

**Summary of the Spring Forum on
Uncertainty and Risk in Fishery Management**

**Duke University Marine Lab
May 2010**

The Fisheries Leadership and Sustainability Forum hosted its fourth successful forum at the Duke University Marine Lab in Beaufort, North Carolina from May 10-13, 2010. Sixteen council members from all eight of the regional fishery management councils contributed a diversity of experience, knowledge and perspectives on the topics of uncertainty and risk in fishery management. We were pleased to welcome returning participants as well as newcomers, including several newly appointed council members.

The Fisheries Forum brought together council members, NOAA Fisheries representatives, scientists and experts from across the United States to openly discuss the challenge of accounting for scientific and management uncertainty and managing risk in fisheries. The presentations and discussions focused on implementing the annual catch limit (ACL) and accountability measure (AM) requirements of the reauthorized Magnuson-Stevens Act (MSRA), and interpreting the recommendations contained in the revised National Standard 1 (NS1) Guidelines.

Our forums apply a variety of teaching methods, both inside and outside the classroom. Our primary teaching tool is the case method, providing council members an opportunity to work through the specifics of a case and apply concepts through small group dialogue. In addition, we bring experts from across the country to give presentations and offer a variety of perspectives. Group discussions allow all participants to share ideas and insights. Finally, we provide time outside the classroom—during meals and field trips—to allow council members and experts get to know each other and share experiences.

The Case Method

The forums use a case study approach, allowing council members from different regions to engage in critical thinking and discussion around a common set of information. The case study serves as a focal point for each forum and enables participants to delve more deeply into key topics. Part 1 of the case study investigated scientific uncertainty, with decision points focusing on allowable biological catch (ABC) control rule approaches, risk policy, and proactive strategies for reducing scientific uncertainty. Part 2 focused on identifying, accounting for and reducing management uncertainty. Participants and experts worked through the case study in smaller breakout groups, then reconvened to debrief and share their results. The full group synthesis and discussion focused on each group's decision-making process and the key information that contributed to the outcomes of their deliberations.

Presentations

The first day of the Forum focused on scientific uncertainty, and featured presentations from leading experts on risk and uncertainty, including:

- Dr. Joseph Powers from Louisiana State University,
- Dr. Rick Methot with NOAA Fisheries' Northwest Fisheries Science Center, and
- Dr. Erik Williams of NOAA Fisheries' Beaufort Laboratory and SAFMC SSC member.

Dr. Powers began the morning's presentations with a broad overview of scientific uncertainty and risk in fisheries management. Dr. Powers reviewed the major sources of scientific uncertainty—data, model/parameter and projection uncertainty—and made the distinction between estimating uncertainty and determining an acceptable level of risk as a policy decision. He also emphasized the importance of considering uncertainty associated with implementing management measures. His presentation set the tone for the forum's discussions by highlighting the need to understand, account and plan for, reduce, and ultimately live with uncertainty in fisheries management.

Dr. Methot discussed the NS1 Guidelines, updated in 2009 to reflect changes to the 2006 MSRA. The NS1 guidelines are intended to guide the implementation of the new MSRA requirements to establish ABC levels, ACLs, and AMs. Dr. Methot provided insight into the relationship among catch reference points, and explained how the regional councils can utilize these reference points to reflect scientific and management uncertainty.

Dr. Williams guided participants through the probability of overfishing (P^*) approach to ABC control rules. The P^* approach characterizes the relationship between ABC and the overfishing limit (OFL) as a function of the allowable probability of overfishing, P^* . The probabilistic approach to ABC control rules is recommended by the NS1 guidelines and has been applied by many of the regional councils. Dr. Williams, who serves on the South Atlantic Fishery Management Council's (SAFMC) Scientific and Statistical Committee (SSC), outlined SAFMC's control rule approach and demonstrated how it would be applied to gag grouper.

The Fisheries Leadership & Sustainability Forum was honored to welcome Dr. Paul Sandifer, Senior Science Advisor to the NOAA Administrator, as our keynote speaker on Tuesday evening. Dr. Sandifer spoke about NOAA's commitment to strengthening science for fisheries management, and focused on the implementation of ecosystem-based management, advances in stock assessment science, and cooperative research.

On Wednesday, the focus of the Forum shifted to management uncertainty, and to developing a broader view of risk. Participants heard presentations from:

- Dr. Mike Orbach, Professor of the Practice of Marine Affairs and Policy at Duke,
- Dr. Jake Kritzer, Senior Scientist at Environmental Defense Fund and NEFMC SSC member, and
- Matt Ruby, fisherman from Seven Seas Seafood in Murrells Inlet, South Carolina.

Dr. Orbach discussed the different facets of risk associated with fisheries policy and management. As a social scientist, Dr. Orbach emphasized that all management decisions, including social and economic as well as biological and ecological, are associated with risk and require managers to acquire information and make tradeoffs. In addition to the more familiar concept of impact risk, Dr.

Orbach discussed review risk (the Department of Commerce review process and the role of Congress), implementation risk (achieving the intended results of management measures), legal risk, and community risk (the councils' relationship with constituents and with one another).

Dr. Kritzer discussed uncertainty and risk in the context of New England fisheries. He began by discussing the tradeoffs between underfishing and overfishing, and emphasized the importance of monitoring in reducing scientific and management uncertainty. Using several case studies of New England fisheries, Dr. Kritzer then introduced issues that may influence the effectiveness of management plans but are not necessarily considered in stock assessment models, including inter-species interactions, fishing-induced evolution, spatial stock structure, demographic structure, and habitat loss.

Matt Ruby provided a stakeholder's perspective on risk and uncertainty. Mr. Ruby focused on the industry's perception of long versus short-term tradeoffs, and discussed fishermen's views of participating in the management process.

Wednesday afternoon included a session on marine spatial planning. Dr. Paul Sandifer provided an introduction to coastal and marine spatial planning within the context of the U.S. Interagency Ocean Policy Task force and its Interim Framework for Effective Coastal and Marine Spatial Planning (CMSP). The interim framework includes seven National Goals and twelve Guiding Principles for CMSP, and outlines the essential elements of developing and implementing CMSP. Dr. Sandifer demonstrated one potential application of marine spatial planning, using an example from the Gulf of Maine where the number of whale strikes was reduced by rerouting shipping lanes around areas of high whale density.

Dr. Larry Crowder, Professor of Marine Biology at the Duke University Marine Lab, discussed next steps in CMSP and the role of the regional fishery management councils. Using ecosystem-based management as an example, Dr. Crowder identified the goals and governance constraints to managing ocean ecosystems for multiple uses. Dr. Crowder reviewed ocean users' perspectives on CMSP and emphasized that the goal of CMSP is not just to plan, but to actively facilitate cross-sectoral spatial management.

Discussion

The discussion segments following the presentations and Part 1 and Part 2 of the case study led to thoughtful conversations. Each of the forum participants contributed a unique perspective based on their experiences in fishery management. Although the fisheries in the case study are fictional, each council member was able to reflect on their experience managing similar challenges in their respective regions and ultimately each group arrived at a different set of decisions.

During the case study synthesis sessions, participants recognized important similarities between their decision-making approaches. All three groups concurred that there was no "correct" way of approaching the different questions posed by the case studies, and that all of these decisions are intertwined as part of the larger discussion of risk policy. Each breakout group took a proactive approach to identifying additional information that could inform their decisions, and made it a priority to explicitly discuss their assumptions. While all of the groups felt that flexibility was an important quality in an ABC control rule and risk policy, there were different opinions even within groups on the best way to do so. Throughout the two-day forum, the case study and presentation discussions reinforced a definition of uncertainty as something managers need to understand,

account for and reduce where possible, but also as a challenge that council members must consider inherent to the management process.

Risk Policy and Uncertainty across the Regions

In addition to the presentations and case study, the Fisheries Forum team consulted with fishery managers from each region to compile a report that provides an overview of the different approaches being considered and/or adopted by each of the eight regional fishery management councils to deal with risk and account for uncertainty in their fishery management framework. The regional summaries examine the progress made by each of the Councils to characterize scientific and management uncertainty and incorporate those estimates into the harvest specification process and associated management measures. The Fisheries Forum recognizes that dealing with risk and uncertainty is on an ongoing challenge and an evolving process. Each summary represents a snapshot in time and served as a foundation for discussion among participants at the spring 2010 Fisheries Forum.

Field Trip

The May 2010 Forum concluded on Thursday with a field trip on the *R/V Susan Hudson*. Dr. Aleta Hohn, Director of NMFS Programs at NOAA's Center for Coastal Fisheries and Habitat Research in Beaufort, met participants for a dockside presentation on current research, including investigations of the invasive Indo-Pacific lionfish, now a common sight throughout the southeastern U.S. and much of the Caribbean. On board the *Susan Hudson*, Dr. Orbach provided a history of the area's commercial and recreational fishing heritage and infrastructure. Participants toured working waterfronts, steamed up the Intracoastal Waterway, and viewed the Rachel Carson Reserve, part of the National Estuarine Research Reserve System (NERRS). The tour concluded with lunch on Shackleford Banks, the southernmost barrier island of the Cape Lookout National Seashore.

The Fisheries Leadership & Sustainability Forum staff would like to thank all of our participants and invited speakers for yet another successful Forum. Risk and uncertainty are challenging and timely topics for all of the eight regional councils, and we hope the discussions that emerged from this Forum proved to be informative for participants. The next Forum, focusing on allocation, will be held September 19-22, 2010 in Monterey, California.

Background Information on the Fisheries Forum: The Fisheries Leadership & Sustainability Forum is a partnership of the Nicholas Institute for Environmental Policy Solutions and the Nicholas School of the Environment at Duke University, the Center for Ocean Solutions managed by the Woods Institute for the Environment at Stanford University, and Environmental Defense Fund, Incorporated. The purpose of the Forum is to assist members of the regional fishery management councils by increasing their understanding of fisheries, ocean science, economics, and policy by convening workshops and providing ongoing support throughout the year.