
Practical Recommendations for Improving the Use of Science in Marine Fisheries Management

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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:

- 1) 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 SSC.
- 2) 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.
- 3) 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.
- 4) 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 appointment, professional certification, and compensation of members.
- 5) Peer review processes should be enhanced overall, following recommendations of the US Commission on Ocean Policy and with the SSC as the primary facilitator for such reviews.
- 6) Strong default measures should be required by NMFS to provide sufficient incentive and pressure to ensure that Councils complete fully adequate FMPs in a timely fashion.
- 7) 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 better the science, the more objective the science, the less politicized the science, and the more this science is used, the better the 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 science 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, concerns and advice on, for example, 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.

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In this paper, we outline practical options for improvements in the ways that the Regional Fishery Management Councils (RFMCs) acquire and utilize science in transparent decision processes involving public fishery resources, based in large part, but not exclusively, on the recommendations of the US Commission on Ocean Policy (USCOP, 2004). Our recommendations are specifically targeted toward helping make the role of scientific information in fisheries management – 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 reasonably 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;

1. a regional approach to fishery management based on geographically defined units that correlated reasonably well with our current understanding of large marine ecosystems;
2. a management process that requires local participation and incorporates local knowledge;
3. a fishery management plan development process that requires incorporation of scientific information; and
4. 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.

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 so-called 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 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 can be incorporated into the existing Council system without great difficulty. The areas are:

- 1) Council membership, appointment and training;
- 2) Adoption of an ecosystem approach to fisheries management;
- 3) Application of a precautionary approach to fisheries decision-making;
- 4) Substantial strengthening of the Scientific and Statistical Committees of the Councils, with expansion of their responsibilities;
- 5) Enhancement of scientific peer review processes;
- 6) Establishment and implementation of default measures as a response to inadequate fishery management plans; and
- 7) Increased research targeted toward management information needs.

COUNCIL MEMBERSHIP, APPOINTMENT, TRAINING AND AUTHORITY

By the nature of their work, Council members are inundated with scientific information, analyses, jargon, mathematical models, and reams of data and pummeled with differing interpretations of scientific information, yet most have little or not 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 interests 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, with the public 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.

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 entities to ensure objectivity in presentation. Private business also frequently offers short courses of all kinds, as do professional societies. The 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 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 filling 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 advisory group members and plan team members 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:

- 1) 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.
- 2) 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.
- 3) establish the training program in a 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
- 4) periodically review and revise the course modules to include new information.

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.

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 become realized (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.

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 is also 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. 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, along 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 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. What is clear from experience to date, is that if the Councils and the agency do not vigorously pursue issues and solutions to problems, someone else will take the lead. Thus, all new FMPs, amendments and plan revisions or updates should be prepared within an ecosystem context, taking 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 not stop activities being undertaken if risks do not appear high, nor activities being prevented 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 and 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” 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).

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 and when the information is uncertain is also an application 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 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 (SSC)

Science informs policy, but it is not policy. For society to have policy that is well grounded on science, it must first have a firm, dependable scientific foundation – not the “shifting sands” of science chosen by one stakeholder group or another for political or short-term economic expediency (Fig. 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 (Fig. 1B).

Figure 1A. Illustration of selection of science that supports one viewpoint as opposed to full consideration of all available information.

Not this:

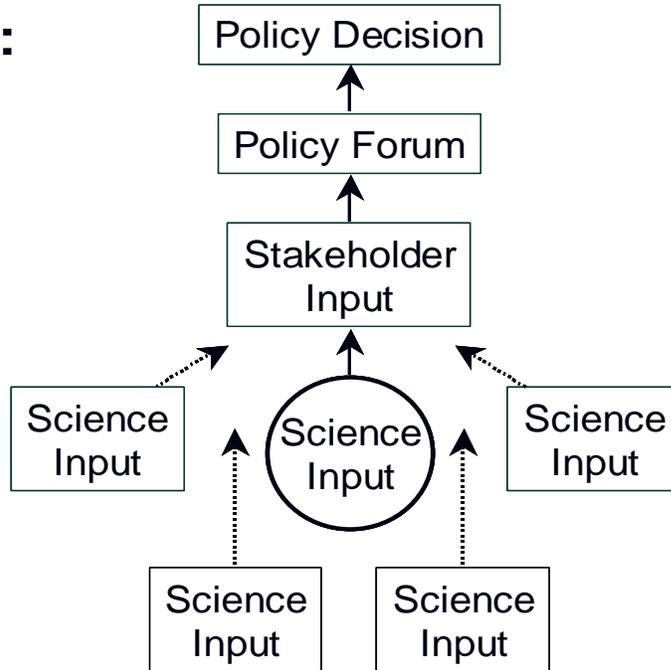
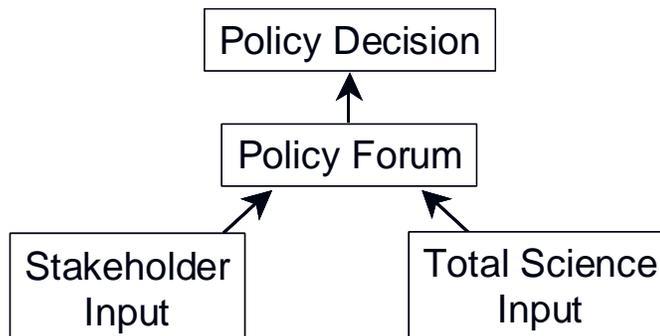


Figure 1B. Illustration of full consideration of the best available science by the SSC in providing information to the Council for decision making.

But this:



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 best available science period (Fig. 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. 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 in fact adhered to. In fact, the Magnuson-Stevens Act as currently written limits the SSC to an advisory role and, as pointed out above and clearly 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;
- retain the SSC within the Council structure, but provide the SSC relative independence in the formulation of its science advice; and
- require that Councils could not change or exceed the ABC determined by the SSC.

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 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. All scientific information to be used by the Council should first be vetted and its peer-review ensured through the respective Council’s SSC. 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, with appropriate uncertainty measures, 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 alternative "conservation equivalencies" (*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 guidelines, 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

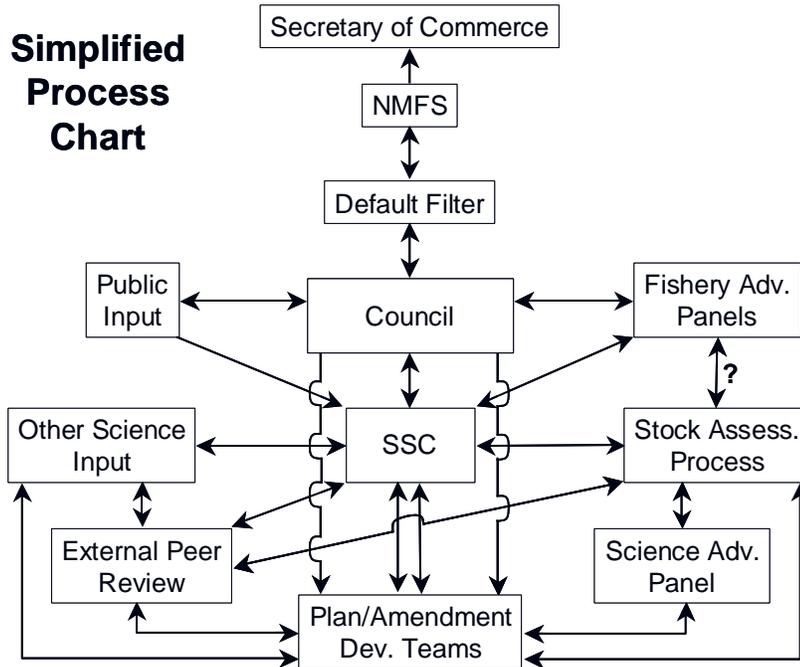
As envisioned by the USCOP, the SSC members would be nominated by the respective Council and then appointed by the same appointing authority as appointed Council members. This would allow the Council to determine the kinds of personnel and expertise needed on its SSC at a given time, but maintain a clear 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 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 (Fig. 2).

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.

Figure 2. A simplified process flow chart illustrating the scientific information clearinghouse functions of a strengthened Scientific and Statistical Committee maintained within a Regional Fishery Management Council system.



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 Scientist” 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.”

Once developed by the AFS (or other credible scientific organization), the process should be vetted through a one-time review by the National Research Council of the National Academy of Sciences.

As we have envisioned it, the certification process for SSC members should include three elements:

1) 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 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, and 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, and we expect that most, if not all, of the persons that Councils would consider for appointment to an SSC already have such certification or would easily meet its requirements. See the AFS (2005) website for more details.

2) 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 base scientific information 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. Development of such a standard could include such things as: (a) neither the nominee or members of their immediate families should not have received or been approved for funds derived directly or indirectly 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., four years); (b) the nominee should not have a “well-formed position or history of advocacy” for a specific viewpoint on a subject relevant to matters likely to be determined or reviewed by the SSC (CIE, 2005); or (c) the nominee should have no other perceived conflict of interest which might affect a perception of impartiality.

3) 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 3-4-year terms, renewable once, with allowance for continuous 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.

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, and, more generally, the Office of Management and Budget (OMB, 2004) reported that “A wide variety of authorities have argued that peer review practices at federal agencies need to be strengthened.” It may be instructive to consider how the OMB (2004) defined and described peer review:

“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 rulemaking 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:

- 1) “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.
- 2) “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 the getting the best reviewers from across the country or internationally and the SSC concentrating on reviewers with both technical competence and regional-specific knowledge.
- 3) “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 Cooperative Fisheries Management Act.

The USCOP (2004) recommended implementation of default measures in two circumstances:

- (1) 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 a plan from going forward simply because the SSC scientists could not come to agreement on an appropriate science-based ABC limit.
- (2) 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:

- (1) accept an FMP (or amendment) as fully adequate, in which case fishing is conducted as specified in the FMP.
- (2) 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., 3-6 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.
- (3) 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., 3-6 mos) for resolution of the issue.

- (4) 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 likely require amendment of the MSA.

ENHANCED RESEARCH

In general, the USCOP (2004) recognized that the US 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. 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 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 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 Marine 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 our recommendations, if put into place by the Councils, NMFS and where necessary by the Congress through amendment of the MSA, 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, and measurable progress toward improving the status of exploited stocks and the ecosystems upon which they depend.

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