IFQs do not constitute a right to the fish before they are harvested, and can be revoked or limited at any time without compensation (Sec 303(d)(2)(B-D));
- Contains both national standard language and IFQ-specific language requiring that no person (no entity) acquire an excessive share of fishing privileges (National Standard 4 and (Sec 303(d)(5)(C));

- Provides for cost recovery for enforcement and management costs, subject to the 3 percent limitation on fees (Sec 303(d)(5)(B) and Sec304(d);
- Requires that IFQs take into account the importance of fishery resources to fishing communities to provide for their sustained participation and to minimize adverse impacts (National Standard 8);
- Provides that councils consider opportunities for new entrants by considering allocation of a portion of the annual harvest for entry-level fishermen, small vessel owners and crew who do not hold or qualify for IFQs (Sec 303(d)(5)(C); the Act also permits the Secretary to establish guaranteed loan programs financed by fees assessed on the quota holders to facilitate the purchase of IFQ by small-boat and entry-level fishermen (Sec 303(d)(4);
- Stipulates that approval of IFQ programs must include provisions for effective enforcement and management of the programs, including adequate observer coverage (Sec 303(d)(5)(B); and
- Requires councils and the Secretary to take into consideration a number of criteria when developing limited access programs including present and historical participation, dependence, economics of the fishery, capability of vessels to engage in other fisheries, and the cultural and social framework relevant to the fishery and any affected communities and any other relevant considerations (Sec 303(b)(6) (A-F).

What changes in law are necessary to assure that regional fishery management councils can design the dedicated access program that best meets the conservation, economic, and social needs of a specific fishery?

Do councils currently have the authority to utilize a full range of dedicated access privilege designs? While IFQs are presently mandated under the Magnuson-Stevens Act, some forms of dedicated access privileges, such the cooperatives prescribed for the Bering Sea pollock fishery, would still require special legislation.⁷ Therefore I **recommend that the Magnuson-Stevens Act be amended to define and reaffirm authorization for the full range of dedicated access privilege programs available for management of U.S. fisheries.** Central to this recommendation is my belief that regional fishery management councils are required by the Magnuson-Stevens Act and other applicable law to evaluate a full range of alternatives and assess the costs and benefits, as well as the

⁷ Mariam McCall, NOAA General Counsel, NW Region, personal communication.

distributional impacts of these alternatives. If councils do not have the full range of options available to them, then the rationale for legislating programs directly is strengthened. While I understand the temptation to fast-track programs through legislative action, doing so undermines the requirements for full analysis and attention to safeguards contained within the Magnuson-Stevens Act and associated guidelines.

This issue deserves serious attention. To date, there are several types of dedicated access privileges that have been legislated that restrict in some way entry opportunities for shoreside processors as well as where fishermen can sell their catch. Other fisheries managed under the Magnuson-Stevens Act are precluded at this time from using these same design elements in dedicated access program alternatives. Congress needs to clarify its intent on whether such design options can be considered for other federal fisheries and, if so, whether any additional criteria are needed to govern their use. After Congressional intent has been clarified, then I suggest that Congress stand by the Magnuson-Stevens Act and allow fishery management programs to be designed through the regional council process, with its legislated requirements for full evaluation of the tradeoffs between alternatives.

The Magnuson-Stevens Act already authorizes collection of fees for cost recovery but such fees are currently capped at three percent. This may be too low to achieve the cost recovery objectives of a given plan. **Therefore I recommend that the three percent cap on fee assessment be removed.** At the same time, it should be recognized that many of the fisheries where dedicated access privileges are needed may have been in a depressed state for some time. Therefore, a phase in of cost recovery may be warranted.

Auctions are another mechanism for quota allocation and recovery of rent from the fishery not currently authorized. **I recommend that the use of auctions be authorized.** While I am not advocating the use of auctions as a preferred method for allocating of quota shares, I believe that councils should have the ability to use this tool to capture some of the resource rent if deemed appropriate. Careful consideration should be given on how auctions could adversely affect the council's ability to meet other allocation requirements of the act such as those described in National Standard 4 and the criteria that must be taken into account when establishing a limited entry system (Sec303(b)(6)).

In order to fully evaluate both the potential impacts of dedicated access privilege alternatives and to provide documentation

of actual impacts after implementation, **I also recommend that Sec303(b)(7) and Sec402(a) be modified to allow economic data to be collected from processors subject to the same confidentiality requirements that apply to harvesters.** Collection of such data is necessary to determine the impacts among stakeholders of various alternatives, as well as continuing to evaluate the economic performance of the fishery after a dedicated access privilege program is implemented.

Finally, I would like to propose one other revision to the Magnuson-Stevens Act that was a NRC recommendation but has gotten little attention since then. To continue strengthening the stewardship incentives of dedicated access privileges, **I recommend that Congress add a new provision to the MSA allowing quota holders to take legal action against private parties whose unlawful actions harm fishery and marine resources.** If share holders know the value of their quota shares is secure and defensible from such damage, the incentive to conserve stocks is strengthened.

What issues are better addressed through NOAA Fisheries guidelines than through congressional mandates?

One other mechanism that has been suggested as a "safeguard" has been a mandatory referendum prior to the implementation or possibly even before initial discussion of IFQs. I do not support referendum provisions for a number of reasons. First, many, if not most, conservation measures have either direct or indirect allocation consequences. Why single out this promising tool for a "vote", but not other allocation decisions by councils? Second, for many fisheries, a minority of permit holders catch the majority of the available harvest. Therefore, individuals with a smaller investment in the fishery could decide the fate of an IFQ program depending on the design of the referendum. Finally, as councils consider a larger universe of potential quota recipients (e.g., processors, crew, communities) even deciding who could be eligible to vote in a referendum becomes extremely difficult.

The underlying goal of referenda appears to be assuring that any IFQ program (or ideally other management measures) has broad support from stakeholders. I suggest that this is better addressed by including all affected stakeholders in an inclusive and transparent design process. Additional guidance on assuring this broad support could be included in national guidelines related to development of dedicated access privilege systems.

As noted above, many of the IFQ criteria that have been suggested as safeguards over the past few years are already addressed in broad terms in the Magnuson-Stevens Act. Guidance is now needed to help interpret these with respect to design and implementation of dedicated access privilege programs and provide a thoughtful framework for evaluating alternative program designs.

I recommend, consistent with the recommendation of NRC and the U.S. Commission on Ocean Policy⁸, that NOAA Fisheries take the lead in developing national guidelines for the development and implementation of dedicated access privilege programs. I also recommend that NOAA Fisheries establish an advisory body with representation from all regions to assist in the development of these guidelines.

NOAA Fisheries has already begun development of IFQ related guidelines. Responding to a recent GAO report⁹, NOAA Fisheries is in the process of developing guidelines on defining “excessive share”.

Three of the four regions are presently developing DAP alternatives. These efforts can help inform the national guideline development process, highlighting areas where more clarification and guidance is particularly needed. A national guideline advisory group will provide a forum for identifying other issues in balancing safeguards and regional flexibility.

Among the issues that national guidelines should consider are the following:

- **Program Review and Revision:** As noted by the National Research Council in their report to Congress¹⁰ requiring specific term limits, or sunsets, in the Magnuson-Stevens Act is counterproductive. Decisions regarding whether to limit the duration of IFQs require careful thought, as a limited duration IFQ is likely to reduce the holder’s incentives to conserve fish stocks because the holder’s own future in the fishery is uncertain.

While decisions regarding program or quota share duration should be left to the councils, the Magnuson-Stevens Act does require that any IFQ program also establish procedures and requirements for the review and revision of the terms of any such program, and if appropriate for the renewal, reallocation or reissuance of individual fishing quotas. National guidelines on providing measurable performance measures related to the DAP program’s objectives, timelines for review, and other related measures necessary to monitor and improve the effectiveness of the program should be developed. In developing these guidelines, the recommendations of the GAO in terms of providing periodic review of community protection and new entry provisions, as well as the recommendation of the NRC report, should be taken into account.^{11, 12}

- **Initial Allocation:** Guidelines should address procedures and criteria that should be considered when determining participation in and allocation of initial quota shares. The goal is not to make these decisions for the council but should provide a framework to assist the councils in assuring that the program provides for a “fair and equitable allocation of individual fishing quotas”.
- **Providing for Communities:** Guidelines interpreting National Standard 8 related to communities in the context of developing and evaluating IFQ and other dedicated access privileges alternatives should be developed.

Summary

IFQs and other dedicated access privilege measures are valuable fishery management tools that can help address conservation issues and increase the net benefits from the use of our nation’s fishery resources. The Magnuson-Stevens Act contains a number of national standards and specific IFQ provisions that provide oversight for IFQ development. I have

⁸ This recommendation has already been incorporated into the Administration’s Ocean Action plan which “directs NOAA to develop, in consultation with the Regional Fishery Management Councils and interested parties, national guidelines for the development and implementation of IFQ allocations”. U.S. Ocean Action Plan, pg 19.

⁹ Individual Fishing Quotas: Better Information Could Improve Program Management, GAO Report 03-159, December 2002.

¹⁰ Sharing the Fish: Toward a National Policy on Individual Fishing Quotas, National Research Council, 1999.

¹¹ Individual Fishing Quotas: Methods for Community Protection and New Entry Require Periodic Evaluation, GAO, 2004.

¹² Sharing the Fish, NRC, pg. 218.

suggested some specific revisions to the Magnuson-Stevens Act that I believe are necessary to assure that councils have the ability to design dedicated access programs that best meet fishery-specific biological, economic and social objectives. These include:

- Defining and reaffirming authorization for the full range of dedicated access privilege programs available for management of U.S. fisheries;
- Removing the 3 percent cap on fee assessment contained in Sec304(d);
- Authorizing the use of auctions to allocate quota share;
- Modifying Sec303(b)(7) and Sec402(a) to allow economic data to be collected from processors subject to the same confidentiality requirements that apply to harvesters; and
- Adding a new provision to the MSA allowing quota holders to take legal action against private parties whose unlawful actions harm fishery and marine resources.

Beyond these revisions, I believe that any further guidance regarding IFQs should be through administrative guidelines, rather than additional legislative mandates. I have recommended that NOAA Fisheries immediately begin developing a set of national guidelines to assist the councils in developing, implementing and evaluating DAP programs. The recommendations contained in the NRC report to Congress, the U.S. Commission on Ocean Policy and other issues that have emerged during the national debate on IFQs should be taken into account when developing these guidelines. NOAA Fisheries should appoint and consult with an advisory group with representation from all eight regions when developing draft guidelines.

References

- NATIONAL RESEARCH COUNCIL. 1999. Sharing the Fish: Toward a National Policy on Individual Fishing Quotas. National Academy Press, Washington, D.C.
- PEW OCEANS COMMISSION. 2003. America's Living Ocean: Charting a Course for Sea Change. A Report to the Nation: Recommendations for a New Ocean Policy. Washington, D.C.
- U.S. COMMISSION ON OCEAN POLICY. 2004. Preliminary Report of the U.S. Commission on Ocean Policy Governor's Draft. Washington, D.C.
- U.S. GENERAL ACCOUNTING OFFICE. 2002. Individual Fishing Quotas: Better Information Could Improve Program Management. GAO-03-159.
- U.S. GENERAL ACCOUNTING OFFICE. 2004. Individual Fishing Quotas: Methods for Community Protection and New Entry Require Periodic Evaluation. GA)-04-277
- U.S. OCEAN ACTION PLAN. The Bush Administration's Response to the U.S. Commission on Ocean Policy.



INVITED PAPER

In Search of Transition, Community, and a New Federalism: Six Questions to Confront on the Road Towards a National Policy on Dedicated Access Privileges

SETH MACINKO

SETH MACINKO
Professor
University of Rhode Island
310 Washburn Hall
Kingston, RI 02881
Tel: 401-874-4820
macinko@uri.edu

Introduction

The founding premise for this paper is the same as that underlying our national fishery management system under the Magnuson-Stevens Act: fishery resources in the EEZ are national, public assets. Ironically, consistency with this premise requires challenging much of the prevailing wisdom in contemporary fisheries policy. For example, the concept of national resources implies national interests; it is inconsistent with these interests to permit the regional Councils to effectively negate or to throw into doubt the founding premise by virtue of the design of dedicated access programs. I reject the notion that we should leave *all* important decisions regarding dedicated access privileges up to the regional Councils. In the rush to embrace user self-regulation masquerading under the names of co-management and community-based management, there is a forgotten federalism to fisheries policy these days.¹ National standards for dedicated access programs are necessary to reinforce and preserve the national interest in our fishery resources. Federalism is the balancing of local and national interests. Striking this balance well is itself a mutual (i.e., federal and local) interest. Thus there is also a national interest in vibrant, adaptive coastal communities. We need greater focus on the possible roles of communities in dedicated access programs. However, the current emphasis on “protecting” communities is misguided. Let’s enable communities, not protect them. In large part, the damage done to the national interest and communities arises from the prevailing approach to the initial allocation of dedicated access privileges. This approach is characterized by the awarding of permanent allocations to individuals in response to what are transitional impacts. Ironically, this approach substitutes the initial allocation for a transitional strategy. We need to recover the idea of a meaningful, planned transition between policy regimes. The current approach to the initial allocation and the attendant denial of a transition period retards adoption, and thus realization of the promise, of management systems based on assigned catches.

I offer the following recommendations for national standards for dedicated access programs:

- Prohibit permanent allocations. Mandate fixed, limited terms for dedicated access privileges. Congress should set the upper bound at 15 years and require the Councils to explain why their management goals cannot be met with shorter terms.
- Authorize use of auctions and Community Fishing Trusts. The use of Community Fishing Trusts as a means of administering auction systems should be encouraged.
- Mandate identification of a specific transition period and specific transitional features, as opposed to permanent features, for all dedicated access programs.
- Establish a minimum threshold for revenue sharing with the federal government.

¹ Curiously, we do not talk about other national assets in the same manner. We do not, for example, suggest that all decisions regarding Yellowstone (including possible disposition) should be made by the local board of county commissioners.

These recommendations result from consideration of six key questions that challenge conventional wisdom:

1. What is the Purpose of the Initial Allocation?
2. Whatever Happened to the Idea of a Transition?
3. Why Does Anyone Warrant a Permanent Allocation?
4. Who Should Be the Lessor?
5. Who's Afraid of Markets?
6. What About Communities?

These questions are sequentially interrelated in a knee-bone-connected-to-the-thigh-bone fashion. As a result, I devote proportionally more attention to the early questions.

1. What is the Purpose of the Initial Allocation?

I do not think we have confronted this question in any serious manner up until now. In very broad terms, it seems that there are essentially two ways to answer this question and these answers shape our policy options. The first answer is that the purpose of the initial allocation is to make a select group of individuals in the present generation rich. The second answer is that the purpose of the initial allocation is to assist in the transition between the current management regime and a new, presumably preferred regime in the future. But making people rich is different than a transitional strategy and I caution strongly against conflating the two concepts. I suggest that, although no one openly admits it, the first interpretation of the initial allocation is in fact our current default position.

Through our specific policy choices, we are inducing opposition to dedicated access privileges and imposing losses in terms of foregone opportunities. These unfortunate outcomes are self-inflicted wounds and arise from two aspects surrounding the initial allocation. First, there is the design of the initial allocation. Second, there is the matter of how we talk about heartfelt concerns associated with those design decisions. Ultimately, our current approach to the initial allocation is unsustainable as an approach to fisheries policy. Because we are effectively treating the initial allocation as an event whose purpose is to make people rich (and because lots of parties would like to be rich), we are building increasingly complex, some might say bizarre, allocation schemes that threaten to collapse under their own weight.

a) Picking Winners (and killing Transition in the process).

Most of the opposition to assigned catch programs can be

traced to a particular combination of key design choices that determine the initial allocation scheme. The prevailing approach to the initial allocation features assigned catches that are: i) fully transferable; ii) awarded free of charge to initial recipients; iii) effectively permanent; and iv) awarded to a subset of vessel owners chosen through an inherently political process. At bottom, this approach to the initial allocation amounts to a profound exercise in the government "picking winners." While not exhaustive, a listing of the concerns engendered by this approach to the initial allocation that give rise to opposition to future programs includes the following:

- Rampant speculative "fishing for catch history"—a new kind of race in which the cure promotes the disease.
- Inter-generational equity concerns, particularly those associated with the so-called transitional gains trap (c.f., Copes, 1986). All subsequent generations face significantly heightened entry costs precisely because the original assignments are into perpetuity while at the same time the future wealth of the fishery is transferred into the hands of the recipients of the original allocation.
- Intra-generational equity concerns (i.e., distributional equity concerns among the present generation) associated with the same transfer of wealth.
- Concerns for the social and economic impacts on coastal fishing communities arising from permutations of all three of the above concerns coupled with concerns over "permit drain" (and permit dearth) in such communities. In particular, there is a profound fear that the form of the initial allocation will inevitably promote absentee ownership thus redefining both what it means to be a fisherman and the distinctive "way of life" in fishing communities by radically altering cherished relations of production.
- The unleashing and encouragement of massive rent-seeking in the political arena (as well as on the water, see 1 above).
- National patrimony concerns. The indefinite nature of the assignments plus the relentless accompanying emphasis on "property rights," "right-based fishing," and/or "privatization" inherently sows confusion regarding the status of fishery resources as national, publicly owned assets.²

² The U.S. Commission on Ocean Policy (USCOP) recommended that dedicated access programs "assign quota shares for a limited period of time to reduce confusion concerning public ownership of living marine resources, allow managers flexibility to manage fisheries adaptively, and provide stability to fishermen for investment decisions [USCOP 2004:290]."

If not allayed, these concerns give rise to, and inflame, opposition to assigned catch programs. At the same time, these concerns represent costs in the overall net benefit calculation. Not addressing them results in a loss of potential benefits (both in terms of fewer programs being adopted and higher-than-necessary losses associated with those few programs that are adopted). But these are consequences of specific design decisions not preordained outcomes generically associated with dedicated access privileges. All of these concerns are associated with the form of initial allocation that currently prevails, particularly our penchant for permanent allocations. Permanent allocations can attain extraordinarily high values precisely because they are permanent (and transferable) and thus embody the entire future benefit stream from the fishery. High values make for high entry costs (and all kinds of subsequent concerns) and large windfalls (another source of many subsequent concerns). These properties of permanent allocations compel consideration of the initial allocation from a functional perspective; what is the function of the initial allocation? *If* (and this qualification will be examined further below) permanent allocations are not necessary to achieve the on-the-water behavior we seek to promote and if permanent allocations are a critical contributor to concerns over (and opposition to) dedicated access programs, then what is their positive role? The positive function of permanent allocations is simply that they make some initial recipients rich off the initial allocation alone.

But permanent allocations make still more mischief. Significantly, when the initial allocation involves the conveyance of permanent endowments to individuals, the very idea of a transition is eliminated. There is no real transition, there is simply the initial allocation and thus everything rests on the initial allocation (see below for further discussion of the problem of the missing transition). Under these conditions, a lot of attention is rightly focused on the initial allocation and on the implications the particular form of the initial allocation holds for things people care deeply about. However, the responses of managers, theoreticians, and analysts to these expressions of concern often compound the controversy surrounding the initial allocation and adoption of dedicated access programs.

b) The Opportunity Cost of Defending the Indefensible, Or, The Marie Antoinette School of Public Policy (I, II,

and III). Expressions of concern along the lines itemized above have frequently been met with brazen dismissals by those urging us to simply get on with the inevitable business of privatizing public assets and to suffer through the design of the initial allocation with good graces, humor, and some measure of compassion. Of course, this nostrum represents nothing less than an ends-justifies-the-means invocation and such invocations are frequently upsetting to people of good conscience.³ Further, this brazenness carries its own opportunity cost in the policy arena. Below, I present three quotations culled from the annals of fisheries policy debates involving dedicated access privileges that demonstrate the kind of inflammatory brazenness to which I refer.

i) Let Them Work Elsewhere

One implication of this [theoretical] insight is that reducing the number of fishermen and gear will usually increase the income of those enterprises that remain by more than it will reduce the incomes of those that are excluded. In principle, at least, a system that transferred part of the gains from the first group to the second could leave both of them better off than they had been, while the rest of society would benefit from the labor and capital freed for other useful activity [Tussing, 1972:8].

This quote demonstrates both just how long we have been employing this sort of brazen dismissal and how such brazenness applies generically to consideration of dedicated access privileges. Indeed, this quote represents a timeless example of how we explain to ourselves removing people from the fishery under any form of limited entry or “rationalization” program. Sometimes, people form funny ideas about being greeted as liberators; for example, it has always struck me as a bit delusional to expect people to be grateful for having been removed from their current employment (for both their own and society’s benefit). On the other hand, there is nothing like the prospect of being so liberated (by the prevailing qualification scheme) to turn even the most ardent supporter of dedicated access privileges into a dedicated opponent.

(ii) Let Them Find Another Community

I wonder what the effect the share quota systems . . . [would have on] Alaska’s coastal communities or industries.

Well, I suppose I don’t know. To some extent, I’d like those

³ The damage done springs largely from the insistence (mostly by fisheries economists) that *allocation* is the paramount policy concern while *distribution* (think distributional equity) is a decidedly secondary (if not tertiary or lower) concern. A variant on the same dichotomy is the frequent pitting of “efficiency” concerns in inevitable opposition to equity concerns. If those schooled in the discipline do not acknowledge that true economic efficiency (in the sense of the Pareto criterion) admits, rather than opposes, equity concerns (see Saraydar 1989; Bromley 1990), what is a mere “lay” participant in fisheries debates to do? But of course, real people involved in real initial allocation debates know that distribution is everything, indeed the only thing (especially when the allocations are permanent).

questions to be on the other side of the ledger. What I'm interested in and what I think we need to focus our attention on is the aggregate effect over the entire U.S. economy, initially ignoring the question of how particular groups, and particular individuals and particular regions come out.

. . . You know the political system as well as I do. There's no shortage of opportunity for you to raise the issue of how is this and how is that community going to come out.⁴

I am not sure much more needs to be said about this exchange over the fate of communities under “rationalization” programs. People are and will continue to be concerned about impacts on fishing communities. Simply telling them that these concerns are wrong (e.g., lecturing them to focus on “allocation” not “distribution”), is not terribly productive. Community concerns are discussed further below under Question 6.

iii) Let Them Cease Processing

The flow of product over a much longer period would mean that processors would either have to adapt schedules to allow processing to occur throughout the season, arrange for deliveries only during specified periods, or cease processing sablefish. [NPFMC, 1989:117].

This little-known quote from the official analysis of what became the halibut/sablefish IFQ program in Alaska provides perhaps the most instructive lesson on the dangers of treating distributional issues in the transition period with callous disregard. Processors could simply cease processing? And thus did the world (eventually) come to know the terms “two-pie” and “processor quotas.” Seriously, telling people you are doing them a favor by, as the British would say, making them redundant; telling people that there is always another community; and telling processors they can simply stop processing are all examples of how *not* to handle the initial allocation if you indeed want to make progress towards wider application of dedicated access privileges.

The debate over the initial allocation often seems like it is interminable precisely because we have fashioned the initial allocation into a high stakes game of chance (or political opportunism). The debate is interminable because the stakes are so high, and the stakes are so high largely because the initial allocation involves permanent allocations. Permanent

allocations mean everything rests on the initial allocation. Exhorting people to disregard the only moment that counts (because we have designed it to be the only moment that counts) is illogical, if not irresponsible.

2. Whatever Happened to the Idea of a Transition?

Transition. The word implies a certain temporal dimension, a *period* of change. But our approach to the initial allocation effectively negates any transition period. There is simply the instantaneous switch to the new regime effected the moment permanent allocations are awarded to the lucky sweepstakes winners. To argue that this switch involves a transition is akin to arguing that being shot by firing squad at dawn involves a transition. I argue that permanent allocations eliminate the possibility of planned transition periods and that this result severely limits our policy options. In an interesting twist, the specter of transitional impacts produces demands for permanent allocations that in turn remove the option of transitional policies. A particularly striking example of this process was presented at this conference last year.

In his presentation last year, Mr. Joseph T. Plesha (General Counsel for Trident Seafoods Corporation)⁵ asked us to imagine that a valuable fishery resource was discovered off a remote U.S.-owned island in the Pacific ocean and fishery managers wanted the ensuing fishery to operate in a rational fashion from the beginning. Given this hypothetical, Mr. Plesha's recommendation for what would/should follow next was startlingly concise and candid: The government should conduct an auction. After all, Mr. Plesha reasoned, “[o]ur Nation's fishery resources are owned by the general public...and not a group of fishing vessel owners [Plesha, 2004; see Appendix]” nor, as he made clear in another portion of his statement, a group of processors. Further, Mr. Plesha argued for an auction on the grounds that “the general public should receive the full economic benefit from the resources they own [Plesha, 2004; see Appendix].”

But of course, we are not starting from scratch. In real world applications, Mr. Plesha argued for a far different solution—an allocation of permanent “rights” to both vessel owners and processors. The reason for Mr. Plesha's abandonment of the auction idea is highly instructive. When not presented with the luxury of Mr. Plesha's hypothetical “new” fishery, we face

⁴ This exchange (between a Kodiak fisherman and a fisheries economist) is taken from the panel discussion section in Frady (1985:145-146).

⁵ For those not familiar with the industry in the North Pacific, Trident Seafoods is a major, if not the major, processor and a principle advocate for as well as beneficiary of the various forms of processor considerations (including processor quota shares) that have graced the North Pacific arena in recent years. Mr. Plesha's presentation at this conference was echoed in his testimony before a subsequent Congressional hearing into processor shares and it is that testimony that is relied upon here. An excerpt of Mr. Plesha's Congressional testimony is attached as Appendix A to this paper.

fisheries with existing interests in place. In view of these existing interests, Mr. Plesha reasoned “[b]oth fishing vessel owners and processing plant owners should, therefore, receive rights in a rationalized fishery as compensation for having the value of their existing investments expropriated by the new management system [Plesha, 2004; see Appendix].”

Notice what has happened: a much-warranted focus on the issue of transitional impacts has been transformed into a claim for a permanent allocation. But transitional impacts do not require permanent therapy. Investments by a select few members of the present generation (whether processors or vessel owners) cannot logically be the basis for conveying public assets into private hands on a *perpetual* basis. The very idea of attention to the transition, which by definition is a limited period, is obliterated by the leap involved in laying claim to a permanent allocation. We need to consider the transitional impacts on all parties more than we have done in the past, but we must insist that treatment of transitional impacts be consistent with, not undermine, our founding premise.

3. Why Does Anyone Warrant a Permanent Allocation?

The question that we need to confront in this context is why does *anyone* warrant a permanent allocation? The argument against permanent allocations is perhaps easiest to grasp in the case of the processors. As noted in the quotation presented earlier, processors may indeed suffer regulatory-induced impacts during the transition to an elongated season. But these are, by definition, transitional impacts and may warrant temporary, not permanent redress. The same conclusion applies to the harvesting side of the industry. Existing interests (investments) in vessels may suffer in the transition but these are transitional impacts and call for at most temporary mediating measures.

At this point, the objection is usually raised that the race for fish is perpetual and therefore permanent allocations *are* warranted on the harvesting side of the equation. But we *know* this reasoning is specious. Permanent allocations are not necessary to alleviate the race for fish. We know this to be empirically true because we already have programs that feature limited duration assignments and these programs are widely hailed for their ability to end the race for fish. I am referring to the

widespread presence of leasing. Leasing demonstrates that what is important, in terms of ending the race for fish, is that each and every operation on the water is in pursuit of an assigned catch. The term of that assignment is irrelevant. Leasing by definition involves limited fixed-term assignments and those that lease do not race more than those in possession of permanent assignments. So we know that permanent allocations are not necessary to produce the on-the-water results we covet. Both harvesters’ and processors’ demands for permanent allocations rest on a profound conflation of interests with rights⁶ and the subsequent transformation of potential transitional impacts into claims of entitlement to a permanent benefit stream. Those who object to processors holding the policy process hostage over transitional impacts yet insist that harvesters warrant permanent allocations practice hypocrisy.

Close inspection reveals that the function of permanent allocations is not to end the race for fish but to deliver a reward to those chosen to receive the initial allocation. But, as outlined earlier, these rewards carry a high opportunity cost. Finally, there is another dimension to the hypocrisy involved in our current approach to dedicated access programs. Permanent allocations have the curious effect of shielding a select few vessel owners (and perhaps processors) in the current generation from the market forces we believe are so salubrious for all others. If we actually believe in the market, we ought to use it across all generations of participants. This will require, in some form, a system in which all participants operate under lease arrangements.

To counter the problems induced by permanent allocations, the maximum term of any allocation/lease should be established by Congress as a matter of national policy for a national resource.⁷ I would suggest that 15 years is sufficient for any fishery both in terms of a reasonable planning horizon and scale of investment involved. The Councils should then set specific lease terms within this broad overall guidance from Congress in accordance with local circumstances. I would further suggest that there is a direct relationship between the term of the lease and the scale of industry that will prevail. That is, the more industrial the fleet desired, the longer the lease term should be. The smaller scale desired, the shorter the lease term should be (shorter terms result in lower entry

⁶ On the endemic confusion of interests with rights in the fisheries literature, see Macinko and Bromley (2002). For a more damning account of the failure to recognize established legal scholarship on “rights” within the economics literature generally, see Cole and Grossman (2002). Despite these contributions, the tendency towards cavalier usage of the term “rights” continues unabated in the field of fisheries. Whatever the “rights” contents of specific dedicated access programs, it is clear that these programs are not rights-based. To say that they are rights-based is to assert a causal analysis declaring that the programs work *because* of the putative rights involved. See Macinko and Bromley (2004) for discussion of why this causal analysis is fatally flawed.

⁷ Note that limited term allocations/leases are fundamentally different than “sunset provisions” for dedicated access programs. Sunset provisions are plagued by the fact that no one is likely to vote (when the sunset date comes due) to terminate (or conversely to fail to renew) a system (any system) that has vanquished the race for fish. In contrast, a system of constantly renewing limited term allocations provides the kind of periodicity that motivates interests in sunset provisions in the first place.

costs and more opportunity for entry and more dynamism within the fleet due to more frequent turnover of leases). And this brings us to the next critical question.

4. Who Should Be the Lessor?

Once we have liberated ourselves from the option-constricting belief that allocations have to be permanent to work, we are presented with the interesting question of who should be the lessor. Currently, we have programs in which many, or in some cases most, actual participants are lessees and a group of vessel owners are the lessors (although they may not actually own a vessel anymore). But there is no basis for believing that a system in which some level of government acted as the lessor (rather than individual vessel owners) would not offer exactly the same relief from the race for fish. Yet such a system would offer considerable additional benefits in terms of addressing the intra and intergenerational equity issues outlined earlier and would clearly reinforce our founding premise.

Publicly administering limited duration allocations via leases raises the question of how to distribute and redistribute the allocations when lease terms expire. Three broad options exist for distributing/redistributing limited term allocations: (1) the government can engage in an on-going cycle of picking winners; (2) distribution could occur by lottery; or (3) we could employ the market — i.e., via periodic lease auctions. I am simply assuming a preference for the market approach.

5. Who's Afraid of Markets?

Limited duration allocations could eliminate many, if not most, of the problems associated with our current approach to dedicated access programs. And auctions are intuitively appealing as a means of administering programs based on limited duration allocations. But, auctions are scary, to lots of people. Perhaps the first thing to say regarding auctions is to note that we already have lease auction systems in place. This is most notably true in the case of the Community Development Quota (CDQ) program in Alaska but I would argue that the existing market in privately contracted leases under dedicated access programs already in place is, in effect, an auction system. Recognition of these existing auction systems returns us to the question of who should be the lessor (examined above), while mediating any tendency to regard auctions as a radical departure from current practice.

Rather than fear mongering, I think we need to have an honest national conversation about “auctions without fear.”

If we wanted to make sure that public auctions never saw the light of day, I would suggest that we instantly switch to a 100% auction system (i.e., overnight we auction off all of the available catch) and deposit all the proceeds into the general treasury of the nation. Such an approach takes us back to Mr. Plesha's thought experiment and the apparent conflict between exist-ing interests and a policy shift to auction systems. The conflict is artificial and rests entirely on the negation of a transition. That is, does anyone seriously believe we can *never* transition to auction systems? The key issue of course is *how* to *transition* to auction systems.

I suggest that if we really wanted to use auction systems to improve our fisheries, we would fashion a planned transition period, devise auction systems that partitioned the TAC into segments and stagger the lease periods for these segments so that they did not come up for auction at the same time (i.e., it is desirable both to have frequent opportunities to enter the fishery and to not have one's entire portfolio of leases possibly expire at once), directly involve our local fishing communities in the administration of auctions and as recipients of the proceeds from auction systems (see below under Question 6), and we would fashion many of the same kinds of provisions we attach to dedicated access programs generally to meet important goals.⁸ I do not know which of the various claims for consideration during the transition period we should honor — that is for the Councils to decide — but I do know that we should keep treatment of such claims as short as possible. That is, some temporary shielding from the very market forces we are trying to introduce may be warranted as a matter of transitional policy but we cannot exempt any participants on a permanent basis. Moreover, it is not clear that shielding from market forces is the obvious choice for addressing transitional impacts.

Notably, auctions offer extreme flexibility in crafting transitional strategies. For example, in commenting on the crab plan developed by the North Pacific Council, the Department of Justice (DOJ 2003) noted that auctions:

Could improve efficiency. In addition, an auction would capture for the public some of the value from the scarce resource, which could be used for public purposes. The proceeds could, for example, be reinvested in the fisheries, used to fund conservation programs or used to partially compensate harvesters and/or processors for overcapitalization.

Here we see the fusion of two important ideas. First, the transition is important and claims of transitional impacts

⁸ The point here is that the kinds of social, political, and economic goals the Councils may wish to attain are really not a function of whether or not auctions are employed. All (or none) of the various “bells and whistles” used to reach these goals may be used in conjunction with auction systems.

deserve careful consideration. Second, there are ways to use the market to assist in the transition (that do not involve bestowing permanent awards in response to transitional claims). Of course, auctions systems present other options for fashioning a transition. The transition to an auction system could be phased in (say, e.g., 10% of the TAC per year could be devoted to the auction pool, thus offering a 10 year phase-in period). If impacts on present participants are judged especially severe, an initial allocation could be given to selected participants (say 50% of the TAC,⁹ the remaining 50% going straight into the auction pool) for a fixed period (say 5 years, to then revert into the auction pool). These are just examples, the possible permutations are many.

Finally, auctions should not be thought of as a way to pump up the federal coffers while pushing beleaguered fishermen into penury. In fact, I argue that we need to see, and to fashion, auctions as a critical component of fleet and community revitalization—not deprivation.

6. What About Communities?

There is a forgotten federalism in fisheries policy these days. We need national standards on dedicated access programs to reinforce the national interest in our fishery resources (c.f., Scheiber 2002). But federal and local interests need not be regarded as mutually exclusive. Local communities are obviously associated with local interests, yet there is a national interest in vibrant, adaptive coastal communities. We need to place greater attention on the possibilities for direct engagement of communities in dedicated access programs. However, the current emphasis on “protecting” communities is misguided. Protectionism often has the unfortunate effect of eventually killing that which we wish to protect. This ironic outcome results from the fact that protectionism promotes ossification which is the very opposite of what is needed in a dynamic, vibrant, competitive world. We should focus on enabling communities, not protecting them. For example, instead of protection, let’s just stop systematically disadvantaging communities via our obsessive focus on individual, permanent, portable allocations. Communities are not portable.

McCay (2004) has argued persuasively that if future programs featuring individually assigned catches are to be sustainable, they will require much greater integration of community perspectives and treatment of community concerns. While I

agree, I think we need to fundamentally rethink what I would call the sequencing of this integration. We need to consider endowing communities (or regions) first and then letting the magic of individual initiative flourish underneath these community endowments rather than trying to tack “community protection” measures onto programs focused on permanent individual allocations. Elsewhere, I have likened this reversed sequencing to thinking about fisheries as “community gardens” (Macinko, 2004). The benefits of thinking of fisheries as resource endowments for places and regions are manifest (see Cunningham, 1994) and yet curiously relatively unexplored in any serious operational context.¹⁰ The concept of fisheries as resource trusts (or conservation trusts, see Fairfax and Guenzler 2001) deserves much more consideration. I suggest that a system of lease auctions locally administered through Community Fishing Trusts has much promise. As noted, federalism cuts both ways. Congress should establish a minimum level of revenue sharing with the federal government but the Councils should be given broad discretion to enable, not protect, our coastal fishing communities.

Conclusion

National standards are appropriate and necessary for dedicated access programs. In devising such standards, we need to challenge much of the conventional wisdom that lies behind our current approach to dedicated access programs. We must wean ourselves off of the belief that permanent allocations are necessary or even beneficial. All dedicated access privileges should be of limited duration terms (not sunsets). We must stop telling people to “get over” or “get on with” the initial allocation when we have fashioned the initial allocation to be the only thing that matters. The initial allocation is not a substitute for a transitional strategy. We must use the initial allocation as *part of* a transitional strategy, not as a tool to make some people rich. We must treat the subject of the transition between policy regimes as a period requiring direct management attention. We must consider transitional impacts as a distinct category; but that means resisting the tendency to turn some claims of transitional impacts into a basis for permanent allocations. Finally, we must reinforce the founding notion that fishery resources are national assets but realize that we can do so in ways that endow, not disadvantage, fishing communities.

⁹ The choice of the 50% figure is not completely arbitrary. In the Alaska halibut fishery, ex-vessel prices approximately doubled following introduction of the IFQ program. A similar increase is projected by Weninger and Waters (2003) for the red snapper fishery in the Gulf of Mexico.

¹⁰ The Community Development Quota (CDQ) program in Alaska (NRC 1998) being the obvious exception.

References

- BROMLEY, D. W. 1990. "The Ideology of Efficiency." *Journal of Environmental Economics and Management* 19:86-107.
- COLE, D.H. AND P.Z. GROSSMAN. 2002. "The Meaning of Property Rights: Law vs. Economics." *Land Economics*, 78(3):317-330.
- COPEs, P. 1986. "A critical review of the Individual Quota as a Device in Fisheries Management." *Land Economics* 62(3):278-291.
- CUNNINGHAM, S. 1994. "Fishermen's Incomes and Fisheries Management." *Marine Resource Economics* 9:241-252.
- DOJ. 2003. Letter from R. Hewitt Pate, Assistant Attorney General, U.S. Department of Justice, Antitrust Division to James R. Walpole, General Counsel, U.S. Department of Commerce. August 27, 2003. Copy on file with the North Pacific Fishery Management Council.
- FAIRFAX, S. K. AND GUENZLER, D. 2001. *Conservation Trusts*. Lawrence, KS: University Press of Kansas.
- FRADY, T., (ED.) 1985. *Proceedings of the Conference on Fisheries Management: Issues and Options*. Alaska Sea Grant Report 85-2. Fairbanks, Alaska Sea Grant College Program, University of Alaska.
- MCCAY, B.J. 2004. "ITQs and Community: An Essay on Environmental Governance." *Agricultural and Resource Economics Review*, 33(2):162-170.
- MACINKO, S. 2004. "Coastal Fisheries as Community Gardens: Options for Our Times if Place Matters." Paper presented at the the CoastFish 2004 Conference 4-8 October, 2004, Merida, Yucatan.
- MACINKO, S. AND D.W. BROMLEY. 2002. *Who Owns America's Fisheries?* Covelo, CA: Center for Resource Economics (Island Press).
- _____. 2004. "Property and Fisheries for the Twenty-First Century: Seeking coherence from legal and economic doctrine," *Vermont Law Review* 28(3):623-661.
- NPFMC. 1989. *Draft Supplemental Environmental Impact Statement and Regulatory Impact Review/Initial Regulatory Flexibility Analysis to the Fishery Management Plans for the Gulf of Alaska and the Bering Sea/ Aleutian Islands*. Anchorage, North Pacific Fishery Management Council, November 16, 1989.
- NRC. 1998. *The Community Development Quota Program in Alaska and Lessons for the Western Pacific*. Committee to Review the Community Development Quota Program. Ocean Studies Board, Commission on Geosciences, Environment, and Resources, National Research Council. Washington: National Academy Press.
- SARAYDAR, E. 1989. "The Conflation of Productivity and Efficiency in Economics and Economic History." *Economics and Philosophy* 5(1):55-67.
- SCHIEBER, H. N. 2002. "Bringing the Community Back In: The Next Step in Fishery Management." Pp. 30-34 in *Managing Marine Fisheries in the United States: Proceedings of the Pew Oceans Commission Workshop on Marine Fishery Management, Seattle, Washington, 18-19 July 2001*, Arlington, VA: Pew Oceans Commission.
- TUSSING, A. R. 1972. "Introduction: Economics and policy in Alaska fisheries." Pp. 1-11 in *Alaska Fisheries Policy: Economics, resources, and management*. A. R. Tussing, T. A. Morehouse and J. D. Babb, Jr. (Eds.). Fairbanks, Institute of Social, Economic and Government Research.
- USCOP. 2004. "An Ocean Blueprint for the 21st Century." Final Report. Washington, D.C., U.S. Commission on Ocean Policy.
- WENINGER, Q. AND WATERS, J.R. 2003. "The Economic Benefits of Management Reform in the Northern Gulf of Mexico Reef Fish Fishery." *Journal of Environmental Economics and Management* 46(2):207-230.

Seafood Processors Quotas Hearing

Excerpt, first five paragraphs of testimony given at a Full Committee Hearing on Seafood Processor Quotas
Wednesday, February 25, 2004 - 9:30 AM, Sr - 253

TESTIMONY OF MR. JOSEPH T. PLESHA, *General Counsel, Trident Seafoods Corporation*
http://commerce.senate.gov/hearings/testimony.cfm?id=1066&wit_id=3008
(last visited, 2/27/05)

Our Nation's fishery resources belong to the general public. Logically then, the general public should receive the full economic benefit from the resources they own — through a simple auction by the Federal government to the highest bidder — when fishery stocks are rationalized. Neither processing plant owners nor fishing vessel owners have an absolute right to be included in the allocation of the public's fishery resources.

If a large stock of cod were discovered off a remote U.S.-owned island in the Pacific ocean and fishery managers wanted to rationalize it, I assume the Federal government would auction the rights to this undeveloped cod resource instead of allocating rights to vessel owners or processors based in Portland, Oregon or Portland, Maine.

Why should any participant in the seafood industry be allocated rights when open access fishery resources are rationalized? Under most circumstances there is a compelling reason to include both fishing vessel owners and primary processing plant owners in the allocation. In an overcapitalized "open access" fishery that is capital intensive, and where that capital invested in fishing vessels and processing plants is relatively non-malleable, the owners of that capital will

suffer enormous losses during the transition between the open access and rationalized fishery equilibrium conditions. The capital investments in primary processing and harvesting are transferred to quota owners when an open access fishery is rationalized.

Simply put, you do not need all of the harvesting and processing capacity that exists when an overcapitalized fishery is rationalized. Primary processing plants and fishing vessels with no alternative uses become nearly worthless. Both fishing vessel owners and processing plant owners should, therefore, receive rights in a rationalized fishery as compensation for having the value of their existing investments expropriated by the new management system.

Although including processors in the allocation of rights may be controversial, it should be embraced by fishing vessel owners. The rationale for including primary processing plant owners in the allocation of rights is also the only rationale for including vessel owners. Otherwise, open access fisheries should be rationalized by the Federal government through an auction of the resource to the highest bidder. Our Nation's fishery resources are owned by the general public after all, and not a group of fishing vessel owners.

SECTION V

Poster Abstracts



NURC/UNCW



NURC/UNCW



NURC/UNCW



Mike Pol/MIA DMF



Ed Lyman/MIA DMF



TABLE OF CONTENTS

■ Ocean Bioacoustics, Human Generated Noise, and Ocean Policy.....	248	■ Identifying Essential Fish Habitat Using Bayesian Network Models and GIS.....	257
■ A Collaborative Program to Assess Possible Temporal Access to Closed Area II: Targeting Yellowtail Flounder Without Significant Bycatch of Cod and Haddock.....	248	■ Development of a Supplemental Finfish Survey Targeting Mid-Atlantic Migratory Species.....	258
■ A Collaborative Program to Test the Use of Cod/Haddock Separator Panel in Trawl Nets.....	249	■ ACCSP Bycatch Data Collection Standards: Strengthening Scientific Advice for Management.....	258
■ The Use of Composite Mesh Codends to Reduce Bycatch and Discard in North Atlantic Fisheries.....	249	■ NOAA's Ecosystem Approach to Management.....	259
■ Obstacles and Opportunities to Community-based Fishery Management in the United States.....	250	■ Overview of Electronic Data Collection Program in Our Nation's Fisheries.....	259
■ An Assessment of Marine Managed Areas (MMAs) Implemented by NOAA Fisheries.....	251	■ The Economic Costs of Regulation: A Bioeconomic Comparison of Legislative Mandates for Rebuilding Fish Stocks in the United States and New Zealand.....	260
■ Marine Stewardship Council Certifications and Ecosystem-based Management.....	251	■ Cooperative Research and the Management of Marine Fishery Resources in New England: A Comprehensive Assessment.....	261
■ Fishermen's Initiative for Scientific Habitat and Ecosystem Research (FISHER Initiative).....	252	■ Center for Independent Experts: Improving the Quality of NOAA Scientific Advice for Management and Conservation.....	262
■ Criteria for the Surfclam and Ocean Quahog Individual Transferable Quota Fishery Management System from Implementation in 1990 to Current (Lessons Learned) ..	253	■ Atlantic States Marine Fisheries Commission: Working Towards Healthy, Self-sustaining Populations for all Atlantic Coast Fish Species or Successful Restoration Well in Progress by the Year 2015.....	263
■ Surfclam Management Advice Collected Through a Cooperative Research Program with Academia, Government, and Industry.....	253	■ Coral and Sponge Habitat Mapping in the Central Aleutian Islands.....	264
■ Commercial Fishing Crew Demographics and Trends in the North Pacific: 1993-2003.....	254	■ Northeast Cooperative Research Results in Management Decisions.....	264
■ Development of a National Strategy for Training Regional Fishery Management Council Members.....	255	■ Developing Sociocultural Profiles of Fishing Communities: A Contribution to Ecosystem-based Approaches to Fisheries that Strengthens the Social Scientific Base for Management Advice.....	265
■ Angling Management Organizations: Integrating the Recreational Sector into Fishery Management.....	256	■ Alaska's Fisheries: A Model for Sustainable Fisheries Management.....	266
■ Implementation of Fisheries Ecosystem Management Models in Western Pacific.....	256		



■ Framework for a National System of Marine Protected Areas	267	■ Marine Research in the North Pacific	276
■ MPAs to Protect Deep-sea Corals and Seamounts Off Alaska	267	■ Ecosystem-based Fishery Management in the North Pacific: A Practical Approach to Management	277
■ The Northeast Regional Cod Tagging Program: Building a Strong Partnership Among Academic, Government and Non-profit Scientists, Commercial and Recreational Fishermen, and Fishery Managers along the Eastern Seaboard of the United States	268	■ Healthy Marine Habitat – Foundation of North Pacific Fisheries	277
■ Collaborative Research – Making a Difference in New England’s Fishery Management Decisions	269	■ Mapping the Distribution of Structure-forming Invertebrates off the U.S. West Coast	278
■ An Inventory of Marine Managed and Protected Areas in Alaska Waters	270	■ Cooperation – A Critical Component to Improved Science for Fisheries Management	278
■ Designing Observer Programs – Do You Get What You Need?	270	■ Promoting Social and Cultural Sustainability of Marine Resource Conservation and Management in the Northeast	279
■ The Arctic Yukon Kuskokwim Sustainable Salmon Initiative: A Cooperative Approach to Research Planning	271	■ Development of a Spatially-Explicit Ecosystem Model to Examine Effects of Fisheries Management Alternatives in the Northern California Current	279
■ U.S. Coast Guard North Pacific Regional Fisheries Training Center, Kodiak, Alaska	272	■ How Does Stochasticity Change Our Perception of the Effectiveness of Fishery Management Strategies?	280
■ Protecting Sensitive Deep-sea Canyon Habitats through Fisheries Management: A Case Study in the Northeastern United States	274	■ ESA Section 7 Consultation Hawaii Pelagic Longline Fishery: A “No Surprises” Approach	280
■ Cooperative Research to Improving Science: Development of Fishermen Based Stock Assessment Survey Methodology	274	■ Amending the Halibut/Sablefish IFQ Program to Accommodate the Needs of Small Coastal Communities	281
■ Albacore Tuna – Tracking the Transpacific Odyssey through National and International Cooperative Research	275	■ Measuring Coastal “Fishing Power” – Determining and Displaying QS (Quota Share) Holdings of Persons Who Live in Gulf of Alaska Communities Proximate to the Halibut and Sablefish Fisheries	281
■ Commercial Vessel Acoustic Data: A Tool to Analyze Fishery Parameters and Fishing Behavior	275	■ Aleutian Islands Trawlers’ Perspectives on the Recently Approved Bottom Trawl Open Area	282
■ Magnuson-Stevens Act Regional Approach to Governance Best for Fishery Management	276	■ Avoiding Salmon Bycatch: Fishery Cooperatives and the Development of Bycatch Management Contracts	283

Ocean Bioacoustics, Human Generated Noise, and Ocean Policy

MICHAEL STOCKER

*Scaflow Inc.
1062 Fort Cronkbite
Sausalito, CA 94965 USA
(415) 488-0553
mstocker@msa-design.com*

The recent release of the U.S. Commission on Ocean Policy (USCOP) report, just a year on the heels of the Pew Ocean's Commission report, has alerted policymakers and the public about the precarious biological health of our oceans. The extents of the damage done to the sea by human enterprise are both deep and far reaching. Because of the economic, as well as the environmental reach of our ocean management practices, changing ocean policy to stem the damage will require dramatic measures and sacrifices by every ocean stakeholder — from Indiana farmers to coastal businesses, from scientific researchers to fishing and other extraction industries.

While both reports discuss “ecosystem-based management,” what is missing from both reports is a “global” environmental framework. The discussions bind all stakeholders into a body of water called “the ocean,” but there is a critical feature of the ocean that is given short treatment in both reports. This feature is so ubiquitous in the sea that it is still mysterious; it is so pervasive, that it is not often considered an autonomous element of discussion. Most animals in the sea depend on it, but we know next to nothing about how living organisms use it. This feature is the way the ocean transmits sound.

We know from recent studies that ocean habitats are being seriously compromised by human generated noise — in evidence through stranded whales, and more recently, high fish mortality and low productivity in fishing areas due to seismic exploration and civil engineering. Due to the ubiquity of sounds and noises in all of our ocean enterprises, legislating anthropogenic sound promises to be a Byzantine endeavor. This paper examines some of the known challenges to crafting ocean noise policy.

A Collaborative Program to Assess Possible Temporal Access to Closed Area II: Targeting Yellowtail Flounder Without Significant Bycatch of Cod and Haddock

CHRISTOPHER GLASS

**M. RAYMOND
BENEDETTA SARNO
T. FEEHAN
GREGORY MORRIS
BENJAMIN FOSTER**
*Manomet Center For
Conservation Sciences
Manomet, MA 02345 USA
(508) 224-6521
glasscw@manomet.org*

Seasonal and year-round closures of fishing grounds have been useful tools for the Northeast Multispecies Fishery Management Plan (FMP) of the New England Fishery Management Council (NEFMC). These closures have proven effective in improving the status of several species covered under the FMP, and in particular, the status of Georges Bank (GB) yellowtail flounder.

The status of GB yellowtail flounder has improved markedly since the implementation of Closed Area II in 1994. The spawning stock has increased from 2600 mt in 1992 to 33,500 mt in 1999 (SAW, 2000). Mean biomass has also increased from 4,500 mt to 49,600 mt in the same time period (SAW, 2000). In 2001 the TRAC Advisory Report on Stock Status estimates the SSB to be between 37,000 and 50,500 mt (80% probability) and the mean biomass to be between 48,000 and 66,500 mt (80% probability). This brings the GB yellowtail flounder biomass well above the rebuilding target of 49,000 mt (TRAC, 2001).

Here we report on a cooperative research program between the fishing industry and scientists on an observer based survey program to document the quantity and composition of catch and discards, and assess whether the rebuilt GB yellowtail flounder stock, within Closed Area II, can be accessed on a seasonal basis without significant bycatch of cod and haddock.

Results from this study demonstrate that cod, haddock and yellowtail flounder show spatial and temporal separation and that yellowtail can be harvested without a significant bycatch and discard of either cod or haddock. Furthermore, the results show evidence of clear spatial/ecological separation between major species showing evidence of ecological niche separation. The results are discussed in terms of their implications with regard to management of rebuilding and rebuilt stock access.

A Collaborative Program to Test the Use of a Cod/Haddock Separator Panel in Trawl Nets

CHRISTOPHER GLASS
BENEDETTA SARNO
BENJAMIN FOSTER
GREGORY MORRIS
Manomet Center For
Conservation Sciences
Manomet, MA 02345 USA
(508) 224-6521
glasscw@manomet.org

Since 1994, the New England groundfishery (the nation's first fishery, and still New England's principal fishery) has been subject to a strict management regime. As a result, the status of many stocks and, in particular, Georges Bank (GB) haddock and GB yellowtail has improved dramatically. In contrast, improvement in GB cod has been slowed by recruitment failure. One of the challenges faced by the industry is to be able to harvest haddock without further depleting cod.

The project reported here was designed to test the effectiveness of using a separator trawl gear in New England waters to separate cod from haddock and to assess its potential to reduce bycatch of cod and other species, while maintaining haddock catches.

Two cod/haddock separator trawl gears were built by Nordsea (Halifax, Canada). The study was conducted on four commercial trawlers, two large ones (*F/V Olympia* and *F/V Capt'n Jake*) and two smaller ones (*F/V North Star* and *F/V Joanne A.*). In order to meet size related specifications for these vessels, two different nets were built. Complete nets were constructed and modified from original by inserting a 4-inch (small mesh) separator panel dividing the trawl into an upper and lower codend.

The results show substantial and significant separation of cod between top and bottom codends for both classes of vessels. Although cod were not separated exclusively into the bottom codend, the results nevertheless demonstrate that cod capture could be significantly reduced (if not totally eliminated) by fishing such a net with no codend on the lower portion. Furthermore, inadvertent capture of many other species of concern such as skates, monkfish and dogfish would also be reduced thereby substantially lowering bycatch and discard overall. However, haddock appeared not to separate into the upper codend, as expected, but to be evenly distributed in both top and bottom codends. This may partly be explained by the low numbers of haddock encountered during the study.

The Use of Composite Mesh Codends to Reduce Bycatch and Discard in North Atlantic Fisheries

CHRISTOPHER GLASS
BENEDETTA SARNO
GREGG MORRIS
TIM FEEHAN
BENJAMIN FOSTER
Manomet Center For
Conservation Science
Manomet, MA 02345 USA
(508) 224-6521
glasscw@manomet.org

The at-sea discarding of fish harvested from the ocean and its associated mortalities have been recognized and noted by fisheries scientists as inherent problems in the management of world fisheries for many years. Such practices constitute not only waste of a valuable resource but perhaps more importantly help contribute to observed decline in many of the world's marine fisheries.

However, despite considerable research efforts into technical measures to mitigate bycatch and discard, success has in general been limited. This may in-part reflect the *ad hoc*, and hence non-directed, nature of many such research programs but lack of implementation of novel bycatch reduction devices may also reflect the conservative nature of fisheries managers.

Here we present a case study where technical measures have been developed in the Northwest Atlantic to reduce inadvertent capture of cod in bottom trawl fisheries. This measure has been shown to effectively reduce bycatch and discard. We report on the success of the technical measure, its general acceptance by industry and potential reasons for lack of implementation. Using this example we discuss the usefulness of technical conservation measures as a management tool.

Obstacles and Opportunities to Community-based Fishery Management in the United States

MICHAEL L. WEBER
2300 S. Catalina Ave. #406
Redondo Beach, CA 90277
USA
(310) 316-0599
MLWeber@aol.com

SUZANNE IUDICELLO
2718 W. St. Patrick St.
Rapid City, SD 57702
USA
suzanneiudicello@rushmore.com

Concepts such as sustainable development and ecosystem-based resource management have been tried with some success at local and regional levels in watershed management, logging, and conservation of grasslands. Is it possible to practice locally-directed, sustainable fishery management? While a number of countries have promoted community-based management of fisheries, particularly nearshore fisheries, fishing communities in the U.S. have very little experience with this approach.

In a study completed in 2004, the authors examined obstacles and opportunities to community-based fishery management (CBFM) in the United States. The authors found a stark contrast between fishery management at state and federal levels in the United States and CBFM efforts in Japan, the Philippines, and elsewhere. CBFM emphasizes the ecosystem, sharing of power, local control, local knowledge of the environment and common responsibility for common resources. Fishery management in the United States emphasizes large catches of single species, an adversarial relationship between fishers and regulators, federalized control, dominance of the biological sciences, and isolation of fishermen as outsiders in their communities and the governance system.

A review of CBFM projects around the world and an examination of how the principles might be applied to U.S. fisheries revealed that while legal and political obstacles to the practice loom large, CBFM may be possible in certain kinds of fisheries. Using a set of questions that identified attributes of fisheries, the authors found that community-based management was possible where:

- Fishers are highly dependent upon and identified with local fishing grounds.
- Fishers have access rights, and can exclude others from access to their grounds.
- Participants share access rights equitably among community members.
- Fishers have a legal basis to assert management that is respected by government.
- The community at large, as well as the fleet, is willing to invest the people, time and money in managing fisheries without hidden agendas.

The study identified a handful of communities and fisheries in the United States where these conditions apply. In several instances, communities had found ways within the current management system to acquire some responsibility for managing their fishery. These fisheries and communities were found where a fleet had adapted gear to local species and conditions and did not go elsewhere, and where the community was able to work within the conventional fishery management system to exclude non-community members from the local fishery. Other potential exists where treaty lands or regulatory designation makes it possible to carve out community fishing grounds. The challenge to CBFM is that it is not the fishing business as usual. Trust, loyalty, patience, a long-term view, a shared vision, and stepping back from competition are necessary. This work requires skill sets not often found in among fishermen, such as coalition building, communication and cooperation.

A workshop brought together practitioners of community-based fishery management from Canada, Belize and several U.S. communities who vetted the findings of the study and outlined possible next steps for expanding opportunities for CBFM in the United States. A second workshop is set for mid-March in Sitka, Alaska.

An Assessment of Marine Managed Areas (MMAs) Implemented by NOAA Fisheries

LISA WOONINCK

NOAA Fisheries
Southwest Fisheries Science Center
Santa Cruz Laboratory
110 Shaffer Rd.
Santa Cruz, CA 95060 USA
(831) 420-3900
lisa.woonick@noaa.gov

CARLI BERTRAND

NOAA Fisheries
Habit and Conservation
Silver Spring, MD

NOAA Fisheries (National Marine Fisheries Service, NMFS) is the primary agency responsible for management of fisheries and protection of endangered species within coastal and ocean waters of the United States. To this end, NOAA Fisheries, often in conjunction with fishery management councils, has designated various marine protected or marine managed areas (MPAs or MMAs). We present here the results of a characterization study of 67 NOAA Fisheries' MMAs that are currently part of the national MMA database. For a subset of 32 sites (48%) we also conducted an evaluation of their goals, targets and timelines, monitoring practices, and effectiveness at achieving the goals associated with their establishment. Our study finds that NOAA Fisheries manages large MMAs (>1000 km²) with year-round protections and restrictions that are frequently co-managed with other MMAs within a region as part of programmatic systems (88%), such as fishery management plans or recovery plans for endangered and threatened species. Far fewer MMAs (38%) function as biologically linked and connected networks. Nearly half of the MMAs promulgate fishing regulations under the Magnuson-Stevens Act combined with laws for the protection of an endangered or threatened species, and more than half of the sites have been established since 1996. All sites in the subset have goals, but only 63% have specific targets and timelines associated with the goals. Monitoring, most frequently in the form of stock assessments is routinely performed at 87% of the sites within the subset. Lastly, 50% of the subset was either effective or part of an effective program, as evaluated against an MMA's ability to achieve the targets associated with its designation.

Marine Stewardship Council Certifications and Ecosystem-based Management

KATE TROLL

Marine Stewardship Council
2110 N. Pacific St., Suite 102
Seattle, WA 98103 USA
(206) 691-0188
katetroll@msc.org

The Marine Stewardship Council's (MSC) fisheries certification and ecolabeling program has grown significantly over the past year from having 7 fisheries certified to 11 fisheries; from having 170 labeled product lines in 11 countries to more than 220 product lines in 22 countries. The most significant addition is the addition of the world's largest fishery — the Alaska pollock fishery. With this certification, new ground is being explored in relation to ecosystem-based management.

Every fishery certified to date has included "corrective actions" that must be addressed during the five years the certification is valid. Most of the corrective actions attached to the pollock certification relate to the second principle which states: "Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends".

By agreeing to an action plan for incorporating ecosystem-based corrective actions, the Alaska pollock fishery is now leading the way above and beyond what's required by the Magnuson-Stevens Act. Copies of this action plan are available at www.msc.org.

The MSC Standard for Sustainable Fisheries was developed over a two-year period and was loosely based upon the FAO's Code of Conduct for Responsible Fisheries. The MSC Standard has three main elements:

1. The status of the stocks;
2. The impact of the fishery on the ecosystem; and
3. The effectiveness of the fisheries management system.

CERTIFIED AS SUSTAINABLE AND WELL-MANAGED: Alaska Salmon, BSAI Pollock, South African Hake, Mexican Baja Spiny Lobster, Australian Rock Lobster, New Zealand Hoki, Thames

Herring, Scottish Nephrops, Burry Inlet Cockles, South Georgian Patagonia Toothfish.

U.S. FISHERIES IN FULL ASSESSMENT STAGE: Pacific Halibut and Alaskan Black Cod, Oregon Dungeness Crab, California King Salmon, Pacific Cod-Freezer Longline Sector, and GOA Pollock.

Fishermen's Initiative for Scientific Habitat and Ecosystem Research (FISHER Initiative)

OLIVIA RUGO FREE
Massachusetts Fishermen's
Partnership
2 Blackburn Center
Gloucester, MA 01930 USA
(978) 282-4847
olivia@fishermenspartnership.org

The Massachusetts Fishermen's Partnership (MFP) is coordinating a multi-faceted research initiative that strives to coalesce fishermen's and scientist's empirical and technical knowledge into a legitimate scientific foundation that encourages the collaboration between fishermen and scientists and promotes an ecosystem-based approach to fisheries management. Because sand lance are an important forage and possible keystone species and their study is likely to reveal significant ecosystem patterns and relationships, the first step of this initiative is to examine the role sand lance play in the marine ecosystem in the Gulf of Maine. Both scientists and fishermen believe sand lance will serve as a critical ecosystem indicator and that this ecosystem approach merits immediate attention.

The MFP convenes the FISHER Initiative in coordination with the Stellwagen Bank National Marine Sanctuary, Harvard University, NOAA's Northeast Fisheries Science Center, University of New Hampshire, Massachusetts Institute of Technology, Boston University, University of Massachusetts, Massachusetts Division of Marine Fisheries, and numerous local commercial fishermen. FISHER participants aim to collaboratively establish a foundation for an ecological understanding of our marine environment. The MFP has convened a seven member Board of Directors to provide administrative support, fund raising development, and research guidance.

The goals of the FISHER Initiative are to:

- Examine the role sand lance play in the marine ecosystem in the Gulf of Maine as a starting point for this initiative;
- Explore areas of common interest between scientists and fishermen and build strong research partnerships;
- Jointly conceive, prioritize, develop and review subsequent research projects and products to increase levels of confidence in results for scientists, fishermen, and managers over the long term;
- Coordinate scientific research to avoid replication of effort and maximize the use of resources;
- Create new opportunities for expanding funding for collaborative ecosystem research.

FUNDED PROJECTS:

- *Habitat-Dependent Catch Composition and Food Web Dynamics With Respect to Long-Term and Rolling Closures on Stellwagen Bank* (Commercial fisherman, Boston University)
- *An Examination of Biological Processes of Sand Lance and Associative Species on Stellwagen Bank* (Commercial fishermen, MIT, Boston University)
- *Charting Anecdotal Information and Oral Histories from Local Commercial and Recreational Fishermen* (Commercial and recreational fishermen, MIT)

PROJECTS PENDING FUNDING:

- *The Impacts of Physical Oceanographic Forces on the Ecosystem of Massachusetts Bay* (Commercial fishermen, Harvard University)
- *Partnership for Pelagic Ecosystem Monitoring in the Gulf of Maine* (Commercial fishermen, University of New Hampshire)

Criteria for the Surfclam and Ocean Quahog Individual Transferable Quota Fishery Management System from Implementation in 1990 to Current (Lessons Learned)

DAVID H. WALLACE

Wallace & Associates
North Atlantic Clam Association
1142 Hudson Road
Cambridge, MD 21613 USA
(410) 376-3200
dhwallace@aol.com

THOMAS B. HOFF

Mid-Atlantic Fishery
Management Council

RICKS SAVAGE

JOHN BRYSON

Wallace & Associates

Prior to the implementation of the ITQ system in 1990 the surfclam and ocean quahog fishery was grossly overcapitalized to the point that each vessel was only allowed to fish six hours every other week. Consolidation of permits was not allowed. The fleet had been inefficient for years after the surfclam stock had been rebuilt in the early 1980s. The CPUE increased from 26 to 190 bushels per hour between 1979 and 1987. The surfclam and ocean quahog fishery management plan always had a fixed total allowable catch, and the system was designed to keep the fishery open year round by reducing the hours each vessel was allowed to fish. With the increased catch, as the resource rebuilt, the price of clams decreased creating a hardship for the vessel owners and crews. Most crews fished multiple vessels to make a living. The vessel owners could not increase their revenue because the vessel could only produce, at most, a boatload every other week, weather permitting. The pre ITQ regulations were designed to force as many vessel owners out of the surfclam fishery as possible. Many single boat owners sold their vessels with permits and catch history to multi-boat owners because their only other choice was to go out of business. The owner could either go broke or sell out; there were no federal by-outs or subsidies for the clam fleet. When the original fishery management plan went into effect in 1977, there were 184 surfclam permits. By the time the ITQ system went into effect, there were 142 permitted vessels with a catch history, and about half of those vessels left the fishery during the first year. Most of the vessels that left the fishery were the old, inefficient, and least safe vessels in the fleet. Individual captains have become vessel owners and entered the fishery using rented quota to become established. Derby style fishing has stopped so the fleet fishes more cleanly, with less bycatch and in a more environmentally friendly manner. The speculators and multi-national corporations have been bought out by family owned boat operators, most of which have been in the clam fishery for generations. The fishery has become profitable, allowing new, safer and more productive vessel to be added to the fleet. The result is that the consumer receives high quality products at a reasonable price on a sustainable basis from the surfclam and ocean quahog fishery.

Surfclam Management Advice Collected Through a Cooperative Research Program with Academia, Government, and Industry

ELEANOR A. BOCHENEK

Haskin Shellfish Research
Laboratory, Rutgers University
1636 Delaware Ave.
Cape May, NJ 08204 USA
(609) 898-0928
eboch@rci.rutgers.edu

DAVID H. WALLACE

North Atlantic Clam Association

ERIC N. POWELL

Haskin Shellfish Research
Laboratory, Rutgers University

JAMES R. WEINBERG

Northeast Fisheries Science Center
National Marine Fisheries Service

The surfclam fishery is among the most valuable and best managed fisheries in the northeast. Since 1990, this fishery has been managed as an ITQ (individual transferable quota) fishery. Through 1999, surfclam stock abundances were stable or rising throughout the Mid-Atlantic. The 2002 stock assessment survey conducted by the NMFS in the EEZ revealed a dramatic reduction in abundance. The New Jersey inshore survey also recorded persistent declines in abundance and little, if any, recruitment. The reasons for the population decline remain unexplained. The stock has not been overfished and the commercial landings were not high enough to account for the decline in the stock. The NMFS 2005 stock assessment survey could not be rescheduled to an earlier date, so the surfclam industry volunteered to fund a cooperative research survey in the EEZ during the summer of 2004. Participating in the cooperative survey were Rutgers University, Haskin Shellfish Research Laboratory; the Virginia Institute of Marine Science; NMFS, NEFSC; and the surfclam industry (North Atlantic Clam Association and NFI-Clam Committee). NMFS assisted with the design of the survey, fieldwork, database management, and final calculations. Academia assisted with the survey design and participated in the fieldwork and data analysis. The surfclam industry provided funds for the survey as well as a fishing vessel and crew. The goals of the 2004 surfclam survey were to estimate the overall reduction

in Mid-Atlantic surfclam biomass levels, to evaluate recruitment into the fishery, to estimate reduction in meat weight versus shell length ratios, and to assess the offshore movement of the habitat range. A standard commercial hydraulic dredge vessel was used to sample the survey area. The hydraulic dredge was fitted with a sensor package to record key physical bottom conditions at each sampling site. This sensor package was used on previous surveys and was purchased by NMFS and the surfclam/ocean quahog industry. The cruise was conducted in nearshore waters to 50 meters extending from northern New Jersey to the North Carolina border. The data collection procedures used the NMFS survey format so that the information would be compatible with previous surveys. The cooperative survey cruise was successful and completed work on July 6. During 10 days at sea, 219 stations were sampled. Survey results indicate that the Delmarva mortality event of the 1999-2002 period seems to have run its course. Data collected from this cooperative survey will be used by the MAFMC and the NMFS to determine the best course for setting future quotas and planning the NMFS 2005 surfclam stock assessment survey.

Commercial Fishing Crew Demographics and Trends in the North Pacific: 1993-2003

COURTNEY CAROTHERS
JENNIFER SEPEZ
Alaska Fisheries Science Center
7600 Sand Point Way NE
Seattle, WA 98115 USA
(206) 526-4221
courtney.carothers@noaa.gov

More than half of the nation's fish harvest passes through the hands or under the eyes of crew members aboard commercial fishing vessels in the North Pacific, yet we know very little about the individuals that make up this work force. Fishing crew members are often affected by regulatory changes, but without direct demographic data it is difficult to anticipate and analyze consequent social impacts. Documenting crew participation can be especially challenging, and as a result many management decisions are made without broad input from this population. Until a thorough census of the crew member population is undertaken, we must turn to innovative uses of existing records to understand commercial fishing crews.

This study analyzes the State of Alaska Commercial Crew Member License Database, the most comprehensive set of information describing the people who work as fishing crew in North Pacific fisheries. Trends are summarized for over 270,000 annual licenses issued between 1993 and 2003. Demographic fields, including: total population, license longevity, age, gender, nationality, Alaska residency, and geographic residency distribution are profiled. Although it is not possible to reliably analyze this database by specific fishery, the data yield a rich set of findings about a population that has typically been difficult to quantify and describe.

The average crew member aboard commercial fishing vessels in the North Pacific is male, about 30 years old, a resident of Alaska, and holds a crew license for about 1.8 years. The total population of crew members has shrunk by 46 percent from 1993 to 2003. The vast majority of license holders are US citizens. While these individuals come from all 50 states, Alaska and Washington are the most common states of residence for crew members in this region. About 15 percent of all crew members call Anchorage, AK, Kodiak, AK, or Seattle, WA home. Other trends are noted for various subgroups of the total crew member population. For example, on average, women are slightly older than men in this population, and non-residents slightly older than Alaskan residents.

To test that these license-based statistics present a valid representation of all working crew, we compare these results with an actual sample of vessel crew aboard commercial fishing vessels in the North Pacific, using a novel sampling methodology drawing on US Coast Guard Search and Rescue incidents. Statistically similar results are found in both analyses. As many regions do not require crew licensing, demographic analyses can be especially difficult. The Coast Guard Search and Rescue sampling procedure described in this study provides a method to overcome this data gap and should enable demographic research on fishing crews nationwide.

Follow-up analyses of crew should include surveying and interviewing of captains and crew members. This research would help to explain the demographic trends observed in this type of large population profiling, and would inform more predictive analyses of potential social impacts resulting from regulatory action in the future.

Development of a National Strategy for Training Regional Fishery Management Council Members

GILBERT SYLVIA

Coastal Oregon Marine
Experiment Station,
Oregon State University

SUSAN HANNA

Coastal Oregon Marine
Experiment Station,
Oregon State University

LAURA JODICE

Training Managers for
21st Century Fisheries Initiative
Clemson University
Clemson, SC 29634 USA
(864) 656-2209
jodice@clemson.edu

The regional fishery management council system faces difficult challenges in achieving sustainable fisheries. These include rebuilding stocks, reducing overcapacity, sustaining fishing communities, implementing ecosystem-based approaches, and improving the cost-effectiveness of research and management. Management decisions that address these needs require a wide range of core competencies capable of evaluating and integrating complex biological, ecological, economic and social information. The *2001 International Workshop-Building Capacity for 21st Century Fisheries Management* found that worldwide, the level of fishery management training is insufficient for current needs and recommended strategies relevant to regional council training including: (1) defining needed competencies for each management context, (2) designing training strategies based on needs, and (3) developing certifiable training programs. The *U.S. Commission on Ocean Policy (USCOP) 2004* report recommends that all newly appointed members of regional fishery management councils (RFMC) be required, as a pre-requisite for voting, to complete a training course within six months of their appointment that includes fishery science and stock assessment, social science and fishery economics, and legal mandates (USCOP 19-14). These needs and recommendations are driving the interest in development of training for regional councils.

To provide a forum for discussion of training, a panel presentation was held at the *Workshop for Members of the Regional Fishery Management Councils*, in Baltimore, Maryland on October 19, 2004. The presentation, facilitated by the *Training Managers for 21st Century Fisheries Initiative*, provided a brief overview of training recommendations and a possible national training strategy to improve U.S. fishery management capacity. The following principles would guide the strategy: (1) involving RFMC members in development, (2) emphasizing flexible approaches, (3) including benchmarking, evaluation, and adaptability, and (4) integrating, where appropriate, with other NOAA Fisheries training initiatives. The proposed approach included five main steps: (1) form a steering committee including RFMC members, (2) survey RFMC members on training needs, (3) conduct a national workshop to identify RFMC needs and approaches, (4) design a curriculum and program with RFMC partners, and (5) develop an implementation plan.

Following this introductory presentation, RFMC workshop participants discussed the overall need for training, specific priority areas, and alternative training approaches. Some participants suggested that the training pre-requisite for voting is problematic, specifically given the time between appointment and the first council meeting. Furthermore, existing experience of nominees should be relevant. In support of training, participants indicated that new council members are overwhelmed by the volume of reading materials and that the transition from the initial learning stage to effective Council participation is slow, with turnover resulting in repetitive discussion. Participants outlined existing training occurring in a few regions: (1) NEFMC 3-day orientation, (2) Marine Resources Education Project in New England, and (3) NMFS 3-day orientation in Washington, D.C. Participation in cooperative research and within council mentoring also can serve as training. Most participants felt training curricula should be regionally focused, but noted the overlap among councils given the shared governance and regulatory issues. Scientists and agency staff should be included in training. Overall, there was general support for the initial proposed training strategy and guiding principles.

Angling Management Organizations: Integrating the Recreational Sector into Fishery Management

JON G. SUTINEN

Department of Environmental
and Natural Resource Economics
University of Rhode Island

ROBERT J. JOHNSTON

Department of Agricultural and
Resource Economics
University of Connecticut

KATHRYN C. VIATELLA

Environmental Defense
Austin, Texas USA
(858) 505-8741
kviatella@
environmentaldefense.org

This poster presents a new concept for fully integrating the recreational sector into the management of fisheries, called *angling management organizations* (AMOs), that would reduce conflicts and improve the sustainability and value of marine recreational fisheries. This novel and practical approach combines three of the more pervasive and promising trends in fishery management worldwide — management devolution, strengthening of harvest rights, and co-management. AMOs are envisioned as community-based organizations designed to conform to seven basic principles of integrated fishery management. Loosely related to rights-based producer organizations in commercial fisheries, AMOs are designed to provide greater management flexibility and authority to recreational anglers in various regions, within a strong rights-based framework. Based on similar experiences in commercial fisheries, AMOs are expected to strengthen resource stewardship, reduce enforcement and monitoring costs, alleviate management conflicts, and produce greater long-term net economic benefits in recreational fisheries. The red snapper fishery in the Gulf of Mexico, which has both a significant commercial and recreational component, will be used as an example of a fishery that is poorly served by existing management arrangements, and therefore, might benefit from the AMO approach.

Implementation of Fisheries Ecosystem Management Models in Western Pacific

KITTY M. SIMONDS

Western Pacific Fishery
Management Council
1164 Bishop Street, Suite 1400
Honolulu, HI 96813 USA
(808) 522-8220
kitty.simonds@noaa.gov

Generations of Pacific islanders survived largely on seafood by practicing “ecosystem management” for centuries before contact with Europeans. Through careful observation of spawning cycles, migration patterns and environmental trends, Pacific islanders were able to develop resource management strategies which provided a stable food supply while maintaining ecological balance between man and his environment. Building on ancient traditions of ecological thinking and practice in the U.S. Pacific islands, the Western Pacific Fishery Management Council is developing and implementing contemporary Fisheries Ecosystem Plans (FEPs) for the Western Pacific.

Traditional management knowledge evolved from adaptive response to local marine resource rhythms and limitations. The Council directly applies this knowledge to FEPs for demersal resources in U.S. Pacific archipelagos. Traditional systems also include beliefs and values that are shared by many Pacific societies and are therefore useful in fostering broad cooperation toward pelagic ecosystem management in the Pacific basin.

The Council is developing archipelagic FEPs for demersal marine resources for each area under its jurisdiction. Under this approach an FEP would be developed for the Hawaiian archipelago, one for the Mariana archipelago, one for the Samoa Islands group and one for Pacific Island Remote Areas. The new FEPs will subsume the existing fishery management plans (FMPs) for bottomfish, seamount groundfish, coral reef ecosystems, crustaceans and precious corals and manage those resources together under one plan. An important element of the FEPs is “regional standards” (patterned after but quite different from Magnuson-Stevens Act national standards). Application of these regional standards requires (a) “best available data” that merge local resource knowledge with science-based knowledge; and b) practice-based methods that allow for experimentation to facilitate learning and adaptive management.

Regional standards offer guidance for place-based Fishery Ecosystem Strategies (FESs) initiated by partnerships of user communities, government and non-government organizations. FESs would be conducted on various spatial and temporal scales, from the restoration of specific “fish houses” (*koa*) and watersheds (*abupua'a*) to cooperative study and experimental management

of offshore banks. Supporting these efforts are studies of biophysical patterns to facilitate understanding of environmental cycles and marine resource rhythms. Through this research, human and resource resiliency to ecological change can be evaluated in the context of long-term timescapes.

By addressing ecosystem issues, such as bycatch, protected species and predator-prey relationships under its Pelagics FMP, the Council has already begun to transform this plan into a Pelagics FEP. Some of the ecosystem-based measures already in action include:

- Prohibition of longline fishing within 50 nautical miles of the Northwestern Hawaiian Islands creates a buffer zone protecting sea turtle and seabird habitats.
- New and proposed regulations reduce incidental catch and mortality of sea turtles and seabirds in longline fishing.
- Partnerships with conservation groups to protect Pacific sea turtle nesting habitats.
- Co-sponsorship of International Fishers' Forums.
- Limitation of longline fishing permits in Hawaii and American Samoa restrains tuna fishing mortality, while reopening of the swordfish longline fishery in Hawaii restores an alternative target to bigeye tuna.
- Cooperation with the Hawaii seafood industry to enhance the market value of the entire multi-species pelagic fish catch spreads fishing pressure and reduces bycatch.
- Inclusion of squid as managed resources recognizes their importance as predators and prey in the North Pacific pelagic ecosystem.

The evolution to a Pelagics FEP will continue as the Council's "extended family" approach further expands multi-national partnerships and encourages pelagic resources management across political boundaries.

Identifying Essential Fish Habitat Using Bayesian Network Models and GIS

GRAEME PARKES
RUNI VILHELM
MRAG Americas Inc.
110 South Hoover Blvd.
Suite 212
Tampa, FL 33609 USA
(813) 639-9519

BOB BURN
COLIN GRAYER
University of Reading

ALLISON BAILEY
TerraLogic GIS

STEVE COPPS
WALDO WAKEFIELD
NOAA Fisheries

Work on essential fish habitat (EFH) for the Pacific, Gulf of Mexico and US Caribbean regions (MRAG, 2003, 2003a; MRAG *et al* 2004) has led to the development of an analytical decision-making tool that uses scientific process to support identification of EFH and habitat areas of particular concern (HAPC) and to examine the impacts of fishing on habitat. The tool allows mitigation measures to be assessed and subsequently monitored, providing for informed policy-making. The procedure uses data on fish distributions; habitat preferences; and a geographical information system (GIS) which incorporates information about the physical and biogenic habitat (bottom type, bathymetry, latitude, vegetation, etc.) and fishing effects (spatial fishing information, gear operations, sensitivity of habitats to gears, habitat recovery rates) under a Bayesian Network architecture. The procedure also helps determine impacts of data gaps on decisions.

Designation of EFH for a Fishery Management Plan is based on the habitat requirements of life stages of all species considered. The model plots habitat suitability probabilities across the habitats mapped in the GIS and incorporates uncertainty in the habitat data. The identification of EFH can then proceed based on an informed decision regarding the chosen threshold probability or other criteria. Output presentation in a GIS format facilitates spatial consideration of management alternatives.

Development of a Supplemental Finfish Survey Targeting Mid-Atlantic Migratory Species

SARAH E. KING
ELEANOR A. BOCHENEK
ERIC N. POWELL
Haskin Shellfish
Research Laboratory
Rutgers University
6959 Miller Ave.
Port Norris, NJ 08349 USA
(856) 785-0074 ext. 4317
king@hsrl.rutgers.edu

The constant goal of developing ways to improve estimates of stock abundance includes seeking ways to augment survey data to improve the underlying database supporting abundance estimates. The main target of this project is to supplement the NMFS-NEFSC survey database with information on the deepwater extent and migratory behavior of recreationally and commercially important species by developing a multispecies survey program in the Mid-Atlantic region. To accomplish this, the supplemental survey program is designed to track the fall offshore and downcoast migration coincident with declining temperatures and the spring upcoast and onshore migration that occurs as the water warms. Secondly, this supplemental survey takes place on a commercial fishing vessel and extends beyond the domain of present-day federal and state surveys with increased sampling intensity between 150-250 fm.

Surveys are scheduled to occur in January, March, May and November. Tow stations are organized into cross-shelf transects oriented perpendicular to the average trend of the depth contours. Two-thirds of the stations are fixed while the other one-third of the stations are adaptive and are redistributed while at sea based on a ranking of target species catches in fixed tows. Fixed transects are sited near major canyons, including Baltimore, Hudson and Poor Man's Canyons. In the future, the goal is to expand the survey to include transects near Norfolk, Washington and Alvin Canyons. Funding to the National Fisheries Institute-Scientific Monitoring Committee (NFI-SMC) is provided by the Mid-Atlantic Research Set-Aside Program and the NMFS-NEFSC. The survey is a cooperative effort with personnel representatives from the commercial fishing industry, Rutgers University and NMFS-NEFSC. Sample processing protocol follows standard NMFS survey methods. During every tow, the fish are sorted by species, catch weights are obtained, length and individual weights are measured for target species, which include summer flounder (*Paralichthys dentatus*), spiny dogfish (*Squalus acanthias*), monkfish (*Lophius americanus*), scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), silver hake (*Merluccius bilinearis*), offshore hake (*M. albidus*), and *Loligo* squid (*Loligo pealei*). When time permits, otolith and scale samples are collected from certain species. In addition, temperature, depth, GPS position, door spread, and when possible, headrope height, are recorded during each tow.

Since the inception of the Supplemental Survey in March of 2003, there have been seven sampling events on the two core transects, Baltimore and Hudson Canyon, and one on Poor Man's Canyon. *Loligo* squid, butterfish, and scup have consistently been caught during all of the surveys and the spatial distribution of these species show similar trends over time. All three species appear to gradually move inshore from March 2003 through January 2004. During this time period, *Loligo* squid and butterfish have overlapping distributions at depths of 125-175 fm whereas, scup are distributed further inshore between 100-125 fm. In March 2004, species' migrate offshore into deeper water and then move back inshore as the summer approaches.

ACCSP Bycatch Data Collection Standards: Strengthening Scientific Advice for Management

ABBIEY COMPTON
1444 Eye St. NW, Suite 410
Washington, D.C. 20005 USA
(202) 216-5690
abbey.compton@accsp.org

The Atlantic Coastal Cooperative Statistics Program (ACCSP) is a cooperative state-federal program to design, implement, and conduct marine fisheries statistics data collection programs and to integrate those data into a single data management system that will meet the needs of fishery managers, scientists, and fishermen. Initially focusing on fishery-dependent data, program partners have examined the data collection needs for commercial, recreational and for-hire fisheries coastwide, and set minimum standards for collecting relevant data from each. Planning began with establishment of an MOU in 1995 and implementation has been progressing rapidly since the late 1990s.

The ACCSP partners have written standards for commercial fishing and recreational fishing (both for-hire and private boat/shore) to collect data on bycatch, releases, and protected species interactions. For quantitative data, commercial vessels should be required to carry bycatch observers, and fishermen should be required to report protected species interactions and releases and discards of managed species. For qualitative bycatch data, the ACCSP has approved a variety of reporting structures including data collected through the Turtle Stranding and Marine Mammal Stranding Networks. Quantitative data for recreational fisheries come from existing intercept surveys for catch and from at-sea observer data collected on headboats. For qualitative data, questions can be added to effort surveys conducted via telephone.

The ACCSP's Bycatch Prioritization Committee includes stock assessment biologists, field supervisory personnel, and observer program and protected species experts from partner agencies. Each year the Committee develops a priority matrix of fisheries to be sampled. Partners consider the priorities established in the matrix when drafting bycatch sampling proposals. The Committee is also prioritizing partner bycatch databases for integration into the ACCSP's coastwide data warehouse, which includes catch/effort and biological information from Atlantic coast fisheries.

NOAA's Ecosystem Approach to Management

HEATHER BRANDON
JAMES BURGESS
JESSE MECHLING
ELIZABETH NORTON
EVERETT VOLK
LAURA WALKO
KAY WESTON
NOAA Fisheries
1315 East-West Hwy.
Silver Spring, MD 20910 USA
(301) 713-9075
Jesse.Mechling@noaa.gov

NOAA's Ecosystem Approaches to Management (EAM) is a holistic, evolutionary management strategy designed to improve the productivity of coastal and marine ecosystems. NOAA has developed definitions of ecosystems, and an ecosystem approach to management, and detailed its mission and outcomes for sustainable use of the nation's coastal and marine resources. NOAA's holistic vision of ecosystem-based management moves current management practices from sectoral, short-term perspectives, with humans independent of ecosystems to ecosystem-based, long-term perspectives and humans integral to ecosystems. The new management practices will be geographically specific, located in 10 recently delineated US regional ecosystems based on Large Marine Ecosystem models. NOAA's vision for EAM includes seven strategies: collaborative and voluntary, adaptive, incremental, geographically specifying management areas, accounts for ecosystem knowledge and uncertainties, and balances diverse societal objectives. These strategies will provide greater biological, physical, and socio-economical understanding of ecosystems. NOAA's vision incorporates collaboration among NOAA, other federal, state, tribal, and local agencies, NGOs, academic and business communities. NOAA's future steps towards EAM includes improving internal integration and coordination to produce better products and services, while collaborating with partners to begin the regional process of ecosystem-based management.

Overview of Electronic Data Collection Program in Our Nation's Fisheries

ROBERT MIKOL
OceanLogic L.L.C.
234 Gold Street
Juneau, AK 99801 USA
(907) 586-0145
rmikol@oceanlogic.com

Throughout the United States and its territories, electronic data collection is a major goal of management and significant challenge. Each region has its own approach, however there has not yet been a forum for the discussion of this topic. The poster will be a snapshot of the different data collection needs, problems and solutions to the various regions of NOAA Fisheries. Observer programs as well as cooperative electronic data collection programs involving fishermen will be surveyed and illustrated.

The poster will not only look at the methods of collection and transmission, but the uses of the data as well: who uses it; how is it used; how valuable is it; and are we getting the maximum value

or are there identifiable uses of electronic data that have not yet been tapped. The poster will illustrate examples of the data as well as some of the data products. Examples shall be produced from programs around the country. Successes and challenges from each region's programs shall be included along with quotes and contact information.

The poster shall include a formal handout of the report generated from the poster. It is hoped that the poster and report will encourage a broader discussion possibly leading to a workshop or conference concerning electronic data collection programs.

The Economic Costs of Regulation: A Bioeconomic Comparison of Legislative Mandates for Rebuilding Fish Stocks in the United States and New Zealand

SHERRY L. LARKIN

*Food and Resource
Economics Department
University of Florida*

MICHAEL HARTE

Falkland Islands Government

GIL SYLVIA

*Coastal Oregon Marine
Experiment Station
Hatfield Marine Science Center
2030 SE Marine Science Drive
Newport, OR 97365 USA
(541) 867-0284
gil.sylvia@oregonstate.edu*

Implicit in many national fishery laws — for example the United States MSFCMA and the New Zealand Fisheries Act — is the concept of an optimal rebuilding rate or trajectory for overfished stocks. For New Zealand fisheries the law provides for flexibility in designing a rebuilding process in order to meet economic, social, and cultural needs. In the United States, however, the fisheries manager is constrained by the requirement that, where biologically feasible, stocks must be rebuilt within ten years (or ten years plus one biological generation time). The U.S. fisheries manager has less flexibility in choosing a recovery trajectory and, depending on the biological and economic characteristics of the fisheries, may sacrifice economic and social benefits in order to meet this legal mandate.

Using bioeconomic models, fisheries managers can evaluate the tradeoffs associated with alternative rebuilding horizons, discount rates, and regulations for fisheries characterized by multiple and heterogeneous cohorts. As modelled in this paper, when there are high discount rates, rebuilding strategies for stocks of moderate longevity and productivity will result in lower net present values, slower rebuilding rates (spawning stock increases are delayed as long as possible), and more pronounced harvest cut-backs as the rebuilding deadline approaches. However, at rates that are lower and closer to prevailing market rates of interest, the effects are less significant. Given the wide range of discount rates used for the moderately long-lived species represented by this analysis, a rebuilding period of ten years as specified in the MSCFMA would produce economically inefficient outcomes. Moreover, the social costs may be underestimated since impacts on fishing communities and other are unaccounted for in this economic analysis.

Alternative rebuilding horizons for the longer-lived stock produced significantly larger changes in the value of the fishery even though the rebuilding horizon was shorter relative to the longevity of the species. In addition, the effect of the discount rate was larger with the longer-lived species. The effects on the average annual quotas of alternative rebuilding horizons were also different at the highest discount rate. Specifically, a delayed rebuilding horizon for the long- (moderately-) lived species would increase (decrease) the average annual harvest quota.

These models demonstrate that dynamic bioeconomic analysis is a relevant policy tool in developing optimal strategies for rebuilding fish stocks. For countries such as New Zealand there is considerable flexibility in specifying the recovery period for an overfished stock. This flexibility allows for overfished stocks to have a recovery trajectory that maximises the net present value of commercial harvests or other fishery objectives. In contrast, for countries such as the U.S. where there is far less discretion in structuring the rebuild period, sub-optimal economic and social strategies may result. Given the complex issues that confront real world fishery management, it is critical that fishery managers develop empirical models that can evaluate a broad array of social and biological factors affecting rebuilding strategies.

Cooperative Research and the Management of Marine Fishery Resources in New England: A Comprehensive Assessment

ROBERT ALEX ROBERTSON
TROY HARTLEY

*Department of Resource Economics
and Development
University of New Hampshire
Durham, NH 03824 USA
(603) 862-2711
robertr@cisunix.unh.edu*

Cooperative research has been held up by some advocates from the fishing, scientific, management and policy making communities as a way to incorporate the knowledge of commercial fishermen into the scientific assessments of marine fisheries. Cooperative research seeks to promote partnerships between fishermen and researchers to improve the quality of data used in fisheries management and to improve the relations between the fishing industry and the scientific/management communities. The success of cooperative research initiatives in achieving these goals depends, at least in part, upon (1) the commercial fishing community's willingness to be actively engaged in the design, collection and application of a multifaceted research program; (2) the ability of academic and agency scientists to actively engage the commercial fishing industry in scientifically sound research; and (3) the willingness of resource managers and policy makers to use and apply the results from cooperative research initiatives. There are many potential barriers to cooperative research and very little empirical research on the socio-economic or human dimensions of this topic. This poster will provide a preliminary understanding of the challenges and prospects of cooperative research from the perspective of members of the commercial fishing, scientific, and management community.

More specifically, this poster will graphically display the results from a meta-analysis of five years of social science data collected to document and investigate the social and economic dimensions of the Northeast Consortium. The Northeast Consortium was created in 1999 to encourage and fund effective, co-equal partnerships among commercial fishermen, researchers, and other stakeholders to become active participants in cooperative research and development of selective fishing gear technology. The Northeast Consortium consists of four research institutions (University of New Hampshire, University of Maine, Massachusetts Institute of Technology, and Woods Hole Oceanographic Institution) which are working together to foster this cooperative research initiative between academic researchers and the fishing community. The meta-analysis employed is a procedure for combining data from different studies in order to reach summary estimates of the success of the program. The meta analysis incorporate qualitative and quantitative data collected from (a) informal discussions and interviews with commercial fishermen, scientists, managers, administrators and staff, (b) observations, (c) multiple formal questionnaires administered to participants and non-participants in cooperative research; (d) secondary data analysis, particularly from cooperative research project records; and (e) a detailed case study of cooperative research activities associated with a project focused on Western Gulf of Maine closure area. The poster and meta-analysis will serve three purposes: (1) it will reach conclusions about the overall effects of cooperative research programs, (2) it will identify conditions under which the cooperative is more or less likely to be effective and (3) it will discover which, if any, activities are associated with better or poorer outcomes. The primary importance of this paper and the associated meta-analysis is its potential to improve estimates of cooperative research program related outcomes. It allows for the understanding of both policy level concerns (i.e., overall effects of the program) and program level concerns (i.e., differential effects of alternative strategies).

Center for Independent Experts: Improving the Quality of NOAA Scientific Advice for Management and Conservation

**LISA L. DESFOSSE AND
STEPHEN K. BROWN**
*National Oceanic and
Atmospheric Administration
NOAA Fisheries
1315 East-West Highway
Silver Spring, MD 20910 USA
(301) 713-2367
Lisa.Defosse@noaa.gov*

**DAVID DIE AND
MANOJ SHIVLANI**
*University of Miami
Rosenstiel School of Marine
and Atmospheric Science*

DAVID SAMPSON
*Oregon State University
Hatfield Marine Science Center*

TINA TING
*University of Miami
Rosenstiel School of Marine and
Atmospheric Science*

The use of independent experts in National Marine Fisheries Service (NMFS) peer reviews is an integral and growing part of the agency's Science Quality Assurance Program. The Ocean Commission recognized the importance of peer review in their report to Congress. In 1998, NOAA Fisheries formalized a process of independent peer reviews with the development of the Center for Independent Experts (CIE). This process is run through a competitive contract currently awarded to the University of Miami. The goal of the CIE is to provide independent, expert reviews of the science necessary for the management of living marine resources under the purview of NMFS. NMFS provides the funding and develops the terms of reference for the reviews, but the agency is not involved in selecting the reviewers nor can it influence the content of the review reports. All reviewers are selected by the CIE, working independently from NMFS, and all work conducted by the reviewers is analyzed internally by the CIE prior to its submission to NMFS.

Typically, CIE reviews consist of independent reviews of stock assessments or other scientific products, active participation in assessment working groups, or participation as chairs on advisory panels or working groups. The CIE has been used by NMFS to review stock assessments developed by each of the six Science Centers including the Northeast Stock Assessment Workshop (SAW), the Southeast Data and Assessment Review (SEDAR), and the Northwest Stock Assessment Review (STAR). The CIE has been used by NMFS to review special projects for other important and controversial scientific issues including evaluation of scientific methodologies for fish resource surveys and statistics programs; review of protected species assessments, ecosystem studies, and fisheries interactions; and evaluation of fishing effects on essential fish habitat. The advice and recommendations provided through CIE reviews is forwarded to NMFS clients, including Regional Fishery Management Councils and Interstate Commissions for use in formulating fisheries management strategies and developing fishery management plans.

One example of the use of CIE advice is the participation of two CIE reviewers in the Groundfish Assessment Review Meeting (GARM) in October 2002. Advice was provided to the Northeast Fisheries Science Center and the New England Fishery Management Council (NEFMC) on current catch information, research vessel survey indices, estimated fishing mortality rates, and current stock status for 20 stocks managed under the Northeast Multispecies Fishery Management Plan (FMP). Advice was also provided on the potential sensitivity of assessment results to trawl warp marking discrepancies that occurred in bottom trawl surveys conducted between winter 2000 and spring 2002. Many of the recommendations from this review meeting and the CIE reviewers have been implemented, including the development of a benchmark process used to update and modify assessment models, implementation of a cooperative tagging program with the fishing industry for yellowtail flounder, and development of future age-based assessments for Gulf of Maine haddock and pollock. The advice provided by the CIE on these fish stocks was critical to the NEFMC in updating the Groundfish FMP and in modifying future assessments and research.

Atlantic States Marine Fisheries Commission: Working Towards Healthy, Self-sustaining Populations for all Atlantic Coast Fish Species or Successful Restoration Well in Progress by the Year 2015

TINA BERGER

Atlantic States Marine
Fisheries Commission
1444 Eye Street, NW, 6th Floor
Washington, D.C. 20005 USA
(202) 289-6400
tberger@asmfc.org

The Atlantic States Marine Fisheries Commission was formed by the 15 Atlantic coast states in 1942, through an interstate Compact, in recognition that fish do not adhere to political boundaries. The Commission serves as a deliberative body, coordinating the conservation and management of the states' shared nearshore fishery resources — marine, shell, and anadromous — for sustainable use.

The member states of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida are each represented by three Commissioners: the director for the state's marine fisheries management agency, a state legislator, and an individual representing fishery interests appointed by the governor. Commissioners participate in deliberations through the Commission's programs on interstate fisheries management, fisheries science, habitat conservation, and law enforcement.

The Commission focuses on responsible stewardship of marine fisheries resources, and serves as a forum for the states to collectively address fisheries issues. The one-state / one-vote mechanism in the Commission's governance preserves individual state sovereignty, while facilitating a balanced and cooperative approach to fisheries management. The Commission does not promote a particular state or stakeholder sector.

The Commission's active management of 22 fish and shellfish species differentiates it from its Gulf and Pacific States counterparts. The Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA) of 1993 formalizes this role and provides the Commission with responsibilities to ensure compliance with interstate fishery management plans. The ACFCMA authorizes the Secretary of Commerce to pre-empt any state fishery not in compliance with a Commission fishery management plan.

Under ACFCMA and its predecessor, the Striped Bass Conservation and Management Act, the Commission and its federal and Council partners have achieved notable successes. Populations of striped bass, winter flounder (Gulf of Maine), Atlantic croaker, Atlantic herring, and Atlantic menhaden are fully recovered, while summer flounder, black sea bass, scup, and bluefish have undergone significant rebuilding. Upcoming benchmark stock assessments for American lobster, tautog, American shad and American eel will gauge the effectiveness of current management programs for these species and identify changes necessary for their conservation.

As stocks rebuild, the Commission has begun to develop a multispecies assessment model addressing the predator/prey relationships of striped bass, weakfish, bluefish and Atlantic menhaden. This work complements the Commission's fisheries habitat conservation efforts, with the objective of improving the current single species approach to fisheries management.

Looking forward, the Commission seeks to expand its effectiveness through continued partnerships with the federal agencies and the three Atlantic Fishery Management Councils in pursuit of its vision of healthy, self-sustaining populations for all Atlantic coast fish species or successful restoration well in progress by the year 2015. For more information about the Commission, please visit our website at www.asmfc.org.

Coral and Sponge Habitat Mapping in the Central Aleutian Islands

D. WOODBY

*Alaska Dept. of Fish and Game
Commercial Fisheries Division
Juneau, AK 99802 USA
(907) 465-6115
doug_woodby@fishgame.state.ak.us*

R. STONE

J. HEIFETZ

E. BROWN

*National Marine Fisheries Service
Auke Bay Laboratory
Juneau, AK*

J. REYNOLDS

*University of Alaska Fairbanks
School of Fisheries and
Ocean Sciences
Fairbanks, AK*

D. CARLILE

Alaska Dept. of Fish and Game

G. GREENE

*Moss Landing Marine Laboratory
Moss Landing, CA*

A joint project between the National Marine Fisheries Service, the Alaska Department of Fish and Game, and the University of Alaska began in 2003 to provide the first detailed mapping of coral and sponge habitats for the Aleutian Islands. Coral gardens were first discovered in the central Aleutian Islands in 2002, and the conservation of coral and sponge habitats in this area has become a key issue for federal and state fisheries managers due to incidental mortality in fisheries using bottom contact gear. Bottom substrates were mapped using multibeam sonar bathymetry and backscatter data in a systematic sample of 17 sites between 50m and 3000m depth in swaths averaging about 5 km wide. A series of transects were sampled at most of these sites using the Delta submersible and the Jason II, a remotely operated vehicle, to estimate densities and distribution of coral, sponges, various other invertebrates, and fish. This poster provides highlights of some of the observations and a status report of work in progress. Final results, expected in 2006, are to include a predictive model of coral and sponge distribution as a function of measurable environmental characteristics, estimates of the relative abundance of corals and sponges, their importance to commercially valuable fish and invertebrates, and the degree to which these living substrates have been disturbed, including disturbance by fishing gear. Funding for this research is provided by the North Pacific Research Board, NOAA's Undersea Research Program, and the National Marine Fisheries Service.

Northeast Cooperative Research Results In Management Decisions

CHRIS MOORE

*Mid-Atlantic Fishery
Management Council
Room 2115 Federal Building
300 S. New Street
Dover, DE 19904 USA
(302) 674-2331
cmoore@mafmc.org*

MARLA TROLLAN

*NOAA Fisheries
Northeast Regional Office*

The National Marine Fisheries Service's (NOAA Fisheries) Cooperative Research Program enhances communication and collaboration among agency scientists, managers, commercial and recreational fishermen and constituents to improve data used to make fishery management decisions. The Cooperative Research Partners Initiative (CRPI), developed by the NOAA Fisheries Northeast Regional Office, began in 1999. Since then, partners have collaborated to address research priorities related to management issues in the Northeast. To date, over \$20 million has been allocated to the Northeast Region to fund three long-term research projects and an additional number of short-term projects (1 to 2 year duration). The three long-term projects include an industry-based survey designed to collect fishery-dependent information, a study fleet to collect high resolution fishery-dependent information, and a fish tagging program to study movements and aggregation patterns of Atlantic cod. The short-term projects aim to provide more detailed information on fish stocks, marine habitat, and bycatch reduction through the use of more selective fishing gears. Several investigations have been completed and the results have been made available to scientists and managers. This poster details how cooperative research results have been used by stock assessment scientists and/or translated into management actions in the Northeast Region. Alternative procedures are identified that may be used by fishery management entities such as the Councils, the Atlantic States Marine Fisheries Commission, NMFS and state agencies to facilitate the transfer of research information for purposes of developing and evaluating approaches for fishery conservation.

Developing Sociocultural Profiles of Fishing Communities: A Contribution to Ecosystem-based Approaches to Fisheries that Strengthens the Social Scientific Base for Management Advice

SUSAN ABBOTT-JAMIESON
PATRICIA M. CLAY
NOAA Fisheries
1315 East-West Highway
SSMC 3, #12609
Silver Spring, MD 20910 USA
(301) 713-2328 ext. 101
Susan.Abbott-Jamieson@noaa.gov

Ecosystem approaches require analysis of human as well as other components of the ecosystem. The National Oceanic and Atmospheric Administration-Fisheries (NMFS) Sociocultural Analysis Program is creating standardized community profiles for many localities within the United States and its territories and possessions that have fishing or fishing related activities, most especially all localities that meet the Magnuson-Stevens Act (MSA) 1996 National Standard 8 (NS 8) criteria for fishing communities (MSA FCs). Commercial, recreational and subsistence activities are included, and all profiles will be periodically updated. The community profile database generated through this process will provide each region with systematic, accurate, current information that will improve the quality of data available for social impact assessments and ecosystem analyses.

The MSA requires NMFS to assess the impact of proposed fishery management actions on geographical places labeled *fishing communities*: i.e., “a 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 community.”

Thus NMFS must collect community level data on indicators of involvement in fisheries, in communities that will be characterized by landing sites, processors, and/or residences. Further, NMFS must evaluate their level of involvement in terms of *substantial dependence* or *substantial engagement*. Finally, more detailed analysis of social impacts of proposed regulatory action is required for MSA FCs than for other involved communities.

Dependence measures the importance of fisheries for a community, via indicators based on data just for that community. *Engagement* measures the importance of a community to a fishery or fisheries, via indicators of that community's participation in a fishery or fisheries relative to the combined participation in that fishery or fisheries by all communities. Both require that standards be set for what constitutes *substantial*.

NMFS social scientists have identified 23 different types of data that can be used to produce indicators measuring dependence and engagement. Most are based on data already available, while some require new research. NMFS social scientists have also outlined a procedure for analyzing the indicator data in order to categorize communities as MSA FCs.

NOAA Fisheries staff social scientists located in each NOAA Fisheries region are responsible for community profiling work in their own region, but are conforming their efforts to the national plan to collect similar data. The regions will also add additional categories of information on an as needed basis to address regionally specific sociocultural or socioeconomic patterns.

Topics addressed by the poster include (1) the national plan for developing fishing community profiles, (2) the related federal legislative requirements, (3) procedures for identifying the subset of MSA National Standard 8 Fishing Communities, and (4) brief updates on fishing community profiling progress in each NOAA Fisheries region, and (5) outline of the ways these data contribute to an ecosystem-based approach to fisheries while strengthening social scientific management advice.

Alaska's Fisheries: A Model for Sustainable Fisheries Management

SUE ASPELUND
DOUG MECUM
Alaska Dept. of Fish and Game
PO Box 25526
Juneau, AK 99802-5526 USA
(907) 465-4100
sue_aspelund@fishgame.state.ak.us

Alaska's economy relies heavily on its fisheries, and therefore, long-term sustainability is a cornerstone of our fisheries management systems. Sustainable, productive fisheries translate into jobs for Alaskans, revenues for coastal communities, and a healthy statewide economy. Given the importance of fisheries to our state, generations of Alaskans have insisted upon a clear distinction between science-based conservation and management of fisheries resources and the allocation of them among users. This separation of conservation and allocation, coupled with partnerships between stakeholders, scientists, and managers, and local in-season management, promotes stable and productive fisheries in Alaska's waters.

Prior to statehood, many of Alaska's fisheries were on the brink of disaster. The desire to manage the fisheries locally was a preeminent motivation in Alaska's campaign for statehood. Resource conservation is memorialized in Alaska's unique constitution, which mandates that renewable resources "shall be utilized, developed, and maintained on the sustained yield principle."

A clear separation of authority exists between conservation and management by the Alaska Department of Fish and Game (ADF&G) and allocation by the Alaska Board of Fisheries (BOF). Our continued fisheries management success also depends on a foundation of credible science, working partnerships between government and industry, and inseason management authorities are vested at local, area levels.

In Alaska, state and federal agencies coordinate closely on fisheries management issues. The best example of this collaboration is within the North Pacific Fishery Management Council (NPFMC), where representatives from the States of Alaska, Washington, and Oregon work with stakeholders and federal representatives to develop management plans for the nation's fisheries off of Alaska.

Our state Board of Fisheries is responsible for conservation and development of commercial, subsistence, sport, and personal use fisheries, and allocating resources among various users. Together, the NPFMC and BOF develop management plans that are grounded in independent science and ensure the conservative and sustainable management of resources. Because NPFMC programs often impact state-waters fisheries, and vice-versa, we work to achieve coordinated, compatible, and sustainable management within each organization's jurisdiction. We believe that such a structure and process can serve as an example for other Councils across the country.

In addition to its transparent and participatory public processes, as well as its collaborative approaches to fisheries management, ADF&G abides by a number of policies and regulations that support sustainability. These include, among others, the:

- Sustainable Salmon Fisheries Policy
- High Impact Emerging Fisheries Policy
- Forage Fish Management Plan
- Onboard Observers Policy
- King and Tanner Crab Management Policy

These plans and policies embody concepts that guide ADF&G and the BOF toward full utilization and sustainability of resources. We share them so they can perhaps provide a template for sustainable fisheries management elsewhere.

Framework for a National System of Marine Protected Areas

LAUREN WENZEL
National Ocean Service
Marine Protected Areas Center
1305 East-West Highway
Silver Spring, MD 20910 USA
(301) 713-3100 ext. 136
Lauren.wenzel@noaa.gov

Marine Protected Areas (MPAs) are increasingly used as a conservation and management tool to protect the nation's most important ocean resources and areas. To maximize the benefits of this tool, Presidential Executive Order 13158 directs the National Oceanic and Atmospheric Administration to work with the Department of the Interior and other agencies and stakeholders to develop an effective, integrated National System of MPAs. A National System is needed to bring order to the hundreds of federal, state, territorial and tribal MPA authorities; provide comprehensive planning and coordination to identify and meet national and regional conservation goals; and integrate MPAs as a critical component of ecosystem-based management.

Since its inception in 2001, the NOAA/DOI Marine Protected Areas Center has been gathering the fundamental information needed to develop the National System in a way that will meet diverse conservation goals using the best available science and existing MPA authorities and programs. The MPA Center is now engaging in a dialogue with stakeholders to develop the Framework for the National System over the coming 18 months. The Framework will describe the rationale, goals and components of the National System, and the process for designing and implementing it based on sound science and broad stakeholder input.

Executive Order 13158 states that the National System of MPAs will “enhance the conservation of our Nation’s natural and cultural marine heritage and the ecologically and economically sustainable use of the marine environment for future generations.” These three “tracks” — natural heritage, cultural heritage, and sustainable production — will frame collaborative regional level planning processes with partner agencies and stakeholders to identify conservation and management priorities. Ultimately, the National System will be comprised of existing MPA sites, enhanced sites and any new sites that may be needed to meet national and regional goals. Sites meeting the criteria will be brought in to the National System through a cooperative process with the agencies and programs having authority over those sites.

The poster will explain the process for developing the national system framework and outline opportunities for input from Regional Fishery Management Councils and other stakeholders. It will also summarize the input received to-date from the MPA Federal Advisory Committee and workshops for federal and state agencies.

MPAs to Protect Deep-sea Corals and Seamounts off Alaska

CATHERINE COON
North Pacific Fishery
Management Council
605 West 4th Avenue, #306
Anchorage, AK, 99501 USA
(907) 271-2809
Cathy.Coon@noaa.gov

The North Pacific Fishery Management Council recently established a suite of new marine protected areas (MPAs) to protect deep-sea corals and seamounts off Alaska. This action was taken to minimize the effects of fishing on essential fish habitat and to provide additional protection of fragile and vulnerable benthic habitats in the Gulf of Alaska and Aleutian Islands region.

The Alaska Seamount Marine Reserve will protect sixteen Seamounts within the EEZ off Alaska (Bowers, Brown, Chirikof, Marchand, Dall, Denson, Derickson, Dickins, Giacomini, Kodiak, Odessey, Patton, Quinn, Sirius, Unimak, and Welker): All bottom contact fishing by Council-managed fisheries will be prohibited on these seamounts which total 5,329 nm². Fishing effort for other species on the seamounts is very limited, so the seamounts are essentially no-fishing zones.

The Primnoa Coral Marine Reserves were developed to protect areas containing large aggregations known as “thickets” of long-lived Primnoa coral in Southeast Alaska. All Council managed bottom-contact gear (longlines, trawls, pots, dinglebar gear, etc.) will be prohibited in these areas, which total 13.5nm².

JOHN OLSON
MATT EAGLETON
NOAA Fisheries
Habitat Conservation Division

The Gulf Slope Habitat Conservation area will prohibit bottom trawling within the Gulf of Alaska, for all groundfish species in 10 designated areas along the continental shelf. These areas, which are thought to contain high relief bottom and coral communities, total 2,086 nm².

The Aleutian Islands Habitat Conservation Area was created to address concerns about the impacts of bottom trawling on benthic habitat (particularly on coral communities) in the Aleutian Islands. The concept for this MPA was to prohibit all bottom trawling, except in small discrete “open” areas. Over 95% of the Aleutian Islands management area will be closed to bottom trawling (279,1114 nm²) and about 4% (12,423 nm²) will remain open.

Additionally, bottom fishing will be prohibited in six areas in the Aleutian Islands, that have high density coral and sponge communities. These “coral garden” areas, which total 110 nm² will be closed to all bottom contact fishing gear (longlines, pots, trawls, etc.).

The relatively unexplored Bowers Ridge Habitat Conservation Zone, was also identified as an MPA, and as precautionary measure, the Council acted to prohibit mobile fishing gear that contacts the bottom within this 5,286 nm² area.

The Northeast Regional Cod Tagging Program: Building a Strong Partnership Among Academic, Government and Non-profit Scientists, Commercial and Recreational Fishermen, and Fishery Managers along the Eastern Seaboard of the United States

SHELLY M.L. TALLACK
Gulf of Maine Research Institute
PO Box 7549
400 Commercial Street
Portland, ME 04112 USA
(207) 772-2321
stallack@gmri.org

The Northeast Regional Cod Tagging Program (NRCTP) represents the largest cod tagging program initiated to date along the eastern seaboard of the North American continent. A significant example of collaborative research, this program is international and region-wide, involving commercial fishermen and research organizations from Canada down to Cape Cod. This program focuses on Atlantic cod, *Gadus morhua*; a fish which has furnished a traditional fishery in Canadian and U.S. waters for centuries.

Total stock biomass estimates of Atlantic cod have shown a steady decline since the 1960s (NEFSC, 2001); the effects of this decline on the fishing industry have been dramatic. Greater understanding of the distribution and migration patterns of Atlantic cod in the Gulf of Maine, Georges Bank, and southern New England waters is needed in order to better manage and rebuild cod stocks. Tagging studies provide valuable insight into the movements of fish populations. Despite extensive tagging efforts between 1984 and 1997, there are still large sections of the Gulf of Maine and Georges Bank for which current tag-recapture data are unavailable.

The NRCTP is based on recommendations documented by the New England Aquarium. The Program aims to (1) improve our understanding of cod movement patterns in the Gulf of Maine, Georges Bank, and neighboring New England and Canadian waters; (2) tag 100,000 using a standardized tagging technique throughout the region; (3) obtain information on the growth of Atlantic cod in the study area; encourage the participation of commercial and recreational fishing stakeholders; (4) build on on-line database that is accessible through a GIS mapping interface (www.codresearch.org); and (5) identify and develop testable hypotheses for continuing tagging studies.

Funded by NOAA Fisheries, Northeast Regional Office, the NRCTP is being coordinated by the Gulf of Maine Research Institute based in Portland, Maine. Program partners include: School for Marine Science and Technology, UMass Dartmouth; Cape Cod Commercial Hook Fishermen’s Association; Manomet Center for Conservation Sciences; Maine Department of Marine Resources; Island Institute; and Canada Department of Fisheries and Oceans. The Program successfully met its goal of tagging and releasing over 100,000 Atlantic cod throughout the

study region between March 2003 and December 2004. Over 75 commercial and recreational fishing vessels, roughly 200 fishermen, have participated in the program. Vessels hail from ports throughout the region and include a variety gear types (e.g. trawl, rod and reel, longline and lobster pots). This Program represents one of the largest collaborative partnerships in the Northeast and will provide valuable new information about Atlantic cod migration for the New England Fishery Management Council as they manage the multi-species groundfish complex.

Collaborative Research – Making a Difference in New England’s Fishery Management Decisions

LAURA TAYLOR SINGER
Gulf of Maine Research Institute
PO Box 7549
400 Commercial Street
Portland, ME 04112 USA
(207) 772-2321
lsinger@gmri.org

MAGGIE RAYMOND
Associated Fisheries of Maine

The 21st century has brought with it new and revitalized efforts to conduct fisheries research that involves scientists and fishermen as research partners. Collaborative research (or cooperative research) has begun to take hold in New England, and now other areas of the country are looking for ways to increase the use of this approach. This practice puts scientists on board fishing vessels to gain from the knowledge of fishermen and to utilize fishing boats as research platforms. The combination of the scientific community’s method and credibility with the fishing community’s knowledge of the marine ecosystem and marine operations has dramatically increased the quality and quantity of information available to support marine resource management decisions.

This industry-science collaboration has effected change in several ways, including contributing new information to directly address current fishery management questions. There are several examples of how cooperative research has made a difference in New England fishery management. In the monkfish fishery, a cooperative survey in 2001 conducted by the Northeast Fisheries Science Center and the Monkfish Defense Fund revealed that monkfish were not being adequately quantified in the traditional NMFS Bottom Trawl Survey. The data generated by this cooperative survey were critical to the determination that the monkfish stocks were in better shape than had been previously believed, a planned closure of the fishery was avoided, and the fishery remains open.

Associated Fisheries of Maine and the Gulf of Maine Research Institute secured funding in 2001 from the National Marine Fisheries Service, Cooperative Research Partners Initiative (CRPI) to conduct an experimental shrimp fishery on Cashes Ledge. The goal was to test whether shrimp could be harvested during May and June around Cashes Ledge while protecting juvenile groundfish. The research was used to inform the shrimp management process and ultimately the New England Fishery Management Council (NEFMC) reopened the Cashes Ledge area for a spring shrimp fishery as part of Amendment 13 to the Multispecies Fisheries Management Plan.

In 2003, a similar project to test whether yellowtail flounder could be harvested without a bycatch of recovering cod was developed. Closed Area II, an area on Georges Bank, was shut down to fishing in 1994 to protect cod, haddock and yellowtail stocks. Since then the status of Georges Bank yellowtail and haddock has improved markedly and there was widespread interest among fishermen to access the area to harvest yellowtail. Associated Fisheries and Manomet Center for Conservation Sciences conducted surveys using fourteen fishing vessels to document the catch of yellowtail and the bycatch of cod and haddock. Data from this project was used by the NEFMC in Amendment 13 to recommend access to Closed Area II for the purpose of harvesting Georges Bank yellowtail.

These three examples illustrate that collaborative research is clearly making an impact on the fishery management decisions in New England and serving to foster new relationships among scientists and fishermen. Many additional projects have been successfully integrated into the management process and many new projects are underway to better inform decision-makers.

An Inventory of Marine Managed and Protected Areas in Alaska Waters

KRISTIN R. MABRY
STEVE G. LEWIS
NOAA Fisheries Alaska Region
PO Box 21668
Juneau, AK
99802-1668 USA
(907) 586-7490
kristin.mabry@noaa.gov

Many areas in the Bering Sea, Aleutian Islands, and Gulf of Alaska have been closed to some or all commercial fishing in order to protect endangered species, spawning populations, critical habitat, subsistence use, recreation, tourism, and other natural and human uses of the marine environment. These closures exist both inshore and offshore, and were initiated as amendments to the North Pacific Fishery Management Council's fishery management plans for groundfish and shellfish, Alaska Board of Fisheries' regulatory actions, Alaska Coastal Management District designations, or local government regulations. Federal, state, and local agencies who manage resources in Alaska waters will find this inventory a useful tool in planning marine reserve or marine protected area networks, HAPC closures, species rebuilding plans, and ecosystem and fisheries interaction studies.

This inventory catalogues exact geographic coordinates and management information about each area in a spatial database to enable internet and hard-copy mapping, database querying, and quick reference and reporting. NOAA Fisheries is working in conjunction with the Alaska Department of Fish and Game, which has jurisdiction over inshore waters, in order to provide an undivided view of managed and protected areas in all Alaska waters. When work began in 1999, many of the areas only existed as text in regulations, and needed to be digitized in order to accurately display mapped closures for the first time, or to accommodate subsequent changes to the original design of the area. Currently there are over 340 areas listed in the inventory. Managed areas are as small as coastal management district special areas, and as large as federal fisheries management zones. Activities restrictions within the areas range from requiring a permit to hunt waterfowl to prohibiting trawling in the eastern Bering Sea. Information catalogued about each area includes its creation date and legal authority, purpose of the action, restricted activities, seasonality, sunset dates, pertinent species, dates and description of updates, and any monitoring data or published papers providing additional information or an evaluation of the success of the managed area.

Designing Observer Programs – Do You Get What You Need?

MARK S. KAISER
ANDREW A. ROSENBERG
CHRIS NINNES
ROBERT J. TRUMBLE
MRAG Americas
110 S. Hoover Blvd., Suite 212
Tampa FL 33702

If you don't know where you are going, any road will take you there.

Lewis Carrol, *Alice in Wonderland*

Fishery agencies use observer programs as a key method to obtaining commercial fishery information at sea, and there are substantial impacts of observer information on in-season management and stock assessment. Yet, many observer programs have been designed in an *ad hoc* manner, with little consideration of the analysis of data produced. Appropriate analysis of observer data may be impossible unless users clearly describe what they need to obtain. This poster considers the development of statistical analyses to evaluate three topics in observer programs: adequacy of sampling, observer deployment, and unobserved vessels.

Users of observer data often ask — or are asked — if the observer coverage of an observer program is “adequate.” This question cannot be answered without knowing “adequate for what?” Managers and users need to determine in an unambiguous manner: (1) what the data are to be used to estimate, (2) at what level of resolution (e.g., time and space) estimates are desired, and (3) what criteria should be used to assess performance of an overall observer program.

An Office of the Inspector General report on U.S. observer programs noted that shortcomings in vessel selection processes often result in an un-representative sampling of vessels. Deployment protocols must balance many competing factors, and simulation studies provide a tool with which to investigate various strategies for observer deployment and connections between data collection and alternative estimators. Such studies can provide valuable insights into the behaviors of estimators, methodological robustness to violation of assumptions, and the manner in which potential assessment criteria function.

The observer effect — fishers changing behavior when observers are on board — can lead to the collection of non-representative data, and subsequent bias in estimation. Data common to both observed and unobserved vessels or trips can be used to determine whether the observer effect exists in a given fishery. Simulation studies can help determine the impact this phenomenon may have on estimates. Data from technology-driven observation (e.g., electronic monitoring of fishing behavior) may allow development of methods for extrapolation of observer data to unobserved portions of the fleet.

The collection of observer data and their use for estimation of catch, discard, and biological characteristics cannot be divorced from one another in determining effectiveness of an observer program. While there is no single correct statistical approach in the analysis of data from observer programs, the methods used should constitute a logical and internally consistent approach for estimation of and inference about values desired from observer programs. Development of such strategies is a key for designing scientifically defensible programs that can also evolve in response to changing needs and pressures.

The Arctic Yukon Kuskokwim Sustainable Salmon Initiative: A Cooperative Approach to Research Planning

CHRISTIAN E. ZIMMERMAN
USGS Alaska Science Center

JON ISAACS
URS Corporation
2700 Gambell Street
Suite 200,
Anchorage, AK 99503 USA
(907) 261-6714
Jon_Isaacs@URS Corp.com

CHARLES C. KRUEGER
Fishery Science Consulting

MARIANNE SEE
Alaska Dept. of Fish and Game

KAREN L. GILLIS
Bering Sea Fishermen's Association

Integration and coordination across government agencies, regional leaders/stakeholders, scientific disciplines, and biological boundaries is critical to advance research and achieve sustainable salmon fisheries. With this need in mind Alaska Native regional organizations established a new partnership with state and federal agencies — the Arctic Yukon Kuskokwim Sustainable Salmon Initiative (AYK SSI). The AYK SSI was formed to better understand and attempt to reverse the decline of salmon in the AYK region of western Alaska. The partners include three regional Alaska Native organizations (Association of Village Council Presidents, Tanana Chiefs Conference, and Kawerak, Incorporated), a regional fisheries association, (Bering Sea Fishermen's Association), the state of Alaska (Alaska Department of Fish & Game), and two federal agencies (National Marine Fisheries Service and U.S. Fish & Wildlife Service). Given the composition of the AYK SSI, integration between traditional knowledge and traditional science is an important goal that will encourage consensus and cooperation.

The AYK SSI consists of a Steering Committee with representatives from each of the partners and a Scientific Technical Committee. To organize research, facilitate cooperation, and direct funding, the AYK SSI is developing a comprehensive research and restoration plan with input from and review by the National Academy of Science/National Research Council (NAS/NRC). It is anticipated that the AYK Research and Restoration Plan will be used to help coordinate state and Federal research and monitoring programs currently underway as well as identify new research and monitoring needs.

The goals of the AYK SSI are to:

1. Summarize and communicate the state of contemporary scientific and traditional ecological knowledge about the marine and freshwater ecosystems that support the fisheries and culture of western Alaska and the Arctic-Yukon-Kuskokwim region.
2. Identify critical information gaps in the current state of knowledge organized under broad research themes that establish key questions and hypotheses.
3. Describe the research programs and organizations available for information delivery, and propose coordinated mechanisms to enhance delivery, communication, and collaboration.
4. Describe the current complex of state, federal, and international governance that is vested with fishery management authority and propose organizational mechanisms for coordination to enhance collaboration.
5. Communicate the results of these goals through a series of workshops and symposia that include federal, regional, and state organizations.

In 2003, the AYK SSI held a three-day facilitated workshop. Invited participants represented state and federal fishery managers, independent scientists, local fishermen and residents from affected communities of western Alaska, and members of the NAS/NRC. The workshop was structured around eight research themes and facilitated breakout sessions were held to gather input within each theme. Group participants addressed what is known, key data gaps, and research priorities for each theme.

The AYK SSI is a model for collaborative research efforts. It successfully involves all the major stakeholder groups in planning and implementation, and utilizes methods that can be transferred to other freshwater and marine fisheries management programs.

U.S. Coast Guard North Pacific Regional Fisheries Training Center, Kodiak, Alaska

LT DANIEL SCHAEFFER
U.S. Coast Guard North Pacific
Regional Fisheries Training Center
PO Box 190092
Kodiak, AK 99619 USA
(907) 487-5662
DShaeffer@cgalaska.uscg.mil

The current fisheries management system creates a multitude of regulations with the goal of protecting our nation's valuable living marine resources (LMR). Once these regulations are created it falls on the enforcement agencies to safeguard the integrity of the regulatory system by providing effective enforcement.

Effective enforcement instills the confidence of the stakeholders in the management system by ensuring regulations that are created are enforced and applied fairly across the board. Enforcement works to discourage illegal actions and targets bad actors that seek to gain an unfair advantage over regulation abiding fishermen.

The primary at sea fisheries boarding organization is the United States Coast Guard (USCG). The USCG plays a key role in the protection of our nation's living marine resources through aircraft and cutter patrols. The stated USCG LMR goal is to: *"Provide professional and effective law enforcement that promotes a high rate of compliance with the laws and regulations that support the conservation and management of our nation's living marine resources."*

With the focus of fisheries management shifting to an increased emphasis on environmental awareness including MPAs, it is increasingly important to have effective enforcement. The USCG has long prided itself on its ability and willingness to protect man from the sea. With the increased demands on our Nation's LMR the USCG is now also protecting the sea from man.

The USCG has the physical resources to carry out the mission of protecting our nation's LMR but the key to its successes are at the deck plate level. It is our boarding team members and aircrews that conduct the missions.

In 1993, the Coast Guard completed a comprehensive study of its fisheries enforcement program. This study identified a need for "enhanced fisheries enforcement training." To address this need, the North Pacific Regional Fisheries Training Center (NPRFTC) and four other training centers were established nationwide. NPRFTC trains 850-1000 students each year on the intricacies of enforcing LMR regulation in the Alaskan region. The school also plays host to several international events including NPAFC, US/Russian delegation visits and annually hosts a shiprider from the People's Republic of China (PRC) in support of High Seas Drift Net missions. This past spring NPRFTC conducted training for 14 PRC enforcement personnel.

NPRFTC's training focuses the efforts of the boarding teams to meet the three tenets of Alaskan fisheries boardings:

1. Ensure the Safety of Life at Sea
2. Protect the Resource
3. Maintain a Level Playing Field

The students are trained through a combination of training methods including courses held at NPRFTC and at unit's homeports. For recently trained cutters an NPRFTC instructor will deploy with them to provide follow on training and evaluate the effectiveness of the resident training.

Another important function of NPRFTC is to foster improved relations between the USCG, other fisheries agencies, and the fishing industry. NOAA Fisheries and State of Alaska enforcement personnel regularly participate as students and guest speakers during training courses.

NPRFTC has an industry guest speaker program where members of the local fishing community have the opportunity to tell Coast Guard boarding personnel how Coast Guard fisheries enforcement impacts their operations and to give them a glimpse into the life of a commercial fisherman. This professional exchange of views fosters respect and understanding, and enhances our mutual goal of preserving Alaska's LMR. In addition, NPRFTC instructors work with NOAA Fisheries to train fishermen on maintaining their federal fisheries logbooks during fishing industry trade shows several times each year. Input and feedback from fishermen at these trade shows, and after Coast Guard at sea fisheries boardings, is used to improve our training product.

The role of the fisheries training centers in managing our nation's LMR is often overlooked but is valuable in tempering the boarding teams and focusing their efforts on regional specific regulations, trends and policies. Through the Training Centers the boarding teams gain knowledge and perspective which are essential in maintaining positive cooperation with industry and regulators. These relationships are the key to effective LMR enforcement. The National Fisherman magazine highlighted the success of the NPRFTC in Kodiak in the June 2001 issue. The lead in to the article was, "You don't hear Kodiak fishermen bashing the Coast Guard. The North Pacific Regional Fisheries Training Center is one reason why."

Protecting Sensitive Deep-sea Canyon Habitats through Fisheries Management: A Case Study in the Northeastern United States

LESLIE-ANN S. MCGEE
DEIRDRE V. BOELKE
New England Fishery
Management Council
50 Water Street, Mill 2
Newburyport, MA 01950 USA
(978) 465-0492
LeslieAnn.McGee@nefmc.org

DAVID STEVENSON
National Marine Fisheries Service
Northeast Regional Office
Habitat Conservation Division
1 Blackburn Drive
Gloucester, MA 01930

ROBERT N. REID
National Marine Fisheries Service
Northeast Fisheries Science Center
Ecosystems Processes Division
Coastal Ecology Branch
NOAA Fisheries
Howard Laboratory
74 Magruder Rd.
Highlands NJ 07732

The New England Fishery Management Council (lead) and the Mid-Atlantic Fishery Management Council have proposed to close Oceanographer and Lydonia Canyons to minimize the potential impacts of the directed monkfish fishery on deep-sea canyon habitats under Amendment 2 to the Monkfish Fishery Management Plan. This Amendment proposes to re-establish a monkfish fishery in offshore waters on the edge of the continental shelf near the heads of several deep-sea canyons. Within these canyon habitats, a variety of species — including deep-sea corals — have been found which are known to provide structured habitat and shelter for some species of demersal fish and invertebrates. Deep-sea corals are known to exist in some of the submarine canyons in the area that is identified for increased offshore fishing under this amendment. Corals are not currently included in the EFH descriptions for any species in the Northeast region; however, deep-sea species of coral grow on hard substrates and are particularly vulnerable to damage or loss by bottom trawls and gillnets.

The possible expansion of the offshore monkfish fishery — either spatially into new areas or in terms of increased fishing intensity in existing areas — increases the probability of adverse impacts to EFH, canyon habitats, and, thus, deep-sea corals. These closures are intended as a precautionary measure to prevent any potential direct or indirect impacts of an expanded offshore monkfish fishery on EFH and offshore canyon habitats. EFH is designated for juvenile and/or adult life stages of six species within portions of the two areas proposed for closure: redfish, tilefish, and four species of skate. EFH for all these species is defined to include hard substrate in depths greater than 200 meters and has been determined to be moderately or highly vulnerable to the effects of bottom trawls and minimally vulnerable to bottom gillnets.

By avoiding any direct adverse impacts of bottom trawls and gill nets on EFH for six species of fish and any indirect adverse impacts on hard bottom substrates and species of emergent epifauna, adverse impacts of an expanded offshore fishery would be minimized. The Councils asserted that there are several statutory and regulatory authorities that support the Councils' initiative to protect deep-sea coral habitats, and since the fishery is not operating in these two areas at present, there would be no negative economic impacts on the industry; therefore, this proposal is practicable.

Cooperative Research to Improving Science: Development of Fishermen-based Stock Assessment Survey Methodology

GUY FLEISCHER
PATRICK RESSLER
NMFS, Northwest Fisheries
Science Center
7600 Sand Point Way NE
Seattle, WA 98115 USA
Guy.Fleischer@noaa.gov
Patrick.Ressler@noaa.gov

VIDAR WESPESTAD
Pacific Whiting Conservation
Cooperative
4039 21st West, Suite 400
Seattle, WA 98199 USA
vidar@worldnet.att.net

Widow rockfish, *Sebastes entomelas*, is one of several important west coast rockfish species. Widow rockfish is a target species for groundfish trawlers and a bycatch species in the Pacific whiting fishery. Widow rockfish were reduced in abundance through a combination heavy fishing in the 1980s and poor ocean productivity in the 1990s. Widow rockfish are difficult to assess via standard trawl surveys due to their association with non-trawlable grounds. Until recently the only quantitative assessment data came from indices of abundance based on catcher-processor bycatch in the whiting fishery and a juvenile rockfish survey along the central California coast. Since 1997, the catcher-processor index has ceased to be a measure of abundance because of changes in fishing patterns has lead to avoidance of areas of widow rockfish abundance.

With the juvenile rockfish survey the only quantitative data it is difficult to determine the status of widow rockfish. They are currently classed as overfished, but suggestions of increased recruitment in recent years stock abundance is expected to increase. To measure expected increases,

PETE LEIPZIG
Fisherman's Marketing
Association
320 2nd St., Suite 2B
Eureka, CA 95501 USA
pete@trawl.org

and to monitor future stock status, new methods of assessment are needed. A first step in this process was the establishment of an industry-government panel to assess the potential for new methods and the overall feasibility of abundance estimation. Canadian work indicates that widow rockfish can be assessed with acoustics. The combination of new technology and fishermen participation indicate that assessment of this species may be tractable and surveys can be conducted and analyzed cooperatively by fishermen and scientists. This work is on-going, with experimental work on methodology in progress we expect to have a fully functional operation within the next two to three years.

Albacore Tuna – Tracking the Transpacific Odyssey through National and International Cooperative Research

SUZY KOHIN
JOHN CHILDERS
Southwest Fisheries Science Center
8604 La Jolla Shores Drive
La Jolla, CA 92037-1508 USA

VIDAR WESPESTAD
American Fisherman's
Research Foundation
12131 8th Pl. W.
Lynnwood, WA 98036 USA
(425) 672-7603
vidar@worldnet.att.net

In recent years a cooperative archival tagging study has been developed between NMFS and American Fishermen's Research Foundation to better understand the distribution, migration pathways, and to collect biological and behavioral data for Albacore tuna. Japan has also released archival tags and has recovered some tagged fish. State of the art electronic tags record depth, temperature and positions. To date, tags have been deployed in the area between Point Conception and Guadalupe Island and off the Columbia River. Through October, 2004 15 recoveries have been made from fish released 5-20 kg., and the time-at-liberty of recovered fish have ranged from 82 to 422 days. Most fish that were out over the winter remained along the Mexico and California coasts. One was released off San Diego and recaptured off the Columbia River. The recovery data show complex behavior and a potentially more complex migration patterned than previously thought. The results of tagging also suggest that perhaps there could be multiple stocks of albacore in the North Pacific.

Commercial Vessel Acoustic Data: A Tool to Analyze Fishery Parameters and Fishing Behavior

STEVE BARBEAUX
MARTIN DORN
JIM IANELLI
NOAA Fisheries
Alaska Fisheries Science Center
7600 Sand Point Way NE
Seattle, WA 98115 USA
Steve.Barbeaux@noaa.gov

VIDAR WESPESTAD
Pacific Whiting Conservation
Cooperative
4039 21st West, Suite 400
Seattle, WA 98199 USA

TERRY QUINN
Juneau Center for Fisheries
& Ocean Sciences
University of Alaska Fairbanks
11120 Glacier Highway
Juneau, AK 99801 USA

Recent technological advances allow placement of scientific-quality echosounders on commercial fishing vessels and recording of the acoustic backscatter from these echosounders for subsequent analysis. Potential applications of this new data source are now being explored and include conducting informal surveys for real-time management of fisheries on spawning stocks, investigating the foraging behavior of fishing fleets, and studying spatial and temporal patterns of fish and zooplankton distribution. Here we report on a project to log acoustic backscatter data on midwater trawlers fishing for walleye pollock in the eastern Bering Sea, with the objective of evaluating fishing impacts on endangered Steller sea lions. Since our interest is in fine-scale spatial and temporal changes in abundance (i.e., tens of kilometers and weeks), work to date has focused on evaluating the spatial coverage of the data, and examining the general characteristics of cruise tracks and uncalibrated backscatter (UBS) data.

The Alaska Fisheries Science Center (AFSC) in cooperation with the fishing industry, the Pollock Conservation Cooperative Research Center (PCCRC) and the Pacific Whiting Conservation Cooperative (PWCC) has begun a project to collect and store acoustics data collected by the fishing fleet during fishing operations. The first phase of the project was to design and implement a system which would collect data from the fishing vessels with little to no impact on fishing operations. Since January 2002 we have successfully collected 1.2 terra-bytes of raw acoustic data from eight commercial fishing vessels equipped with Simrad ES60 echosounders operating in the United States' Bering Sea pollock and west coast Pacific whiting fisheries.

The second phase of this project was to test whether we could successfully calibrate an ES60 echosounder and correct for a systematic triangle-wave error to within acceptable bounds. On June 18 and 19, and again on October 4, 2004 we successfully conducted two separate calibration studies in Elliott Bay, Washington aboard the *F/V American Dynasty* a 272-foot, 3,480-ton, factory trawler. This was the first calibration study of an ES60 in the North Pacific and the first anywhere on a vessel of this size. The sheer size of the factory trawler vessels in the Pacific whiting and pollock fisheries pose a significant obstacle to calibration studies.

The third phase of this project is to use the commercial acoustic data to investigate intra-annual movement and potential localized depletion of pollock and Pacific whiting due to commercial fishing. Since our interest is in fine-scale spatial and temporal changes in abundance (i.e., tens of kilometers and weeks), work to date has focused on evaluating the spatial coverage of the data, and examining the general characteristics of cruise tracks and both calibrated and uncalibrated backscatter (UBS) data. These data in combination with Alaska Region Vessels Monitoring System (VMS) and North Pacific Groundfish Observer Program (NPGOP) data are being used to model and visualize vessel movement in relation to UBS in three dimensions. Further work will concentrate on expanding this modeling and visualization effort to a fourth dimension, a temporal analysis of the data, which will allow us to investigate the affects of commercial fishing on UBS (a proxy for walleye pollock and Pacific whiting aggregations).

Magnuson-Stevens Act Regional Approach to Governance Best for Fishery Management

DAVID BENTON

Marine Conservation Alliance
PO Box 20676
Juneau, AK 99802-0676 USA
(907) 523-0731
davebentonmca@ak.net

The U.S. Commission on Ocean Policy (USCOP) recognized the need for adopting a regional approach to managing ocean resources. The case for regional management is most acute in the realm of fisheries management where biological, social, and economic conditions across the nation call for vastly different solutions. The Magnuson-Stevens Act (MSA) is the primary statute that establishes the nation's fishery management regime. For over a quarter of a century, the MSA has provided the framework for one of the most successful fishery management programs in the world. However, new initiatives would change the basic framework of the nation's fishery management system. The poster will identify several characteristics of a strong and responsive management process. It will discuss the recommendations of the USCOP, and compare them to the existing MSA framework. The poster will look at the strengths of the existing regional approach, and recommend steps to improve fisheries management.

Marine Research in the North Pacific

DAVID BENTON

Marine Conservation Alliance
PO Box 20676
Juneau, AK 99802-0676 USA
(907) 523-0731
davebentonmca@ak.net

The United States Commission on Ocean Policy (USCOP) report calls for a national marine science program on par with the nation's space program. The Commission recognized that the single best way to improve management of the marine ecosystem is to expand the base of reliable scientific information about how that ecosystem works. From meteorological data, to more comprehensive understanding of the life cycles of marine organisms, to baseline mapping of marine habitats, we need continued, expanded, and ongoing basic peer-reviewed research to better understand this complex ecosystem.

No one has a stronger interest in better understanding the marine ecosystem than the people and communities that depend on the ocean for their livelihoods. The poster will describe steps the seafood industry and the Marine Conservation Alliance (MCA) are taking to improve scientific understanding through:

- Increasing government agency research budgets;
- Increasing private support for research;
- Publicizing important projects and new discoveries; and
- Building new collaborations among interested groups to further research.

The poster will describe how MCA sponsors presently support a wide variety of research efforts. The poster will also discuss actions that can be taken to strengthen national research programs including steps to implement recommendations of the U.S. Commission on Ocean Policy.

Ecosystem-based Fishery Management in the North Pacific: A Practical Approach to Management

DAVID BENTON

*Marine Conservation Alliance
PO Box 20676
Juneau, AK 99802-0676 USA
(907) 523-0731
davebentonmca@ak.net*

The United States Commission on Ocean Policy (USCOP) strongly recommends moving towards an ecosystem based approach to management. In fisheries, there is a pressing need to develop a consistent set of operational functions that lead to reasonable and timely decisions. The National Research Council presented a framework to evaluate fisheries management regimes to ensure that ecosystem considerations are accounted for. The North Pacific Fishery Management Council incorporates procedures and techniques that meet or exceed National Research Council strategies. The poster will describe how the Council works to ensure sustainable ecosystems as discussed by the NRC, i.e., “rebuild and sustain populations, species, biological diversity, so as not to jeopardize a wide range of goods and services from marine ecosystems, while providing food, revenue and recreation for humans.” The poster will also explore the eleven characteristics of an ecosystem-based approach to management presented by the NRC and suggest practical steps leading to improved fisheries management regimes.

Healthy Marine Habitat – Foundation of North Pacific Fisheries

DAVID BENTON

*Marine Conservation Alliance
PO Box 20676
Juneau, AK 99802-0676 USA
(907) 523-0731
davebentonmca@ak.net*

National concern over the health of the oceans has become one of the most important and hotly debated conservation topics in recent years. Concerns over the impacts of fishing on marine habitat feature prominently in this debate. No one is more concerned with the long-term health of the North Pacific and its vast and diverse resources than the people whose lives and livelihoods depend on them. The Marine Conservation Alliance wants and believes we can have sustainable fisheries, good jobs from a healthy seafood industry, and prosperous, livable coastal communities. The cornerstone of all those goals is healthy marine habitat.

Throughout the debate regarding oceans conservation, it has become apparent that the most successful governance system is the one closest to the people, the region, and the fishery being governed. National standards and goals as established by the Magnuson-Stevens Fishery Conservation and Management Act provide a useful model for regional decision making, and the North Pacific region has demonstrated how effective coordinated local, state, and regional fishery management systems can be. The poster will describe how the regional fishery management council system and the mandates of the Magnuson-Stevens Act provide an effective regionally based decision making structure to designate and protect important marine habitat. The poster will also describe conservation actions taken in the North Pacific to protect marine habitat from the effects of fishing, including proposals to protect deep-water corals in the Aleutian Islands.

Mapping the Distribution of Structure-forming Invertebrates off the U.S. West Coast

CURT E. WHITMIRE
M. ELIZABETH CLARKE
NOAA Fisheries
Northwest Fisheries Science Center
2725 Montlake Blvd. E
Seattle, WA 98112-2097 USA
(206) 860-5616
elizabeth.clarke@noaa.gov

Cold-water corals (e.g., Orders Scleractinia, Antipatharia, Gorgonacea) and other structure-forming invertebrates (e.g., sponges) likely play important ecological roles in continental shelf and slope ecosystems and may be indicators of long-term environmental conditions. Despite growing interest from researchers, conservation organizations, and policymakers, a debate continues as to whether or not these organisms provide a structural component to essential fish habitat. To date, there exist no regional surveys of structure-forming invertebrates off the U.S. West Coast. However, we have compiled an extensive database of observations on benthic invertebrates from ongoing regional bottom trawl surveys conducted by NOAA Fisheries over the past three decades. Although bottom trawls are not designed to target megafaunal invertebrates, over 3,000 catch samples of corals, sponges, and anemones have been recorded. These maps are being used as a starting point to inform management decisions that are designed to protect biogenic habitats and essential fish habitat. An additional objective was to use these maps to assist in the design of targeted surveys to investigate potential fish-invertebrate associations. In the fall of 2004, we used this information to design and complete such a pilot survey. The goal of this project was to develop an integrated map of fishes, oceanography, structure-forming invertebrates and geology using the most advanced technologies.

Cooperation – A Critical Component to Improved Science for Fisheries Management

M. ELIZABETH CLARKE
JOHN HARMS
NOAA Fisheries
Northwest Fisheries Science Center
2725 Montlake Blvd. E
Seattle, WA, 98112-2097 USA
(206) 860-5616
elizabeth.clarke@noaa.gov

As part of NOAA fisheries' increased focus on cooperative research, the Northwest Fisheries Science Center (NWFSC) and the west coast fishing community for a number of years have cooperated in innovative ways to address critical west coast fisheries research challenges. The result has been improved science for the management of west coast groundfish. The NWFSC coordinates NOAA Fisheries' Groundfish Program on the West Coast, which includes groundfish surveys, an observer program, ecosystem and habitat surveys, and stock assessments. The NWFSC cooperative research program is unique since it is designed as a mosaic that provides opportunities for many sectors of the fishing industry, from boat owners to crew, to participate in many facets of fisheries research. Cooperative projects are supported in several key areas. (1) A port liaison project was developed to involve individual fisheries in research with academia as well as government. As part of the port liaison project, local leaders in several west coast communities have been selected to facilitate the matching of fishers with research. This unique project supports individual fisher's participation in research with academia as well as government. (2) Since 1998, the Center has conducted a variety of surveys using chartered, local commercial fishing vessels to target ecologically and economically important groundfish populations along the entire West Coast. Owing in part to the successful cooperation in these surveys, the industry now is partnering with the Center in the design of new surveys. (3) The Center, in partnership with the Pacific States Marine Fisheries Commission, also created a program to fund industry initiated research proposals. This program puts industry expertise in the forefront of all phases of research — from design to completion. These three components of the cooperative research program are linked by an outreach project, which has as its basis a web site that is a clearinghouse for cooperative research on the west coast. Each of these cooperative efforts has effectively leveraged resources and created important opportunities and collaborations that have benefited and improved fisheries research on the west coast.

Promoting Social and Cultural Sustainability of Marine Resource Conservation and Management in the Northeast

PATRICIA PINTO DA SILVA
JULIA OLSON
PATRICIA M. CLAY
LISA L. COLBURN

NOAA Fisheries
166 Water Street
Woods Hole, MA 02543 USA
(301) 713-2328
patricia.pinto.da.silva@noaa.gov
patricia.m.clay@noaa.gov

The Social Sciences Branch (SSB) of the National Marine Fisheries Service, Northeast Fisheries Science Center (NEFSC) seeks to promote social and cultural sustainability in relation to the use of renewable marine resources in the Northeastern U.S. This poster describes current research initiatives designed to improve our understanding of the structure and function of individual, household, and industry marine resource use through primary and secondary data collection and analysis. Specifically, it presents brief overviews of a number of interrelated initiatives currently being carried out by SSB staff and contractors, as well as providing some background on this evolving program and identifying key mandates and goals. Many of the research efforts underway are related to National Standard 8 of the Sustainable Fisheries Act of 1996, including the generation of community profiles — both brief and in-depth — for subsets of all communities in the region involved in fishing, mapping of intra-regional variation, and studies on subsistence fishing, environmental justice and the role of women in fishing-related activities. These will provide subject matter data and also be used in formulating the restrictive subset of “fishing communities” (Sec. 3 Definitions 16 U.S.C. 1802) which will receive special consideration under National Standard 8 with regard to regulatory processes.

Development of a Spatially-Explicit Ecosystem Model to Examine Effects of Fisheries Management Alternatives in the Northern California Current

P.S. LEVIN
C.J. HARVEY
E. BRAND

NOAA Fisheries, Northwest
Fisheries Science Center
Fisheries Resource Assessment
and Monitoring Division
Seattle, WA 98112 USA
(206) 860-3473
phil.levin@noaa.gov

TIMOTHY ESSINGTON
University of Washington
Seattle, Washington

E.A. FULTON
A.D.M. SMITH
CSIRO Australia

Decision analysis is intimately associated with the analysis of uncertainty: given uncertainty about future behavior of a system, what policies are most robust over the full suite of alternative future conditions? Classic fisheries science, which relies on single-species population models, has been criticized by some as inadequate for fisheries decision analysis because it considers one possible effect of fisheries policy (i.e., fishing affects abundance and age structure which, in turn, affects yield). In contrast, ecosystem-based management recognizes a broader suite of system responses, and explicitly recognizes that fish stocks respond to underlying yet unpredictable ecosystem dynamics (e.g., irreducible uncertainties) and that fishing itself can induce ecosystem changes. Thus, decision analysis frameworks ideally explore responses of populations to fishing under alternative scenarios of ecosystem forcing and fishing-mediated ecosystem change.

Do we presently have the tools to predict all elements of marine ecosystems? Absolutely not, and it is exceedingly unlikely that such a case will ever arise. Do we presently have the tools to identify potential ecosystem responses and behaviors? Fortunately, we have considerable and expanding expertise. Our knowledge of food web processes in marine ecosystems continues to grow, building a strong conceptual framework of the types of food web relationships that are common, rare, and most importantly, dangerous in the context of fisheries management. What is presently lacking, however, is an integrated modeling framework that can be used to (1) synthesize this information; (2) analyze possible ecosystem responses; and (3) identify key processes that govern ecosystem condition.

We are developing such a modeling framework for the Northern California Current Ecosystem (NCCE). Our approach explicitly estimates the ecosystem and population-level consequences of various fisheries management alternatives in the face of a varying environment. ATLANTIS, a modeling approach developed by CSIRO scientists in Australia, achieves the crucial goal of integrating physical, chemical, ecological, and fisheries dynamics in a three-dimensional, spatially

explicit domain. In ATLANTIS, marine ecosystem dynamics are represented by spatially-explicit sub-models that simulate hydrographic processes (light- and temperature-driven fluxes of water and nutrients), biogeochemical factors driving primary production, food web relations among functional groups, and the model represents key exploited species at the level of detail necessary to evaluate direct effects of fishing. The ATLANTIS model is thus ideally suited for ecosystem-based decision analysis.

The overarching goal of this project is to develop a model that allows users to examine the effects of large-scale management efforts against a backdrop of environmental variability resulting from climate events, seasonal changes, oceanographic dynamics, food web interactions, and fisheries. To achieve this goal, we are (1) collating data for the processes and functional groups included in the model; (2) defining the spatial structure of the NCCE; and (3) simulating behavior of the NCCE under alternate fisheries management policies and environmental regimes.

How Does Stochasticity Change Our Perception of the Effectiveness of Fishery Management Strategies?

PANAYIOTA APOSTOLAKI
Cooperative Institute for Marine
and Atmospheric Science
Rosenstiel School of Marine
and Atmospheric Science
University of Miami
4600 Rickenbacker Cswy.
Miami, FL 33149 USA
(305) 421-4831
yapostolaki@rsmas.miami.edu

ELIZABETH BABCOCK
Pew Institute for Ocean Science
Rosenstiel School of Marine
and Atmospheric Science
University of Miami
4600 Rickenbacker Cswy.
Miami, FL 33149 USA

MURDOCH McALLISTER
Imperial College
Dept. of Environmental Science
and Technology, RSM Building
Prince Consort Road
London, UK, SW7 2BP

The large uncertainties over the dynamics of resource systems have increasingly led to the use of probabilistic modeling in the provision of model-based fishery management advice for decision-making. However, deterministic analysis still remains the easiest and quickest approach to formulate model-based management advice. Here, a sophisticated Bayesian modeling framework is used to contrast deterministic and probabilistic modeling methods in evaluations of the potential consequences of alternative fishery management measures such as spatial and temporal closures, size-specific regulations, etc. We thereby assess how model-based fisheries management advice may vary between deterministic and probabilistic analyses of system dynamics and what the implications of these variations could be for decision-making. Using data for the sandbar shark (*Carcharhinus plumbeus*) population off the eastern coast of the U.S. it is shown that management approaches which according to deterministic calculations appear to be the most effective are not so when uncertainty in the population dynamics is taken into account. The analysis also suggests that the results of deterministic analysis could be misleading and shows that increasing the level of realism in the simulation of the system of interest should be made a priority in fisheries management evaluation.

ESA Section 7 Consultation Hawaii Pelagic Longline Fishery: A “No Surprises” Approach

TAMRA FARIS
BRANDEE GERKE
NOAA Fisheries
Pacific Islands Regional Office
1601 Kapiolani Blvd., Suite 1110
Honolulu, HI 96814 USA
(808) 973-2937
Tamra.Faris@noaa.gov

NOAA Fisheries has devised a new way of doing business to address problems with unnecessary delays, unpredictable outcomes, and lack of accountability. The process of regulatory streamlining seeks to develop and apply standardized practices to improve the quality and efficiency of regulatory decisions and raise the likelihood of success in litigation. A key ingredient to this “no-surprises” approach is “frontloading”, which requires the active participation of all regional, science center, and Council staff in key responsibilities (e.g., sustainable fisheries, protected resources, habitat, economics, legal review) at the early stages of fishery management action development.

The federally managed Hawaii Pelagic Longline Fishery is a case study for the “frontloading” approach. Adverse impacts to sea turtles have long been conservation concerns in the fisheries

authorized under the Pelagics Fishery Management Plan (FMP) of the Western Pacific Region. Recommendations from the Western Pacific Fishery Management Council concerning sea turtle mitigation triggered several consultations under section 7 of the Endangered Species Act (ESA) to assess impacts of these actions on all ESA listed species taken by the fisheries. Actions to mitigate interactions between the Hawaii-based longline fishery and sea turtles include: differentiation of the fishery into deep-set and shallow-set components, spatial and temporal gear restrictions, fishing gear modifications, trip catch limits, and requirements that fishers receive training in sea turtle handling and resuscitation protocols and carry equipment necessary to release hooked or entangled sea turtles.

During 2004, the Hawaii-based deep set longline fishery's take of olive ridley sea turtles exceeded the current amount specified in the incidental take statement, necessitating another formal Section 7 consultation by NOAA Fisheries. To ensure a "no-surprises" approach, this consultation is being managed using concepts related to regulatory streamlining such as: preparing the biological opinion openly and transparently with input from the applicant and the Western Pacific Fishery Management Council, establishing accountable teams of scientists and managers, and utilizing credible staff trained in administering the ESA, MSA, NEPA, and other laws and Executive Orders. The desired outcome of these efforts is early identification and resolution of concerns; providing the action agency and applicant t opportunities to modify or "frontload" their action to mitigate impacts to listed species.

Amending the Halibut/Sablefish IFQ Program to Accommodate the Needs of Small Coastal Communities

PHIL SMITH

NOAA Fisheries, Alaska Region
PO Box 21668
Juneau, AK 99802-1668 USA
(907) 586-7344
Phil.Smith@noaa.gov

In early 2004, a Final Rule was published that amended the terms of the halibut and sablefish Individual Fishing Quota (IFQ) program to allow small coastal communities to enter the Quota Share (QS) market by forming non-profit corporations to receive, hold, and fish the IFQ harvest privilege on behalf of community residents. Forty-two Alaska coastal communities are eligible to participate in the program and some have already take the first steps to do so. The State of Alaska, Department of Commerce, Community, and Economic Development obtained special legislative authority to lend funds to these new entities to purchase the shares. The program contains specific elements that protect existing program participants, and insures that individual opportunities to enter the fisheries are not diluted.

Measuring Coastal "Fishing Power" – Determining and Displaying QS (Quota Share) Holdings of Persons Who Live in Gulf of Alaska Communities Proximate to the Halibut and Sablefish Fisheries

ALEXANDER KOTLAROV

PHIL SMITH

NOAA Fisheries, Alaska Region
PO Box 21668
Juneau, AK 99802-1668 USA
(907) 586-7344
Phil.Smith@noaa.gov

In the late 1990s, the North Pacific Fishery Management Council was petitioned to consider changes to the halibut/sablefish Individual Fishing Quota (IFQ) that would allow Gulf of Alaska coastal communities to more fully participate in the benefits of the program. Proponents of the change cited anecdotal evidence that the "fishing power" (as measured by QS held by community residents) in such communities was declining because QS holders were transferring their shares to persons outside the communities (or were relocating).

Testing that premise, and determining whether a trend exists has required longitudinal analysis of existing data on permit holdings, fishing activity, and gross earnings by residents in the subject

communities. Early analysis was accomplished by the State of Alaska Commercial Fisheries Entry Commission, while data through year-end 2004 have been prepared by the Restricted Access Management Program of the Alaska Region, NOAA Fisheries Service.

Aleutian Islands Trawlers' Perspectives on the Recently Approved Bottom Trawl Open Area

JOHN GAUVIN

Gauvin and Associates, LLC
2104 SW 170th Street
Burien, WA 98166 USA
(206) 660-0359
gauvin@seanet.com

The Aleutian Islands has one of the most rugged and unforgiving seafloors in the world. In addition to highly varied bathymetry characterized by rocky ledges and gullies dotted with jagged pinnacles, dense coral stands are often found along banks and steep slope areas. Claims have been made that trawls and other fishing gears cause extensive damage to coral habitat in the Aleutian Islands and then move to new fishing areas. In the end, no one really knows the degree to which trawling areas overlap with coral habitats in the Aleutian Islands. This is because only very limited undersea mapping has occurred over the 1,000 plus mile long stretch of remote island archipelago. The limited submersible dives that have occurred have produced extensive video footage of undisturbed coral gardens. But corals and bryozoans do occasionally show up in observers' samples of trawl hauls and fixed gear sets. When these samples are extrapolated from percentage of sample weight to overall weight in the haul, these expansions amount to tons of extrapolated coral bycatch.

The recent discussion of deep-water corals in the Aleutian Islands has been a polarized one. The debate in front of the North Pacific Council has covered such topics as the validity of coral bycatch extrapolations, the inherent protection that corals get given the natural inclination to avoid damaging fishing gear, and the degree to which corals are already protected by existing sea lion protection measures affecting trawl fisheries. Additionally, Aleutian Islands groundfish stocks have remained healthy and trawling has remained productive in the same areas for more than fifty years. The overall "footprint" of the trawl fishery in the Aleutians is a small fraction of the overall extent of the shelf and slope of that area. In the end, however, this debate essentially boiled down to the issue of how precautionary should managers be in protecting corals as part of essential fish habitat in the Aleutian Islands. Scientists reviewing this issue have pointed out that corals are very long-lived and their function as habitat for groundfish occurring off Alaska is poorly understood. What is known, however, is that some groundfish species are often found in close proximity to rocky habitat containing coral stands. Given the unknowns, the bottom trawl industry gradually accepted the need to craft a proactive solution or risk being forced to accept someone else's notion of a fix.

In searching for a viable outcome, trawlers found a foothold in the basic tenet of a proposal by an environmental group to keep trawlers within their historically productive fishing grounds. This was viewed as a reasonable approach for Aleutians trawlers because save for sea lion protection regulations, trawling had not appreciably moved to new locations over the last fifty years. From the trawler's perspective, however, the environmentalists' original "open area" proposal had unworkable components such as coral bycatch caps that would have required reliance on extrapolated estimates of coral bycatch from observer basket samples. Equally infeasible were reductions in groundfish catch quotas and the proposed boundaries for the area remaining open to trawling. Data from fishermen's plotters showed that the proposed "open area" included extensive grounds that had never been fished while omitting grounds that have been relatively important.

While fishermen believe that the concept of an "open area" makes virtually no sense for the Bering Sea because groundfish continually move across the broad shelf in response to swings in food and temperature (a system constantly in flux), the Aleutian Islands was a different situation. In the Aleutian Chain, groundfish appear to respond to the water flows through the island passes

this pipeline of food and temperature conditions has persisted. But in embracing the concept, the real work focused on how to delineate the open areas. The “official” NMFS fishing location data contained only trawl retrieval positions. Assumptions about random starting positions were unacceptable because fishermen set gear systematically in response to currents and bathymetry.

Despite these obstacles, an *ad hoc* working group of Aleutian Islands trawlers in conjunction with the Groundfish Forum and the Marine Conservation Alliance developed an “open to bottom trawling area” based on the environmentalist’s basic idea of keeping fishing where it has historically occurred. This restriction would then be in place until coral mapping is done to evaluate the overlap of trawling with coral abundance. To fashion their proposal, fishermen brought their GPS plotter data and logbook catch information to the table. A big roadblock among fishermen was that these previously well-guarded tow tracks might become available to their fellow fishermen who might become new participants in their fisheries with this information.

In the end, trawlers successfully developed a workable set of boundaries around historically fished areas. These were presented to fishery managers in December of 2004. From there, the North Pacific Council approved a set of delineated open areas with only minor modifications to the boxes put together by fishermen. The “open area” effectively closes >65% of the fishable depths in the Aleutian Islands to bottom trawling. Approved by the Council in February of 2005, the proposal is now pending final approval by the Secretary of Commerce. Following the North Pacific Council’s approval of the proposed measures, environmentalists hailed this action as a huge step forward for coral protection.

Avoiding Salmon Bycatch: Fishery Cooperatives and the Development of Bycatch Management Contracts

KARL HAFLINGER

Sea State, Inc.
P.O. Box 74
Vashon, WA 98070 USA
(206) 463-7370
karl@seastateinc.com

Conventional area closures or combined time-and-area closures may work well for controlling bycatch if non-target species are predictably associated with defined habitat. However, most species for which bycatch is a concern in the Bering Sea are migratory, with movements that are often unpredictable. Developing a system of “hot spot” avoidance measures is a seemingly obvious answer to this bycatch problem, but implementation of such a system as a federal rule is problematic. For example, fleets in the Bering Sea have found that salmon avoidance zones may need to be changed several times per week, which is difficult under federal in-season action guidelines. Also, a nearly universal feeling among fisherman is that there should be some incentives to individual vessels to fish cleanly; however, development of individual incentive programs in Alaska in the past have been hampered by legal issues involving due process. Recently, fishery cooperatives organized to prosecute the pollock fishery have adopted a system of bycatch control measures to which all ten pollock cooperatives bind themselves through an intercooperative contract. This contract contains explicit definitions of conditions leading to closures and definition of the extent and duration of closures, methods for enforcement, penalties for lack of compliance, and incentives for individual performance. The unanimous view from the fleet is that these measures will be much more successful than any simple time/area closures and allow for bycatch reduction while maintaining a profitable fishery.