

Educating Us Fishery Managers And Policy Makers: The Problem Of Incentives

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Abstract. This paper addresses the question of how to equip U.S. managers and policy makers with the management capacity required to successfully manage 21st century fisheries. Management capacity comprises the knowledge, skills and processes that enable the effective development, implementation and enforcement of regulations. The theme of this paper is that building effective management capacity involves not only education to provide knowledge but also an incentive environment compatible with the effective application of that knowledge. The U.S. regional fishery management councils involve people with diverse expertise. The type and quantity of knowledge needed to effectively manage fisheries has changed over time. The new management portfolio includes yield stabilization, bycatch reduction, stock rebuilding, capacity reduction, habitat protection, and ecosystem considerations. The management performance of many U.S. fisheries suggests that managers do not have the required knowledge base to manage the new management portfolio. It is also clear that incentives facing managers are often incompatible with taking a long-term ecosystem approach to management. Problems resulting from power ambiguity, low-intensive incentives, moral hazard, bounded rationality, and a failure to make credible commitments make it difficult for managers to make long-term decisions and take action to reduce uncertainty. The incentive problems in U.S. fishery management illustrate not only the lack of alignment of private and social objectives but also the barriers that exist to effective management. These barriers must be explicitly addressed if the education of U.S. fishery managers is to be effective.

Keywords: fishery management, U.S. regional fishery councils, management history, management portfolio, knowledge base, incentive problems

1. INTRODUCTION

How do we equip managers and policy makers with the knowledge and tools they need to successfully manage 21st century fisheries? This paper addresses that question in the U.S. context through an assessment of the historical evolution of federal fishery management and its influence on present conditions. It focuses on the incentives embedded in the management system and the educational needs tied to those incentives. Finally, it identifies changes in incentives and knowledge needed to equip the U.S. fishery management system for a future of sustainable and effective performance.

The ultimate goal for the training and education of fishery managers is to build and maintain management capacity that is responsive to the existing management requirements and adaptive to changing management conditions. Management capacity comprises the knowledge, skills and processes that enable the effective development, implementation and enforcement of regulations. The educational task for fishery managers is to get the appropriate knowledge and apply it. The larger educational task is to ensure that the appropriate institutional support structure is in place to enable managers to apply that knowledge effectively.

The theme of this paper is that building effective management capacity is not only a matter of training and information transfer. Managers need not only the appropriate knowledge but also a compatible incentive environment that will encourage the effective application of that knowledge. Managers are expected to focus on the long term and to cope with uncertainty. The structure of incentives facing managers is critical to their success in meeting this expectation.

2. THE U.S. CASE: A HISTORY OF CHANGING FISHERIES

U.S. federal fishery management has evolved in its 25-year history from a system primarily concerned with fishery growth and development to one attempting to balance fishing capacity, stock rebuilding, bycatch reduction and habitat protection. Although there are many standards by which organizational performance can be measured (Meyer 1994), there is widespread recognition of the generally poor performance of U.S. fishery

management and of the need to redirect management toward sustainable economic and biological production (Heinz Center 2000.)

In the period immediately following World War II the American fishing fleet was in disrepair. American seafood producers were at a competitive disadvantage in world seafood markets, and the proportion of imports in seafood consumption steadily increased (Wise 1974; NMFS 1977). By the late 1960's, concern over the weak competitive position of the American seafood industry combined with alarm at the intensity of foreign fishing off U.S. shores to build strong political support for an extension of fishery jurisdiction (Wenk 1972). In 1976 the Congress passed the Fishery Conservation and Management Act (FCMA), extending territorial claims to fisheries out to 200 miles from shore. Favorable loan and tax incentives for vessel refurbishment were included. The conditions were set for a reversal of the fishing fleet's decline.

To manage the new Fishery Conservation Zone, the FCMA set up a system of eight regional fishery management councils charged with developing fishery management plans and recommending courses of regulatory action to the Secretary of Commerce, who held ultimate decision-making authority (Wise 1991).

Throughout the 1970s, most fisheries remained open access, resulting in the predictable race for fish. Fishing and processing capacity expanded rapidly. However, the management burden on the regional fishery management councils remained relatively light, with fishery management limited mostly to the development of simple rules to set fishing seasons, limit total harvest and protect minimum sizes of fish.

By the 1980s the effects of the earlier decade's capacity buildup were being felt in many fisheries. Yields peaked, and management councils struggled to find ways to allocate a decreasing quantity of fish among excess capacity. There was widespread acknowledgement of the problem of overcapacity, leading to the development of access limitation programs to contain further growth in fishing effort. The information burden of management was increasing, as was the level of conflict among interest groups (Anon 1986).

The mid-1990s saw the passage of the Sustainable Fisheries Act (SFA) that amended the Magnuson Fishery Conservation and Management Act (MSFCMA) and, in recognition of the biological problems in many fisheries, contained strict new requirements for ending overfishing, reducing bycatch, and protecting essential fish habitat. These requirements significantly expanded both the responsibilities of management and the information needed to manage. At the same time the Act hindered managers in taking action to reduce capacity through its moratorium on individual transferable quotas. In response to the more conservative management requirements, quotas continued to decline. Lawsuits challenging management performance increased (Bard 2001.) A broader set of constituencies, including environmental organizations, were a more vocal presence at fishery management meetings.

In the space of 25 years American fisheries management has reversed its focus from expansion to contraction, from seafood production to ecosystem protection. The requirements for management knowledge, while initially low, expanded considerably over time as management responsibility increased. The nature of required management knowledge also changed. Expectations for sustainable exploitation, now codified in law, imply a much more conservative and broader ecosystem approach to setting quotas and other regulations.

New regulations layered on old are often overburdening the human capital of fishery management, leaving the way to redirect fishery management toward ecosystem-based management unclear. What is clear is that it will require the re-education of managers and policy makers and major changes in management incentives.

3. WHO ARE THE U.S. MANAGERS?

The U.S. fishery management system involves many different people as managers through the eight regional fishery management councils. The councils are composed of representatives of state fishery agencies, commercial and recreational fishermen, seafood processors, Indian tribes, environmental organizations, and federal agencies such as the National Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service, U.S. Coast Guard, and the U.S. Department of State. Councils are advised by scientific, technical, and industry committees, which represent diverse areas of expertise and interests. Advice from the public at large is also received through written and oral testimony on regulatory actions.

The diversity of fishery management roles means that managers themselves vary considerably in personal attributes and management skills. The level of knowledge varies in degree of specificity. There is a wide range among managers of the depth of knowledge and the degree to which that knowledge is general or specialized. Knowledge about a particular fishery subject may be patchily distributed over different specialists.

<Figure 1 about here>

Once a Council makes a decision, it is developed into a regulatory package and advanced to NOAA Fisheries for review. The review is concerned with whether the action conforms to a suite of federal laws and executive orders. The Secretary of Commerce has ultimate approval authority, which in most cases is delegated to NOAA Fisheries. Once an action is approved, NOAA Fisheries develops the action into rules.

Two other entities – the U.S. Congress and the courts – become *de facto* managers through intervening actions. Congress manages fisheries through passage of framework laws such as the Magnuson-Stevens Fishery Conservation and Management Act and through passage of laws such as the American Fisheries Act that contain specific regulations. Congress also “earmarks” portions of NOAA Fisheries’ budget for particular projects. Additionally, Congress may intervene on behalf of particular fishery constituents and exert political pressure to overrule a decision taken by NOAA Fisheries.

The courts are becoming more important as fishery managers in deciding cases that challenge various aspects of fishery management. Since the SFA made decisions and levels of decision-making within the fishery management system judicially reviewable, the amount of litigation challenging these decisions has increased. Between 1996-2001 the number of suits against the NOAA Fisheries more than doubled (Bard 2001). Plaintiffs in these lawsuits cover the full range of interests; commercial fishermen, recreational fishermen, environmental organizations, and tribes, challenging different aspects of the fishery management system.

Legal challenges are being made to the quality of the data and analysis (Hawaiian longline/sea turtle), to the completeness of the analysis (North Pacific Steller sea lion interactions with the cod, pollock and atka mackerel fisheries), to force adherence to the regulatory process (NOAA Fisheries highly migratory species plan) and to the legitimacy of management decisions (reduction of the summer flounder quota) (Bard 2001.)

From the perspective of any particular plaintiff, the objective of a lawsuit is to improve the performance of the fishery management system, through better conservation, improved allocation of fish stocks, more complete assessments of economic and social impacts, or creating an more effective management process. As the number of suits increases, so too does the number of fishery management decisions being made outside the regional council system. Litigation is moving many management decisions out of the purview of fishery management councils and NOAA Fisheries and into the courts.

3. THE NEW MANAGEMENT PORTFOLIO: NATIONAL AND INTERNATIONAL TRENDS

In the past, U.S. fishery managers needed to know something about the biology of the fish, the general properties of simple regulations, and a little about the economics of the fishery. The emphasis was on maintaining conservation limits while intruding as little as possible into the operations of fleets and processors. However, the type and quantity of knowledge needed to effectively manage fisheries has changed over time as conditions in fisheries have changed. The new management portfolio reflects national and international trends, and has implications for both the information base of management and the incentives under which it functions.

The brief of U.S. fishery managers is now multidimensional and long-term. Instead of maximizing flexibility for fleets and processors, the management emphasis now is on yield stabilization, bycatch reduction, stock rebuilding, capacity reduction, habitat protection, and ecosystem considerations. Surprisingly to people more accustomed to market-based management systems, maximizing economic value of the fishery is not an explicit charge to U.S. managers. Instead, two of the ten national standards direct that management measures shall consider efficiency and minimizing costs where practicable (NMFS 1996.)

The fishery management task is to understand and accommodate the full range and distribution of public values within the constraints of the law. All this takes place in a context of changing public expectations. The constituent base of management is broadening. Fishing interests are no longer just commercial harvesters and processors. They are increasingly heterogeneous, representing a wide range of recreational and environmental interests as well as commercial. Additionally, the “general public” is taking a much stronger in demanding that

fishery resources be managed sustainably. Nonmarket values of fish stocks – existence and option values – are taking on greater importance in management.

The new management portfolio requires a wide range of skills. There are expanding needs for human capital in management to effectively coordinate, negotiate, think strategically, interpret science, understand risks, design regulations, implement regulations, monitor and enforce.

The idea behind the council system is that people with working knowledge of regional fisheries can make the most informed decisions about those fisheries. The effectiveness of council decision-making rests in large part on the quality of the information describing and predicting the people they manage. The meeting agenda of any regional fishery management council will confirm that a large proportion of council meeting time is devoted to human issues – to allocating allowable catches among competing interests. But the investment in social science – in the data and research to understand the human components of fisheries – is insufficient to enable councils to be effective. The social science that exists does not provide in-depth description and prediction on an ongoing basis (National Academy of Public Administration 2002.)

The management performance of many U.S. fisheries suggests that managers do not have the required knowledge base. U.S. managers share with managers throughout the world unmet educational needs. However, while acknowledging the need for new management knowledge, it is also clear that a lack of management knowledge alone does not fully account for poor management performance. Incentives facing managers are often incompatible with taking a long-term view. The pressures and uncertainty created by overcapacity and the absence of property rights results in a management time horizon that is reduced to the short-term. The institutional support needed for effective management is missing.

4. MISSING INSTITUTIONAL SUPPORT

Institutional support is required for managers to take a long-term perspective and manage for sustainability. This institutional support includes both management structure and management processes that exist within a set of clearly specified, measurable objectives.

The structure of institutional support rests on property rights. Systems of property rights over fishery resources are required to bound the set of fishery participants, provide them with assurance about their tenure in the fishery, and reduce transactions costs (Barzel 1997). These property rights must include mechanisms that control capacity, so that exploitation pressure is in balance with the productivity of fish stocks.

In addition to a solid institutional structure, institutional processes that promote consistent expectations and learning must also be in place. These processes must provide for transparency of information so that participants can have symmetric information and be fully informed. Processes must also accommodate adaptive management by promoting experimentation, supporting monitoring and evaluation, and allowing learning to take place. Experiential learning is where the rules are modified on the basis of “learning by doing” (Tirole 1995.)

Most of these institutional supports are missing from U.S. fishery management resulting in a lack of clarity in the management environment. Management objectives are often poorly specified, trending toward unmeasurable “motherhood” lists of internally contradictory statements. For example, the Pacific Coast Groundfish Fishery Management Plan contains 18 objectives covering scientific information, habitat, gear, economic benefit, utilization, bycatch, communities, equity and safety. None are expressed in quantifiable terms that would allow management performance to be evaluated (PFMC 1998.)

Systems of property rights are generally weak in U.S. fisheries. Most that exist are embedded in license limitation or gear limitation programs. There are four programs of individual transferable quotas in U.S. fisheries – North Pacific halibut and sablefish, Mid-Atlantic surf clam and ocean quahog, South Atlantic wreckfish, and Florida spiny lobster (National Research Council 1999) – but a moratorium placed on the use of this form of property right in 1996 has prevented their further development. The absence of property rights creates an incentive to emphasize short-term over long-term goals. Without property rights, ownership of fish is possible only at capture. Fishermen compete for ownership through the race for fish and invest in levels of capacity that will maintain their competitive position. Seafood processors expand their plants to accommodate the increased volumes of fish being landed. Long-term economic productivity is lost. The expiration of the

moratorium in 2003 leaves open the possibility that management councils will again be free to consider these forms of property rights as a fishery management tool.

The result of these institutional deficiencies is excess levels of fishing and processing capacity that bring pressure on managers. Overcapacity forces managers to focus on short-term allocation problems at the expense of long-term strategies. Assurance about the future declines, and conflict among competing interests increases. Management costs rise. Many U.S. fisheries reached this condition by the early 1980s. A different approach would be to encourage the development of property rights and responsibilities that promote long-term perspectives, define responsibilities associated with rights, and reward desired behavior. The existence of property rights would allow the focus to shift toward performance-based regulation, where the right to fish depends on certification of meeting specified conditions (Hanna 1999; 2001.)

Processes of U.S. fishery management also present institutional problems for managers. The information base of management is becoming so detailed in many fisheries that ensuring full access to and understanding of fisheries information is problematic. The councils in different regions vary considerably in the extent to which they make fishery information transparent by distributing it to participants in accessible forms. Throughout the council system, detailed regulatory process rules work against flexible experimentation and adaptation. Funding limits restrict the resources available for monitoring, evaluation and learning.

5. INCENTIVE PROBLEMS

Incentive problems make it difficult for managers to take the long-term view and take action to reduce uncertainty. The literature on organizational economics offers insight into a number of important incentive problems that can limit the effectiveness of organizations. Several are characteristic of U.S. fishery management: power ambiguity, low-intensive incentives, moral hazard, bounded rationality, failure to make credible commitments,

Power ambiguity: Power ambiguity exists when there is uncertainty about relative positions on a hierarchy. Ambiguity about power positions can lead to questioning and undermining of authorities (Arrow 1974). Although the relative roles and responsibilities at different levels of the U.S. fishery management hierarchy (Figure 1) are detailed in law and implementing regulations, confusion among management participants about the hierarchy of management – who has the authority to make which decisions, and when – is common. Authority is accordingly challenged, and power struggles between entities persist. The intermittent intrusion of *ad hoc* managers such as Congress or the Courts adds further ambiguity about who is in charge.

Low-intensive incentives: Low-intensive incentives exist when there are weak connections between a person's decisions, and the appropriation of the consequences of those decisions (Williamson 1985). Accountability is missing. For U.S. managers, there is little direct accountability for management outcomes. Monitoring the performance of management plans is not routinely done, and there is no institutional mechanism to tie the performance of managers to a system of professional or monetary rewards.

Moral hazard: Moral hazard exists when hidden actions of some are unobservable to others – whether because it is too costly to fully observe or for other reasons – creating the potential for shirking and affecting the enforcement of contracts. These contracts can include fishery regulations, staff performance, or agreements on decision processes (Eggertsson 1990).

Bounded rationality: Bounded rationality is behavior that intends to be rational but is limited by uncertainty and inconsistency. Combined with opportunism, it can lead to complex bargaining outcomes (Williamson 1985). High levels of uncertainty in fishery management – much of it brought about by the continuing conflicts over authorities, rights, and management philosophies – limits the degree to which fishery managers can be rationally foresighted, and prevents the completion of complex contracts that would simplify and stabilize management. Instead, continual bargaining is the norm, sometimes adding costs to the point that potential gains from bargaining are dissipated (Young 1991.)

Failure to make credible commitments: Credible commitments exist when what is promised is reliably delivered (Williamson 1995). The ability to make credible commitments – or their inverse, credible threats – rests on the management's ability to enter into contracts with fishery interests. The absence of property rights and that uncertainty and instability in the fishery management environment prevent managers from making either commitments or threats with credibility.

Truncated learning: Learning-by-doing can be a way for organizations to increase proficiency, adapt to changing circumstances, and reduce costs (Tirol 1995.) Opportunities for this method of learning are truncated by the decision environments of fishery management councils, which combine a tightly proscribed regulatory process with the existence of strategic information shaping. Additionally, the flow of information tends to be vertical in the hierarchy (Figure 1), rather than horizontal, thereby limiting the opportunities for internal learning and flexible adaptation.

Power ambiguity, low-intensive incentives, moral hazard, bounded rationality, a lack of credible commitment and truncated learning - all these aspects of the incentive environment create problems for U.S. fishery management. All complicate the application of knowledge in management and keep the private incentives of decision-makers and other management participants from being fully aligned with public objectives. Many of these incentive problems are corrected through market-based approaches to fishery allocation, but the continuing prohibition against new development of such programs in the U.S. ensure their continuance as factors shaping management performance.

6. CONCLUSION: THE EDUCATION-INCENTIVES PORTFOLIO

The portfolio of fishery management includes management knowledge, institutional support and the environment of incentives. The management knowledge base must expand with changing management responsibilities. Management knowledge is needed at the systems level of economics, biology, ecology, sociology, regulatory processes and tools. Additionally, for knowledge to be applied effectively, it must be used in an environment that contains appropriate levels of institutional support and includes the right incentives.

The incentives of private decisionmakers must be compatible with the social objectives of management, an outcome that is both desirable and elusive. The incentive problems in U.S. fishery management illustrate not only the lack of alignment of private and social objectives but also the barriers that exist to effective management. These barriers must be explicitly addressed if the education of U.S. fishery managers is to be effective.

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