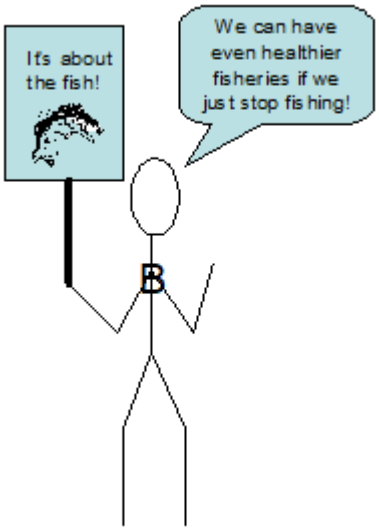
FISHERY MANAGEMENT OBJECTIVES

Gunnar Knapp
Professor Emeritus of Economics
University of Alaska Anchorage
www.gunnarknapp.com

This document is a draft chapter for a book which I am writing on "Fish Economics." I welcome questions, comments, and suggestions.

To analyze and evaluate fisheries management and how well it works, we need to consider what management is trying to do: what are its *objectives*? Different people—such as fisheries biologists, fishermen, processors, and economists—often have widely differing opinions about what the objectives of fisheries management should be.

Stereotypical "biologist's perspective" about the objective of fisheries management: protect fish resources



But if that were the only objective of fisheries management we should stop all fishing.

Stereotypical "economist's perspective" about the objective of fisheries management: maximize efficiency.

But if that were the only objective of fisheries management we should reduce fishing fleets to the minimum size needed to catch the fish.

The table on the next page lists some of the many potential objectives of fisheries management. Note that some of these objectives are about *outcomes* of fisheries management while others are about the *process* of management (how the rules are made).

Some Potential Objectives of Fisheries Management

Type	Objectives	Examples
Outcome Objectives	Resource protection	Protect fish stocks of a given species Protect marine ecosystems (other fish species, marine mammals, etc.) Be precautionary (extra-careful) when there is uncertainty
	Sustainability	Provide for sustainable fish harvests Avoid major disruptions to commercial fisheries
	Profitability	Keep fishing costs low Avoid over-capitalization Avoid having too many fishermen Reduce short and long-term uncertainty about fish supply Enable fishermen to deliver high-quality fish Match harvest timing to market demand
	Promote economic activity	Maintain and create fishing jobs Protect traditional fishing communities Ensure access of local residents to fisheries
	Safety	Reduce commercial fishing risks of death, injuries and vessel loss
	Consumers	Provide abundant and low-cost fish for consumers
	Balance fish uses	Allocate fish appropriately between commercial, sport, and sport fisheries
	Public benefit	Collect a fair return on publicly owned fish resources (taxes and fees) Keep management costs low Avoid having to subsidize fisheries
	Flexibility	Be flexible enough to adjust to changes in resources, markets, climate, etc.
	Net economic benefit	**Maximize net economic benefits from fisheries over time.***
Process objectives	Have a fair process	Have a clear and open fishery management process Provide opportunities for all stakeholders to participate Avoid potential for corruption
	Allocate fairly	In allocating fishing opportunities, be fair to: * People historically dependent on a fishery * Vessel owners who have invested in a fishery * Crew who have worked in the fishery * People who want to enter the fishery (including young people) * Aboriginal groups * Everyone else
	Follow legal mandates	Conduct required environmental and other analyses Meet requirements of endangered species act and other legislation Don't discriminate in access to fishery resources Don't restrict interstate trade Meet obligations to aboriginal groups
	Be informed	Base management on reliable information Collect needed biological, economic and other data Conduct needed research
	Enforce policies	Only enact regulations which can be enforced Provide for necessary enforcement

* This is how many economists would characterize the primary objective of fisheries management.

Most people would probably agree that most of these objectives, by themselves, is reasonable and desirable. But they may disagree strongly about which objectives are most important. That matters, because some of the objectives conflict with each other, sometimes in direct and obvious ways, sometimes in indirect and less obvious ways.

Examples of fishery management objectives which may conflict with each other

Be precautionary (extra-careful) when there is uncertainty	Avoid major disruptions to commercial fisheries
Avoid having too many fishermen	Maintain and create fishing employment opportunities
Ensure access of local residents to fisheries	Don't discriminate in access to fishery resources
Be fair to vessel owners who have invested in fishery	Meet obligations to aboriginal groups
Keep fishing costs low	Collect a fair return on publicly owned fish resources (taxes and fees)
Keep management costs low	Provide opportunities for all stakeholders to participate Conduct needed research Provide for necessary enforcement

When two or more objectives conflict, it's impossible to simultaneously optimize (achieve the best possible outcome) for both or all of them.

- We can't simultaneously be as precautionary as possible in our fisheries management while also avoiding any potential disruptions to commercial fisheries.

- We can't simultaneously have the lowest possible fishery management costs and also the best possible fishery enforcement.

Thus fisheries management inevitably has to make tradeoffs between how well it meets different objectives. No matter how well-intentioned and competent and well-funded the managers may be, they can't possibly meet all these objectives perfectly.

That alone makes fisheries management hard. But the fact that different groups disagree about the relative importance of different objectives makes it even harder.

Stereotypical Perspectives on Fisheries Management Objectives

Different people often have widely different opinions about the relative importance of different potential fishery management objectives. This isn't because some people are "right" and others are "wrong." It's because they have different personal values about what matters or what's most important. They may also be personally affected by fisheries management in different ways. The personal consequences of a management choice for a fisheries biologist or economist are different than the consequences for a fisherman!

It is useful to contrast between several different "stereotypical perspectives" about the relative importance of different fisheries management objectives which are typically held by different kinds of people. I call these the "biologists' perspective," the "fisherman's perspective," the "economists' perspective" and so on. Keep in mind that these "stereotypical perspectives" are generalizations and simplifications! Not all biologists, fishermen or economists think alike! But—based on a lot of listening and reading over a lot of years—I think that people in each group are relatively more likely to hold what I'm calling the "stereotypical perspective" for each group.

Biologists' Perspective

Fisheries biologists (many, not all) tend to think that the primary objective of fisheries management is to protect fishery resources. All other goals are secondary. Fisheries biologists realize of course that another objective of fisheries management has to be providing for harvests. But they tend to think that in order to protect fishery resources, fish harvests should be sustainable. These objectives can be measured in physical terms, such as numbers or volumes of fish swimming in the ocean or harvested by fishermen.

Fishermen's Perspective

Fishermen (many, not all) tend to think that the primary objective of fisheries management is to allow fishermen to make as good as possible a living from fishing over time. Fishermen recognize making a good living over time depends upon having fish in the ocean that they can catch. So they agree in principle with biologists that fishery resources should be protected and harvests should be sustainable. But they argue for balance between the needs of fish and the needs of fishermen: they tend to argue that fishing should be allowed even if it might take longer for overfished resources to rebuild.

Fishermen are also concerned about prices and costs. Making a living depends not only on catching fish but also getting a good price for the fish and not spending too much on catching the fish. So they tend to oppose regulations which would have the effect of lowering their prices or adding to their costs.

Fishermen are also very concerned about allocation: who is allowed to catch fish, and under what conditions. It doesn't do a fisherman any good if a fishery is sustainable and profitable, but he isn't allowed to participate in it. Not surprisingly, many fishermen argue that if somebody needs to be kept out of the fishery so that it can be profitable, it should be somebody else. *Fishermen want to be able to keep on fishing!*

Economists' Perspective

Economists (many, not all) tend to think that the primarily objective of fisheries management should be to maximize net economic benefits from the fishery resource over time. Net economic benefits are the value of the fish harvest minus the cost of catching the fish. Net economic benefits depend not only on how many fish are harvested, but also on the price of the fish and what it costs to catch them. Mathematically:

$$\text{Net economic benefits} = \text{Value} - \text{Cost}$$

$$= \text{Harvest} \times \text{Price/lb} - \text{Harvest} \times \text{Cost/lb}$$

$$= \text{Harvests} \times (\text{Price/lb} - \text{Cost/lb})$$

In the economists' perspective, protecting fish resources certainly matters, because you can't have high harvest value over time without protecting fishery resources. But economists also argue that how management affects prices and costs also matters a lot.

Economists argue that the biologists' perspective—defining the goal of fisheries management in physical terms such as "maximum sustained yield" without reference to cost—makes no more sense than saying that the goal of agriculture is to produce the most possible food without reference to cost. Obviously it isn't. That's why farmers don't plant every field, pull up every weed or irrigate every plant.

Economists also tend to argue—to the dismay of many fishermen—that *fishermen are part of the cost of harvesting* fish—just like factory workers are part of the cost of making cars. If we want to maximize net economic benefits from fisheries, we should look for ways to harvest fish using fewer fishermen, or *increase labor productivity.*

Other Perspectives

Many other groups also tend to have perspectives on the objectives of fisheries management which differ, in various ways, from biologists', fishermen's and economists' perspectives.

Processors, like fishermen, also depend on healthy fishery resources and sustainable yields. Processors also care about how management affects their own prices and costs, which may be affected by management in different ways than fishermen's prices and costs.

Local community residents (and businessmen and politicians) care about the local economy, which benefits from spending by fishermen and processors. Like fishermen and processors, they tend to want a balance between the needs of fish and fishermen, and they want to make sure that fishermen in their own communities can keep on fishing. They don't necessarily like economists' ideas about reducing costs if that means reducing spending in their communities.

Consumers also care about healthy fishery resources and sustainable yields, so that they will have fish to eat. But unlike fishermen, consumers want fish prices to be *low*—not high.

Other user groups care about their right to harvest fisheries resources and the economic, social and cultural benefits they derive from guided and non-guided recreational fishing, personal use fishing, and subsistence fishing.

Taxpayers care about the costs of fisheries management, and whether those costs are covered by taxes paid from the industry. While fishermen would naturally support spending a lot of money for the best possible fisheries management, taxpayers might have a different perspective.

The public in general may care not only about whether the fishing industry pays enough taxes to pay for management, but whether it pays anything extra in return for the right to access to a public resource. We wouldn't be satisfied if the oil industry only paid enough taxes to support administering oil leases: we expect to share substantially in the profits earned from our public oil resources. This perspective may become more important for fisheries in the future.

The point is that different groups may have very different perspectives about the relative importance of different fisheries management objectives—for reasons which make good sense to them.

Legal Fishery Management Objectives

The objectives that matter most for fisheries managers are those that are written into laws which they have to follow—or try to follow. One example is the "national standards" for United States federal fisheries management listed in the Magnuson-Stevens Fishery Management and Conservation Act (MSFMCA), the law which governs how U.S. federal fisheries are managed.[i]

National Standards for Management of United States Federal Fisheries

Any fishery management plan prepared, and any regulation promulgated to implement any such plan, pursuant to this title shall be consistent with the following national standards for fishery conservation and management:

1	Conservation and management measures shall **prevent overfishing** while achieving, on a continuing basis, the **optimum yield** from each fishery for the United States fishing industry.
2	Conservation and management measures shall be based upon the **best scientific information** available.
3	To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.
4	Conservation and management measures shall **not discriminate** between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) **fair and equitable** to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.
5	Conservation and management measures shall, **where practicable, consider efficiency** in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.
6	Conservation and management measures shall take into account and **allow for variations** among, **and contingencies** in, fisheries, fishery resources, and catches.
7	Conservation and management measures shall, **where practicable, minimize costs** and avoid unnecessary duplication.
8	Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the **sustained participation** of such communities, and (B) to the extent practicable, **minimize adverse economic impacts** on such communities.
9	Conservation and management measures shall, to the extent practicable, (A) **minimize bycatch** and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.
10	Conservation and management measures shall, to the extent practicable, promote the **safety** of human life at sea.

How much guidance do these standards give fishery managers about the objectives of fishery management, and their relative priority? And which perspectives do they reflect?

The standards include a lot of different objectives for fishery management outcomes that managers are supposed to consider—such as *prevent overfishing* and *efficiency* and *safety*. The also include objectives for the fishery management process, such as *best scientific information*, and *fair and equitable*.

Language such as *prevent overfishing* clearly reflects the "biologists' perspective;" language such as *fair and equitable* reflects the "fishermen's perspective;" language such as *minimize adverse economic impacts* reflects the "local community residents' perspective."

The national standards also reflect the "economists' perspective"—but in a qualified way:

> *"where practicable, consider efficiency"*
> *"where practicable, minimize costs"*

The standards give fishery managers a lot of objectives they have to consider and try to balance—but they don't give very much guidance about the *relative* priority of different objectives when they conflict. Standard 1 requires managers to achieve "optimum yield" on a continuing basis. What is "optimum"? According to the law:

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

You can interpret that pretty widely—depending on your perspective about what economic, social or ecological factors might be "relevant."

The Bottom Line

Why do all these non-economic perspectives matter for a book on fish economics? They matter because economists' perspectives about the objectives of fisheries management often differ significantly from other groups' perspectives. They also often differ from the objectives formally set out in fisheries management laws and policies.

Put differently, economists often have very different ideas than other people about what matters for fisheries management—and which effects of fisheries management we should be studying.

This helps to explain why economists' analyses of fisheries management are sometimes ignored and sometimes strongly opposed by other groups such as fisheries biologists and fishermen. Part of the challenge for economists interested in fisheries management is to understand the objectives of different groups and to communicate effectively why the objectives economists consider important matter.

[i] 16 U.S.C. 1851, Section 301, National Standards for Fishery Conservation and Management.