

The Design and Use of Limited Access Privilege Programs

Lee G. Anderson and Mark C. Holliday, Editors



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Foreword

In October 2005, Dr. William Hogarth, NOAA Assistant Administrator for Fisheries, initiated a project to develop guidance for the design and use of Limited Access Privilege (LAP) programs. Creating planning and implementation guidance for LAPs was a response to several stimuli including the President's Ocean Action Plan recommendation to promote broader use of market-based fishery management alternatives.

The document was developed in a transparent and collaborative process by NOAA Fisheries Service and the Regional Fishery Management Councils. All eight Councils and all NOAA Fisheries Service (NMFS) field and headquarters offices had the opportunity to contribute to and comment on the contents of the document. A draft of the document was made available for public review. The development process was directed by the NMFS Office of Policy utilizing a small steering committee comprised of NMFS and Council personnel.

The result is non-regulatory guidance on the technical design and use of LAP approaches, all in the context of the Magnuson Stevens Reauthorization Act of 2006. This non-binding technical advice evaluates the relative pros and cons of various LAP approaches and includes options available to address general questions about the future use of LAPs given past domestic and international experiences.

This technical advice is based on the considered opinion of the two editors who have benefited from the counsel of the Steering Committee and numerous reviewers. Given that LAP program design is a complex and controversial issue, there is certainly room for differing views especially concerning interpretations of the details of the revised MSA. Informal discussions on these different interpretations will continue as Councils work under the new legislation, and in some cases formal legal interpretations and federal rulemaking will be necessary to settle some issues. Besides the technical information it provides, it is hoped that this document helps focus these discussions.

Acknowledgements

The preparation of this document required the collaboration of many experts in fisheries management and policy. The effort was lead by the NOAA Fisheries Service Office of Policy, who had the privilege of having Dr. Lee Anderson, a world expert on fisheries economics and management, on staff as a visiting scientist from the University of Delaware. Dr. Anderson formulated the outline for the document, wrote the majority of the sections, and provided editorial review of the contributions from other authors.

A Steering Committee provided extremely helpful guidance throughout the process and contributed reviews and specific advice and assistance, including writing of individual sections. Membership of the Committee included Dr. Anderson; Mark Fina, North Pacific Fishery Management Council staff; Adam Issenberg, NOAA General Counsel for Fisheries; Richard Newell, on detail to the President's Council of Economic Advisors (CEA) from Resources for the Future; James Odlin, New England Fishery Management Council member; Phil Smith, NOAA Fisheries Alaska Region; Phil Steele, NOAA Fisheries Southeast Region; Wayne Swingle, Gulf of Mexico Fishery Management Council Executive Director; and Galen Tromble, NOAA Fisheries Office of Sustainable Fisheries.

Soren Anderson, a University of Michigan fellow authored the section of the report on auctions. Dave McKinney, NOAA Fisheries Office of Law Enforcement, wrote the section on enforcement, and Phil Smith, NOAA Fisheries Alaska Region, wrote the sections on monitoring, permits, and appeals. Jason Didden, a Knauss Sea Grant Fellow in the Office of Policy and Jason Blackburn, NOAA Fisheries Service Office of Sustainable Fisheries, contributed research on existing Individual Fishing Quota programs and cost recovery materials.

The support and contributions of the Regional Fishery Management Council Chairpersons and Executive Directors throughout the development of the document, including review of and comment on a preliminary draft, is gratefully acknowledged.

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Overview

The purpose of this document is to assist Regional Councils and NOAA Fisheries Service (NMFS) in the design and implementation of Limited Access Privilege (LAP) programs. The statutory basis is the recently reauthorized Magnuson-Stevens Act (MSA, Public Law 109-479). Subject to the constraints in the MSA and other applicable law, the basic philosophy underlying the document is that the Councils should have as much latitude as possible as they design fishery management plans (FMPs). This flexibility pertains to the choice of whether to use a LAP approach, and if so, to the type and the construction of that program. This document provides information on the important issues that must be addressed for each of the allowable types of LAPs. In addition, through a presentation of theoretical and practical examples, it provides a discussion of the pros and cons of the various options for addressing those issues. The material herein is intended simply to inform and help managers make present and future decisions.

Definitions.—

Over the years market-based programs have been referenced in many different ways, both in the United States and around the world. Originally, they were called Individual Transferable Quotas (ITQs) or Individual Fishing Quotas (IFQs). Most recently, the U.S. Ocean Commission used the term Dedicated Access Privileges (DAPs) to expand the emphasis beyond “individual” control and to stress that what is owned is something less than a complete property right *per se*. The term used in the reauthorized MSA is LAP, and it is the term that will be used here.

The MSA does specify some mandatory conditions and provision for designing LAP programs that are discussed below (see Sec. 303A (a), (b), (c)(1), and (c)(2)). In addition to complying with these mandates, the basic advice to the Councils can be stated as follows. If a Council wishes to develop a LAP program, they should use the National Standards, other applicable law and the management objectives of the particular FMP as the criteria for selecting and designing a LAP program. The choice and construction of a LAP program should be based on a conclusion that it will be the most likely option to achieve those objectives among all other management strategies considered. The MSA implicitly includes this guidance when it mandates that Councils must specify the goals of any LAP program and include provisions for regular monitoring and review to ensure that the goals are achieved (see Sec. 303A (c)(1)(F) and Sec. 303A (c)(1)(G)).

Comparative criteria.—

There are additional criteria used throughout the document to help evaluate the pros and cons of different design and implementation choices associated with LAPs. The criteria discussed are not necessarily unique to LAPs and could be used to compare the strengths and weaknesses of any type of management strategy. A comparative framework is an efficient means to assess different LAP features given the relative newness of and limited experience with LAP usage. Table 1 lists the comparative criteria used throughout the document.

One of the most important criteria is internal consistency. It is essential to ensure that a feature chosen for one component of the plan (e.g., transferability) does not work at opposite purposes with the options chosen for other components (e.g., specification of management unit). One of the purposes of this document is to discuss how choices in one area can complement or contradict choices made in others, while recognizing the tradeoffs inherent with different management objectives.

Another criterion is the level of complexity. It sometimes may seem necessary to adopt some special “bells and whistles” when addressing a particular component to achieve certain management objectives. For example, while transferability may be allowed, the Council may find it desirable to restrict transfers between boats with different gear types or different ports. However, such restrictions make it more difficult and confusing for individuals to operate within the system, reduce the efficiency of the harvesting sector and inhibit mutually-beneficial transfers between privilege holders. This can increase the management cost of implementing and monitoring the LAP program. Councils should carefully weigh the trade-offs between designing special rules and conditions to meet management objectives, and the increased direct and indirect costs such complexity can generate.

Table 1. Criteria for evaluating LAP programs.

- Compliance with the National Standards, other mandates of the MSA and other applicable law.
- Consistency with Council determined management objectives for the fishery under consideration.
- Internal consistency.
- Level of complexity.
- Compatibility with other related FMPs.
- Operational effectiveness
- Cost of implementation and operation.

It is also important to consider the compatibility of new LAP programs with other existing LAP and non-LAP management programs developed by the Council. In New Zealand, for example, there is only one ITQ program for all the different federally managed stocks. The rules governing transferability and other aspects of ITQs are the same for all the different fisheries. This consistency helps keep management and monitoring costs down. On the other hand, by the nature of the eight Councils under the MSA, the U.S. LAP programs will be designed individually in the various regions, sometimes fishery by fishery, or even a single species within a fishery. If they are designed completely in isolation, there is the possibility that there could be significant differences with respect to various components which could complicate and increase the costs for implementation and monitoring. Moreover, from the industry perspective, multiple LAP rules and conditions for fisheries within an FMP, across FMPs, and across Council jurisdictions can be very confusing and run counter to efficient business planning and conduct. Councils

should make every effort to ensure that LAP programs for similar fisheries under their jurisdictions are, where appropriate, as much the same as possible.

The complexity and the compatibility issues are related in that they both can affect operational effectiveness and costs. The arguments for operational effectiveness are self-evident and it is always a main focus for Councils as they prepare plans. However, the separation between who designs a plan and who pays the implementation costs can sometimes cause a disconnect such that costs do not get enough consideration in the plan development process. One of the purposes of this document is to ensure that the relative cost of implementing different management options is given the attention it deserves. This is important because, in some but not all cases, LAP programs can significantly increase management benefits and costs (GAO, 2005). From an overall management perspective, the important bottom line is the difference between the benefits of a plan and its costs (Environmental Defense, 2007). Over time it has generally been shown that the efficiency and biological benefits from using LAPs are worth the extra costs.

In times of constant or shrinking federal budgets, obtaining the funds to pay for new management plans is a real concern. Congress implicitly took this into consideration by mandating a cost recovery program for LAP programs. However, there is a cap on the amount that can be collected equal to 3-percent of the ex-vessel value of the fish harvested under any such program. If the incremental costs of implementing a LAP program in a particular fishery are less than the amount that can be collected through cost recovery, the funding problem goes away (that of course does not mean that it is not important to design the most efficient program). Note that cost recovery is only applicable to the management (including data collection and analysis) and enforcement associated with LAP programs. The costs of developing and implementing the programs are not subject to cost recovery.

There is a potential problem in those cases where the incremental costs of implementing and operating a LAP program will, on average, be greater than 3-percent of the gross revenues of the fishery. Funds to cover the additional costs of the LAP program will have to come from the current appropriations. This means that there will have to be cuts elsewhere. Councils should carefully choose the management strategies that achieve the plan's goals and objectives, keeping in mind the costs of implementation. The decisions should ensure that the costs of implementation and operation do not exceed the appropriated and cost-recovered funds available. Regardless of whether it is a LAP program, the alternative is the potential disapproval of a FMP (or part of it) where funds are insufficient to carry out a management choice.

Structure of the document.—

As LAP programs are developed, there are certain things that the Councils do, and there are certain things that NMFS does. Generally, the Councils design the programs while NMFS implements and monitors them. There is a range of choice in the first task, while there are accepted practices for doing the second task. While consultation and collaboration with the Councils is commonplace since NMFS is a member of each Council, most aspects of implementation, monitoring, and enforcement are done solely by the agency. Accordingly, after a brief introduction (Part 1), there are two main sections to

the document. Part 2 is the design of LAP programs and contains information for planning and developing LAPs. Part 3 is the management of LAP programs and discusses LAP implementation and administration. The purpose of including the second section is as context for the Councils as they design programs. They will be able to do the best job of program design if they thoroughly understand the issues of implementation and monitoring. Appendix 1 follows and is a series of ten “spotlights” on existing or imminent LAPs in the United States. Each spotlight employs the same template to describe the major attributes of a particular LAP program to help focus on the similarities and differences, and includes hyperlinks to additional information on each program. Appendix 2 is a detailed derivation of how to compute what constitutes an excessive share of LAP privileges, a concept introduced in Part 2. Appendix 3 is a detailed discussion of the types and uses of auctions, supporting the introductory auction section presented in Part 2. An extensive references/bibliography section completes the document.

Part 1: Introduction

Open Access to Limited Access to Access Privileges.

The purpose of this work is to provide technical advice to the Regional Fishery Management Councils as they prepare Fishery Management Plans (FMPs) using Limited Access Privilege (LAP) programs. The term LAP is the Congressional equivalent of the term Dedicated Access Privilege (DAP) introduced by the U.S. Commission on Ocean Policy (USCOP, 2004). In their report, the Commission defines a DAP as an:

...output control whereby an individual fisherman, community, or other entity is granted the privilege to catch a specified portion of the total allowable catch. With this assurance in place, there would no longer be an incentive for fishermen to fish harder and faster because each could only catch his or her share of the total. The incentive would then be to catch the full share at a low cost and sell the best quality fish at the highest obtainable price. (page 288)

The term DAP is relatively new. These types of programs are more commonly called individual transferable quotas (ITQs), individual fishing quotas (IFQs), or more generally rights-based management techniques. The Commission stated a preference for the term DAP for several reasons:

First, it highlights the fact that fishing is a privilege, not a right. Second, it is an umbrella term that includes access privileges assigned to individuals (ITQs, IFQs, individual gear quotas), as well as to groups or communities (community development quotas, cooperatives, area-based quotas, community-based quotas). Finally, it reflects the fact that the dedicated privilege being granted is access to the fish, rather than the fish themselves. (page 289)

To set the stage of this discussion, it will be useful to consider a very short and somewhat simplified history of the evolution of fishery management techniques.¹ Until the end of the 20th century, most U.S. fisheries were managed under a system which allowed free access. There were few limits other than obtaining a readily available permit and the possession of the necessary fishing gear. In profitable fisheries, this led to ever-increasing numbers of participants which put increasing pressure on the fishery resource.

Seeing the problems of free access, managers began to implement programs which, while not limiting the number of fishermen, began to place controls on their activities. They used input controls such as specifying allowable types and amounts of gear and methods, and limiting available fishing areas or seasons. By restricting what operators can do, this type of regulation increases the cost of fishing and creates incentives to change fishing procedures so as to increase catch given the constraints. This has the twofold effect of decreasing the biological effectiveness of the regulation and increasing the cost of fishing.

¹ This material draws heavily on the discussion in the Commission on Ocean Policy Report. (USCOP 2004, page 287ff.).

Managers also used output controls such as setting total allowable catches (TACs - the amount of fish that may be taken by the entire fleet per fishing season), bycatch limits (numbers of non-targeted species captured), and trip limits for individual fishermen. These management techniques create incentives for fishermen to develop different types of gear or to devise new methods that allow them to catch more fish in spite of the regulations, and to do so faster than other fishermen, before any overall limit is reached. Neither input nor output controls provide incentives for individual fishermen to delay or forgo fish harvest, because any fish not caught is likely to be taken by someone else.

The incentive to keep one's individual catches as high as possible, that is part and parcel of both input and output controls, creates an unfortunate game between managers and fishermen where the fishermen always have the last move. In response to each new measure designed to limit total fishing effort, fishermen develop new fishing methods that, although legal, undermine the goal of reaching sustainable harvest levels. This prompts managers to promulgate more restrictive measures, and fishermen to develop more ingenious methods to work around them.

For example, if managers limit the length of the boat, fishermen might increase the width if it would increase fishing power. Instead of trying to build boats and design equipment that can harvest efficiently, with total output controls fishermen have incentives to do everything in their power to modify inputs to catch fish faster than their competitors do. If input controls are used, fishermen will work to get around the constraints. In the short-run, such regulations can be biologically effective because it takes time for fishermen to adjust their gear or behavior. However, the temporary increase in stock size just helped to finance more changes in such things as boat designs with more fishing power. This phenomenon has been called "the race for fish."

In addition to conservation concerns, the race for fish can create safety problems. Faced with a sharply curtailed amount of time in which to harvest, fishermen may feel compelled to operate in unsafe weather conditions rather than forgo harvests to their competitors by waiting for fairer weather.

As a next step in the development of modern fishery management programs, managers started to control total catch or effort by limiting the number of participants through limited access programs. Although they are common now, they were very controversial when they were first implemented because people thought they had a basic right to fish and limited license programs contravened that right. But at the end of the day, these limited license programs were just another type of input control. In most cases, the *status quo* input or output controls remained in effect. In some instances these limited access programs were of little use because the number of permits did not place an effective binding constraint on the participants. In those cases where they did form a binding constraint, they did partially circumscribe the problem. At least there were a limited number of individuals who could join the race for fish or the race to improve the fishing power of their vessels. Depending upon the actual number of permits relative to safe harvest limits, the types of other management controls, and on the potential for input

substitution in the fishing process, a limit on the number of participants could sometimes be effective for holding harvest at safe levels, at least for the short-run.

Where the conditions were not right and harvest levels tended toward unsafe levels under limited access programs, the next logical step was to specify the access control in terms of output. To solve the race for fish problem, managers began exploring the use of IFQs, whereby an individual fisherman is granted the *privilege* to catch a specified portion of the TAC. Since IFQs were tied to TACs, they were an output control. However, with the assurance of a specified share of the TAC, there is no incentive for fishermen to fish harder and faster. The incentive is to catch the full share at a low cost and sell the best quality fish at the highest obtainable price.

Over time the concept of IFQs has been expanded and is referred to as LAPs in the amended MSA. There are many types of LAPs in use, or under discussion, around the world.

- *Individual fishing quotas* (IFQs) allow each eligible fisherman to catch a specified portion of the total allowable catch. When the assigned portions can be sold or transferred to other fishermen, they are called individual transferable quotas (ITQs).
- *Community quotas* grant a specified portion of the allowable catch to a community. The community then decides how to allocate the catch. While in years past the Community Development Quota (CDQ) Program in Alaska granted remote villages a portion of the total allowable catch to enhance fishery-based economic development, the 2006 MSA amendments for DAPs explicitly exclude CDQs from the LAP program.
- *Regional fishery associations* (RFAs) are another form of group who can acquire and hold LAPs, although there are limitations on composition and eligibility.

Many other variations and combinations of access privileges are possible. *Harvest cooperatives* split all or part of the available quota among various fishing and processing entities within a fishery via contractual agreements. *Geographically-based programs* give an individual or group dedicated access to the fish within a specific area of the ocean based on fishing area or home port. Many, perhaps all, of them can be implemented under the amended MSA if the proposed recipient is a legal entity that meets applicable participation and eligibility requirements.

LAP programs can provide substantial benefits in addition to meeting biological goals by ending the race for fish. Consumers may benefit because producers have more flexibility in the types of product than can ultimately be produced. For example, fresh, rather than frozen, fish are available for most of the year as fishing seasons are lengthened. These programs may enhance safety because fishermen will no longer have to go out in bad weather, and the U.S. Coast Guard/other safety resources will not be overwhelmed by thousands of fishermen operating in small areas or during a compressed season. Fishermen may benefit economically by developing better long-range business plans because they can more accurately anticipate their annual catch and are less likely to over-invest in boats

and gear. They can also fish more carefully, minimizing gear loss and unintended harvest of protected and other non-targeted species. Finally, these programs may allow fishermen and managers to promote a more cooperative and business-oriented environment as fewer direct input and output controls are required.

But LAP programs are not without potential difficulties, most of which have to do with the potential reorganization of the fishery and its participants. The chronic management problem with open access fisheries is that there are too many people chasing too few fish; LAPs have the potential to correct this problem. However, changing the “too many people” to “just the right number of people” is a very difficult social and economic process. And in many instances, Councils are not just concerned about the number of actual fishermen, they are concerned with the distribution of the harvesting privileges across ports and fleets. They are also concerned about how the implementation of a LAP program will affect other fisheries-related industries such as boat building and processing. Such effects are sometimes called the unintended consequences of LAPs and they can impact such things as community structure. When designing a LAP program, it makes sense to anticipate such things so as to know the full implication prior to approval to make sure that it will indeed accomplish the management objectives, and to adapt the design to mitigate such effects if possible. This document will discuss ways in which LAPs can be developed so as to address such issues.

As a sidelight, in a few cases the “privileges” in market-based regimes have been denominated in terms of inputs rather than outputs. The state of Florida has two individual transferable trap permit programs where a limited number of traps are allowed and the permits for those traps can be traded among qualified participants. While at the surface it may appear that there is little difference between input and output based privileges, the former suffers from two potential weaknesses. First, there is a less than direct relationship between the input control and the resulting output, so it may be harder to achieve the desired harvest level with input privileges. In addition, there will be incentives for participants to increase the amount of harvest that can be obtained from a given defined level of input. This again will have the dual drawback of weakening biological effectiveness and increasing the cost of producing fish.

In summary, the types of fisheries regulation used around the world has evolved from open access, where fishing is open to all, to limited access where fishing is limited to a specified group, to LAP type programs, where fishing is limited to a specified group each of which is given a specified amount of fish that may be harvested or a specified amount of effort that may be used² Understanding this evolution is useful for practical fisheries managers because it clarifies the management weaknesses that each step in the evolution was designed to correct. Notably, this evolution is not a required or desired sequence that will occur naturally nor should it occur in all fisheries. The type of program that will be best for a particular fishery is a policy choice that should be based on the different characteristics of the fishery and the objectives of management. One choice will be whether to have a LAP program or not. However, that choice can not really be made in

2 While some harvest privilege programs are focused on effort, LAP programs which are possible under MSA must be based on harvest rights.

isolation. It is first necessary to determine what type of LAP to use. This document provides assistance in designing the best possible privilege program for a particular fishery.

A Short Note on the Theory of Market Based Management Techniques.

From an economic theory point of view, the major source of the overfishing problem is the lack of property rights. This is the main point of Garrett Hardin's seminal article "The Tragedy of the Commons" (Hardin, 1968). Since no one can own a fish until it is caught and put in the boat, there are no incentives to conserve the stock. Postponing harvest may make economic sense in terms of being able to take a larger more valuable catch later. In addition, allowing the fish the opportunity to spawn before being harvested may provide for even larger catches in the more distant future. However, from a private individual point of view, the postponement will not make sense unless the individual who foregoes the harvest is guaranteed the right to the increases in future harvests. With no property rights to fish, or a program with analogous characteristics, there can be no such guarantee. As a simple counter example, no one is worried about the over exploitation of cattle. If the owner postpones harvest, he or she is guaranteed the benefits of doing so.

Look at the case of property rights in cattle in a little more detail. What exactly does that mean? First it means that no one, including the government, can take them away without compensation. It also means that the individual can buy or sell cattle so as to achieve the proper balance between the number of cattle and the productivity of its pastures. It also means that the owner can choose what to do with the cattle. Should they be kept for breeding purposes or should they be slaughtered for meat? It also means that if the inadvertent or deliberate act of another kills or lowers that value of the cattle, the owner can sue for compensation.

Given the nature of these property rights, there are incentives for private owners to utilize cattle so as to maximize the economic value from their use because they will receive all of the gains. If the economic returns are higher from breeding the cattle, the owner will be motivated to retain them. If the returns for slaughtering depend upon the throughput of the feedlots each year, there will be incentives to develop procedures that maximize profits by considering the choice and costs of input and timing of production.

The basics of what are now called privilege-based management were derived from the notion of trying to simulate *some* of the aspects of property rights that work so well with cattle. Without going into all of the details, it has not been possible to mimic all of these attributes. Partially this is due to technical reasons. Fish move around over wide spaces and it is not possible to identify and assign individual fish to individual owners. Similarly, it is not possible to keep track of which fish are the offspring of which parents. There are also some legal and political constraints. The MSA is very clear that any LAP is a permit to harvest and does not confer any right to compensation and that there are no rights, title, or interest in any fish until it is harvested. If a Council creates a LAP program, but then

decides to replace it with another type of regulation, the holders of the LAP permits would not be entitled to compensation.

The privileges to fish under LAP programs are clearly different and weaker than those that would apply to property rights to cattle. At the same time however, there are many other aspects of property rights that can apply to LAPs. And the important thing here is that carefully crafted LAP programs can create privileges with sufficiently analogous characteristics to those provided by traditional property rights such that they create many of the same positive incentives. Such things as transferability, program duration, eligibility to acquire/hold, and other aspects of LAP programs will affect, for good or ill, the incentives of participants.

These concepts can be stated more formally by considering the important characteristics of property rights as they are discussed in most elementary economics texts. (For a discussion couched in terms of privilege-based fishery management programs see FAO, 2000, especially the articles by Scott and Arnason). The critical characteristics that will be directly applicable to the design of LAP programs are:

1. **Exclusivity:** This refers to two things. First, exclusive claim refers to the degree to which the outputs produced as a result of owning and using the resource for which the property right is defined are under the complete control of the owner to use or relinquish. Similarly the degree to which all costs associated with the use of the resource is the responsibility of the owner. The ability to enforce these claims is an important aspect of exclusivity, and sometimes enforceability is listed as a separate characteristic.

Second, exclusive control refers to the ability to use and manage the resource without outside interference. The more legal interference, the less exclusive is the right. Sometimes this aspect of exclusivity is referred to as flexibility. Exclusivity is important for providing both the incentives and the ability to put a resource to its highest valued use.

2. **Permanence:** This is the length of time the holder's powers may be enjoyed; it refers to the duration of the property right. In common everyday parlance "ownership" usually represents a property right in perpetuity or for as long as the owner wants. But there are some important policy issues with respect to duration in the design of LAPs.

Duration is important because it allows the owner to take a long-run view. If a privilege has a specified life of 5 years, any returns from the sixth year onward will be of no concern to the owner. There will be no incentive to maintain, and even less to make investments to improve, the resource in latter years. Under such conditions a land owner will not likely put nitrogen back in the soil or buy a large combine that can lower harvesting costs in the fifth year.

3. **Security or quality of title:** This refers to the degree to which the right is free from involuntary seizure or encroachment. The quality of the title is not very strong if the government by decree or legislation, or if other individuals by filing suit, can easily change some of the characteristics of the right. Quality of title is valued because it saves

the owner from the costs of protecting the nature of the right. And related to the concept of permanence, incentives to care for or improve the resource can be reduced, if the nature of the right can change over time.

4. Transferability: This refers to the ability to transfer the right to someone else. This is important for the owner because it is another aspect of flexibility. If there are others that have abilities or other assets that allow them to produce higher returns from the resource, there is the basis for a mutually beneficial exchange. The owner may be able to make more from selling the resource than from using it. More important, the incentives to engage in trade allow for an expansion of the horizon with respect to putting the resource to its highest valued use. An important feature of transferability is divisibility, the ability to subdivide the property right into smaller parts for the purpose of transfer. This also improves the ability get the resource into its highest valued use.

In summary, property rights can improve incentives to allocate resources to their highest valued use. They consist of a number of characteristics, and the nature of these characteristics depends upon custom, legal practices, and the nature of the resource. It would likely be difficult to identify a property right in any market economy that would receive a perfect rating in all of the above characteristics. However, it does provide a useful way of analyzing the relative merits of various types of property rights. It will also prove to be a useful framework to consider when designing the various characteristics of a LAP program.

The privilege-based management techniques authorized by the MSA are clearly not specified as property rights. However, they do mimic aspects of property rights that work well with other resources, even though it is not possible to provide exclusivity with respect to the basic asset that is the fish stock and its marine environment. This is why in the existing IFQ programs the basic “privilege” is denominated as a specified volume of harvest from a given stock of fish over a certain time period. In the Mid-Atlantic surfclam and ocean quahog IFQ program, this harvesting privilege is almost 100 percent exclusive in both senses of the definition provided above. Due to certain restrictions, exclusive control is somewhat weaker in the halibut and sablefish IFQ program in the North Pacific.

The important thing here is that carefully crafted LAP programs can create privileges which have the appropriate characteristics so as to provide many of the same positive incentives as those provided by traditional property rights. Such things as transferability, program duration, eligibility to own, and other aspects of LAP programs will affect, for good or ill, the incentives of participants. At the same time, it is important that Councils consider the likely trade-offs between the potential biological and economic advantages of LAPs and the ability to meet other management objectives.

Finally as Councils undertake these deliberations, they may wish to consider the perspectives found in the recent fisheries management literature by individuals from a range of disciplines which demonstrate the practical benefits of capturing market incentives in FMPs..

We contend that much greater emphasis must be placed on fisher motivation when managing fisheries. Using evidence from more than a dozen “natural experiments” in commercial fisheries, we argue that incentive-based approaches that better specify community, individual harvest, or territorial rights and also price ecosystem services-coupled with public research, monitoring and effective oversight-promote sustainable fisheries. Grafton et al (2006.)

Our analysis suggests that management authorities need to develop legally enforceable and tested harvest strategies, coupled with appropriate rights-based incentives to the fisheries community, for the future of fisheries to be better than in the past. Beddington, Agnew, and Clark (2007).

A More Detailed Look at Fishery Operations

The discussion has been quite general to point out some basic principles. The discussion will now get a little more detailed to provide a more accurate picture of the operation of a commercial fishery, the exact role of fisheries management, and some likely direct and indirect effects of management.

While the concept of a fishery may conjure up a vision of a fleet of vessels harvesting from single fish stock, the reality is often much more complex. Joint harvest is a very common occurrence. At the same time, there is often quite a difference between what is brought on the boat and what is finally sold in the market place. To capture all of these nuances, it is necessary to define a number of terms. The concepts are familiar but the same words have different meanings in common usage and even different definitions in the policy and scientific literature.

For obvious reasons, we must start with the definitions found in the MSA. Other terms will be defined to produce an internally consistent and logical system. The price of starting with the legal definitions in the law is that some of the terms used below will have different meanings than some readers may be used to. Section 3 of the MSA defines:

(2) The term "bycatch" means fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program.

(9) The term "economic discards" means fish which are the target of a fishery, but which are not retained because they are of an undesirable size, sex, or quality, or for other economic reasons.

(38) The term "regulatory discards" means fish harvested in a fishery which fishermen are required by regulation to discard whenever caught, or are required by regulation to retain but not sell.

Bycatch is also the subject of one of the MSA National Standards in Section 301:

(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.

In addition, Section 303(a) of the MSA requires that each FMP prepared by a Council or the Secretary:

(11) establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority--

(A) minimize bycatch; and

(B) minimize the mortality of bycatch which cannot be avoided;

While not defined in the MSA, we define *harvest* as the quantity of species that are captured in the process of fishing. Further, we define *target harvest* as the subset of the harvest species that have a market value. Target harvest can be broken down into *primary target harvest* (fish with market value that are actively sought) and *incidental target harvest* (fish with market value that are caught in combination with primary target harvest) *Landings* are the difference between harvest and discards.

Non-target harvest is that subset of harvested species for which there is no market value; while they may be captured they are not actively being sought. Although not formally defined in the MSA, the concept of non-target harvest is referenced several times. For example, in Section 206(b) on large-scale drift net fishing Congress found:

(3) there is a pressing need for detailed and reliable information on the number of seabirds, sea turtles, nontarget fish, and marine mammals that become entangled and die in actively fished large-scale driftnets and in large-scale driftnets that are lost, abandoned, or discarded;

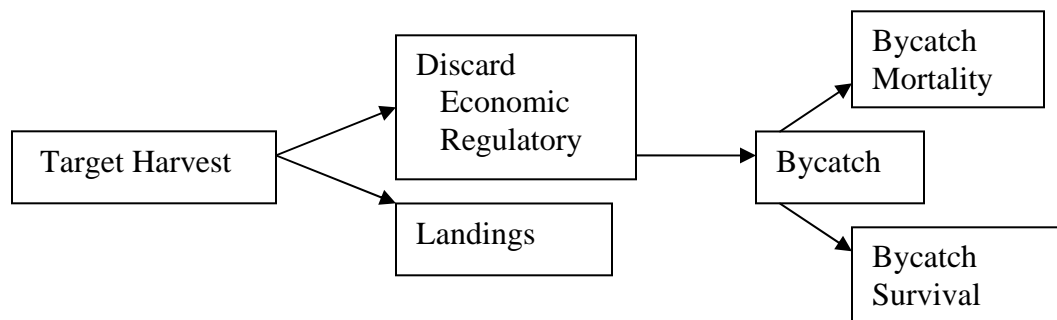


Figure 1. Target Designations in a Single Species Fishery.

Just because the non-target species have no market value does not mean that they are without any value. It just means that they can not be sold in the market place. They can

generate non-market value because people like to view them or just know that they are there. In addition, they can be important for their role in the overall ecosystem.

Consider the schematic displayed in Figure 1 which demonstrates the relationship between these terms in a single species fishery. Given the simplicity of the situation, we have more terms than we need but it sets the stage for the discussion of a multi-species fishery below. A single species fishery occurs if the harvest technology and the temporal and spatial distribution of the fish stock results in the fleet harvesting fish from one and only one species. It targets one type of fish and it only brings one type of fish on the boat. By definition, all harvest is target harvest. If some fish are too small for the market or if they are damaged in the harvest process, they will be discarded for economic reasons. If there are regulations to prevent the harvest of certain sizes of fish which otherwise would have been landed, there will be regulatory discards. The sum of economic and regulatory discards is the bycatch of the fishery. Depending upon the method of harvest, some of the discarded bycatch can potentially survive. Total mortality in the fishery will be the sum of landings and bycatch mortality.

Speaking in general terms, and assuming that an appropriate target mortality level has been determined, the purpose of a MSA FMP is to keep total mortality at or below the target while addressing the bycatch issue. Think of the above discussion on the pros and cons of various types of regulation. Input controls, including limited access programs such as limiting the number of licenses, can reduce mortality, at least in the short-run, but there is a rather weak link between the control and the actual amount of harvest. In addition, the cost of fishing will be higher than necessary. Consider trip limits. Since boats can not control the exact amount of fish brought on board, it is possible that each trip will involve some regulatory discards as some fish are thrown away to keep the boat within its limit. At the same time, if the fleet takes more trips than were predicted when setting the allowable number of trips, the total mortality goal may not be met. Finally, the same amount of catch could have been taken with fewer trips and less cost.

If TACs consider bycatch and can be properly enforced, they will be biologically effective. However, they can stimulate a race to fish which causes various types of inefficiency.

Setting up a LAP program is *conceptually* a fairly straight forward proposition in a single species fishery.³ Establish a process for determining the TAC which, if necessary, takes bycatch into account. Then distribute the harvest permits, and let participants fish as they choose as long as, in the aggregate, total mortality remains within the permitted levels. Compared to input controls, there will likely be lower costs, lower bycatch, and better control on total fishing mortality.

Look at the bycatch issue in more detail. By definition there will be no regulatory discards. Further there will be incentives to maximize earnings per unit of allowable harvest which may lead to a reduction in economic discards. With no race to fish,

³ This is not to say that it will be an easy task in reality given standards set in the MSA and the myriad of fisheries management objectives for any given fishery.

participants can change fishing strategies and/or technologies to reduce damage to fish and to reduce the take of small unmarketable fish.

In certain cases, this potentially beneficial incentive can go too far and encourage what has been called highgrading. This can occur when different sizes of fish have different prices and it is fairly easy and inexpensive to separate fish on deck. Under these conditions it can sometimes be profitable to discard the lower value fish and save the harvesting privileges for higher valued individuals. Whether this actually will occur or not depends upon relative prices, the cost of sorting and the cost of landing other fish to replace those that were discarded. Also there will be no incentives to highgrade in programs that are based on catch and which have adequate on board monitoring,

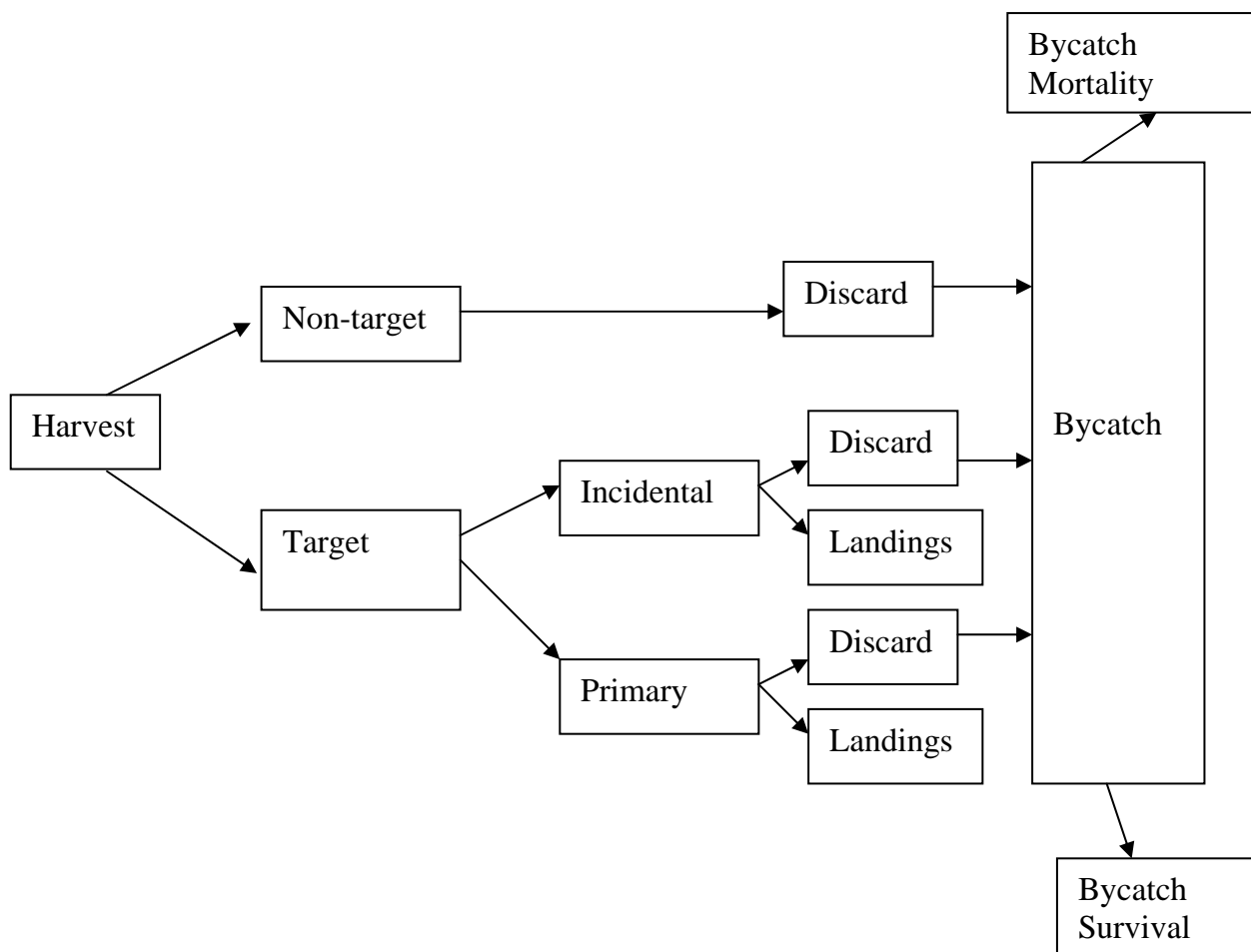


Figure 2. Target and Non-Target Designations in a Multiple-Species Fishery.

Now consider the more general multiple species harvesting operation (see Figure 2). Here the distinction between target and non-target harvest and between primary and

incidental target harvest are relevant. For clarity, the distinction between economic and regulatory discards is not included in the figure. What is harvested depends upon fish distribution, the types and amounts of harvesting gear, and their temporal and spatial use throughout the year. However, the relative composition of harvest is, within certain limits, subject to the control of the fleet. In the short-run, responding to changes in relative abundance and relative fish prices, boats can change the location of where they operate and the way they fish to change the relative amounts of harvest of the different species. In the longer run, they can change their technology to do the same thing.

In an open access fishery, the choice of gear type and the way it is used is based on the individual's profit motive. As shown above, this motive will not ensure that the appropriate total catch levels are maintained, nor will it necessarily result in the best catch composition. While there will be incentives to avoid fish which have no value, it is total revenue that is important. The cost of discarding a species that is jointly harvested with a valuable species may be an easy expense to bear. But the important issue for managers is exactly how much flexibility do fleets have in changing catch composition and how will different types of management cause them to make adjustments?

In some cases part or the entire incidental harvest may be sold while in other cases it can end up as an economic discard. It has a market value, but given the process of getting the primary harvest to market, it may not be worth the extra cost of getting the incidental harvest to market.

Looking at this more realistic picture of the way a fishery operates puts the fishery management problem into better perspective. The main issue is still to control total fishing mortality and to address the bycatch issue. But the biological, technological, and market relationships between the harvest and landings of different species makes the problem very complex. The problem is due to the nature of the multi-species fishery, not due to the type of management *per se*. The important question is how well do the different types of management control both harvest *and* bycatch mortality in multi-species fisheries? Addressing either issue will have effects on the other, and evaluating case examples will provide a context for identifying subsequent design criteria for LAPs.

Consider first the case of achieving a set of annual catch limits for a set of interrelated species. To make the discussion easier, let us use a two species fishery. The ratio of the TACs is a function of relative stock sizes and critical aspects of the reproductive capacity of each stock. The ratio of harvest levels is a function of the range of technology throughout the fleet, the ratio of prices, and the relative size and the spatial and temporal distribution of the two stocks. However, except in very rare cases, the two ratios will not match which means that it is not possible to achieve exactly both TACs no matter what type of regulation is used.

For example, consider where the ratio of TACs for species A and B are 10 and 1 respectively, while the catch ratio, depending on which type of boat is fishing where and how, ranges between 10 to 2 and 10 to 3. Then under the best of circumstances, if the harvest of species A is kept at the TAC of 10, the harvest of species B will be 2.

However, it could be as high as 3. Therefore the TAC will be surpassed by an amount somewhere between a 3:1 and a 2:1 ratio. On the other hand, if the harvest of species B is kept to its TAC of 1, the highest possible harvest of species A is 5, but it could be as low as 3.33. In either case, harvest will be less than the TAC. In the first instance, there will be a biological problem with species A and in the second case possible harvest is left in the sea. The latter issue can be called the problem of the binding or the constraining TAC.

Even a casual interpretation of the MSA will show that on a policy level the biological problem with species A takes precedence. Ignoring the constraining TAC to take more of the other species is not an option. This points out the importance of setting the biologically based TACs as carefully as possible since the ramifications can extend beyond the species being considered.

Given the reality of the binding TAC, the problem facing the managers of this hypothetical fishery is to how to arrange harvesting activity so that the harvest of species A is as close to 5 as possible while the harvest of species B is kept at 1. More accurately the problem is to maximize the value of the harvest of both species while keeping the harvest of species A to 1, taking into account other management objectives.

How well do traditional regulation methods solve this problem? Very general techniques such as closed seasons by their very nature do not specifically address the differences in harvest ratios. Do you set the season length so as to achieve the constraining TAC, the other TAC, or some average? Even if it is set with the binding TAC in mind, how well can the program be expected to work? What kind of incentives does this provide to participants both in the short-run and the long-run?

What about a straight TAC program? Is the fishery shut down when the binding TAC is met or is just the landing of the constraining species prohibited? If so, the regulated bycatch will increase and, unless discard mortality is zero, the binding TAC will be surpassed.

What about the use of landings limits, where landings of species B is limited to the appropriate percentage of species A? This may keep landings in the correct proportions but not the relative mortality rates.

To the extent that they can be enforced, regulations on season, area, or depth fished may lead to desirable changes in the catch ratios.

Finally, what about a LAP program? The basic principles also apply, and difficult interdependencies will be hard to resolve. But in principle, harvest will stop once the TAC for a particular species has been achieved. Further, there will be incentives for the annual privileges for the species with the binding TAC to be acquired by those who can catch more of the other valuable species per unit of the constraining species. This will help in achieving the goal of maximizing the value of total output while staying within the limit set by the constraining TAC.

On the other hand, the exact design of a LAP program that can adequately address all, or even the most important, interdependencies in a multi-species fishery is much more difficult task, even on a conceptual basis. Which of the primary or incidental species should be included in the programs? How can non-target species be considered? Can various species be safely grouped as a complex with a separate TAC? Are there special rules or protocols for quota balancing that add flexibility and cost efficiency for management and participants alike without sacrificing the biological requirements? These topics are addressed in the following sections.

But again it must be stressed that there are no definitive answers that will work for all fisheries or for all Councils. The point to remember is that issues such as the problem of the constraining TAC are there because of the nature of the fishery. They are not caused by the type of management chosen. The objective is to choose the type of management that will do a better job of solving the problems, and acknowledge that none of them will be able to achieve perfection. With respect to LAPs, the issue is to design the details of the program so that it addresses the special problems of the particular fishery thinking in terms of Figure 2. The next step is to determine if that particular program can achieve the overall fishery management objectives better than traditional techniques.

The Two Parts of a LAP Program

There are two critical parts of a LAP program. The first is the design of the program itself which includes the specifications and the characteristics of the harvest privileges. The second is the design of the method of determining the initial, and sometimes subsequent, allocations of the privileges. For the most part, when constructing and evaluating LAP programs, these can be considered as separate and distinct parts. One important exception is that any design decision to disallow transfers will ultimately necessitate a second round of allocations (see further discussion below). It is necessary to give both aspects the appropriate emphasis and not let an important attribute of one take up all the attention. In some experiences the design of the allocation decision soaks up so much attention that participants neglect the operational design of the system. While the allocation formula has immediate and critical implications, the program's operational design will be important for a very long time. However, neither a well designed program with a socially unacceptable allocation formula nor a poorly designed program with an acceptable allocation program will likely be a success.

An introduction to some of the theoretical and operational fishery management parameters affecting design choices has been provided in the previous two subsections. The following subsection provides an introduction to the application of these parameters to the LAP design process, setting the stage for the detailed comparative analysis provided in the "Nature of the Harvest Privilege" section of Part 2.

The Process of Designing a LAP program.

The basic process of developing a FMP that implements a LAP program should be no different from the process of developing any other FMP. All plans should be developed following the current version of the Operational Guidelines for the Development and Implementation of Fishery Management Plans (NMFS, 1997). The Councils should undertake the required steps of scoping, planning, preparation of documents, public review, and adoption regardless of the type of management regime. Granted there may be special requirements, such as referenda in some cases, but the overall process of designing the fishery regulation program should be the same.

While the process will not be different, the types and amounts of work done at each step will vary, especially when a Council is preparing a LAP program for the first time. This can be discussed in terms of the following generalized steps for the plan development process.

Step 1. Current Status Description. Summarize the current status of the fishery including stock characteristics, existing management regulations, catch trends, fleet size, cost, earnings, and employment levels of the various sectors including the processing and support industries. If applicable, descriptions of the recreational sector should be provided including participation, catch rates, and any valuation information. All of this should be placed in context by describing the physical and natural environment including ecosystem interrelationships and community structures. The discussion should focus on identifying potential areas of concern with respect to the stock or to participants. In reality this step is going on continuously as part of observing the current operation of the fishery.

Step 2. Set Objectives. State the fishery management objectives or goals that the Council wishes to achieve with the FMP. Often the goals have to do with correcting or mitigating one or more of the problems identified in step 1. The objectives will be most useful if they are stated such that it is possible to measure the degree to which they are achieved.

Step 3. Specify Management Alternatives. List the range of management options that will (or can) be considered to achieve the management objectives. Often the list will be expanded or the nature of specific alternatives will be modified during the performance of steps 4 and 5.

Step 4. Analyze Alternatives. Using the best data and analytical tools available, determine the effects of the various management alternatives on the stock and the welfare of stakeholders measured in ways that relate to the management objectives.

Step 5. Select and Implement the Best Option. Select the management option that most nearly achieves the management objectives while meeting the other requirement of the MSA.

Step 6. Monitor and Adjust. Develop a monitoring protocol that can determine if the selected management option is producing the desired results.

When performing these steps it is necessary to consider the transition phase between the *status quo* and the operation of the fishery after it has adjusted to the new fisheries management structure. As with any change in a management plan, the switch to a LAP program can have far reaching effects. While there is the potential for biological, financial, and efficiency improvements, in the process there will be both real and perceived winners and losers. Some of the problems result because it takes time to learn how to operate under a new system and some from the fundamental changes in the rules of the game. It is possible that many of the problems can be avoided or mitigated if in the process of designing a LAP program the transition to the new regime is as much a part of the planning as is the final destination.

Thus, management objectives should include addressing biological, distributional, and other goals during the transition phase. The range of management alternatives should be broad enough to provide a meaningful choice between effects during the transition as well as after program implementation. In reality this may involve minor modifications, including time specified adjustments, in the options discussed below. For example, because it will likely take time for participants to learn how to operate in a market-based system, it may make sense to limit transferability in the first year or to allow only short-term transfers in the next two years, before allowing for full transferability in the fourth year. This is discussed in more detail in the section on transferability below. Further, when the Council's goals include correcting for fleet overcapacity, a LAP program may include transition measures that result in phased reductions in fleet and labor force. Further, a loan program may be financed as part of the cost recovery process or by other means to help certain individuals acquire harvesting privileges. When the different alternatives are analyzed, the fish stock and economic welfare effects during the transition should also be clearly laid out for participants and Council members to review.

The actual design of a potential LAP program should occur during step 3. However the basis for deciding if one is necessary, and if so, how it should be designed, should be derived in steps 1 and 2. LAPs have the potential to eliminate the race for fish (often caused by simple input or output controls) and the deleterious effects the race can have on fleet and processing capacity, product quality, and safety. They provide incentives to reduce overcapacity and to improve product quality. A careful study of the current state of the fishery is necessary to determine if a LAP program will be a suitable management option to address the issues of concern.

However, because there are innumerable ways to design a LAP program, it is necessary to have criteria for selecting which options to use to design the best one for the given situation. The management objectives selected in step 2 will be those criteria. To be useful, the objectives or goals should address biological, economic, social, cultural, and distributional issues.

If, based on the results of steps 1 and 2, the Council decides to consider a LAP program, the technical design work will take place in step 3. The task will be to design the specifics of the program such that it achieves the management objectives while conforming to the

MSA and other applicable laws. Implicit in this is that the LAP program will be an improvement over the *status quo* regulation program.

While the devil is in the details and these details will be explained further below, there are two basic things that must be done when designing a LAP program: (1) Determine who will receive and who can hold the harvest privileges; and (2) Define the nature of the harvesting privilege. With regard to the first issue, under previous versions of the MSA, the privileges were called IFQs and they were given primarily to individuals and firms even though “persons” was broadly defined in a legal sense. IFQs may still be used by Councils, and they are defined in Section 3(23) of the MSA as:

(23) The term "individual fishing quota" means a Federal permit under a limited access system to harvest a quantity of fish, expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for exclusive use by a person. Such term does not include community development quotas as described in section 305(i).

The reauthorized MSA followed the lead of the U.S. Ocean Commission and broadened the scope of harvesting privileges by introducing the concept of LAPs, which can be given to a broad range of entities as long as they satisfy the eligibility requirements. This may include partnerships, corporations, coops, and fishermen’s organizations. RFAs and Fishing Communities (FCs) are two new types of entities that can acquire and/or hold LAPs and are specifically defined in the Act. RFAs and FCs will be discussed in detail below in the section entitled “Eligibility to Acquire/Hold Privileges.”

A LAP is defined in Section 3(26) of the MSA as follows:

(26) The term ‘limited access privilege’—
(A) means a Federal permit, issued as part of a limited access system under section 303A to harvest a quantity of fish expressed by a unit or units representing a portion of the total allowable catch of the fishery that may be received or held for exclusive use by a person; and (B) includes an individual fishing quota; but (C) does not include community development quotas as described in section 305(i).

As defined, IFQs are a subset of LAPs, but it is hard to distinguish between the two. IFQs represent a quantity of catch expressed as a *percentage* of the TAC, while LAPs are expressed as a *portion* of the TAC. It is not absolutely clear what is the distinction between the two terms. In both cases the amount of fish that can be harvested by the privilege holders in any year is bounded by the TAC, but presumably LAPs provide a little more latitude in the way the TAC is divided. With IFQs, the quota shares are always granted as a percent of the TAC, but with LAPs, the quota shares may be given in terms of weight but will require adjustments with changes in the TAC. (This issue is described in detail in the section entitled “Denomination of LAP Units.”)

Given that IFQs (the term of choice under the previous MSA version) is now subsumed under the term LAP, and further given the very small difference between the two, it makes sense to use the term LAPs when discussing market-based management programs under

the new legislation. The only time there is a need to make a distinction is with respect to the way the TAC is divided. An IFQ represents a LAP where the “portion of the TAC” is always a percentage. Subject to any subsequent legal interpretation, a LAP without the IFQ distinction can be a “percentage” but it can also be some other type of portion.

For the purpose of discussion it will be useful to specify the range of choice open to the Councils when creating a LAP program under the revised MSA, relative to what could be done under the previous legislation. The range of choice is shown in Figure 3. Most Councils are familiar with the development of IFQ programs, which is shown in the left-hand box. The right-hand box shows the use of only the new elements in the MSA. In between is the wide range of combinations of the old and the new. The main distinction between the customary and the new is that the latter gives more emphasis to community-based control of harvesting privileges, where community is defined in the broadest possible sense.

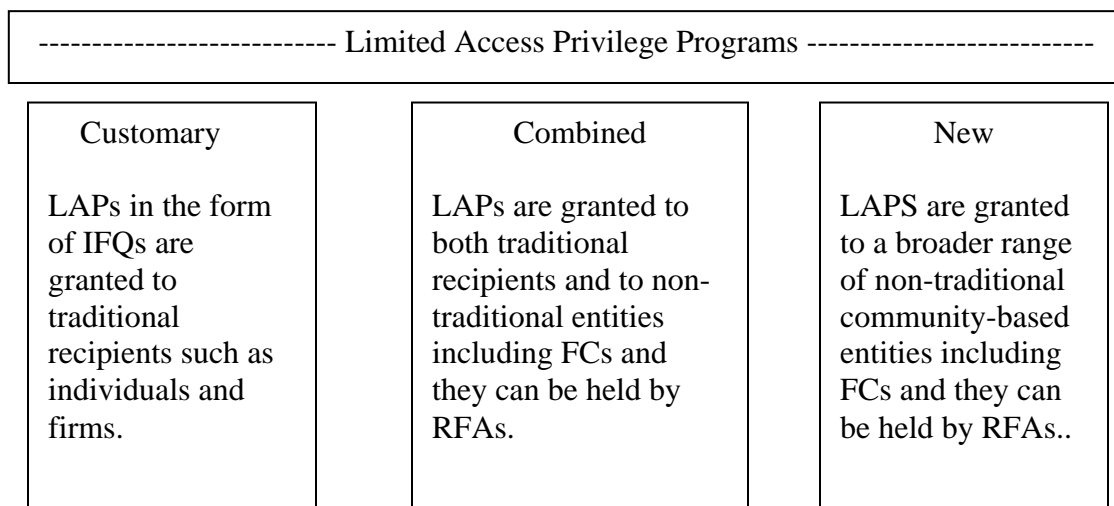


Figure 3. Range of Limited Access Privilege Program Options.

In many important ways, granting LAPs to RFAs or FCs will have little effect on the design of a program relative to the design of an IFQ program. In other ways, there are some important differences to consider, especially in combined cases where there are significant differences in the nature of the recipients. The discussion to follow will focus on these similarities and differences.

The second design issue is to specify the nature of the privileges. The components that, in concert, specify this nature include specification of management or resource units, denomination of LAP units, details of eligibility to acquire/hold, program duration, transferability, and excessive share. To assist the Councils as they evaluate each of these components, this document describes the nature of each component and provides a summary of the pros and cons of the different options that can be used in their design.

Before going into the details of the development of a LAP program, it will be useful to review the more general requirements for LAPs that are spelled out in the MSA. The following is taken verbatim from the Act. These are the mandates for LAPs. Most are self-explanatory. Note that Steps 2 and 6 of the generalized steps for the plan development process described above are mandated, and that most of these provisions will be at least partially the responsibility of NMFS. The requirements for LAPs in Section 303A(c) include:

(1) IN GENERAL.—Any limited access privilege program to harvest fish submitted by a Council or approved by the Secretary under this section shall—

(A) if established in a fishery that is overfished or subject to a rebuilding plan, assist in its rebuilding;

(B) if established in a fishery that is determined by the Secretary or the Council to have overcapacity, contribute to reducing capacity;

(C) promote

(i) fishing safety;

(ii) fishery conservation and management; and

(iii) social and economic benefits;

(D) prohibit any person other than a United States citizen, a corporation, partnership, or other entity established under the laws of the United States or any State, or a permanent resident alien, that meets the eligibility and participation requirements established in the program from acquiring a privilege to harvest fish, including any person that acquires a limited access privilege solely for the purpose of perfecting or realizing on a security interest in such privilege;

(E) require that all fish harvested under a limited access privilege program be processed on vessels of the United States or on United States soil (including any territory of the United States);

(F) specify the goals of the program;

(G) include provisions for the regular monitoring and review by the Council and the Secretary of the operations of the program, including determining progress in meeting the goals of the program and this Act, and any necessary modification of the program to meet those goals, with a formal and detailed review 5 years after the implementation of the program and thereafter to coincide with scheduled Council review of the relevant fishery management plan (but no less frequently than once every 7 years);

(H) include an effective system for enforcement, monitoring, and management of the program, including the use of observers or electronic monitoring systems;

(I) include an appeals process for administrative review of the Secretary's decisions regarding initial allocation of limited access privileges;

(J) provide for the establishment by the Secretary, in consultation with appropriate Federal agencies, for an information collection and review process to provide any additional information needed to determine whether any illegal acts of anti-competition,

anti-trust, price collusion, or price fixing have occurred among regional fishery associations or persons receiving limited access privileges under the program; and

(K) provide for the revocation by the Secretary of limited access privileges held by any person found to have violated the antitrust laws of the United States.

(2) WAIVER.—The Secretary may waive the requirement of paragraph (1)(E) if the Secretary determines that—

(A) the fishery has historically processed the fish outside of the United States; and

(B) the United States has a seafood safety equivalency agreement with the country where processing will occur.

While, for the most part, these provisions are self-explanatory, it is possible to provide more details. First, a well thought-out LAP program should easily be in compliance with points (A), (B), and (C). A TAC that conforms with other parts of the MSA will ensure that there are no problems with overfishing. Similarly, with reasonable rules on transferability, the incentives for efficiency in production produced by a LAP program will contribute to the reduction of overcapacity. Finally, the potential freedom given to participants to fish where and when they choose will contribute to safety at sea and the improvement of overall management and conservation. LAPs provide incentives for economic efficiency. A full consideration of the issue of promoting social and economic benefits is discussed below.

Section (D) places legislative constraints on how Councils choose to address the “Eligibility to acquire/hold” component of a LAP program. This is discussed in more detail in the relevant section below.

Section (E) ensures that all fish harvested in LAP fisheries will, with certain specified exceptions, be processed by U.S. processors presumably to prevent a system that will allow certain segments of the industry to be blocked from the gains of a LAP fishery.

Sections (F) and (G) are merely the codification of Steps 2 and 6 in the generalized plan development process described above. Both should be part of the current development and updating procedure for all plans, although a written report is rarely done. The purpose of the review is to provide a formal analysis of how well the plan objectives have been achieved and of how well the fishery is operating overall. To ensure that the review can be completed, it is imperative that the relevant data on metrics related to the meeting of the objectives are collected in a regular and organized manner.

Sections (H) and (I) are also legislative mandates for procedures that are routinely performed as part of the preparation of all management plans. The NMFS has programs for enforcement of all existing management plans and experience with implementing administrative appeals processes for many historical allocation decisions. Although LAP programs are different, the changes required with respect to enforcement and appeals should be straightforward, and will, for the most part, be the responsibility of NMFS and not the Councils.

Section (J) and (K) provide a legislative mandate to prevent monopolistic activities that is directed at the Secretary and NMFS. Presumably, other than providing a statement in the plan that the mandated issues are to be addressed by the Secretary, there is little that Councils can do. As such, except for the section of excessive shares, this document will not address this topic *per se*.

Introduction to Allocation of LAPs.

The following introduction to allocation issues sets the stage for the detailed comparative analysis discussion in the “Initial Allocation” section of Part 2. One of the desirable properties of LAP programs is the freedom, and indeed the incentives, to increase efficiency in the production of fish products. This has general benefits for the overall economy and especially for seafood consumers. Just as important, this efficiency will lead to improved harvester profits. Or looking at it the other way around, it is the search for improved profits, made possible by the creation of harvest privileges, that leads to improved efficiency. To the extent that LAP programs are successful, there will be an increase in profits, and these profits will accrue to someone. Sometimes the potential profits will be quite small as in the South Atlantic Council wreckfish IFQ program and sometimes they can be quite large as in some of the programs in Alaska. Regardless of magnitude, there will be distributional issues to be resolved as part of a LAP program.

Before going on it will be useful to clarify two issues. First, the granting of harvest privileges is not an absolute guarantee of profits. It certainly provides the opportunity and the incentives, but it will still involve some initiative and the investment of other human and physical assets to produce the higher valued fish and to obtain lower costs.

Second, all fisheries management programs have allocative effects that influence absolute and relative profits. For example, with a TAC and an open season, those with bigger boats that can fish in more locations and under more varied weather conditions have a better opportunity to capture the gains from the restricted harvest. In this case, however, the profit incentives do not lead to increased efficiency. People will have incentives to build bigger and faster boats that will only intensify the race to fish and will result in decreased overall efficiency. Limited access programs that restrict the number of participants have very clear distributional consequences, especially if they include more specific limits such as allowable days at sea. There may not be a direct tie to a certain amount of catch as in a LAP program, but there is certainly a bold line between those that can fish and those that can not, and perhaps even further differentiation among those that are permitted to fish.

The above notwithstanding, LAP programs are considerably different than other types of management with respect to distributional issues and this difference needs to be incorporated in their development. While all FMP work can have important repercussions for industry participants, LAP effects can sometimes be more significant, longer lasting, and more difficult to “un-do.” Council members should always remember this as they design and vote on a LAP program. The flip side of this is that because so much is at stake, industry participants will have extra incentives to get involved in the Council

process as the program is developed. This is a good thing, but at the same time, Council members must be very careful to interpret comments from various constituents relative to potential gains or losses. Council members must realize that all constituents may not have the means to attend Council meetings or even to understand the nuances of various programs designs.

When it comes to addressing the distributional aspect, the new MSA grants wide latitude in how allocation decisions are made. For one thing, because of the provisions for auctions and other methods to collect royalties, the option to return some of the gains from improved management back to the general population, as represented by the government treasury, is now a possibility. The word “some” is important because it is the possibility of increased profits that provides the incentives for changing fishermen’s behavior. All of the increased profits can not be taken away without destroying these incentives. The details of collecting royalties are discussed below in Part 2.

With LAP programs there is a broader emphasis on allocating privileges to a wider range of potential recipients. Although it was not required by earlier versions of the MSA, traditionally, IFQs have been given to “persons” in the narrow sense of the word. Primarily, they went to individuals or various types of business entities. It is now possible to consider explicitly RFAs or FCs, two types of entities defined in the MSA, as well as other types of organizations. Of course, allocations to traditional recipients are also an option. This will also be discussed in more detail below.

In summary, the allocation question is more complex since MSA reauthorization because the range of choice has increased. There is now a greater choice of distributing net benefits among participants and between the national treasury on the one hand and fishery participants on the other. While it may be more complex, it also improves the ability of the Councils to achieve a wider range of overall management objectives.

Part 2: The Design of LAP Programs

1. Nature of Harvest Privilege

A. Duration

The term “duration” refers to the lifetime of a privilege or share itself and not its possession by any one entity. Possession of shares is governed by initial and subsequent eligibility requirements, transfer provisions, and other applicable rules. The MSA is very clear about most aspects of duration; LAPs may be revoked or limited in accordance with the Act, they do not confer rights of compensation, and they do not create any ownership of a fish before it is harvested [Section 303A(b)].

Further, while the language is somewhat obscure, the revised MSA effectively mandates that duration of LAPs be equal to the actual life of the plan [Section 303A(f)].

(f) CHARACTERISTICS.—A limited access privilege established after the date of enactment of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 is a permit issued for a period of not more than 10 years that—

(1) will be renewed before the end of that period, unless it has been revoked, limited, or modified as provided in this subsection;

(2) will be revoked, limited, or modified if the holder is found by the Secretary, after notice and an opportunity for a hearing under section 554 of title 5, United States Code, to have failed to comply with any term of the plan identified in the plan as cause for revocation, limitation, or modification of a permit, which may include conservation requirements established under the plan;

(3) may be revoked, limited, or modified if the holder is found by the Secretary, after notice and an opportunity for a hearing under section 554 of title 5, United States Code, to have committed an act prohibited by section 307 of this Act; and

(4) may be acquired, or reacquired, by participants in the program under a mechanism established by the Council if it has been revoked, limited, or modified under paragraph (2) or (3).

Councils have the option of issuing permits for periods up to 10 years, however it is mandated that they will be renewed unless they have been revoked for cause. That is, a current owner of a privilege is entitled to have the permit renewed unless he or she fails to comply with the requirements of the plan or commits an act that is prohibited by the MSA in general. Using a literal translation, the MSA essentially states that LAPs must possess what may be called rolling conditional permanence.⁴ Congress put in some conditions that must be met for the permits to be renewed and Councils have the option of creating their own conditions. If they choose to do so, the conditions should be well defined, easily monitored, and subject to clear-cut determinations of compliance. Ultimately, of course, the Councils do have authority over duration. They can repeal a LAP program by a plan amendment. But they are limited in what they can do with respect to duration in the context of an ongoing LAP program.

⁴ The actual interpretation that follows from official NMFS guidance might be different.

Any permits that are revoked, limited, or modified are to be reallocated by whatever means the Council chooses. The reallocation process is, in principle, no different than the initial allocation process that is discussed below. Due to the infrequent occurrences and likely small amounts involved, it may be a time to consider auctions. Note that the law does not prohibit those who have lost the permits from reacquiring them.

While the MSA does limit how Councils can deal with duration, in theory there is a range of policy choice between making the privileges as permanent as possible and various limited horizon options. Since a LAP program can be replaced through a FMP amendment, the longest possible duration would be for the life of the plan. This is what Congress has mandated. At the other extreme, privileges could be subject to a sunset provision after a specified number of years. After that they could be reallocated to the same or different entities.

The trade-offs between these two potential options are as follows. By allowing the privilege to be as permanent as current policy allows, the owner will have the securest possible planning horizon and will have better incentives to make efficient investments in harvesting and processing equipment and to develop market channels. Longer term privileges are expected to generate greater economic returns than shorter term privileges. Thus, on economic efficiency grounds, a permanent quota is generally considered superior to a fixed term quota. Also, the longer the duration of privileges, the greater is the fishermen's stake in the fishery and the stronger the desire to conserve and protect the resource.

On the other hand, fixed-term privileges could allow some flexibility. Some have argued that this can be important when a LAP program is being considered for the first time and there is uncertainty about how well the program will work. If quota privileges are initially set for a short period of time, it could be easier to modify the program and even abandon it if necessary. For example, if the initial allocation of quota is deemed inappropriate, a short, fixed-term privilege would allow the Council to re-adjust the allocation to better suit the goals of the program. Also if the Council wishes to allocate shares by an auction, a fixed term policy where some or all of the permits are recalled periodically and resold will provide a continuing source of revenue.

Councils do have the flexibility to address those issues that some have used to argue for fixed duration, but they must be direct about it. A fixed duration program would allow the Council the chance to adjust a program if it does not like the way the program is working, and there would be no need to specify problem areas in advance. But under the law as written, Councils may set rules in the plan to forbid certain actions that it believes will lead to unsatisfactory results. The difference is that these actions must be defined before the plan goes into effect. While the ability to set the conditions is something that the Council can use to ensure that management objectives are met, appropriate care should be taken. For example, some have proposed that to maintain their permits, holders of LAPs must show that they are making *extra* efforts toward providing for the sustainability of stocks. While that may be a noble goal, it will be difficult to prove that, and it begs the

question of why they should they be held to higher standards than those who operate under non-LAP programs.

An option that is related to duration is a “use it or lose it” provision. The notion is that if the holder of exclusive privilege to harvest a portion of the nation’s fish stocks does not use it, it should be turned over to someone who will. Otherwise consumers will have access to less fish and the opportunity to provide earnings to the industry will be lost. While at the surface this appears to be logical, there are many reasons why holders of privileges might not use their privileges in any given year. For one thing there may not be a profitable market for the fish and other times the fish may not be accessible to the gear. If participants can not find the fish or can not sell them at a profit if they catch them, it does not make sense to penalize them. A use it or lose it policy would also preclude individuals, including NGOs, from acquiring privileges and taking independent conservation actions by allowing some fish to remain in the water. Section 303A(c)(5)(E) on LAP allocation requirements would allow the Councils or the Secretary to condition the allocation of privileges though their definition of “substantial participation”:

(E) authorize limited access privileges to harvest fish to be held, acquired, used by, or issued under the system to persons who substantially participate in the fishery, including in a specific sector of such fishery, as specified by the Council.

Thus, privileges can be held or acquired by persons who substantially participate in the fishery, and Councils do have the option of including a use it or lose it provision in the plan. Holders who do not comply would lose their permits.

B. Specification of the Management or Resource Units

Defining the management unit or units is an important part of any fisheries regulation program. This is no less true with a LAP program. A LAP management unit is the species, stock, or aggregation for which a TAC is specified and for which harvesting privileges are distributed. In the Mid-Atlantic Council surf clam and ocean quahog ITQ program, there are only two units: surf clams and quahogs, throughout their range. The ITQ program for Alaskan sablefish and halibut has many management units. Each stock is broken down into several units defined by geographic areas and vessel size class, and a separate set of harvesting privileges is issued for each unit. The purpose was to customize the IFQ program so as to achieve certain fishery management objectives. See the “Eligibility to Acquire/Hold” section below. In some cases, it may be necessary to design a LAP program with some management units for which harvesting privileges will not be distributed. This will be discussed in more detail at the conclusion of this section.

Selecting the management units for a LAP program is a very important step. It defines what stocks, or parts or aggregations thereof, will be the basis for the harvesting privileges. It is also the biological foundation for ensuring proper conservation. In this latter regard, there are two types of questions pertaining to the selection and definition of the LAP management units that must be answered:

(1) How many species should be included in the program? If different species are biologically or commercially related, there may be grounds for managing them jointly under the LAP program. Some of the considerations to be addressed include: Are the species caught as a primary or incidental target harvest with the same gear or by the same fleet at different times or seasons, and are there predator-prey or other ecological relationships between the species?

Care must be taken when selecting the stocks. There are two types of errors that can be made. An error of exclusion occurs when a species that is closely related to those in the program is left out. This can make it difficult to appropriately manage the species that are in the program and/or the one that is left out. For example, if the catch of a species which is not covered in a program has a significant incidental catch of a species which is included, it may be quite difficult to account for this mortality. There are many examples of mixed trawl and multispecies fisheries where these issues are relevant including New England and Alaska groundfish and Gulf of Mexico reef fish. [For further reading see the documentation of the Trawl Individual Quota program of the Pacific Council (<http://www.pcouncil.org/>) and the LAP program for the South Atlantic Snapper-Grouper Fishery of the South Atlantic Council (<http://www.safmc.net/>)]. On the other hand an error of inclusion occurs when a minor or unrelated species is included in the program. Determining and enforcing the TAC for such a species can potentially involve more work and managerial repercussions on the major species than the gains from managing the minor stock are worth. Notwithstanding the requirement to establish annual catch limits for each of its managed fisheries under Section 302(h)(6), Council's selection of a LAP versus some other management option for each species in a management unit should be evaluated on a case by case basis.

(2) How should each of the included species be classified? There may be several stocks or geographically distinct units of the same species. If so it may be appropriate to have a separate TAC for each. At the other extreme, there may be certain groups which may be treated as aggregations for management purposes even though they are technically made up of separate species. The multi-species groundfishery of the Pacific Coast is an example. These aggregations can have a joint TAC. These are complex issues that will depend upon the ecology of the region and it will be necessary to make these classification decisions in a way that is consistent with the requirements for specifying annual catch levels. (See Section 302(h)(6)).

Here again the decisions are critical. An error of agglomeration can occur if biologically distinct stocks are managed as a unit. A single overall TAC on two separate stocks may put too much pressure on one stock if it is closer to port or has a higher catch per unit of effort. On the other hand, an error of specificity may occur if the different species are divided into too many stocks because the program can become unwieldy and difficult to manage. This is also a potential problem when customizing a management program to divide the harvesting privileges among many different groups or areas.

There are definitely trade-offs in answering these two questions. The larger the number of stocks that are included in the program, the more inclusive the system will be and the

lower the need for a separate management program to handle species and stocks not included. Additionally, the finer the quota share stocks are geographically defined, the easier it will be to focus management on more narrowly defined species or species groups (assuming there are biological, technological, or distributional reasons for doing so). However, the larger the number of area divisions, the more complex and difficult it will be to manage the LAP program. There will be more TACs to set, and the monitoring program will have to be able to distinguish landings according to the stock from which they were harvested.

As mentioned in the introduction, in complex multiple-species fisheries it will not be possible to take all of the allowable harvest if the ratio of harvest levels is not the same as the ratio of TACs. This was called the problem of the binding or constraining TAC. It is very important to keep these issues in mind when trying to specify the management units. At the same time, managers in existing LAP type programs around the world have developed ways of addressing these issues. Because of the importance of binding or constraining TACs to LAP design work on the Pacific coast, a detailed study on this was funded by the Alaska Fisheries Science Center at the Northwest Regional Office. (See Sanchirico et. al., 2005; a related study is Holland and Herrera, 2006). The following quote summarizes the general points:

Fishery managers have addressed this difficulty by allowing market transactions, such as permanent and temporary transfers of quota. Management systems permit “retrospective balancing” or trades after landings are made to allow a fisherman to cover overharvest of quota. Managers also have used non-trading mechanisms to aid in balancing catches with quota holdings. These include rollover provisions, such as carrying forward or back of quota, “deemed value payments,” under which fishers are charged a fee for each unit of catch they land above their quota, or permitting fishers to surrender or discard catch they cannot match with quota. Some programs also permit “cross-species” exchanges where quota of one species can be used to cover catches of another species at a prescribed trading ratio.

All of these mechanisms introduce flexibility into the system for the benefit of the individual quota owner. The costs of this additional flexibility, however, can be a loss of precision in TAC management, potential effects on the performance of the lease market, and a greater administrative burden. If two species in a multispecies complex have TACs that are out of balance with average catch ratios, the non-trading instruments might enable fishers to more fully utilize the TAC of the species that would otherwise have been constrained by the TAC of the jointly caught species. Flexibility mechanisms can, therefore, increase the value generated by the multispecies complex, but they also can increase the risk of overexploitation. Achieving the right balance between flexibility, overexploitation risk, and administrative simplicity is critical for the profitability and sustainability of multispecies fisheries. (Sanchirico et. al. page 1)

Further in the abstract, they report:

We find that a combination of incentives and limits on use rates for the mechanisms provide sufficient flexibility to the quota owner without the fishery manager incurring excessive levels of overexploitation risk. Contrary to some opinions, these programs are

evidence that it is possible to implement IFQ programs for multispecies fisheries and that they can be profitable and sustainable.

Councils designing LAP programs in multispecies fisheries should study this report carefully to evaluate the details of the various ways of dealing with quota balancing in these types of fisheries.

As mentioned above, in some cases it may be necessary to include certain species in the overall FMP that will not be an explicit part of the LAP program. For example, there may be a non-target harvest relationship with an ecologically sensitive species that has little or no market value. It would make sense to include the species in the management plan so that fishing mortality issues could be legally addressed. In some cases it may make sense to do so in ways that are independent of the LAP program such as specifying direct bycatch controls. However, even in these cases, it may be useful to consider the use of bycatch LAPs. If the bycatch ratios vary across users or harvest techniques, and the target bycatch harvest level can place a constraint on directed harvest, a program that includes bycatch harvest privileges and directed catch harvest privileges will provide incentives for maximizing the level of directed catch per unit bycatch.

C. Denomination of LAP Units

A LAP program requires permit holders be given the authority to harvest a specified amount of catch each year such that the sum of harvests is equal to the TAC, or in some cases the sum can be equal to an allocated share of a TAC. Since the TAC can vary over time due to variation in the status of the fish stock, a mechanism is needed to vary the harvest privileges associated with each permit as the TAC changes. As mentioned above, there are two types of LAPs authorized under the revised MSA. With an IFQ, the basic entitlement is specified as a percentage of the TAC. For example, if a fisherman holds an IFQ share equal to one-tenth of one percent of the TAC, and the TAC is set at 15,000 metric tons for the year, then the fisherman has the right to catch up to 15 metric tons during the year. Let the term quota share (QS) refer to the basic entitlements, which are denominated in terms of a percentage of the TAC. Further let the term annual harvest privilege (AHP) refer to the periodic harvest privileges, which are denominated in terms of units of catch. The system as a whole can be called a QS/AHP program.⁵

The arguments in favor of using a percentage system is that it takes into account the biological uncertainty that is inherent in fisheries utilization and at the same time is easy and straight-forward to administer. Further it does so in a way that puts the risk on the quota recipients. Given the vagaries of Mother Nature, Councils can not realistically guarantee participants a specified harvest year after year. The recipients, who must be current participants in the fishery, will be used to operating in an uncertain environment, and should be able to design general operating plans to take into account expected changes

⁵ There are many different terms for the annual privileges in use in various regions: annual IFQ in Alaska, quota pounds in the Northwest, and IFQ allocation in the Gulf. The general term annual harvest privilege is meant to include all of them.

in the TAC. Further if a LAP program is instituted in a fishery with an overfished stock, the initial AHPs may be substantially less than historic catches. One could argue that since they are the ones who will bear the costs of the necessary restrictions in harvest, they deserve to receive the benefits when the stocks recover.

When using the more general notion of a LAP, the permit to harvest is specified as a quantity of fish that is a “portion” of the TAC. But what is the operational distinction between a “percentage” and a “portion”? Since a percentage is a portion, one interpretation is that Councils are free to use percentages when using LAPs, but they also have the flexibility to use something else if they so choose. Another interpretation is that if this is to be a meaningful distinction, then the portion must be something other than a percentage. For working purposes, this document will use the former interpretation. The term “portion” does not preclude using a percentage based system.

However, if a Council chooses to use a portion other than a percentage, how is the harvest privilege to be defined? The most obvious choice would be to express the harvest privilege directly in terms of a fixed quantity of fish with the *proviso* that the total amount of privileges in any year can not be higher than the annual TAC. This can be called a fixed annual harvest privilege (FAHP) system. However, for the system to work there must be a procedure to change the “fixed” shares when there is a change in the TAC. Given the mandate that harvest permits must possess rolling conditional permanence (see the section on Duration above) this means that Councils must develop a procedure to change the fixed quantity of fish that is associated with each permit when there is a change in stock conditions.

Think about this in more detail. The basic “permit” must be permanent but the AHP it generates must change with stock conditions. This is true for both “percentage” and “portion” based programs. However, there is a straight forward way to do so with percentage programs; the fixed permit is denominated as a percentage of the TAC. With a portion system, the fixed permit is denominated as a quantity of fish. But the opportunity to take that fish must be circumscribed in some manner.

There are several ways to do this. One possibility is to start from scratch and go through a modified allocation procedure every time there is a change in stock conditions. It would be modified in the sense that the recipients will already be defined as the current holders of the permits. The problem would be to specify how much each permit holder should be allowed to harvest. There are two possible starting points. Start each at a zero base or start at the current harvest levels. Then allocate the whole TAC or the required change according to specified performance specifications that are in conformance with the allocation criteria in the MSA. For the most part it would seem prudent to only deal with the required change in the TAC. Don’t start from the beginning; just modify each permit holder’s fixed quantity such that the net change equals the change in the TAC. But even so, there is a vast difference between the happy times when the TAC increases and each permit can be allowed to generate more AHP and the more critical times when it is necessary to do the reverse. This whole process may result in more effort and acrimony than Councils will be willing to endure.

A better solution may be to use a system that never actually takes privileges away from permit holders but rather differentiates different types of permanent permits according to when the permit would generate AHP. This can be done by setting up a “cushion” system which can best be described using an example.

Assume that over the life of a fishery, the TAC has ranged between 7,000 and 8,500 tons. In principle 7,000 tons could be called a safe harvest level which could be taken in perpetuity. Permits to harvest this amount could be issued to entities according to the allocation procedures described elsewhere in this document. Call these Priority A permits.

To be safe and in full compliance with the MSA it may be smart to set the safe harvest level below 7,000 tons by some safety margin and to specify a procedure on how these “perpetual” privileges would be changed in the rare case when the actual TAC is below the safety limit. That is, it may be possible to significantly reduce the number of times the holders of Priority A permit will lose some for their fixed catch amount, but it is not possible to eliminate it completely.

Table 2. Allocation of the TAC Using Differential Permits.

The other part of this system is the allocation of the cushion, which is the difference between the current TAC and the safe harvest level. This can be done through the use of differentiated Priority B permits. The first step would be to define the size of each Priority B class. For illustrative purposes, they will be set at 100 tons in this example. The whole system can be described by referencing Table 2.

Assuming a safety margin of 1,000 tons, the safe harvest level is set at 6,000 tons. This means that Priority A permits denominated in tons of fish can be allocated such that the total amount is equal to 6,000 tons. Except for the unexpected time when the TAC is less than the safe harvest level, these permits will generate AHP on a ton-for-ton basis.

Then it is possible to issue a range of Priority B permits, also denominated in tons of fish, such that the total amount allocated in each class is equal to 100

TAC 7560		Cushion 1560
Permit Type	Range in Tons	conversion factor
A	≤ 6000	1
B1	> 6000 ≤ 6100	1
B2	> 6100 ≤ 6200	1
B3	> 6200 ≤ 6300	1
B4	> 6300 ≤ 6400	1
B5	> 6400 ≤ 6500	1
B6	> 6500 ≤ 6600	1
B7	> 6600 ≤ 6700	1
B8	> 6700 ≤ 6800	1
B9	> 6800 ≤ 6900	1
B10	> 6900 ≤ 7000	1
B11	> 7000 ≤ 7100	1
B12	> 7100 ≤ 7200	1
B13	> 7200 ≤ 7300	1
B14	> 7300 ≤ 7400	1
B15	> 7400 ≤ 7500	1
B16	> 7500 ≤ 7600	0.6
B17	> 7600 ≤ 7700	0
B18	> 7700 ≤ 7800	0
B19	> 7800 ≤ 7900	0
B20	> 7900 ≤ 8000	0
B21	> 8000 ≤ 8100	0
B22	> 8100 ≤ 8200	0
B23	> 8200 ≤ 8300	0
B24	> 8300 ≤ 8400	0
B25	> 8400 ≤ 8500	0

tons. The distinction between the different Priority B permits is the conditions under which the permanent permit actually generates AHP. As demonstrated in the table, each permit class is associated with a range of TAC values. If the annual TAC is above that range, the permits will generate AHP equal to the full weights associated with the permit.

Assume the TAC for a certain year is 7,560 tons. Given the specified safe harvest level of 6,000 tons, the cushion amount to be allocated is 1,560 tons. Individuals with permit types B1 through B15 will receive full AHP value for their permits. However, individuals with permit types B17 or higher will receive no AHP that year. Depending on how the Council wants to set the rules, individuals with B16 permits could either receive no AHP (this might be done to simplify the system and would mean that the number of units in each B subclass should be relatively small) or a percentage share. The range for B16 permits is 7,500 to 7,600 tons and the TAC is 7,560 tons. Therefore each permit holder could be granted AHP equal to 60 percent of its fixed weight.

A different TAC would lead to a different final AHP distribution, but the principle is the same. The total amount of AHP generated each year will be equal to or less than the TAC depending on how the marginal B class permit is handled.

Another option would be to allow an open access fishery for the cushion. The disadvantages of such a scheme are very large. Anytime a management system uses two different types of controls simultaneously, there is bound to be an increase in administrative cost and detail. In addition, both the biological integrity of a firm TAC and the efficiency and capacity reducing incentives of a privilege based system for the entire fishery would be lost.

Several points are in order here. First what is the real difference between the cushion system and the traditional percentage system? It is not that difficult to see that the arithmetic is not really that much different. There are however some significant changes in the distribution of the risks of TAC changes. Holders of different types of permits will bear different risks. Put differently, participants will have the potential to make better business decisions with respect to TAC fluctuations. Priority A permits and the lower numbered Priority B permits will generate AHP on a more consistent basis. Accordingly they will have a higher market value. At the same time, owners will be more certain of the amount of fish they will be able to harvest. Individuals will have the option of building up a portfolio of permit types depending on the size and other potential uses of their vessels, the type of their fish delivery contracts, their willingness and ability to handle risks, etc.

Also, at least initially, Councils would be able to allocate the different types of permits depending upon the perceived needs of potential participants. For example, Priority A permits could be given to participants with small boats or who live in small ports with little alternative employment. In spite of this feature, the received wisdom from current programs around the world is that percentage based systems are preferred.

Second, the purpose of this discussion has been to demonstrate a possible way to use a portion system in such a way that the TAC can be maintained. There may be other possible ways, with more or less advantages or disadvantages. While it may be possible to use a portion system, the basic policy question revolves around the ability of the alternative systems to meet overall management objectives relative to the complications and costs of designing, implementing, and running the system.

The mandate that the basic permit must possess rolling conditional permanence limits the number of ways that portion systems can be used. For example, if it were possible to use time-limited permits it would be possible to allocate the cushion on a yearly basis based on a similar procedure used in an initial allocation. It would even be possible to auction them. The difference is that the AHP could, in principle, be given to a wider and differing range of entities, whereas with rolling conditional permanence, the AHP will always go to certified owners of the relevant permanent permits.

To summarize, there are two related policy issues involved. First, who should bear the inherent risk and the costs and benefits that are associated with changes in the TAC? Should it be the participant who must deal with uncertainty in planning fishing activities? Or should it be the management authority that has to develop and follow adjustment protocols? The related question has to do with the difference between using formulas and using policy discretion. Once determined, a percentage formula is easy to use, transparent, and free of the taint of backroom bargaining, as the gains and losses are proportionate to QS holdings. However, some may feel that management objectives can be better met if decisions on the allocation of decreases, and especially significant increases, in the TAC are subject to Council deliberations.

Whichever system is used, the actual annual harvesting privilege will be denominated in terms of catch weight. It may seem like a small point, but it is also necessary to specify whether the denomination will be in terms of the live weight of fish put on the deck, or the landed or first sale weight after heading and gutting. It will be important to ensure that the one that is used is consistent with the denomination used in stock assessment analysis. Also if catch is sometimes landed in green weight and sometimes with some processing, it will be necessary to establish a conversion coefficient so that the different types of landings can be compared. This can be a difficult problem because the relationship between green weight and landed weight can vary depending upon the season and the type of fish processing technology or procedure is used. And errors in conversion can create problems with respect to keeping the fishery below the TAC and in ensuring that individual participants take no more or no less than they are entitled to. See Anderson (1991a).

D. Eligibility to Acquire/Hold Privileges

The issue here is the selection of the individuals or entities that are allowed to participate in a LAP program. Eligibility relates to the initial allocation issue because those who are chosen to be part of the initial program must be eligible to acquire harvest privileges.

However, all parties that are eligible may not necessarily receive privileges during the initial allocation. Eligibility also relates to the transferability issue. If the set of entities that are eligible subsumes the set receiving initial allocations, transferability must be allowed if all in the larger set are to have access to privileges.

As with other components of the nature of the harvest privilege, the criteria to acquire or hold LAPs should be selected according to the goals and management objectives of the FMP, as constrained by the MSA. To set the stage, at one end of the widest possible continuum is to allow any person or entity to hold harvest privileges. This is not allowed under the MSA. At the other extreme, acquisition can be restricted along a number of margins. For example, only licensed fishermen and certified boat owners who have participated in the fishery for X years using an owner operated boat outfitted with Y gear, and fishing out of Z port are eligible. Moving from broader to more restrictive criteria may help achieve certain management objectives but it can also limit the potential benefits provided by an active market in the trading of privileges. In addition, such moves may affect implementation, operation, and monitoring costs. These are the types of trade-offs that Councils will have to consider.

The MSA does put some constraints on what the Councils can choose to do. As previously discussed, Section 303A(c)(5)(E) links privileges to be acquired or held by persons to those who substantially participate in the fishery.

In MSA Section 3(36) a “person” is defined as:

(36) The term "person" means any individual (whether or not a citizen or national of the United States), any corporation, partnership, association, or other entity (whether or not organized or existing under the laws of any State), and any Federal, State, local, or foreign government or any entity of any such government.

Before interpreting this however, it is necessary to note a general requirement for any LAP in Section 303A(c)(1)(D):

(D) prohibit any person other than a United States citizen, a corporation, partnership, or other entity established under the laws of the United States or any State, or a permanent resident alien, that meets the eligibility and participation requirements established in the program from acquiring a privilege to harvest fish, including any person that acquires a limited access privilege solely for the purpose of perfecting or realizing on a security interest in such privilege;

Since Councils must prohibit any person other than those listed, in plain language this means that only those on the list may be granted LAPs. Therefore the range of applicable “persons” that may own or control harvesting privileges is more circumscribed than the general definition of a “person.” For example, non-citizens, other than permanent aliens, and entities established under foreign laws may not acquire/hold harvest privileges. As a counterpoint, in the 1996 version of the MSA, IFQs could be given to persons in the broadest sense of Section 3(36) and with none of the restrictions specified in Section 303A(c)(1)(D). Even with the introduction of FCs and RFAs (see below), the revised

MSA places more restrictions on who can acquire/hold harvesting privileges than did the previous version.

While the Councils have some latitude in determining who may or may not acquire harvesting privileges, it is certainly more restrictive than the “anybody can own” criterion mentioned above, because of the citizenship requirements and the “substantially participate in the fishery” clause. It is the responsibility of the Council to determine what “substantially participate” actually means based on the fishery management objectives. In addition to vessel owners, who have been recipients in previous IFQ fisheries, presumably recipients could include captains, crew members, processors, or participants in fishery dependent support businesses. At the same time, the Council, to meet management objectives, can prohibit certain citizens, permanent aliens, and U.S. entities from acquiring harvest privileges by specifying eligibility and participation requirements in the FMP. It is interesting to note that there are no specific restrictions in the law on non-U.S. citizens participating through ownership of, or membership in, one of the permitted entities. Presumably this could be addressed independently by the Council.

The reauthorized MSA explicitly allows Councils to permit harvesting privileges to be held by two new types of entities: FCs and RFAs. FCs, previously defined in the MSA, now appear in Section 2(17):

(17) The term "fishing community" means a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community.

The concept of a RFA was introduced in Section 2(14) of the reauthorized MSA:

(14) The term ‘regional fishery association’ means an association formed for the mutual benefit of members—

(A) to meet social and economic needs in a region or subregion; and

(B) comprised of persons engaging in the harvest or processing of fishery resources in that specific region or subregion or who otherwise own or operate businesses substantially dependent upon a fishery.

If Councils are to use either of these two new options in a LAP program, they must specify criteria that, in addition to conditions set out in the Act, are to be used to officially designate organizations as RFAs or FCs for purposes of the Act. Presumably the designation will be an official Council process carried out under the authority of an approved LAP FMP.

According to Section 303A(c)(3)(A)(i)(I) to (IV), the eligibility requirements for FCs are that they must:⁶

(I) be located within the management area of the relevant Council;

⁶ It is interesting to note that while recreational participants are not mentioned in the formal definitions of a FC and a RFA, they are included in the discussion of eligibility requirements.

(II) meet criteria developed by the relevant Council, approved by the Secretary, and published in the Federal Register;

(III) consist of residents who conduct commercial or recreational fishing, processing, or fishery-dependent support businesses within the Council's management area;

(IV) develop and submit a community sustainability plan to the Council and the Secretary that demonstrates how the plan will address the social and economic development needs of coastal communities, including those that have not historically had the resources to participate in the fishery, for approval based on criteria developed by the Council that have been approved by the Secretary and published in the Federal Register.

The eligibility requirements for RFAs are not quite the same. The first and second are identical but the remainder of 303A(c)(4)(A)(i)-(vi) make for some striking differences between the two types of organizations.

(i) be located within the management area of the relevant Council;

(ii) meet criteria developed by the relevant Council, approved by the Secretary, and published in the Federal Register;

(iii) be a voluntary association with established by-laws and operating procedures;

(iv) consist of participants in the fishery who hold quota share that are designated for use in the specific region or subregion covered by the regional fishery association, including commercial or recreational fishing, processing, fishery-dependent support businesses, or fishing communities;

(v) not be eligible to receive an initial allocation of a limited access privilege but may acquire such privileges after the initial allocation, and may hold the annual fishing privileges of any limited access privileges it holds or the annual fishing privileges that is [sic] members contribute; and

(vi) develop and submit a regional fishery association plan to the Council and the Secretary for approval based on criteria developed by the Council that have been approved by the Secretary and published in the Federal Register.

Given the differences, it appears that FCs must be actual communities which can be identified as a location on a map, and they may be selected out as a qualifying entity because they are in need of, or merit, regional economic development. On the other hand, RFAs are voluntary organizations that are not necessarily geographically specified. There is no reference to the need for regional economic development. Most important, RFAs can not receive LAPs as part of an initial allocation, but they can use those of its members, or may purchase them on the open markets as part of an ongoing LAP program.

The Councils must stipulate criteria that potential groups must meet to be classified as an FC or an RFA and hence be eligible to receive harvesting privileges. In developing the participation criteria for FCs, the Council is directed by Section 303A(c)(3)(C) to consider:

(i) traditional fishing or processing practices in, and dependence on, the fishery;

(ii) the cultural and social framework relevant to the fishery;

(iii) economic barriers to access to the fishery;

(iv) the existence and severity of projected economic and social impacts associated with implementation of limited access privilege programs on harvesters, captains, crew,

processors, and other businesses substantially dependent upon the fishery in the region or subregion;

(v) the expected effectiveness, operational transparency, and equitability of the community sustainability plan; and

(vi) the potential for improving economic conditions in remote coastal communities lacking resources to participate in harvesting or processing activities in the fishery.

When developing participation criteria for RFAs, the list of things the Council is directed to consider is the same except that item (vi) is omitted and the following phrase is added in Section 303A(c)(4) as new item (v): “the administrative and fiduciary soundness of the association.”

These participation criteria demonstrate again that assisting regional economic development can be used as a justification for choosing to use FCs. In addition they clarify a potential underlying purpose for establishing either of the new entities: they may be used to mitigate any severe untoward effects of establishing a harvest privilege program. This likely refers to direct and indirect effects on fishery dependent businesses, community disruptions, and the argument made in some quarters that in a fishery with redundant vessels and processing plants, there can be serious distributional effects on processors if harvesting privileges are given only to vessel owners.

An important difference between FCs and RFAs is the ability of FCs to receive LAPs as part of the initial allocation. Operationally, this means the RFAs can not be formed until after initial allocation is complete and the LAP program is operational. Further RFAs will be organized from the bottom up. The Council will have to make provision for organizations to be designated as RFAs and specify the eligibility criteria, but the decision to form an organization and to apply for designation will be up to willing sub-groups of the existing participants in the fishery. They can become participants through either initial allocations or purchase of harvesting privileges.

While the Councils can presumably treat FCs the same way and let groups apply for designation on their own after the program is in operation, Councils may also include FCs in the initial allocation. This requires a different level of planning during the construction of the LAP FMP. There is even a minor chicken-and-egg problem. FCs can not be designated until the eligibility criteria have been designed, approved by the Secretary, and published in the Federal Register. This approval can likely be made concurrent with the approval of the overall FMP, but it may not be possible to get that approval prior to the approval of the FMP. Until the FCs have been designated, it is not possible to know for certain how much of the TAC should be allocated to the overall FC segment.

One way to envision the process is as follows. The Council decides that it wishes to design and to implement a LAP program. It determines whether it will use IFQs or the more general form of a LAP. It determines that it will allocate X percent of the TAC to traditional types of recipients which will be allocated according to a specified eligibility criteria and an allocation formula or procedure. This is essentially what was done in the Halibut/Sablefish program. The remainder of the TAC will go to FCs that meet the specified eligibility criteria using another allocation procedure. These will have to be

simultaneous decisions based on participant comments and staff analysis during the FMP development process. The whole procedure will be based on the best estimate of how many traditional recipients will meet their allocation criterion, and how many FCs will likely form and be capable of meeting the eligibility criteria. If the plan is approved, the various participants will be given time to show that they meet the appropriate criteria and then the allocations will be made.

In summary, it appears that a FC can be designated as an entity that is entitled to receive harvesting privileges if those privileges would assist in regional economic development. In addition, that designation could be made if the way in which the privileges are used by the FC can ameliorate serious economic or social impacts that would likely occur if the privileges were only given to individuals. The latter reason is the only specific reason noted in the Act for which RFAs can be established. Presumably RFAs can also be used in other cases if the Council can demonstrate that their use will help achieve management objectives, especially those related to maintaining “traditional fishing or processing practices,” the “cultural and social framework of the fishery,” or if they address “economic barriers to access to the fishery.” They can not however receive initial allocations.

At this point, it is worth recalling from the general specifications discussed above that Councils may grant privileges to any “entity established under the laws of the United States or any State.” So even if one accepts the strict interpretation of RFAs and FCs, Councils can still allocate to other types of entities to accomplish fishery management objectives. A city or a town is an entity established under the laws of a State. Further some States may grant legal status to certain forms of fisheries organizations. Therefore if these types of entities can achieve the same goals as can RFAs or FCs, then they are also able to hold or acquire LAPs. This is especially true if the specifications are carefully crafted. Small fishing towns in need of economic development could receive privileges which could be used in approved ways by its citizens. Similarly, organizations of industry participants, broadly or narrowly defined at the will of the Council, could be treated in a similar manner, as long as they have obtained legal status as an entity. This could include a properly authorized fishery cooperative formed under the American Fisheries Act or other similar legislation. Indeed, sectors as introduced by the New England Fishery Management Council could conceivably receive and hold LAPs under the revised MSA if they met the MSA specifications such as legal recognition as an entity.

The potential to include a wide range of entities in a LAP program introduces another policy consideration. The types of entities that have been used in traditional ITQ programs include partnerships and corporations. For the most part, they can be treated like individuals in LAP programs. They receive harvesting privileges and they must use them according to the rules of the plan. When the U.S. Ocean Commission introduced the concept of DAPs they discussed them in terms of a continuum between private control and community control. IFQ programs with privileges allocated to individuals, partnerships, and corporations are at one end of that continuum. Granting LAPs to RFAs, FCs, coops, and fishermen’s organizations is at the other end. Councils may feel that these types of programs may be better able to achieve fishery management objectives because many of

the operational decisions are made by a group of participants rather than by a single authority in a traditional firm. However, they may want to ensure that the internal operating rules for operating these entities are constructed such that they will indeed lead to beneficial results. This is why Congress specified the necessity of Council approval of the operation plans for FCs and RFAs. If Councils choose to use community based entities other than RFAs and FCs, they should still consider the necessity of, and the criteria for specifying, operational plans.

At the same time, it may be possible to devolve some management authority to community-based entities which receive LAPs. For example, the Cape Cod Commercial Hook Sector is responsible for regulating the activities of its members so as to maintain the sector's allowable catch limit. This has the potential to improve overall compliance and to lower government management costs. In these cases, it may be prudent to establish operational plans in the form of a sector allocation proposal between the entity and the Council/NOAA Fisheries.

In summary, the revised MSA sets up procedures which allows Councils to create FCs or RFAs using a specific set of eligibility criteria and a second set of considerations for developing participation criteria. Once formed, both can hold LAPs if they meet the legally recognized criteria, however only FCs can receive LAPs in an initial allocation. Apparently, Councils can also develop LAP programs whereby LAPs can be held by or allocated to any other legally recognized entity, which do not necessarily have to be specified as RFAs or FCs. The program would have to comply with the general LAP mandates contained in the revised MSA. If community-based entities are used, Councils have the option of requiring operation plans to ensure stated criteria are met.

Given the possibility of designating FCs and RFAs or allocating LAPs to other types of entities, the continuum of choice facing the Council is actually more complex than the one used to set the stage for discussion in the introductory paragraph, although the basic points apply. Under the reauthorized MSA, the Councils have the ability to establish a harvesting privilege program following the IFQ model used under the previous versions of the law. But they have much more flexibility. And, in addition, harvesting privileges can be made available to FCs, RFAs, and other entities, as well as to traditional recipients. But as mentioned above, Councils could have issued harvesting privileges to other entities under the prior version of the MSA.

The choice between a traditional IFQ program and a more broadly defined LAP program is an important one that, in addition to the long-term effects on the fishery, may have serious implications for the complexity and cost of the plan development process. It would be quite difficult to give specific advice on the range of options that are available when using the expanded LAP program since this is uncharted territory. The eligibility and participation criteria spelled out in the Act are very general. FCs are likely intended to be cousins of CDQs, but given the lack of specificity it is doubtful that Congress was considering something quite so elaborate. Similarly RFAs may be related, conceptually at least, to Co-ops on the west coast or the cod hook sector in New England, but the analogy is far from perfect. More importantly, the range of other eligible entities is very broad

indeed. When faced with the opportunity to use them to address management objectives of specific fisheries, Councils will likely come up with some very innovative ideas. This is likely exactly what Congress intended. However, the decision to go beyond the basic IFQ model should be a very deliberate one.

For the most part, economic development, even in the most general sense, has not been considered as a management objective except in CDQ fisheries. However, given the option, some Councils may wish to rethink this issue. This will be discussed in further detail below. For now we will focus attention on developing LAP programs to achieve the more common range of fisheries management objectives.

How should a Council make the, at least partially simultaneous, decisions of whether or not to use RFAs or other entities, and if so, what eligibility criteria should be established? On the one hand, they could adopt a process of thinking “outside the box.” Set the management objectives, and design a RFA alternative or select a range of other possible alternatives *de novo* on the basis of these objectives. On the other hand, there may be advantages, at least for conceptualizing the problem, to take a marginal approach. For example, the one stipulated reason for establishing a RFA is to mitigate the untoward distributional or social effects of traditional IFQ programs. But it will not be possible to predict if such things will occur, to what extent and to whom until the various aspects of the program have been selected and studied. Further, it may be possible to address potential untoward effects or certain management objectives by tweaking the IFQ system rather than initiating a more complex system.

Following this logic, consider the issue of determining the eligibility criteria when the focus is on a program that exclusively grants IFQs to traditional recipients such as individuals or firms. At this point, the Council has the option of allowing for broad or restricted participation. To be more specific, under an IFQ program, the range of choices open to the Council could include the following:

- Allow any legal entity permitted by the Act to acquire or hold privileges;
- Allow only individuals or partnerships to acquire or hold privileges but exclude corporations; or
- Establish other restrictions to ensure that only certain types of participants, or sub-groups thereof, acquire or hold privileges.

The use of the first option is constrained by “substantially participate” rule, but the Council may wish to define the term to provide for real and viable options for entry into the fishery. This option provides the most flexibility with respect to allowing changes in the fishery. As such it may be useful in potentially inducing long-term economic efficiency in harvesting and processing. Also, as mentioned earlier, in the context of a traditional IFQ program, the entities that have been selected were from the private end of the continuum.

The second option might be chosen because some think that preventing corporations from participating may help maintain industry and community structure. At the same time, the

limited flexibility may prohibit owners of harvest privileges the opportunity to organize their activities to their best advantage. Currently, many small “mama/papa” operations take advantage of the opportunities provided by incorporation. The point is that the pros and cons of any restrictions should be carefully considered. What may help one section of the industry may hurt another.

The third option can work at two levels. The Council may restrict the type of fishery participant to certain segments of the industry. For example, a Council may stipulate that only individuals in the harvesting sector would be allowed to own privileges, which would prohibit processors from holding privileges. It could also exclude members of unrelated professions who perceive the purchase of IFQ as an investment, or prevent non-fishing interest groups who wish to restrict the activities of commercial fishermen from acquiring privileges. In addition, there may be tighter restrictions placed on the permitted groups. In the example where eligibility is restricted to the harvester sector, tighter restrictions might be used if there are concerns that harvest privileges will be removed from the control of regional fishermen by individuals from other areas. At one extreme, quota ownership may be restricted to vessel owners from a certain area who must be onboard during a fishing trip and in attendance during the off-loading period.

While the Councils do have the flexibility to impose either the general or more specific type of restrictions, it must be acknowledged that the reauthorized Act is quite clear that a wider range of potential owners is now possible. The Councils need to be sure that any limitations are necessary to achieve the management objectives. The full economic and social impacts of various types of limits should be carefully considered when making these decisions.

While the Act does not give specific direction with respect to where in the above range the eligibility criteria should be set, it does address the subject with respect to the related topic of criteria for making the initial allocation of harvest privileges. To ensure fair and equitable initial allocations, the Councils are directed by Section 303A(c)(5) to consider:

- (i) current and historical harvests;
- (ii) employment in the harvesting and processing sectors;
- (iii) investments in, and dependence upon, the fishery; and
- (iv) the current and historical participation of fishing communities.

Once the eligibility criteria have been specified (even if only in a preliminary or draft manner) and taking into account the other selected elements of the proposed program, the Council will be able to make initial estimates of the distribution and other effects of implementation. If some of the projected effects of the traditional IFQ program appear to be incongruent with the objectives of management, it may be wise to consider the use of RFAs or other entities, and to use the expected problems as a focus in determining how they should be designed or selected. It bears repeating that it may make sense to consider tweaking the system to address these issues, rather than to take the plunge and move beyond a traditional IFQ program. For example granting harvesting privileges to both harvesters and processors could address distributional effects on processors. Although it

would likely not find much support with harvesters, it may be preferred to certain types of RFAs.

If the Council wishes to expand its range of choice and consider a more broadly-based LAP program which includes IFQs for individuals and LAPs for RFAs or other entities, it will still be necessary to make the choice with respect to ownership criteria for individuals. In addition, it will be necessary to make an analogous but slightly more complex decision with respect to acceptable types and institutional structures for RFAs or analogous institutions. Again, the choice of the latter may depend on the nature of perceived untoward effects of the traditional IFQ program.

At the first level, the possible range of institutional structures would fall between the following:

1. A group of individuals each holding and using harvest privileges independently, but who may choose to share vessels and processing capability.
2. A corporate entity is granted privileges and those privileges are used by or on behalf of its members according to an agreed upon annual plan that specifies, among other things, who will harvest, and where the product will be landed, processed and sold.

From a loosely-joined collection of individuals to a monolithic centrally (but democratically) controlled union is a very broad range indeed. One reason why a Council may choose to use a more broadly based entity is because designing the structure is part of the game. There will likely not be that much flexibility if they choose to use existing entities. But no matter what, Councils need to determine what kinds of entities will be most useful in allowing for the achievement of the overall management objectives, and then write participation guidelines to ensure that only those types of entities will be used.

If FCs are primarily for economic development, then the process of determining when to use FCs should be different than for RFAs. While the concept of a FC may be related to the CDQ program, the conditions where they can be used in existing fisheries throughout the country are likely to be very different. Originally, CDQs were given to isolated communities with weak economies composed of very poor ethnic minority individuals. The quota shares that they were given were part of a very large TAC of a healthy stock. Moreover, while there was heavy utilization of the stock, giving a small percentage of the TAC as CDQ did not have dramatic effects on the current users. In addition, some of the current users favored the program because they foresaw the opportunity to gain access to these shares through the market place rather than racing across the high seas.

In contrast, most fisheries in the U.S. today are fully utilized and some are overfished and will be, or are, undergoing rebuilding plans which means there will be short-term reductions in harvest. At the same time, while there is a need for economic development in many small and remote fishing ports throughout the U.S., the conditions are seldom as harsh as in the remote parts of Alaska.

It follows that if Councils choose to use FCs that mimic CDQ programs, they will be taking part of a decreasing-sized pie away from current users, who because of restrictive regulations may not be in the best financial shape themselves. If constituents weakly support LAPs in the first place, then the addition of FCs to a program will not be cheered.

On the other hand, economic development can be interpreted in a slightly different way. Granting existing or historical users harvesting privileges in the context of a FC or a similar entity may provide for economic development that was not possible when those users were involved in a competitive open-access race for the fish. They will have the opportunity to cooperatively determine ways to harvest, process, and market the fish so as to increase the net returns and then distribute the gains amongst the members. It is also possible to target these developmental gains because of the ability to specify harvesting privileges as part of the initial allocation. In this case the eligibility criteria will have to be designed so that those eligible for economic development benefits are properly circumscribed. It should not be forgotten that there may be certain existing entities that can be used when Councils are considering economic development. For example, using the municipal governments of small villages may be more convenient than going through the whole process of developing a FC. Depending on the circumstance, municipal governments can be entities which are established under the laws of a State, and if they meet the other criteria in the MSA or those specified in the FMP, they could be an eligible recipient.

If the Council decides to use either FCs or RFAs, it will have to specify the criteria that will be used to evaluate the operational plans that privilege recipients must develop as part of the Council and Secretarial approval process. While operational plans may not be mandated when using other types of eligible LAP entities, Councils would be prudent to consider requiring them especially for initial allocations to entities which are on the community side of the continuum to ensure that the allocations are used as intended.

While the appropriate content of these plans will likely vary according to management objectives and the way in which the Councils choose to construct the entities, the following items will likely be useful or necessary.

1. A statement of how the entity as organized meets the eligibility criteria specified by the Council.
2. A list of members including any pertinent information such as address, vessel or plant name, catch or processing history, taxpayer identification number or other data required for the initial allocation process.
3. The name and contract information of the representative or agent for service of process.
4. A plan on how the harvesting privileges will be used and by whom.
5. A plan to show how actual harvest of the group will not exceed the allotted harvesting privileges. This should include provisions for monitoring of all catch.

6. Rules for entry to and exit from the organization, including procedures for removing or disciplining members who do not abide by the rules, and for informing NMFS of such actions.
7. A contract signed by all parties that they will agree to abide by the plan.
8. A statement of operational rules including collection of fees, voting rules, etc.
9. A commitment to produce a periodic report indicating how it is meeting program requirements.

E. Transferability

The mandates of the MSA with respect to transferability in Section 303A(c)(7) are as follows:

- (7) TRANSFERABILITY.— In establishing a limited access privilege program, a Council shall—
- (A) establish a policy and criteria for the transferability of limited access privileges (through sale or lease), that is consistent with the policies adopted by the Council for the fishery under paragraph (5); and
 - (B) establish, in coordination with the Secretary, a process for monitoring of transfers (including sales and leases) of limited access privileges.

(Subparagraph (5) provides the criteria to be considered in making initial allocations.)

Transferability refers to the legal ability to transfer the “ownership” of the privileges from one entity to another. In brief, the advantages of transferability are the flexibility given to participants and the incentives that it provides to produce the allowable harvest as efficiently as possible. Those that argue against transferability emphasize that it has the potential to disrupt the current industry structure. Others are opposed to transferability because it allows individuals to permanently gain from the sale of harvesting privileges rather than to use them to harvest fish. These points are explained in more detail in the remainder of this section. In some cases, it is possible to add provisions to the transferability options that will eliminate or reduce untoward effects.

When speaking of transferability of LAPs, especially IFQs, it is useful to distinguish between the quota shares (QS) and the annual harvest privilege (AHP) which the QS generate. Given the most widely accepted practice, the QS are denominated in terms of a percentage of the TAC. The AHP, on the other hand, is denominated in terms of weight of allowable harvest that is generated for a given year by multiplying the percentage share times the TAC. Transferability can apply to both the enduring privilege and the annual catch privilege. Given these multi-dimensional characteristics, the main options for transferability can be summarized as follows.

Option 1.	QS - transferable	AHP - transferable
Option 2.	QS - transferable	AHP - non-transferable
Option 3.	QS - non-transferable	AHP - transferable
Option 4.	QS - non-transferable	AHP - non-transferable

One critical element of options 3 and 4 is that with no QS transferability, there must be a process to reallocate the LAPs once an owner has died or retired from fishing. Without QS transferability, the allocation question must be faced over and over again.

Transferability allows holders of LAPs to buy, sell, give away or lease their privileges. Buying or selling an AHP is equivalent to leasing in the normal sense of the word. The first issue related to transferability is whether transfer of QS should be allowed at all; the second issue is what restrictions, if any, should be imposed on transfers if they are allowed. In general, the ability to transfer quota enhances the economic performance of the fishery, provides fishermen with a valuable asset and compensation if they choose to leave the fishery, which *tends* to strengthen fishermen's desire to conserve and protect the resource on which the ITQ is based.

This trading of resources among firms encourages the evolution of efficient-sized production units. For maximum economic performance, the number and size of firms in an industry must adjust over time as technology and markets vary. This can be accomplished through private transactions in financial capital, equipment, natural resources, and technology. Similarly, transferability of harvest privileges in a commercial fishery allows firms to accumulate quotas to achieve a quantity and species mix consistent with low cost, efficient operation. In general the harvest privileges will flow to the more efficient operators. Transferability of QS is necessary to make long-term adjustments in firm output, for example when purchasing a new boat. At the same time transferability of AHPs allows for short-term flexibility to change annual production due to vessel repairs, to assist in end of season mop-up activities, etc. It also lowers the barrier to new entrants. They can buy AHP for short periods of time to establish themselves and earn enough money or establish credit that will allow them to obtain permanent QS.

Finally, transferability helps share holders to plan future transactions, and it gives them an economic incentive to preserve the underlying sources of value in the resources they own. For example, a run-down house will have less value when sold than will a well-kept house. Similarly, an LAP will be more valuable if the fish stocks underlying it are in good shape. Hence, transferability encourages the quota owner to think clearly about future consequences of near-term harvest activities on their assets.

While some may agree that transferability offers incentives that allow for increases in efficiency, they may not like the fact that the gains which are generated from transferability go to the individuals or entities which receive the initial allocations rather than to the general public. As such they oppose, as a matter of principle, any transferability. The ability to auction off the LAPs or otherwise collect royalties for the initial or any subsequent distribution of privileges, rather than give them away, may in some cases soften this opposition. The personal gains from the initial allocation and subsequent transfers will be less because they will be net of the auction price or royalty paid. Thus, some part of the value of the privilege obtained by individuals who purchase the privileges will go to the Limited Access System Administration Fund rather than the entire value going to someone who receives the harvest privileges for free.

There is a middle ground between complete transferability and prohibitions on any transferability. Limitations on the types of trades that are permitted may be justified in certain circumstances. The initial allocation will likely include individuals who differ by gear type, boat size, firm size, type of final product, home port, and area(s) fished. Free transferability between all such individuals may result in changes in the industrial or cultural aspects of the fishery which the Council may wish to prevent because they run counter to overall objectives of the relevant FMP. Restrictions on transfers between specified groups may help prevent such changes. However, they will also limit the flexibility of participants and in the long term could become a stifling influence on the development and efficient utilization of the fishery as a whole. Further, it is useful to keep in mind that some degree of fleet consolidation is often desirable or necessary, and may even be an explicit objective of the FMP.

Another important issue is the effect of transferability rules on the cost of implementing the LAP program. While on the one hand a complete prohibition on transfers may reduce administrative costs in the short-run, the necessity to go through the initial allocation process on a regular basis may be more expensive in the long-run. Likewise restrictions on transfers between vessel types or areas will increase transaction costs because it will be necessary to ensure that the buyers and sellers are meeting all of the rules.

While unrestricted transferability may permit concentration of privileges in the hands of a few large producers, resulting in noncompetitive market structures and subsequent losses in economic performance, this is a slightly different issue and is treated in the section entitled “Excessive Shares.”

Using this background it is possible to analyze the transferability options introduced above in more detail. The rationale for options 1 and 4 are straightforward given arguments for and against transferability. Option 2 could be preferred by those who favor the idea of allowing new participants the ability to gain “enduring” access to the fishery but who object to “sea-lords” who own the enduring right but do not participate in fishing. Rather, they merely sell their annual privileges each year. On the other hand, option 3 would be preferred by those who do not want recipients to make permanent gains by selling the enduring privileges, but acknowledge the advantages of allowing participants to make short-term adjustments in the amount they harvest in any year.

Of course it is possible to modify options 1, 2, and 3 by allowing limited transferability with restrictions designed to meet other fishery management objectives. There are no hard and fast rules on how to structure each option. However, the issues of consideration should include:

- The importance (priority) of the management objective;
- The degree to which the restrictions will lead to the achievement of the objectives;
- The effect they will have on individual flexibility and overall fishery-wide efficiency; and

- The impact they will have on regulation and monitoring activities and expenses.

The discussion thus far has been general because the same principles apply regardless of the type of LAP program. Options 1 through 4 are possible alternatives for traditional IFQ programs or more generally defined LAP programs. However, given the nature of the latter, certain options may be more desirable than they otherwise would be for IFQ programs. For example, to achieve the goals of developing a FC, it may be wise to ban the sale of QS to ensure that the basic asset remains in place (i.e., tied to the initial allocation recipients). However, sale of AHP may be useful for inter-temporal adjustments or to earn income to achieve certain development goals.

Given the specific legislative reference to RFAs purchasing LAPs on the open market, Congress appears to look favorably on transferability of LAPs between different RFAs and between RFAs and other participants. However, the Council is free to place whatever restrictions it feels are necessary, subject to the above considerations.

There is also something to be said for establishing a transition phase in a LAP to allow participants the time to learn the benefits and costs of buying and selling QS and AHP. In recent research, Anderson and Sutinen (2005) have shown that in experimental markets for fishing quotas, the system appears to work better in the long-run if AHP are transferable in the first few years of the program but sales of QS were prohibited. Participants learned how the system worked and how the values of harvesting permits were related to the actual returns from fishing. As a result price volatility was decreased considerably, and undesirable outcomes of selling or buying shares at the “wrong” time or price were reduced when a transition period was introduced.

All of the above notwithstanding, enforcing limits on transferability can be quite difficult in some cases. Resources for monitoring the ownership and control of privileges must be sufficient to detect and prevent the Council’s undesired outcomes of transfers. A monitoring system must be thoughtfully designed and robust enough to monitor any transactions that may jeopardize achieving the objectives of restricting transfers. For example, it may be necessary to monitor long-term contracts for the purchase of AHP since they are roughly equivalent to the purchase of quota shares.

F. Excessive Shares

While transferability of harvesting privileges offers many potential advantages, a concentration of ownership can lead to at least two different types of problems. One is market power including monopoly (a single seller) or monopsony (a single buyer). These problems are possible in other sections of the economy as well; it is not a problem unique to LAPs. A second problem is it can lead to undesired changes in the structure of the fishing community broadly defined.

There are different types of market power problems that can follow from concentration of privileges. First, an operator may obtain a significant amount of QS that result in monopoly power in the sale of fish products to the general consumer. The search for monopoly profits will lead to an artificial reduction in output and increase in prices to the consumer. In most instances the threat of this actually occurring is quite small because the product from any one LAP program must compete with similar products from other domestic and international fisheries, including aquaculture-supplied products. Only when the LAP is for a unique fishery with a separate market niche is this likely to become a problem.

Similarly, a participant may obtain a significant amount of QS and operate as a monopsonist or monopolist in the market for quota. Such market power can reduce the actual transferability of quota and hence prevent an ownership pattern which allows for the most efficient operation of the fleet. This type of market power is more likely to occur than market power in the sale of the final product.

The second type of problem that can result from concentration of ownership has to do with the life style of fishing households and fishing communities. There can be significant philosophical support for the maintenance of a fishery composed of many diverse individuals. According to this view, even if concentration will not produce market power problems, it is something to be avoided for its own sake. This trade-off in economic returns from the fishery resource to maintain a social or community structure is a policy and prioritization question the Councils must sort through.

While there are valid reasons for considering limits on ownership, such limits have their weaknesses as well. A main purpose of using LAPs is to allow individuals to have the flexibility to obtain more quota so as to be able to use more efficient vessels, either on their own account, or in combinations with others. Caps on ownership, or even limiting the ability to use more than a certain amount of quota on one boat (even if the shares are owned by different individuals) can be a direct barrier to such efficiencies and this can result in significant economic losses.

An important reference point for discussions of “excessive shares” is National Standard 4 (Section 301(a)(4)):

(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.

Excessive share is referenced again in Section 303A(c)(5)(D) that grants Councils the authority to create LAP programs.

(D) ensure that limited access privilege holders do not acquire an excessive share of the total limited access privileges in the program by—

- (i) establishing a maximum share, expressed as a percentage of the total limited access privileges, that a limited access privilege holder is permitted to hold, acquire, or use; and
- (ii) establishing any other limitations or measures necessary to prevent an inequitable concentration of limited access privileges.

In the same section, the MSA states that when developing LAP programs, a Council should:

- (B) consider the basic cultural and social framework of the fishery, especially through—
 - (i) the development of policies to promote the sustained participation of small owner-operated fishing vessels and fishing communities that depend on the fisheries, including regional or port-specific landing or delivery requirements; and
 - (ii) procedures to address concerns over excessive geographic or other consolidation in the harvesting or processing sectors of the fishery;
- (C) include measures to assist, when necessary and appropriate, entry-level and small vessel owner-operators, captains, crew, and fishing communities through set-asides of harvesting allocations, including providing privileges, which may include set-asides or allocations of harvesting privileges, or economic assistance in the purchase of limited access privileges;

The requirements to consider the allocation of shares to different entities, loan programs, and ways to address different types of consolidation are examples of possible management objectives that may affect what constitutes an excessive share. More to the point, there are specific instructions to develop procedures to address excessive geographic or other types of consolidation. But Councils still must determine what “excessive” means.

It is clear that market power is one thing that needs to be considered in determining what constitutes an excessive share. However, Councils are also given considerable latitude to determine the management objectives for any FMP and to choose the subsequent management measures to achieve those objectives subject to the restrictions and obligations of all 10 National Standards and other MSA requirements. National Standard 8 (Section 301(a)(8)) is of particular relevance to this discussion.

- (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 by utilizing economic and social data that meet the requirements of paragraph (2), 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.

Depending on the particular management objectives chosen and the ways in which the Councils decide to address the National Standards, it will be necessary to look at things other than simple market power to determine what constitutes an excessive share. However, it is useful to make a clear distinction between them because they address completely different issues, and are, for the most part, independent of each other. For

purposes of discussion, this distinction will be maintained by referring to market power share and management objective share limits. An excessive share will exist if either limit is exceeded.

This section is divided into three parts. The first sets out the basic principle of how the excessive share limit can be conceptually determined by a joint consideration of market power (MP) excessive share and management objective (MO) excessive share. That is, the excessive share limit should at least be restrictive enough to prevent monopolistic price control, but it can be more restrictive depending upon a careful consideration of the ability to meet management objectives and potential negative effects on industry operation and plan administration costs. The next two sections describe the suggested procedures to specify each type of share limit.

While most of the economic analysis is placed in Appendix 2, (See also Anderson, 2008) the main conclusions are as follows. First, it is theoretically possible to solve for the value of an effective MP share limit. This is defined as the maximum percentage of quota that can be controlled by a single entity such that there will be no problems with market power output restrictions, either through actual output decisions or through restrictions on the sale or rental of the transferable AHPs that are associated with the permanent QS. Call this percentage value s^* . Second, the s^* market power share limit can address problems in both the market for fish and in the market for quota.

The discussion of the MO share limit is different because, other than broadly defined benefit cost analysis, there is no body of theory, economic or otherwise, upon which to base the determination of the MO share limit. Two points should be made at the outset, however. First, to be relevant, the maximum MO share limit must be less than the MP share limit. Therefore, if a relatively small operational MO share limit is chosen, it will likely preclude the necessity of rigorously determining s^* , because it will be a non-binding constraint. On the other hand, setting a MO share limit may not be enough, in and of itself, to achieve most management objectives. Therefore, they should be used with care and only when the perceived benefits are greater than potential costs, and only then where there are no less costly or less intrusive ways to achieve the same objective.

The Basic Principle

The basic principle for determining an excessive share limit can be stated using the heuristic diagram in Figure 4. Excessive share is expressed as an upper limit on the percentage of quota owned or controlled by a single entity (plotted on the horizontal axis). The MP share limit (MP limit), which is the bolded line in Figure 4, establishes the upper limit for share accumulation based on market characteristics of a particular fishery. In principle, if this limit is exceeded, participants would control enough shares to unduly influence the market price for the marketed product or the price of permanent or annual harvest shares. While not specifically mentioned in the MSA, share levels that would contravene existing anti-trust legislation would be considered an excessive share.

Given the objectives of a particular FMP, the upper limit for MO share (MO limit) may well lie somewhere to the left of the MP limit. The MO limit could be established based on the National Standards, other MSA requirements, or the objectives of the FMP based on relevant biological, social, cultural, and industrial organization characteristics of a fishery. In effect, the two limits work in concert to assure that potential share accumulation is consistent with management objectives and to protect consumers against manipulation of market prices.

Making this conceptual framework operational means that the Council must determine the limit at which, in principle, participants would control enough shares to be able to unduly influence the market price for the marketed product or the price of permanent or annual harvest shares. This limit can be derived in a fairly straightforward manner and is described in Appendix 2. Once determined, this becomes the upper limit on the amount that can be controlled by one entity. Throughout this discussion, the MP limit will be referred to as s^* .

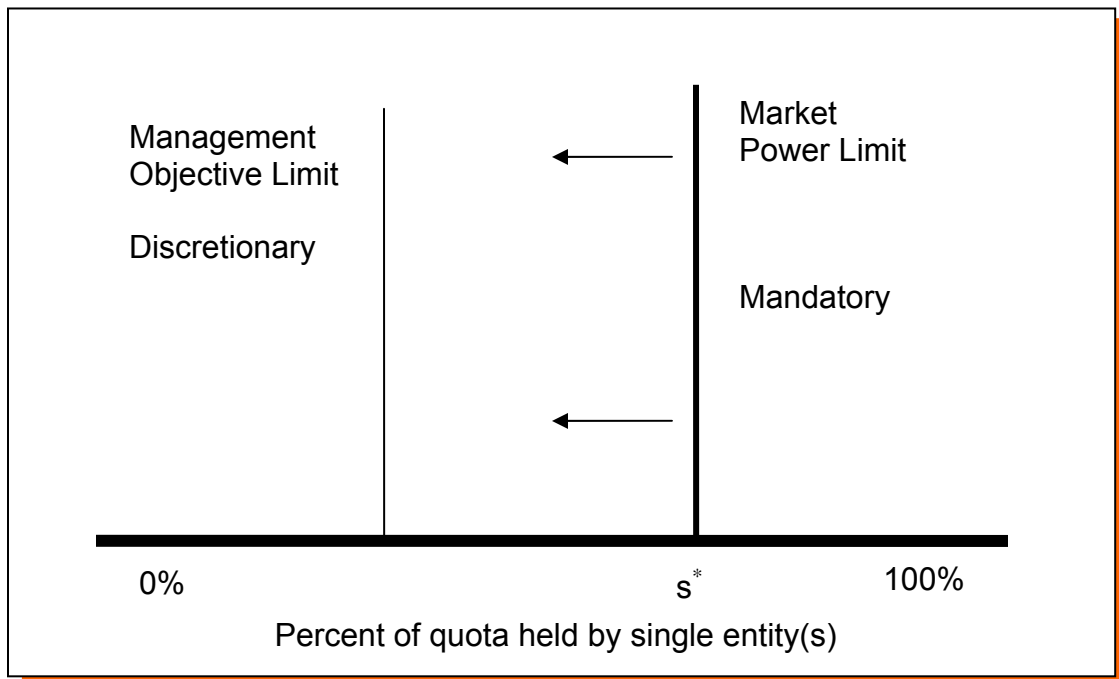


Figure 4. Relationship of Market Objective and Market Power Limits.

Once s^* has been determined, Councils have the prerogative to set more restrictive share limits if such limits are deemed necessary to accomplish stated fishery management objectives or to be in compliance with other National Standards, especially National Standard 8. That is, they may set a limit that is to the left of the bold vertical line in Figure 4. The question becomes what are the gains and what are the losses of moving the share limit progressively to the left. The problem here is that there are no established rules for making such a judgment analogous to the rules to determine the MP limit.

The gains will reflect the degree to which the tighter limits will cause the LAP program to more closely meet the fishery management objectives. However, the tighter limits place restrictions on the output of individual entities that may lead to higher harvesting and processing costs. The Councils and NMFS will have to determine if the gains are expected to exceed the losses that may be generated by the lower limits. For example, if employment levels in an isolated port can be maintained at the expense of a one percent increase in the average cost of fish in a relatively small sector of the industry, the gains, although measured in a different metric, may well be worth the cost. On the other hand, if cost will increase 75 percent in a relatively large sector, a careful consideration may conclude that from a wider perspective the tighter restriction may not be prudent. It is difficult to specify hard and fast rules for determining exactly when the decision should switch from yes to no, but clearly these are the sorts of things that should be considered.

While conceptually the process consists of two steps (setting the outer MP limit and then, if deemed desirable, specifying a tighter MO limit), it is not always necessary for Councils to perform the analysis required for each step. The most obvious case is when the Council has no management objectives that will require tighter share limits. In that case, it is only necessary to consider the MP limit. On the other hand, if the Council has management objectives that it deems can only be achieved by a quite low MO limit, it will not be necessary to perform all the analysis to define the MP limit. It is only necessary to show that the chosen MO limit will for all practical purposes prevent market power abuses as well. This will involve a judgment call. However, using the logic of the analysis to follow, if a Council were to choose, for example, a MO limit of one percent, there would be very little concern about market power. However, the Council would still have to show that the benefits of using that tight limit are greater than the potential cost increases described above. Appendix 2 provides more detailed analysis for the interpretation of this Figure.

Share limits are only one element in the design of a LAP program that will determine its relative ability to achieve incentives for stewardship, cost efficiency, higher productivity, and other fishery management objectives. Other issues include determination of who is eligible to receive initial allocation, the exact formula for making such allocation, rules on transferability, and sunset clauses. Therefore Councils should not make a determination of excessive share limits in isolation.

Market Power Excessive Share

MP excessive share is the possibility that a single entity might control enough QS that it will have incentives to withhold production to raise market price. If this occurs, consumers will be hurt in two ways. First, they will pay a higher price for what they do consume, and second, part of the TAC will not be harvested and so there will be less available for consumption. The value of this lost production is the inefficiency loss of monopoly. The purpose of this section is to describe a process for determining a MP limit that will ensure that incentives to withhold production will be circumvented. This share

limit, s^* defined above as the maximum allowable percentage of quota that may be controlled by a single entity, will be different for different fisheries and will depend upon the characteristics of the relevant markets.

Before proceeding however, it is necessary to point out that after the introduction of LAPs, there may well be price increases that have nothing to do with market power. The halibut fishery is a good example. Under the previous regulations there was a race to fish that resulted in the product being processed in a very short period of time and frozen for consumption throughout the year. Under the LAP program harvesting has been spread more evenly throughout the year and the majority of fish has been reaching the fresh market where it fetches a higher price. The higher price is the result of improvement in the quality of the product and the timing of how it reaches the market, not from a restriction in output. It is only the possibility of the latter that is important here. For practical purposes, this separation will not be much of a problem for the *ex-ante* studies under consideration here. The purpose is to determine if there is the possibility of market power before a LAP program is implemented. Price increases from improvements in product quality or seasonality of delivery, if they do occur, will do so after implementation. However, *ex-post* studies of LAP implementation will need to explicitly consider both potential causes of price increases. If the entire TAC is taken, or if firms with a high percentage of the shares use all their annual harvesting privileges, then this would suggest that monopoly power did not constrain output.

The fundamental policy question is: What is the maximum percentage of the TAC that can be given to a single entity before there will be incentives to withhold production? Using basic microeconomic principles, it is possible to derive a formula for determining what that percentage should be for any given market situation. Using the calculated value of s^* as the excessive share limit will prevent undue market power in both the market for fish and the market for shares. It is beyond the scope of this document to show how the formula is derived. However, Appendix 2 contains a discussion of the derivation and provides suggestions for practical applications.

Management Objective Excessive Share

Once the Councils have set the MP share limit, they are free to specify a more strict MO share limit. These tighter limits must follow from specific management objectives specified by the Councils. These management objectives must be set in accordance with the MSA.

Several sections of the Act speak to objectives with social implications. National Standard 4, which includes a prohibition on the acquisition of excessive shares, also prohibits discrimination between residents of different States and provides that allocations of fishing privileges be “fair and equitable.” National Standard 5 directs Councils to “consider efficiency” when promulgating rules. National Standard 8 directs that conservation and management measures “take into account the importance of fishery resources to fishing communities, provide for the sustained participation of such

communities, and to the extent practicable, minimize adverse impacts on such communities.”

More generally, pursuant to Section 303(a)(9) of the MSA, social considerations must be addressed when a Council or the Secretary prepares an environmental impact statement. Furthermore, pursuant to Section 303(b)(6), a Council or the Secretary has the discretion to establish a limited access system for a particular fishery. The establishment of such a system should take into account present participation in the fishery; historical fishing practices in, and dependence on, the fishery; and the cultural and social framework relevant to the fishery and to any fishing communities, among other factors.

In summary, many elements of the MSA either mandate or authorize a number of social objectives in LAP programs. At a minimum, these goals and considerations include:

- Current and historical participation in and dependence on the fishery;
- Fairness in allocations to fishermen who reside in different States;
- Continued participation and economic welfare of fishing communities;
- Special arrangements for entry-level fishermen, small vessel owners, and crew;
- Social and cultural framework relevant to the fishery and any fishing communities; and
- Capability of vessels to engage in other fisheries.

This is by no means a complete list. There are also numerous other economic, cultural, and social issues that Councils may choose to address in a management objective.

Within the context of these objectives, a MO excessive share will prevent or seriously jeopardize the achievement of these goals. To set a MO share limit, the Councils should explicitly state the management objective(s) that will drive the determination of excessive share limits, and provide justification for choosing it (them). There are several key elements in this requirement. First, it must be explicit or measurable so that it can provide a meaningful basis for determining an excessive share limit. An objective to “address the cultural framework of fishery” does not really say anything. However an objective to “maintain the percentage distribution of harvest among gear types and ports with no more than a 5 percent deviation” is quite explicit. They should also discuss the reasoning used to select the particular objectives including a description of the perceived benefits of achieving these objectives. They should also show how these objectives are consistent with their mandatory responsibilities and/or their discretionary authority under the Act and show how they are within the bounds of the other National Standards.

The Councils also need to specify the share limit that will ensure that the objective, or set of objectives, is met and to show the justification for why that particular share limit is necessary. In other words if a Council selects a 2-percent maximum share limit they need to provide an explanation of why a limit any higher than that will preclude the achievement of the management objective(s).

A Council should consider the full range of options of addressing the social and distributional goals it adopts. The rationale is that any across-the-board limits on ownership of QS will tend to reduce the economic efficiency gains of the LAP program, whereas other more targeted measures may be able to achieve the social goals without compromising the anticipated economic improvement. As examples, the needs of FCs can be met by establishing community quotas within the larger LAP program. The continued participation of small-vessel and entry-level fishermen could be improved by using set-aside programs. The relatively small share limit assigned to participants in the halibut/sablefish IFQ program was intended to provide for continued participation of the owner/operator class. Improved safety-at-sea can be achieved by more stringent regulations and better monitoring. The simple point is that many social and distributional goals can be adequately addressed without excessively constraining markets for QS in LAP programs. At the same time, Councils should consider the effects of the more restrictive MO share limits to ensure that they do not adversely affect the achievement of biological goals of the management plan or of other non-social management objectives included in the plan.

Because some social goals are geographically specific, the more restrictive and lower limits, if necessary, should apply only to carefully designated regions and not to the entire LAP program. Examples of regionally specific social goals are: the protection of geographically remote fishing communities and assured minimum landings at designated ports. As a general rule, these regional goals can be achieved with measures that apply only to designated areas, and do not necessarily require an across-the-board lower and more restrictive limit on individual ownership of QS.

If a Council decides that, to meet a social goal, it must have a lower and more restrictive limit on individual ownership of quota shares, it should first conduct a careful analysis of the expected implications of that lower limit on economic efficiency. That way, a Council electing to adopt a more restrictive limit can make that decision knowledgeably prior to selecting a preferred alternative, i.e., with full awareness of all the economic gains and losses (recall that National Standard 5 and Executive Order 12866 require the Councils to consider economic efficiency).

The emphasis on MP shares above was based on a concern for overall economic efficiency. Undue market power that restricts fishery output for monopoly purposes will mean that the net value of the overall consumer market basket is not as high as it could be. However, setting a MO share limit too far inside the MP limit may also cause inefficiencies. In this regard, the Councils need to list and quantify, to the extent possible, the likely negative impacts of the particular share limit they have chosen. Items to be considered include:

- Possible increased harvesting costs;
- Possible increased processing costs;
- Possible increased data collection and management costs; and
- Possible losses in efficiency from the diminished overall flexibility and freedom for industry to adjust to normal market and stock fluctuations.

Finally, the Councils should document that they have considered these extra costs and explain how the benefits from achieving the management objectives are worth the costs. Because of data limitations, it may be very difficult to estimate how a MO share limit will precisely affect short and long-run efficiency, but it may be possible to use a general analysis to obtain some rough estimates.

Since there are many ways to design a LAP program, it is important to realize that preventing any entity from obtaining an excessive share of LAPs should be performed as part of an integrated analysis of the overall plan. The suite of LAP features chosen will depend upon the management objectives of the plan. Because share limits are only one part of the design of a LAP program, there are three different circumstances under which the basic principle could be applied. The first case is where the overall design of the program does not include MO limits. This would occur if the Council felt it could best achieve the management objectives by instituting other program elements such as allocation by vessel class, an owner on board rule, transferability limitations, or restrictions on where fish can be landed. While it will be necessary to analyze the efficiency effects of these elements, as far as excessive share is concerned, it will only be necessary to determine the s^* rate to control for market power.

The second possible situation would be where the overall design elements include a very restrictive MO limit. For example, it is forbidden for any entity to control more than one percent of the quota. In this case the analysis should focus on the potential efficiency cost of this limit. If the efficiency costs appear reasonable in relationship to the benefits of achieving the management objectives, it would not be necessary to do an extensive analysis of s^* . A cursory examination would suffice to show that given the likely values of the critical parameters, the value of s^* is higher than one percent.

The final possibility is that the overall LAP program design includes a MO limit of intermediate size such that it may allow for market power. In this case it would be prudent to do a careful market power analysis first. If it can be shown that the chosen MO rate is greater than s^* , it would not be permissible to use it as the overall share limit for the LAP program. Rather, it would be necessary to reduce it to at least s^* . On the other hand, if the MO limit is less than s^* , then it will be necessary to consider its effects on efficiency.

The efficacy of any excessive share limit depends upon the ability to monitor ownership. Therefore a necessary part of establishing a share limit is the design of an effective record keeping system. This will require a protocol to identify who owns quota and how much, and to maintain detailed records of ownership transfers that clearly identify who is buying and who is selling. This can be a harder task than it appears on the surface because of the possibility of multiple owners of the same vessel or the interlocking relationships of corporations and their subsidiaries. While the circumstances will vary with the particular fishery, it may prove useful to mandate that owners supply quite detailed information, including, among other things, all owners of vessels which use privileges, all owners of each unit of privilege, all subsidiaries and parent corporations of any participating

corporate vessel or corporate owned privilege, and all employers of individuals owning participating vessels and privileges.

2. Initial Allocation

A. Introduction

The initial allocation of harvest privileges is very important, and largely determines who gets the early benefits from an LAP program. How future participants are determined depends upon the rules for transferability and the duration of the program. The importance of this decision notwithstanding, for the most part the initial allocation decision is independent of other components of a LAP program. Given flexible transferability rules and non-expiring harvest privileges, allocation decisions only have to be made once. And, under these conditions, the exact makeup of the initial allocation will not affect the conservation or ultimate economic performance of the program. (Put another way, the fact that there will only be a need for a single allocation is an argument in favor of transferability and unlimited duration.) To maintain an unbiased focus when considering LAPs, the relative independence of the initial allocation question from the other issues must be kept in mind. Otherwise, it is possible that the distributional issues will unnecessarily cloud or over-shadow the discussions of other important, but basically independent issues.

Two important objectives of an initial allocation procedure are that it should be as administratively simply as possible and it should rely on generally available and transparent data. The potential for appeals can be quite high when there are large values at stake. The procedure should be easy to administer and predict to avoid or at least minimize costly and implementation-delaying appeals.

The MSA in Section 303A(c)(5) specifies general guidance on initial allocation:

(5) ALLOCATION.—In developing a limited access privilege program to harvest fish a Council or the Secretary shall—

(A) establish procedures to ensure fair and equitable initial allocations, including consideration of—

- (i) current and historical harvests;
- (ii) employment in the harvesting and processing sectors;
- (iii) investments in, and dependence upon, the fishery; and
- (iv) the current and historical participation of fishing communities;

(B) consider the basic cultural and social framework of the fishery, especially through—

- (i) the development of policies to promote the sustained participation of small owner-operated fishing vessels and fishing communities that depend on the fisheries, including regional or port-specific landing or delivery requirements; and
- (ii) procedures to address concerns over excessive geographic or other consolidation in the harvesting or processing sectors of the fishery;

(C) include measures to assist, when necessary and appropriate, entry-level and small vessel owner-operators, captains, crew, and fishing communities through set-asides of harvesting allocations, including providing privileges, which may include set-asides or allocations of harvesting privileges, or economic assistance in the purchase of limited access privileges;

(D) ensure that limited access privilege holders do not acquire an excessive share of the total limited access privileges in the program by— (i) establishing a maximum share, expressed as a percentage of the total limited access privileges, that a limited access privilege holder is permitted to hold, acquire, or use; and (ii) establishing any other limitations or measures necessary to prevent an inequitable concentration of limited access privileges; and

(E) authorize limited access privileges to harvest fish to be held, acquired, used by, or issued under the system to persons who substantially participate in the fishery, including in a specific sector of such fishery, as specified by the Council.

In summary, the allocations must be fair and equitable and they should consider the cultural and social framework of the fishery⁷. However, given the use of term “including consideration of” there is some allowable flexibility beyond the four required considerations in determining exactly how the harvest privileges will be distributed. The discussion here will not attempt to list all of the things that cannot be done other than to say any distribution that showed blatant favoritism or utter disregard to the “fair and equitable” standard in the law would likely not be approved nor would it withstand legal challenge. Similarly there will be no attempt to make a list of all the permissible procedures or formulae that could be used. Rather the discussion will focus on procedures and lessons learned. The goal will be to assist the Councils as they use their ingenuity and inventiveness to develop allocation procedures that support their objectives, taking into account the recent changes in the Act.

The initial allocation task can be broken down into two parts. First, it is necessary to select the pool of entities that will be eligible to receive harvest privileges. The basics of this step have already been discussed in the section on “Eligibility.” It is possible however, that the pool of potential recipients can be a subset of those who are qualified to own privileges. The Council may approve of certain types of entities being able to acquire privileges in the open market, but may feel that they do not merit an initial allocation. Congress has placed RFAs in this category.

The second step is to determine how the privileges will be distributed among those in the designated pool. Under the reauthorized MSA, there are two ways that this can be accomplished. As has been done in the past, the privileges can be given away according to specified allocation formulae. It is also possible to use auctions to sell the initial privileges as long as the auctions are constrained such that they meet the “fair and equitable” standards specified in the Act. If auctions are to be used, they would be most appropriate in traditional IFQ programs, but Councils may also wish to use them in more

⁷ Note however that the material under (B) has more to do with restrictions on the use of the harvesting privilege than it does with initial allocation, but the two are related.

general LAP programs as well. The two possible ways of allocating the privileges will be discussed in turn. The revised MSA also allows rent collection with formula-based allocations, and this will be treated in a separate section.

B. Free Formula-Based Allocations

There are literally an infinite number of allocation formulae that are acceptable under the MSA. It is possible, however, to list some of the attributes upon which the formulae can be based. In the IFQ programs that have already been adopted under the MSA, the attributes were related to various aspects of participation in the fishery, primarily catch, capital investment, and number of years fished over a reference period.

In response to suggestions to expand the pool of eligible recipients that lead to some of the most recent revisions in the Act, characteristics of entities have become other attributes to consider. Examples are size, ownership characteristic (owner-operated), and operating location of the firm, various measures of dependence on the fishery including percent of revenue or opportunities to participate in other fisheries, and inter-relations with other fishery related business especially with respect to employment.

The participation attributes, though not without controversy, are relatively easy to handle both conceptually and with respect to data availability. For example, in the surf clam and ocean quahog program, the allocation formula was based on a weighted average of a relative catch index and a relative investment index. Working with characteristic attributes will likely be a different story. Coming up with appropriate measures of the specific characteristics that can be calculated given existing or readily available data, and then using several of them to come up with an actual allocation formula will be more difficult. Nonetheless it is a task that will have to be accomplished by those Councils who choose to broaden the potential range of eligible entities.

The following discussion starts of with a consideration of the relatively easy participation attributes in the context of traditional IFQ fisheries. Using that as a base, the discussion will turn to a preliminary assessment of the consideration of both types of attributes in the context of more general LAP programs.

Traditional IFQ Programs.

If the eligible group is restricted to vessel owners, the allocation formula could be based on equal shares (for all individuals satisfying some minimum requirements), vessel size, catch history, the number of consecutive years of participation in the fishery, or some combination of two or more of these factors. One problem with equal shares is that part-timers will have their relative shares increased, and highliners (those who have historically accounted for a disproportionate share of the landings) will be brought down to the level of the average fisherman.

If the eligible group also includes crew members, it might be difficult to use catch histories for logistic reasons (turnover rates of crew are high and there may be no records of who was on which boat when catches were taken). Allocations to crew members could be based on either equal shares or the number of years of participation in the fishery or both.

If both vessel owners and crew members are considered to be eligible to receive an initial allocation, it would probably be necessary to include several of the above categories in the allocation formula. For example, 30 percent of the total quota could be divided equally among all eligible parties, 30 percent could be divided on the basis of the number of years of full-time participation in the fishery, and 40 percent could be split among vessel owners on the basis of vessel size. Strategies of this nature (with the percentages split out differently) should be explored with the industry as alternatives to strategies that rely on catch histories especially where catch documentation is weak or missing. An alternative that avoids the necessity of deriving an allocation formula is to use a lottery system.

Identified options for allocations:

1. Allocate shares equally among eligible recipients.
2. Allocate shares on the basis of vessel size.
3. Allocate shares on the basis of catch histories.
4. Allocate shares on the basis of historical participation.
5. Use a lottery to allocate shares.
6. Allocate shares using combinations of two or more of the above.

General LAP Programs.

There is little new in the above discussion for those individuals who have watched the current IFQ programs being developed. It is all second nature. However, to consider how to approach more complicated cases where LAPs are given to both traditional recipients and to FCs and may be available for purchase by RFAs, it will be useful to go back and recreate the mental process through which the above potential options were developed.

Given the laws and accepted views on who were potential recipients, historically the main concern was to set up an allocation that would change the fishery from the *status quo* to an IFQ fishery with a minimum disruption of the current distribution between the recipients. When that was the goal, the question became what sorts of things could be used to quantitatively compare allocations among the potential recipients? Looking at participation characteristics was a good way to do this. Catch histories are a way to compare the relative success of various participants. Comparing the financial investments shows, albeit imperfectly, relative commitments to a fishery, and at the same time, relative differences in amounts that will have to be earned to support the capital equipment. It is interesting to note that the two measures will provide different rankings. A smaller older boat operated by a high-liner could have a very good catch record but could be way low on the financial investment ladder. Which measure is best? That is a judgment call. At

the same time, others may not like either of these measures and would argue for years of participation. Finally, others would suggest that the notion of maintaining the existing distribution is not appropriate and would argue for an equal distribution. The allocation formulae actually used in U.S IFQ programs were usually based on more than one of these measures (see the initial allocation entries in the LAP Program Spotlights in Appendix 1).

Consider now the problem of coming up with an allocation formula or procedure for a more general LAP program. It would certainly be permissible to use the same type of measures that have been used in IFQ programs. However, such measures may miss some of the elements or issues that are being addressed by allowing FCs to receive harvesting privileges. It may be possible to correct for this by only using a subset of the measures or to use different weights to make weighted averages.

If Councils want to do more, it may be useful to go through the same type of exercise as described above. For example, what are the motivations for choosing to use a RFA-type organization in a particular case? Assume that it is the ability to look at the full range of fishery related businesses including processing, supply companies, and downstream marketers. In that case it will be necessary to find some measures that capture the specific issues that are being addressed, and can be quantitatively measured. Some possibilities include total employment, employees per unit of fish, percentage of net revenue that remains in the area, etc. The final step would be to turn these measures into an allocation formula. This is but one example of many options, and simply demonstrates a process that the Councils can use to expand the standard ways of calculating allocation formula if they choose to do so.

It would also be possible to use different types of formulae within the general LAP program. The Council may split the TAC into two parts and allocate one part as IFQs according to more or less traditional methods and allocate the second part to other entities with other methods.

Even with this vast array of choices, it is probably impossible to devise a system that will be perceived as equally fair by all eligible entities. To improve the perceived fairness it would be essential for the Council to repeatedly consult with the members of the selected pool and the broader suite of stakeholders.

C. Auction Allocations

Introduction

Auctions are sales in which items are sold to the highest bidders. The current MSA requires Councils to consider an auction system to simultaneously allocate limited access fishing privileges and to collect royalties. It is important to focus on both aspects of these simultaneous actions. Although the general topic is initial allocation, the revenue generation component is critical as well. The first thing to note is the collection of royalties is logically different than cost recovery and the two are treated separately in the

MSA. The principle of cost recovery is that participants in a managed fishery should pay some or all of the cost of running the management program. (Logically the principle could apply to fisheries with all types of management, but it is only applied to LAP managed fisheries in the MSA.) The principle behind a royalty collection program is to transfer some of the financial gains earned from the use of a public resource to the general government coffers. More specifically with respect to LAPs, the notion is that a LAP program eliminates or reduces open access wastes and provides incentives for efficient use of the stock, which is ultimately a public resource. Some of the gains can be siphoned off so that the rewards of efficient use can be shared between the recipient of the LAP and the general public. Similar programs exist for the use of government owned rangeland, oil and gas resources, and other public resources.

Depending on how royalties are collected, care must be taken in determining how much to collect to avoid the problem of killing the goose that laid the golden egg. If too much of the financial gains are taxed away, the incentives to use the resource efficiently will be compromised. This is not a concern with auctions because royalty prices are determined by what bidders are willing to pay to use the resource.

Auctions can provide a number of benefits in limited access programs, including price discovery, efficient initial allocations, and revenue for improved fishery science and management. Councils that incorporate auctions into their allocation systems will need to address two important issues. First, the overall allocation system must result in allocations that meet the requirements of the MSA, including requirements to consider current and historical harvest and other characteristics of the fishing sector. Therefore auctions open to the general public may be difficult to justify, but forms of restricted auctions may be possible. Second, Councils will need to weigh several factors when choosing an appropriate auction method, because what might work well in one context might not in another.

The MSA section dealing with LAPs, auctions, and the collection of royalties is found at 303A(d):

(d) AUCTION AND OTHER PROGRAMS.—In establishing a limited access privilege program, a Council shall consider, and may provide, if appropriate, an auction system or other program to collect royalties for the initial, or any subsequent, distribution of allocations in a limited access privilege program if—

(1) the system or program is administered in such a way that the resulting distribution of limited access privilege shares meets the program requirements of this section; and

(2) revenues generated through such a royalty program are deposited in the Limited Access System Administration Fund established by section 305(h)(5)(B) and available subject to annual appropriations.

In addition to auctions, Councils are also authorized to use other programs to collect royalties. Presumably this includes fees on the initial allocation or transfer of LAPs, an annual use fee, or fee based on a percentage of gross revenue above the amount collected for cost recovery.

Any royalties collected under this provision go to the Limited Access System Administration Fund (the same fund where proceeds from cost recovery programs are deposited). This fund can only be used to cover the cost of administering the central registry system or to administer and implement the MSA in the fishery in which the fees were collected. There are major differences, however. Funds collected in cost recovery programs are to be available without appropriation or fiscal year limitation. Funds collected from a royalty program are subject to annual appropriations. The bottom line is that while Councils are given the opportunity to collect royalties in a manner that is not subject to the 3-percent of ex-vessel value limitation placed on cost recovery programs, there is no guarantee that the funds will be appropriated for use in the fishery.

General Overview of Auctions

Because auctions in fishery management are a relatively new topic for Council discussions, some brief background material is provided before presenting the actual advice for their use. The first section below explains in broad terms the benefits of auctioning fishing privileges. This is followed by a general description of the things a Council, or more likely, the staff, will want to consider when designing an auction program. The discussion considers the issues of what to auction and ways of ensuring that auctions satisfy distributional criteria in the Act. A more technical discussion of how to select an auction type and design a specific auction format is presented in Appendix 3. The Appendix also discusses the use of auctions to allocate other public resources and identifies lessons learned for the Council's use in designing auctions for fishing privileges.

The Benefits of Auctions for Fishery Management

1. Auctions promote an economically efficient initial allocation

Fishing privileges are distributed in an economically efficient manner when they are held by the fishery participants who value them the most. These fishery participants are the ones most likely to harvest fish that consumers value highly and to do so at the lowest cost. These fishery participants also are the ones most likely to submit relatively high bids for fishing privileges in auctions. Auctions therefore promote efficient initial allocations. Trading in fishing privileges on the secondary market also may lead to economically efficient allocations over time as fishery participants that value fishing privileges the most purchase them from others. (See the discussion of transferability above.) Auctions may allow for efficiencies to be achieved more rapidly because they may bypass the first few rounds of trading.

Even in programs that allow trading, however, auctions may improve economic efficiency in other important ways. First, auctions can help avoid lengthy political battles over formula-based allocation rules. This would speed program implementation and recovery of fish stocks, which benefits fishery participants economically. Second, auctions prevent

the ecologically damaging, costly, and potentially dangerous “race for quota” that often develops in anticipation of an initial allocation based on historical catch. Finally, fishery participants that purchase fishing privileges in auctions, rather than receiving them for free, may be more likely to care for the resource to protect their investment.

2. Auctions allow new entrants into the fishery

Initial allocations through auctions give fishery participants without catch histories, including skippers, crew, and fish processors, an opportunity to gain access into the fishery. Annual auctions of fishing privileges could guarantee a steady flow of fishing privileges into the market, ensuring that potential new entrants have continual access to fishing privileges. However, because LAP permits must be renewed unless revoked for cause (see section on Duration) annual or periodic auctions are not possible under the MSA. However, Councils can still provide for this avenue for new entrants by specifying that any revoked permits be reallocated by auction. Trading of privileges also provides opportunities for entry.

3. Auctions provide price discovery

When conducted transparently, auctions can provide excellent information about the value of fishing privileges, which helps fishermen plan their investments and bankers assess the value of fishing privileges as collateral. Public information about prices also facilitates private trades outside the auction and can aid government monitors in assessing the financial health and status of the fishery.

4. Auctions generate revenue

Auctions generate revenue that can be used for a number of things including paying the cost of fishery management. As explained above, the MSA in its current form puts restrictions on the use of these funds.

All of these benefits notwithstanding, auctions will, by definition, allocate harvesting privileges to those individuals with enough money to make the highest bid. There are obviously other criteria by which to make allocations, as is evidenced by the restrictions Congress placed on the use of auctions. But it is important to realize that the individuals who win these types of auctions are not only those with the money but also generally those with a knowledge of, and participation history in, the fishery. Those who know a fishery and have a boat ready to fish are usually able to outbid outsiders simply because the harvesting privileges will be worth more to them.

Basic Principles of Auction Design

Many different auction methods can be used to allocate fishing privileges. This section suggests approaches that are most likely to strike an effective balance among important design considerations.

1. What to auction

There has been considerable discussion on designing the exact nature of the LAP harvest privilege. (See the sections on Duration, Denomination of LAP Units, and Eligibility to Acquire/Hold Privileges above.) Councils have a wide range of choice in setting the exact specification of the LAP. For the most part, auctions are fully consistent with all types of LAP design. The auction will just have to be adjusted in obvious ways. For example, LAP programs with unlimited duration will only require an auction for the initial allocation. On the other hand, a program with a 5-year life will require repeated auctions. One unifying principle is that the nature of the privilege must be clearly defined so that auction participants know exactly what they are bidding on.

2. Designing an auction to meet the requirements of the Magnuson-Stevens Act

Because auctions allocate fishing privileges to the highest bidders they do not explicitly consider historical catch, employment, investments, and the participation of fishing communities. Councils will have to use modified auction systems to meet the allocation requirements.

One way to ensure that auctions meet the requirements of the MSA is to create “carve outs” for auction to particular classes of fishery participants. However, segmenting the auction market in this way could reduce competition leading to low auction revenue and increasing opportunities for auction participants to collude. Councils should therefore consider the full implication of implementing auctions that include artificial limits on competition.

An alternative way for Councils to ensure that the overall allocation system meets these requirements is to withhold a portion of fishing privileges for auction and allocate the remainder by formula using the rules described above. This approach can ensure that the overall allocation system meets the requirements of the MSA no matter how the auction turns out.

Auctioning a fraction of fishing privileges is roughly equivalent to collecting a percentage royalty on the value of fishing privileges, and provides a simple and straightforward way of doing so. For example, Councils that wish to collect a 50 percent royalty on the value of fishing privileges could auction half of the fishing privileges. Auctioning a larger portion of fishing privileges will raise additional revenue.

In addition to raising revenue, auctions promote economically efficient initial allocations and provide a number of other benefits, as described below. On the other hand, auctioning a large fraction of fishing privileges may diminish the control that Councils have over the overall allocation system and their ability to meet the requirements of the MSA. Councils therefore will want to choose the amount of fishing privileges to auction taking into consideration the requirements of the MSA, the benefits of auctioning a large portion or

all fishing privileges, and the potential benefits of using auction revenue for improved fishery management.

Although auctioning a large portion or all fishing privileges may reduce the explicit control that Councils have over who receives the initial allocation, well-designed auctions can be consistent with the allocation requirements of the MSA:

- (1) To the extent that entities with substantial investments in the fishery and high levels of current and historical catch are more competitive, they will be the ones with the highest bids and as such will obtain fishing privileges at auction commensurate with their size and experience. Concentration or excessive limits will guarantee that no single entity obtains too many fishing privileges.
- (2) Auctions that permit broad participation provide opportunities for all fishery participants to obtain fishing privileges, including vessel owners, skippers, crew, and fish processors.
- (3) Low bidders that do not receive fishing privileges initially can buy fishing privileges on the secondary market. Secondary market prices and auction prices should be closely related, so that those who are unsuccessful at auction should not be significantly disadvantaged relative to those who are successful.
- (4) Although the precise allocation that results from an auction can not be known in advance, the allocation may be less susceptible to controversy than allocations based on historical catch and other factors. The market rather than political decision making will determine who gets the privileges.

3. Basic types of auctions

The fundamental goal of an auction for fishing privileges is to sell a fixed number of identical items. Each auction approach must specify how a participant bids and the rule for deciding who wins and how much each winner pays. Some approaches have a single round and others have multiple rounds. Sometimes there are tradeoffs among the simplicity of the auction, the economic efficiency of the allocation that results from the auction, and the amount of revenue the auction raises. Since this goes somewhat beyond the topic of LAP program design, these topics are treated in Appendix 3.

D. Alternative Methods for Collecting Royalties

Besides auctions, Councils are authorized to use other methods to collect royalties. Such programs separate the royalty collection issues from the initial allocation issue. This section describes several different approaches to collecting royalties and discusses some of their benefits and drawbacks.

1. Per-unit fee assessed on allocations

Perhaps the most simple and straightforward way of collecting royalties is to assess a fee annually on every unit of fishing privileges.⁸ Fishery participants that hold more fishing privileges would make higher royalty payments overall. Fishery managers could determine the fee just prior to the fishing season or even several years in advance. Fishery managers could choose the level of the fee to target a specific amount of revenue. Alternatively, fishery managers could choose the level of the fee to equal a percentage of the value of fishing privileges. Finally, fishery managers could choose the level of the fee to equal a percentage of the average value of harvested fish over some historical period.

Per-unit fees assessed on allocations have several benefits. They can be implemented easily at low cost. They provide a predictable revenue stream. Making the allocation of annual fishing privileges conditional on payment would give privilege holders an incentive to pay their annual fees. One disadvantage of per-unit fees assessed on allocations is that, unlike auctions, royalty levels do not adjust automatically to changes in the fishery, and fishery managers will need to adjust fees periodically as fishery conditions change. Finally, fishery managers should choose the level of the royalty fee carefully, because if they set it too high privilege holders might choose not to fish at all. Auctions do not suffer from this problem, because royalty prices are determined by what bidders are willing to pay.

2. Percentage fee assessed on the landed value of harvest

Another method for collecting royalties is to assess a percentage fee on the landed value of fish harvested. This is the method that is mandated in cost recovery programs. It is similar to a per-unit fee on allocations where the level of the fee is set to equal a percentage of the average value of harvested fish over some historical period, but differs in that royalty payments are determined at the end of the fishing season or at the time of landing rather than before the season begins.

The advantage of a percentage fee assessed on landed value is that royalty payments adjust automatically to changes in the quantity of fish landed and the market prices of fish. The flip side of this benefit, however, is that a fee on landed value results in a fluctuating and uncertain revenue stream.

Another disadvantage of fees on landed value is that they might distort behavior away from what is economically efficient. For example, because fees increase with the price of fish, they will impact harvesters that typically sell their catch in high-price markets more than harvesters operating in low-price markets. Depending upon the level of costs, in certain cases this could affect incentives to find higher priced markets for fish. Auctions

⁸ Although Councils could assess a per-unit fee just once on the initial allocation of fishing privileges that last the duration of the limited access program, the benefit of an annual fee is that it can be adjusted to reflect changes in the fishery or changes in the amount of revenue that is necessary to fund the LAP program. Programs that collect royalties just once may put NMFS in a situation where they require more revenue but have no means to acquire it.

and per-unit fees on allocations do not distort economic behavior in this way. In addition, a fee on landed value can be costly to administer, because fishery participants need to keep track of harvest quantities and prices, and fishery managers need to monitor that these quantities and prices are reported accurately. Fishery managers could reduce costs by valuing all harvested fish at the same average market price. In contrast, auctions of privileges generate revenues based on how much each bidder expects to profit from harvesting fish.

3. Fees assessed on transfers

Councils are discouraged from assessing dollar or percentage fees on transfers of fishing privileges as a means of collecting royalties. Likewise, Councils are discouraged from charging percentage fees on capital gains (i.e., sales price minus purchase price) that result from transfers of fishing privileges, although such gains would be reportable on traders' income taxes.

Section 305(h) (5)(A) of the MSA requires the Secretary to collect a limited access system permit title registration and transfer fee:

(5) (A) Notwithstanding section 304(d)(1), the Secretary shall collect a reasonable fee of not more than one-half of one percent of the value of a limited access system permit upon registration of the title to such permit with the central registry system and upon the transfer of such registered title. Any such fee collected shall be deposited in the Limited Access System Administration Fund established under subparagraph (B).

Although there is justification for charging a nominal fee on transfers to cover the incremental cost of updating and maintaining a database of privilege holders, larger transfer fees to capture royalties would discourage economically beneficial transfers and reduce the efficiency of the fishery. Moreover, royalty revenues would depend crucially on the number of trades that occur in any given year and therefore could be highly variable.

E. Limited Access Privilege Assisted Purchase Program

While not exactly a part of an initial allocation, Councils do have an option to create a loan program to assist certain entities purchase LAPs (this is not required but an option). Such programs are to be funded using a portion of the funds collected in the mandated cost recovery program. The authorization for such programs is provided in Section 303(A)(g).

(g) LIMITED ACCESS PRIVILEGE ASSISTED PURCHASE PROGRAM.—

(1) IN GENERAL.—A Council may submit, and the Secretary may approve and implement, a program which reserves up to 25 percent of any fees collected from a fishery under section 304(d)(2) to be used, pursuant to section 53706(a)(7) of title 46, United States Code, to issue obligations that aid in financing—

- (A) the purchase of limited access privileges in that fishery by fishermen who fish from small vessels; and
- (B) the first-time purchase of limited access privileges in that fishery by entry level fishermen.

(2) **ELIGIBILITY CRITERIA.**—A Council making a submission under paragraph (1) shall recommend criteria, consistent with the provisions of this Act, that a fisherman must meet to qualify for guarantees under subparagraphs (A) and (B) of paragraph (1) and the portion of funds to be allocated for guarantees under each subparagraph.

The decision to implement such a program and the establishment of the criteria for participation should be based on the objectives of the management plan and should be consistent with other aspects of a LAP program discussed above. Even with the restrictions regarding small vessel owners and new entrants, these programs do allow Councils a little more flexibility in ensuring that a wider range of entities can participant in a LAP program, especially those that may not fare as well as desired in the initial allocation process.

3. Design Interrelationships

The material presented so far has focused on the various individual components of a LAP program. While there were frequent references to the interrelationships between specific components, a more focused look at these interactions will prove useful. The discussion can be facilitated by using Figure 5. The different components discussed above are listed in the rows and columns of the box. The dark boxes on the diagonal are not relevant because they represent a comparison of a component with itself. An X in the different boxes indicates that an interrelationship exists. The significance of the relationships for each of the columns will be discussed below.

	1. Specification of Management Unit	2. Denomination of LAP Unit	3. Eligibility to Own	4. Duration	5. Transferability	6 Excessive Share	7. Formula Based Allocations	8. Auction Allocations
1. Specification of Management Unit								
2. Denomination of LAP Unit			X					
3. Eligibility to Own	X							
4. Duration					X			
5. Transferability	X	X	X			X		
6. Excessive Share	X		X					
7. Formula Based Allocations	X		X	X	X	X		
8. Auction Allocations	X		X	X	X	X		

Figure 5. Design Interrelationships of Limited Access Privilege Programs.

The question to be evaluated is as follows: Will the choice of the component indicated by the column name affect the choice and operation of any of the components represented by the rows? What is interesting is that the comparisons will vary depending upon the row and column. For example, the choice of transferability options can effect duration but the choice of a duration option had no direct effect on transferability. This will be discussed in more detail below. Finally, for purposes of these comparisons, there is not much difference between formula-based allocations and auction allocations, but both are included for completeness.

In some cases the design or the operation of two components will be related whereas in other cases the design of one component will have a significant effect on the operation of another. For the most part, however, the gradations in both cases are sensitive to the specifics of the particular fishery, and it is not that simple to make general conclusions at this level of analysis. There has been no effort to create a more discriminating ranking system (i.e., one star represents a slight relationship and four stars represent a significant effect), but the nuances which tend to determine the type of relationship will be discussed.

There are several ways the components can be related or can affect each other. The connections may be related to the ease and effectiveness of implementation, monitoring, and enforcement. In some cases the way one component is set up in juxtaposition to another can affect the way in which certain management objectives can be achieved. Finally the interrelationships can affect the economic efficiency of harvesting, processing, and marketing. Not only can the choice of a particular option for one particular component have an effect on these three things, but there are interconnections between different options for different components. The remainder of this section will provide a discussion of possible connections between various components by looking at each column one at a time.

Specification of the Management or Resource Unit

The basic issue with the specification of the management unit is the number of species, stocks, and/or stock aggregations to include in the plan. The more species involved, the more complex the plan. Omitting stocks when they are biologically or technologically related to included stocks can cause a myriad of problems.

This is connected to the eligibility and the allocation components in several ways. Increasing the number of stocks will likely increase the number of entities that have worked with an included stock and hence are potential participants in the LAP fishery. Further, as more and more marginal stocks are included, the range of historical activity of the participants could vary widely. It will likely be quite difficult to develop an allocation program that is perceived as fair when there is a large number of heterogeneous potential participants. It may require many sub-categories and/or special cases which will make tracking the pool of eligible participants more difficult and more costly to administer the appeals process.

On a more practical basis, the quality and length of the historical catch records may vary over the different types of fish. Differences in state or federal recordkeeping systems across time or space will make it harder to establish who is more deserving of being included; analogous records for all participants may not exist. The extreme case would be where a fish stock is included in the management unit to address bycatch issues or ecological relationships, and yet it has not been harvested to any real extent and therefore there are few historical catch records. These are problems that can be overcome, but it will not be easy. Finding a logical system will be a big challenge in and of itself, and the many different views on distributional fairness will make it even more difficult.

The issue of transferability is also closely related to the specification of the management unit. For one thing, if the related species are caught together, participants will have to keep a portfolio of AHP for the different species that will match his/her catches. It is almost certain that it will be necessary in multispecies fisheries to allow transferability to allow this to be accomplished. In addition, it may be wise to set some rules that may not be necessary elsewhere. For example, if two or more species are usually caught together in certain approximate ratios, it may be wise to require trades to occur in bundles with those proportions. The exception would be if the purchaser could show his/her portfolio had sufficient AHP to match the proportions.

The excessive share issue can also be more complex according to the specification of the management unit. An expansive management unit may increase the potential for MP excessive share. Ten percent of the quota share for the fishery for a single stock may grant no market power because there is so much competition from the products of other similar fisheries. However, ten percent of the total quota share for a group of fisheries in an area managed together may be sufficient to affect price.

The problem with MO excessive share is more complex. The more species and stocks that are included in the LAP program, the greater the chance that the transition associated with the new program will result in reorganization and realignment of harvesting, processing, and marketing patterns that run counter to management objectives. In those instances, it is important that the management objectives are well thought out and that the potential effects from transition are fully considered to avoid undesired or unpredicted consequences such as too rapid consolidation.

Denomination of LAP Unit

The issue here is whether the LAP permit will be based on a percentage of TAC (the IFQ) or a portion of the TAC (the LAP). This will affect transferability if both types of permits are used simultaneously and one uses percentages and the other uses portions. There will be complications calibrating exchange rates between percentages and portions. One way to prevent the problem is to prevent transferability between the two types of permits. The problem will not exist if either one or the other type of permits is used is a percentage.

It is worth repeating that the general conclusion from IFQ programs around the world is that denominating quota shares as a percentage of the TAC is the most prudent way to go. Nonetheless the option to use a portion system is available. Councils may find that assignments in terms of fixed tonnages make sense for certain entities such as FCs to provide them with an extra measure of stability. If the TAC falls, prudent management will necessitate that total permissible harvest is reduced, but that reduction does not necessarily have to come out of this tonnage catch privilege. The privileges of other participants could be forced to take all or a greater percentage of the reduction. The flip side holds as well. If the TAC goes up, the management authority retains the option to choose how the extra privileges will be distributed.

For example, consider the implications of transferability between the two types of permits. If stock size (and hence the TAC) is not likely to change very much, there will likely be little difficulty. Assume a person with an IFQ permit buys privileges for 50 tons of harvest from a person with a LAP permit. If the relatively constant TAC is 1000 tons, there would be no biological implications from allowing a transfer that represents a 5-percent QS in the IFQ program. And more to the point, if 10 years later a similar trade was made in the opposite direction, a 5-percent IFQ QS could be transferred to a 50 ton LAP QS with no adverse effects.

However, things will not be so easy for fisheries undergoing a stock rebuilding program or where relatively large changes in the TAC can be expected. With a current TAC of 1,000 tons, consider a sale of 5-percent QS from the IFQ program that ends up as a 50 ton QS in the LAP program. The new owner has more harvest privileges and they are protected against TAC declines. However, if the TAC goes up, the LAP owner will not directly benefit without direct management action. Consider the reverse sale in the same situation. An IFQ permit holder buys 50 tons of LAP QS, which is transferred to a 5-percent IFQ QS. When the TAC goes up, technically that 5-percent share will be translated in extra AHP. The 50 tons is effectively translated to 100 tons. Now what happens if this second sale is reversed? The IFQ permit holder will be able to sell 5-percent of the QS but it will be translated into 100 tons of LAP QS. If biological conditions revert to the *status quo*, the individual will now have 100 tons of protected harvesting privilege where before they only had 50 tons.

Consider comparable sales in situations where the TAC falls. A sale of a 5-percent QS to a LAP permit holder will generate 50 tons of LAP QS. A variable share has been translated into, at least partially, a protected share. If the TAC falls, the LAP permit holder will be able to maintain the 50 tons, and the harvest reduction hits may be imposed elsewhere. A trade between two participants may end up affecting other participants if total harvest must be reduced. This problem will not exist in a percentage-based system.

A sale from a LAP permit holder to an IFQ permit holder will result in the reverse situation. For the amount of the sale, the reduction in TAC will be taken from the IFQ permit holder on a percentage basis. There will be no discretion to lower harvest privileges elsewhere as would have been the case had the sale not occurred.

While it would be possible to discuss other hypothetical situations, for purposes here it should be clear that allowing transferability between programs where one uses a percentage and the other uses a portion, will potentially result in a number of biological and distributional problems. It will be necessary to develop the specific transferability rules that take consideration of these connections.

Eligibility to Acquire/Hold Privileges

The specification of eligibility criteria will have a direct bearing on the design of other components. Some are quite straight-forward and will follow from simple LAP programs. For example, the initial allocation procedure will have to be designed to ensure that entities that are not eligible do not receive QS. Further, the transferability rules and trade approval processes will have to ensure that non-eligible entities do not acquire QS or AHP through market trades.

There are some other rather more subtle issues dealing with the introduction of RFAs and FCs. One has to do with the denomination of the LAP unit. The concept of the LAP based on a portion (rather than a percentage) of the TAC and the possibility of using RFAs and FCs were introduced in the most recent reauthorization. Congress presumably felt that allowing the opportunity to allocate permits based on a portion of the TAC would potentially be better for these organizations than traditional IFQs. So if nothing else, it may be necessary to select the denomination type taking into account what will work best for the types of entity that will receive the quota share.

For example, Councils may feel that FCs, and perhaps certain types of RFAs or similar entities, will be better suited to meet management objectives if their harvesting privileges are more protected. That is, in the case of TAC declines, Councils may feel that they do not want to rely on mandatory percentage cuts. They may desire the option to structure the necessary cuts in some other fashion. Similarly, they may want the option of being able to allocate increases in TAC so that more of the increase goes to specially selected entities. Apparently these options are available under the reauthorized MSA. Two things should be clear, however. First, going to a portion-based QS does not in any way do away with the absolute necessity of keeping the allowable harvest at or below safe biological levels. When the TAC falls, cuts in allowable harvest will be necessary. The discretion will be on who takes the cut, not on whether the cut will be taken. Second, allowing for discretion in the way changes in the TAC are reflected in changes in the AHP of different entities will lead to very difficult and costly political negotiations, as well as the possibility of litigation.

The percentage based system has certain advantages. It is simple to administer, transparent, and likely to be viewed as more fair. It also provides more of the incentives that are the basis for using LAPs in the first place. The harvesting privileges of all participants are more secure which will provide incentives for both biological sustainability and production efficiency. Councils should take a hard look at the pros and cons of choosing either a percentage or a portion based program.

The use of RFAs, FCs, and similar entities will also affect the criteria used to define MO sharelimits. One of the notions behind these organizations is that groups of fishery participants, especially if they are from different sectors, will be able to make fishery operational decisions that will be mutually beneficial to all. Or at least they will make decisions where the effects on all participants are taken into account. As such, it may be permissible, or even desirable, for such organization to control a larger portion of the outstanding QS. One purpose of setting MO share limits is to ensure that one entity can not adversely affect other participants. Since a wider group of participants may be involved in these cases, the concern for this happening may be less.

The eligibility component can also be related to a “yes or no” decision on transferability. With respect to RFAs and FCs, Councils will have to decide whether transferability between either RFAs or FCs, or among RFAs, FCs, and other entities, and if so, in what direction, will help or hinder the achievement of management objectives. The same sort of decision may be necessary even in a traditional IFQ where there are different types of participants who use different types of gear or work out of different ports. This is discussed in more detail above in the initial section on Transferability.

Duration

The choice of a duration component can have definite effects on the allocation component. If a LAP program is designed with a limited duration it will be necessary to set up a continuing allocation system. In the extreme case, if there is an absolutely fixed duration, then the whole program, including the allocation procedure, will have to be redesigned to continue with a LAP program. In more subtle cases, where there is set date for a review and continuation decision, it is necessary to specify how the harvesting privileges will be allocated if the system continues. The possibilities range from the current allocation, to reallocation among current participants based on performance criteria, to redesigning the whole program. When setting a duration limit, the repercussions on the need for a continuing reallocation process should not be overlooked.

Transferability

As with duration, certain choices in the transferability component will have effects elsewhere. If transferability is not allowed, barring any reallocation, the duration of the overall program will be as long as the oldest surviving participant. The program will decrease in size as individual participants are eliminated. If these are corporate entities rather than individual human beings, the issue is somewhat muted.

Non-transferability will also require a continuing process of re-allocation to keep the program going. Presumably, the initial recipients will include a large percentage of, if not all of, the active participants in the fishery at the time of program design. It may be possible to restrict future re-allocation to this pool of active participants, at least for a

while. However, this may lead to problems with excessive share. And over time, the pool of active participants may be significantly reduced. This leads to another problem. The law stipulates that harvesting privileges must be allocated to entities that significantly participate in the fishery, and this is true even if auctions are used. It may not be possible to develop reallocation procedures that are consistent with both the “excessive share” and the “significantly participate” requirements of the MSA.

As discussed in detail above, the initial allocation process can be very difficult to design properly even in the best of cases. The main point to be made here is that it may be just that much more difficult if the LAP program does not allow for transferability.

Excessive Share

The selection of an excessive share limit has an obvious implication on the transferability and allocation options. First, the allocation program must ensure that no one participant receives more QS than is allowed by the excessive share limit. Second, the transferability rules and trade approval processes will have to ensure that no participant will be able to surpass the excessive share limit by acquiring QS or AHP through market trades.

In addition, there are links to the specification of the resource unit. If the LAP program includes two or more species that are harvested together it may be possible to indirectly obtain market power for one species by accumulation of quota shares in another. This could be a problem with bycatch LAP programs.

Allocation Procedures

While an allocation procedure may have to be designed in a special way to be consistent with the way other components are selected, the *a priori* choice of a certain type of initial allocation method will not set any limits on the way the other components are selected.

Part 3: The Management of LAP Programs

The purpose of this document is to assist Councils as they design LAP programs. The continuum of fishery management program design to management program execution requires a close collaboration between the Councils and NOAA Fisheries throughout the process. While most of the operational design requirements for enforcement, monitoring and statistics, etc. are set by the Councils, many of the system implementation details will fall on NOAA Fisheries to complete. This task also necessitates the integration of multiple FMP requirements across fisheries (some of which are not managed using LAPs) as well as across Council, state and international boundaries/jurisdictions. While some aspects of LAP programs, especially those provided or mandated for the first time in the MSA reauthorization have yet to be fully developed, experience with the existing programs and the attributes of the larger operational systems in which they operate are worth exploring. This section will discuss some of the tasks related to LAP implementation and operation. It is provided as context for the Councils as they design programs. Councils will be able to do a better designing job if they understand the implications of management choices on monitoring and implementation costs, feasibility, effectiveness and compatibility with existing systems. This section covers these issues.

1. Enforcement

A principal goal of any fisheries enforcement program is to change human behavior and encourage participatory obedience so as to obtain acceptable levels of compliance with the regulations that are promulgated to support the plan. In the publication “Sharing the Fish” (NRC, 1999), the importance of LAP monitoring and enforcement was addressed in the following finding: “Regardless of how well any fishery management plan is designed, noncompliance can prevent the attainment of its economic, social, and biologic objectives.” Plans containing LAPs are no exception. Any FMP will fail to achieve the desired results without regulatory compliance.

Success of any plan becomes threatened when the regulatory parameters exceed the capacity of law enforcement officials to achieve an acceptable level of compliance. But there are two sides to the equation, both of which are matters of policy. The most obvious is the capacity of the enforcement officials. Theoretically that capacity can always be increased by hiring more people and giving them more resources. However, there are budgetary priorities as well as limits on what the workers and the resources can actually accomplish. The other side of the equation is the nature and complexity of the management program, specifically the rules and regulations that are necessary to implement it. The goal is to design a LAP (or any management) program as simply as possible while being able to achieve the management objectives. Simplicity is beneficial to the participants as well as the everyday working of the plan, especially with respect to the balance between enforcement costs and enforceability.

Origins of Non-Compliance

Frequently Councils consider LAPs as an alternative for a struggling fishery with a downward trend in stocks, sinking economical viability, social skepticism, and escalating levels of non-compliance; all four elements serving to undermine fishery management. (Environmental Defense, 2007). By comprehending the underlying causes of non-compliance in the previous fishery plan, law enforcement experts can identify, control, and eliminate factors which foster unlawful behavior, potentially threatening to the new LAP regime.

In troubled fisheries the cause of non-compliance, and the attending ills, can often be traced to management controls which serve to alienate the participants and create economic incentives to cheat. This is not an obvious or deliberate process. It can occur over a period of years or even decades depending upon the market conditions. As a fishery “heats up” managers attempt to control the harvest by controlling fishing effort with management tools which are well established but ineffective against socioeconomic and market forces. Typically, a troubled plan moves from open access to limited access, from a full fishing season to fishing a limited number of days, from full fish holds to trip limits, moving ever closer to what is now called “derby fishing.”

A fishing boat is a business, and a business exists to make a profit. As such, even fishermen who once might have been supportive of the intentions of management become disenchanted as the newer restrictions begin to cut into their profit margins. As fishing days are cut and trip limits reduced, marginal fishermen are sometimes inclined to violate the law. However, as time passes and the fishery becomes more stressed, the regulations will become even more stringent. As regulated inefficiencies and other input and output controls constrain efficient business choices, more fishermen are forced from mainstream profitability toward the fringe of economic survival, with an increased likelihood of breaking the rules.

The underlying rationale for most non-compliance is this diminishing profitability effect. The effect is different for each participant based upon his/her fishing ability. There comes a point in the management process when competing interests develop between participants who want to stay in business and the management process which needs more aggressive regulations to ensure over-fished stocks recover.

LAP Enforcement Operations

While the institution of a LAP program may not immediately change the mindset of industry participants, it can over time have a favorable effect on the way they conduct their business and thus view the enforcement system. LAPs will eliminate the race between the Council and the individual fishermen where the Council makes a move to control their activities or catch levels, and the fishermen make counter moves to maintain or increase their ability to take fish. LAPs also limit the ways the management system can affect a given entity. Given a known quantity of the TAC, a LAP holder can make

business decisions to harvest that amount at the least cost so they can maximize their profits. With a LAP program, any change in the TAC will change the annual allowable harvest of all participants and they will be affected proportionally with IFQs and in a known specified way in more general LAP programs. In non-LAP programs individuals can be hit with a range of input and output restrictions, which can have differential effects depending on the type and size of fishing vessel, individual fishing habits, and relative fishing skills. Finally, because LAP holders have a long-term interest in the health of the stock, there are more incentives to abide by the fishing rules and to cooperate with enforcement officers with respect to the activities of others.

At the core, the enforcement issue in a LAP program is to annually ensure that each participant does not harvest more than is permitted by the total of his/her accumulated AHP, that amount being the sum of that generated from his/her QS plus or minus any changes from trades. If that is accomplished, total harvest in the fishery will be less than or equal to the TAC. The success of a LAP program rests entirely upon the ability to track the owners of Quota Shares (QS), allocate the appropriate amount of Annual Harvest Privileges (AHP) that flow from the QS, reconcile landings against those AHP, and, ultimately balance the collective figures against the total allowable catch (TAC).

If this can not be accomplished, both illegal landings and unlawful sales will be possible which, more than likely, will eventually destroy the program. These violations not only undermine management goals and objectives, they also erode the security of the privileges holder's interests in a LAP which is the core concept of the program. The LAP program will fail if the participants lose confidence in the government's ability to manage the program.

Traditional fishery regulations and LAP programs converge in the marketing of fish. While many things may change under a LAP program, what is constant is the commercial aspects of the fishery: the entire commercial and economic superstructure- including any black markets. To market legal or illegal fish requires the commercial involvement of others, e.g., dealers, wholesalers, purchasing agents for restaurants, the general public and the like. For example, if fish from a traditional plan were harvested out of season but proper processor record-keeping and landing reports were filled out, it would immediately draw official attention to the perpetrators. The successful movement of illegally harvested fish requires surreptitious transactions, often co-mingled with legitimate product and paperwork, as a means of avoiding detection.

Depending on the design of the LAP system, there are several institutional structures that are available to monitor removals from the fishery. A catch-based LAP monitoring system focuses on tracking catches per vessel usually through the use of fisheries observers and vessel logbooks (paper or electronic). (See the discussion on observer monitoring in the section on discards below.) Where at-sea observers are not possible, a LAP monitoring program based on landings would require a double-entry accounting system (i.e., independent vessel and first-buyer logbooks or trip ticket systems). By the nature of the landings-based system, the enforcement is best done by accountants following a paper trail and not by "fish cops" watching the when, where, and what of fishermen's activities. The

main enforcement procedure relies on a double-entry accounting system under which routine audits can detect illegal landings (landings that are not backed up by AHP) and unlawful downstream fish sales (sales that are not backed up by documented legal landings).

There are several control points that must be set up and a number of tasks that must be performed prior to or as a condition of the monitoring of catch under a double-entry system. The fundamentals of the required monitoring/enforcement procedures can be described heuristically in terms of Figure 6. For simplicity, it is assumed that there are only three harvesting participants and three processors or fish receivers. Each arrow represents a LAP enforcement/compliance control point.

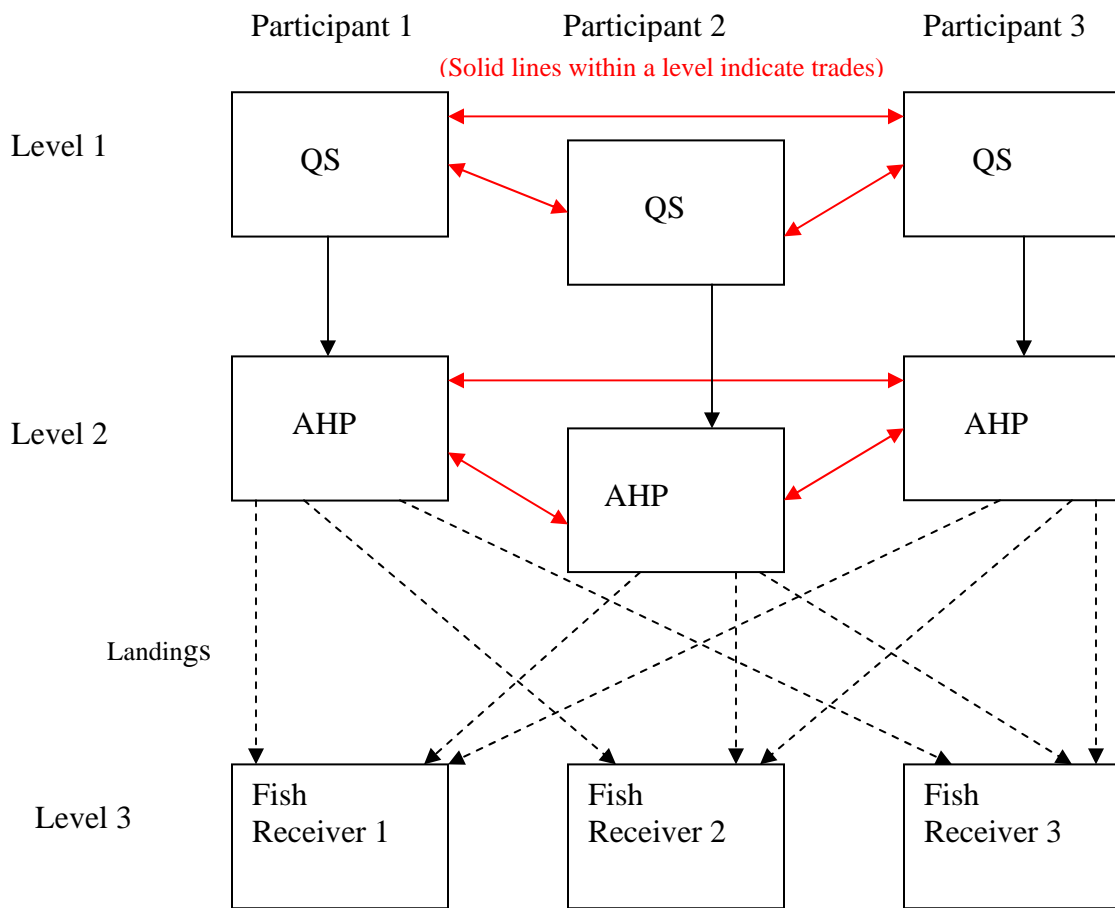


Figure 6. Required LAP Monitoring/Compliance Control Points.

Registry

Level 1 shows the registry of initial allocations of QS. With LAP programs it is not just the monitoring of overall catch that is important, but also the association of that catch with individual LAP holders. The registry of ownership of the LAPs must be capable of annually issuing the proper amounts of annual harvest privileges (AHP) for each unit of quota share (QS) and of keeping track of trades in both QS and AHP. It is necessary to track who holds shares which means being able to track sales/leases from one participant to another. The more limitations on who can hold shares and who can trade with whom, the more difficult and expensive it will be to run the registry.

Harvesters

Level 2 shows the actual harvesting part of the system. Harvesting is authorized by the AHP which are generated by the holders of QS. The exact amount will depend upon the rules of the particular plan, but traditionally it has been based on a percentage of the TAC. If allowed, once the AHP are distributed, they can also be traded. Enforcement officers must be able to keep track of individual balances after such trades. Those balances represent the amount of fish that each participant will be allowed to harvest.

Every time a harvester brings in a load of fish, this first entry transaction is marked by the name and number of the harvester, the name and number of the fish receiver, and the amount of the sale. The transaction must be recorded with the NMFS enforcement branch, after which, the amount of harvest will be subtracted from the harvester's AHP account. The harvester will not be able to complete any more landings transaction when his/her AHP account is emptied.

First Buyers, Dealers, Fish Receivers

Level 3 shows the fish receivers. If a LAP program is to work, all entities that purchase fish must be licensed and must keep appropriate records of all transactions. This represents the second entry transaction of the double entry bookkeeping system between harvesters and fish receivers and also records the name and number of the harvester, the name and number of the fish receiver, and the amount of the sale. As a double check, at the end of the year, the records of all fish receivers can be collected and summed across harvesters. The total recorded landings can then be checked against the AHP available to each participant. If all participants are within their permitted level of AHP, the total catch will be within the TAC.

In addition the total purchases of any one fish receiver can be checked against the amount of their sales on down the product line. If they are selling more than they are legally buying, they will be out of compliance. If fish receivers know this, they will have every incentive to make sure they can prove all of their purchases are legal. They will not be tempted to buy fish off the record from harvesters.

A LAP checks and balances system need not be more difficult than the average on-line banking process. A bank account is opened with a deposit. As more checks are written the account is debited and the balance is continually reduced. Without additional deposits the balance in the account will eventually reach zero. LAP electronic accounting provides an analogous service. The difference is that NOAA Fisheries is the “bank” and oversees all electronic transactions. Electronically accounting for annual allocation expenditure with the landing of catch and reconciliation with the TAC using a checks and balances system is the best assurance that illegal landing and unlawful sales do not take place.

The optimum method of uncovering and identifying illegal product in commerce is through the use of a “paper-trail.” A LAP program can ensure the identification of legal product by incorporating a few additional accounting procedures. First, all purchases by LAP-qualified (i.e., licensed or permitted) dealers are tracked through an account just like the LAP fishermen. Unlike the fisherman’s account which tracks annual allocation expenditures at the point of sale, the dealer’s account tracks the amount of fish purchased and from whom. Obviously, these two accounts should balance. The receipts of the dealers account can be used to confirm the amount of cost recovery fees owed; the amount of fish purchased by a single dealer; the total amount of fish purchased by the dealer against individual landings and compared with the TAC and so forth.

The use and tracking of dealer accounts is a critical component in the checks and balance system. Law enforcement officials who audit fish plants should have an up to the moment account of fish purchases by the LAP licensed or permitted dealer, greatly facilitating and enhancing the audit process. Another essential function of the checks and balances system is to provide an approval code for every purchase which can easily be generated for each reported landing. The approval code should be required on all shipping documents, purchase orders, bills of lading and manifests whether the code reflects one fish or the entire load. This enables a NMFS agent in another region to easily determine whether the fish for sale in the marketplace falls inside or outside the LAP. If the paperwork does not show an approval code then the product is either imported or illegal. If it is imported, there will be U.S. Customs and foreign documentation available from the dealer. If no documentation of any kind exists there is a strong probability the fish were harvested, transported, and marketed illegally and an investigation ensues.

Discards

Sometimes it is important to consider more than just the fish that are landed. Achieving full individual accountability, and the harvesting incentives flowing from it, relies upon each harvester being held responsible for total mortality attributable to his/her fishing activity. This relationship underscores the importance of accurately documenting not only amounts of fish that are retained and landed, but also any amounts of fish that are discarded. Implementing complete observer coverage, or alternatives such as full retention combined with partial monitoring to assure that discard is not occurring at sea, supports individual accountability and encourages fishermen to reduce discards over time.

However, monitoring and managing discards is not unique to LAP-managed fisheries. All other management strategies also have to deal with discards; whether LAPs are superior in discouraging or mitigating the occurrence of unwanted discards is the relevant question to be evaluated. In some instances it may be prudent, or even necessary, to consider the extra steps of full retention, complete observer coverage, and/or discard accounting in monitoring AHPs.

From a behavioral standpoint, there is little incentive for innovation aimed at reducing discards when fishermen are accountable only for fish that are landed. With accountability expanded to include total mortality by debiting discards to AHPs, one would expect that discards would be reduced to the point where the marginal cost of avoiding unmarketable catch is equal to the value of the quota poundage that must be expended for discarded fish. Not only will this evaluation produce short-term changes in fishing methods, but it will promote longer-term innovation in fishing gear and techniques for avoiding unwanted catch, as well as the expansion of markets for fish that are currently unmarketable. Reliance on less-than-complete observer coverage carries lower costs than 100-percent coverage, but is also likely to convey proportionately fewer programmatic benefits. Applying average discard rates derived from some portion of a fleet to all, or the remaining unmonitored vessels, may promote the avoidance of fleet-wide overfishing. However, accounting for discard through the use of fleet averages provides reduced incentives to individual fishermen to develop methods for avoiding fish that are unmarketable. Additionally, if season- and/or depth-specific estimates of average discard rates from an observed sub-fleet are to be used as the basis for debiting individual quota accounts, issues of sample size adequacy and equitability in the application of those rates within a season will likely mean that quota accounts cannot be reconciled on a timely basis.

Overage Allowances

In some cases, the privilege tracking system can be improved by creating an overage system where a LAP fisherman is permitted to have a percentage overage on the last landing. The percentage amount would have to depend upon the particularities of the fishery. The overage amount would simply be docked from the following year's annual allocation. The other part of this is that LAP licensed or permitted dealers can purchase fish overages with the approval of NMFS and without possibility of sanction. The use of a 10 percent overage, for example, eliminates the potential of the law enforcement program getting wrapped up in numerous cases involving small amounts of fish. The usage and exact quantity to allow would depend on the biological reference points and annual catch limits adopted by the Council, with the assurance that significant FMP objectives would not be compromised. These systems have their downsides and so should be implemented with great care. They complicate the accounting system for developing the AHP each year. And in cases where all participants take advantage of the extra harvest in a single year, it may harm the stock unless accounted for in the annual TAC specification.

To summarize, the following are necessary parts of monitoring system for a LAP program based on landings.:

1. All landings are recorded immediately upon offload;
2. Participants and dealers have separate PINS;
3. Participants and dealers have separate accounts tracked by NMFS;
4. Participants can transfer annual allocations electronically;
5. No transaction is complete without an NMFS approval code;
6. The approval is required on all transportation and sales documentation;
7. While not always necessary, consideration should be given to the possibility of requiring observers and/or full retention policies; and
8. Consider flexibility of overage/payback policies for one-time/end-of-year AHP overages.

Second Lines of Defense for the Double Entry Accounting System

Ideally, the double entry accounting system will provide all the monitoring and enforcement activity that is necessary. If routine audits can locate situations where fish are landed that are not backed up by AHP or where final product is sold that can not be backed up by a documented legal landing, these activities can easily be identified and the appropriate punishments can be doled out. What is more, if fishery participants know illegal landings or unlawful sales can be identified, they will have a reduced incentive to undertake such activities.

But things do not always work this nicely, especially when the landings from LAP programs run through the same landing and processing channels as those of non-LAP programs. For example, sometimes it is possible to pass off the landings or the final product sale of a LAP fishery as being from a non-LAP fishery. The illegally harvested fish is co-mingled with legally harvested fish and the entire load is sold in local, intra-state, or inter-state commerce as a legal product. To do this requires accomplices who agree to illegally purchase and transport the fish. More importantly for purposes of discussion here, violators fail to file required record keeping and reporting requirements. Falsifying records to conceal illegal landings can protect those involved in the collusion from being detected. These reports are essential for monitoring the existing TAC and for help in determining next year's TAC and quota allocation.

Prior Notice of Landing

A possible second line of defense is to require a robust, shore-based, real-time data reporting and monitoring program. The shore-side, real-time data reporting begins with a prior notice of landing (PNL) requirement. This typically occurs 3-6 hours before the vessel is moored. When the PNL is made, it should require identification of the operator and the quota-share holder aboard, if different. Also required are holder's permit number, vessel name and number, species targeted, estimated catch aboard, destination for off-load

(and whether they will deliver to more than one LAP licensed or permitted dealer), and the approximate time the vessel will be in port. This is also a final opportunity for the permit holder to “self-report” if they know they have more fish aboard than quota to cover the landing.

Once they have made their PNL and declared their catch aboard, an officer has approximately 3-6 hours to meet the vessel dockside and monitor the offload. Offloads can be required to occur during an “offload window” usually 0600-1800. An offload window ensures the dealer will be open and an enforcement officer will be present. In the event an offload monitoring is required, it must be monitored to completion and the hold checked to ensure no fish remain. In fisheries where more than one LAP species can be harvested and retained, monitoring becomes a bit more complex but is sorted out dockside as the fish are placed in totes and weighed.

Vessel Clearance

Fishing vessels may elect to leave the management area for a destination outside the boundaries of the LAP management regime. If this is going to occur, the vessel must request “vessel clearance” and proceed to a mutually convenient port to have the catch examined by a law enforcement officer, who will grant final permission for the vessel to leave the area (or the country). LAP programs are best enforced via shore-based systems and as such, at-sea evolutions such as transshipments must be carefully evaluated for their benefits and well as the availability of appropriations or cost recovery funds to pay for them if the LAP is to be enforceable at a reasonable cost.

To summarize, the following are necessary to minimally support real-time data reporting:

1. Prior Notice of Landing (usually made 3-6 hours in advance);
2. Offload windows (usually 0600 to 1800);
3. Vessel clearance (when vessel leaves management area); and
4. Prohibitions on transshipment before landing (although there may be special circumstances where it could be allowed).

Vessel Monitoring System

Another tool that can be used in tandem with a real time data reporting system is to require a vessel monitoring system (VMS). VMS is an essential requirement to show the vessel was at-sea, how long it was out, where it docked when it came into port, and the present vessel location. VMS is capable of understanding and recording small details of the ship’s evolutions. It can document, for instance, specific course changes and engine speed changes by a vessel. Collectively this pattern is termed a signature. At present there is not enough data to make a signature admissible in court as an indicator of fishing. Regardless, VMS technicians are trained to look at positioning data and other factors indicating potential fishing activity. An investigator can be dispatched to the landing site

intercepting the vessel as it comes into port or even anchors in a remote area. If the captain and crew are believed to have illegally harvested a LAP species, the agent or officer can intercept the vessel. If, during the course of an initial investigation, a violation surfaces the agent or officer will bring the vessel to port, seize the catch and cite the errant fisherman.

Again, tracking locations of vessels via VMS is not unique to LAP-managed fisheries. Many other management strategies also have to deal with fishermen attempting to evade detection of illegal acts. Whether LAPs with VMS is superior in discouraging or mitigating the occurrence of evading detection of a landing without complementary AHP for the event is the relevant question to be evaluated.

In summary the following conditions are necessary to minimally support a LAP-VMS program:

1. All participant vessels are equipped with NMFS authorized VMS units;
2. The system must be operated 24/7 for 365 days a year;
3. Fisherman must present documented proof VMS is fully operational prior to receiving annual allocation;
4. Participants agree to return to port if VMS is dysfunctional as a condition of participation; and
5. Tampering with the VMS or power source supporting VMS must be prohibited.

Profiling

It is possible to improve enforcement by profiling for possible non-compliance using all parts of the enforcement program including the double entry reporting system, real time monitoring of landings, and VMS. The complete system can collectively and simultaneously monitor vessel activity, fishing activity, landing ports, fish sales, and dealer reports. From all this electronic information harvest tracks and trends emerge. Vessel and fishing activities that do not conform to normal commercial patterns will draw the scrutiny of officials. A comparative analysis between VMS track-lines, landing activity, landing reports, and dealer reports will determine if further investigation is warranted. If the analysis is inconclusive or information indicates a probable violation the fisherman, vessel and dealer are placed on a list to be immediately contacted by law enforcement officials. The vessel is intercepted, boarded, and inspected. The dealer plant is inspected and electronic data files are audited. Based upon the results of this information, the initial activity drawing the attention of officials in the first place suggests that: 1) A violation is probable and an investigation ensues; 2) A violation did not occur and the activity is explained; or 3) The result is inconclusive and both the fisherman and dealer are placed under scrutiny.

Enforcement Conclusions

The above is a brief summary of the basics of the design and operation of an enforcement program for a LAP managed fishery. Clear communication with NOAA Fisheries during the Council's construction of the LAP plan will help to ensure that the peculiarities of the fishery which might affect enforcement are known to NMFS and that the nuances of enforcement that might affect compliance in a particular fishery are known to Council members.

While the simple diagram in Figure 6 provides a picture of what must be done in a LAP monitoring program, the details can be very complex. Also, there is likely a non-linear relation between the complexity and the costs of implementation and operation of a system, and also its ability to actually get the job done. The best plan is the one that gets the job done (where success is defined as meeting the demands of the MSA and accomplishing the management objectives of the plan) in the most efficient manner, not the one that simply has the lowest enforcement costs. If there are two ways to achieve a management objective, however, then choose the one that costs less to implement and enforce if all else is equal.

As Councils develop multiple LAP programs there may be economies of scale in implementing LAP enforcement programs. The personnel and the system that are used to implement one can often, with only moderate cost increases, handle more. This is only true, of course, if the designs of the actual LAP programs are similar. Therefore, it makes good sense, both from the participant's point of view, and from an implementation perspective, to minimize the differences between different LAP programs to the greatest extent possible.

Costs for enforcement activities are recoverable under Section 303A(e), but the MSA places a cap on recovery at 3-percent of the ex vessel value of fish harvested. While the costs of enforcing the Alaska Halibut/Sablefish program are under that cap, this will not necessarily be the case for all future LAP programs, especially those with smaller TACs and lower market prices. The objective to design an efficient enforcement program holds regardless of the 3-percent cap, but it is especially compelling where a proposed LAP approach pushes enforcement costs above the cap. In times of limited appropriated funding, it may be difficult to find the necessary funds to bridge the gap, and therefore other LAP design alternatives may need to be considered.

2. Cost Recovery

The MSA mandates that all LAP programs have a cost recovery program. Both the Secretary and the Councils are given specific tasks. The Secretary is directed by Section 304(d)(2)(A) to collect a fee that will be used to cover certain specified costs:

(2)(A) Notwithstanding paragraph (1), the Secretary is authorized and shall collect a fee to recover the actual costs directly related to the management, data collection, and enforcement of any—

- (i) limited access privilege program; and
- (ii) community development quota program that allocates a percentage of the total allowable catch of a fishery to such program.

(B) Such fee shall not exceed 3 percent of the ex-vessel value of fish harvested under any such program, and shall be collected at either the time of the landing, filing of a landing report, or sale of such fish during a fishing season or in the last quarter of the calendar year in which the fish is harvested.

(C)(i) Fees collected under this paragraph shall be in addition to any other fees charged under this Act and shall be deposited in the Limited Access System Administration Fund established under section 305(h)(5)(B).

(ii) Upon application by a State, the Secretary shall transfer to such State up to 33 percent of any fee collected pursuant to subparagraph (A) under a community development quota program and deposited in the Limited Access System Administration Fund in order to reimburse such State for actual costs directly incurred in the management and enforcement of such program.

Currently, cost recovery is occurring in the halibut/sablefish, crab rationalization, and red snapper IFQ programs (see the Appendix 1 spotlights on these programs). Cost recovery is not yet in place for wreckfish and the surf clam/ocean quahog IFQ programs. Given the mandate concerning the necessity and type of cost recovery program, Councils do not face any substantive design choice questions here as they do with other aspects of LAP program design: cost recovery must be implemented. However, knowledge of the theory and the operation of cost recovery programs is useful background for overall LAP program development.

With respect to the role of the Councils in developing LAP programs, the MSA states in Sections 303A(e) :

(e) COST RECOVERY.—In establishing a limited access privilege program, a Council shall—

(1) develop a methodology and the means to identify and assess the management, data collection and analysis, and enforcement programs that are directly related to and in support of the program; and

(2) provide, under section 304(d)(2), for a program of fees paid by limited access privilege holders that will cover the costs of management, data collection and analysis, and enforcement activities.

The object of the fee program is to cover at least part of the costs of management (recall the 3-percent cap on cost recovery imposed by the MSA). The Councils are given the task of developing the methodology and means to assess the costs that are directly related to and in support of the program. But what exactly does that mean? While specific guidelines may be developed in a future cost-recovery rulemaking, some general principles can be described right now.

Incremental Costs

The relevant costs to recover are the incremental costs, i.e., those costs that would not have been incurred but for the IFQ program (NMFS, 2003). Conceptually, measuring these costs involves a “with and without” comparison, i.e., What is the cost of running the management program for the specified fishery under the *status quo* regime, and what is the cost of running the management program under the LAP program? The difference is the incremental costs attributable to implementing the LAP program. The two justifications for limiting recoverable costs to incremental costs are:

- (1) Since the issue is to find the funds to cover the costs of adding LAP programs, then the real problem is to cover incremental costs.
- (2) To minimize the disincentives for Councils and their constituents as they consider replacing non-LAP programs with LAPs, it makes sense to have participants in LAP programs only pay for the costs that are added because of the LAP program itself. For example, stock assessment costs will be required no matter what type of program is used. Given the current law, it is not possible to have participants in non-LAP programs pay for stock assessments. Therefore, having participants in LAP programs pay for stock assessment while non-LAP participants don't pay would be unfair and prejudice the Council's and industry's preference of LAPs as a management option.

The incremental cost issue was examined in a recent GAO study on cost recovery. (GAO, 2005). GAO pointed out that “actual costs” could alternatively be interpreted as the full costs of managing the fishery under consideration: every dollar that is spent on managing the fishery should be counted. In its response NOAA indicated that the current methodology of defining recoverable costs as those that are directly attributable to the implementation of an IFQ program was the correct interpretation of the MSA. The GAO did not go so far as to suggest that full costs should be recovered. Rather, they said that if Congress wanted full costs to be recovered, it should clarify the cost recovery fee provision of the Act to call for full costs to be recovered. The MSA reauthorization passed by Congress in December 2006 made no such change.

Interestingly, the Administration's MSA reauthorization bill provided additional cost recovery provisions for Congress to consider. The bill included a proposal for cost recovery in non-LAP fisheries, added science activities as a recoverable cost, and raised the potential cost recovery rate to 15 percent. Congress did not adopt any of these provisions, providing additional evidence that the existing cost recovery authorities and practices were sufficient.

The reason for a with-without comparison rather than a before-after comparison is to keep all other factors equal. This becomes tricky for any currently unmanaged fisheries. Here the baseline to use as a reference for the cost comparison is the estimated cost of basic data collection and analysis, management and enforcement under a traditional non-LAP method for that fishery. This means that if the *status quo* management system is incomplete or insufficient to meet current objectives and just happens to be adjusted

concurrent with the introduction of the LAP program, the costs of satisfying the insufficiency should not be attributable to the LAP program. For example, a newly managed fishery would need some form of a stock assessment regardless of whether the management strategy was a LAP or non-LAP approach. The stock assessment cost would not be a recoverable cost in this case. Another example is the general recognition that observers are necessary in a multi-species fishery managed with a non-LAP program. However, consider the case where observers were not part of the initial management program and a decision was subsequently made to require observers. Even though the decision to introduce observer might coincide with the start of a LAP program, the observer costs would not necessarily be eligible for cost recovery unless they were directly related to and in support of the LAP program. The determinations of what costs are recoverable will be extremely important to the industry and the agency, and regulatory guidance may be necessary to promote consistency and equity.

Measurement of Costs

The actual measurement of the incremental costs that are directly related to operating a LAP program can be quite difficult. The costs are generated by NOAA Fisheries programs and these data need to be shared with the Councils.. Experience with the existing LAP cost-recovery programs and the attributes of the larger operational systems in which they operate are worth exploring. The following discusses some of the issues related to LAP cost recovery as guidance and for possible adoption by other programs as Councils design new LAP programs.

The longest-standing U.S. LAP cost recovery protocol is the one that has been established in the NMFS Alaska Region for the halibut/sablefish IFQ program. Here the administrative staff have instituted an automated process whereby the time spent by employees on different categories of work are recorded and tabulated. The direct program cost categories include labor, rent/utilities/overhead, travel, printing, contracts, supplies, equipment, and other expenses. The Alaska Region is set up to capture time allocation information of all personnel who work on management or enforcement of any IFQ program. These costs are collected from various NMFS offices (Sustainable Fisheries Division, Restricted Access Management Program, Office of Law Enforcement, Office of Management and Information, and Office of Administrative Appeals).

In addition, costs from collaborators in Alaska's IFQ management program are tallied as well (including NOAA's Office of General Counsel, the International Pacific Halibut Commission, Pacific States Marine Fisheries Commission, Alaska Department of Public Safety and the Alaska Department of Fish and Game). These costs are added to the NMFS costs that are documented to be attributable to IFQ operations. The actual procedure is more complicated than this simple explanation. However, since there are procedures that will account for the measurement of the appropriate costs within the existing NOAA financial management system, it may not be necessary for the Councils to develop a process on their own.

All LAP programs will also likely require an infrastructure in addition to cost recovery that includes the administrative information systems needed to manage quota catch accounting, permit issuance, transfers of both permanent quota share and annual quota amounts. As more LAP programs around the country come online in the next few years, NMFS wants to minimize unnecessary redundancy in LAP infrastructure and seek economies of scale. Currently the Alaska Region has made the most significant investment in the infrastructure needed to operate LAP programs and has the most experience, having spent millions of dollars on these systems since the mid-1990s. They have created efficient web-based landings reporting system in conjunction with the State of Alaska and have well-documented procedures and systems to monitor and manage the administrative side of their LAP programs. The Southeast Region's red snapper IFQ program that began in January 2007 was able to adopt many ideas and procedures already in use in Alaska. Thus, even with the diversity of regional LAP programs likely to be designed in the future, there will be many opportunities to share common infrastructure components.

Promoting common infrastructure capabilities to support LAP management will be desirable for several reasons. (Note this is not referring to the Council program design elements, as no single LAP program exists that will satisfy every FMP requirement. Rather, it is the administrative and management infrastructure components common to all LAPs that can benefit from open and flexible designs.) For example:

1. Since planning and development costs leading up to a LAP are not cost recoverable, lack of appropriations for independent infrastructure development could constrain adoption of LAP strategies. Thus, an agency-wide capability may be more cost effective and result in more LAP programs than otherwise possible. Rather than duplicating LAP operational system design and implementation FMP by FMP, designing flexible systems for re-use by multiple LAP programs would be less costly. Taking advantage of economies of scale will allow more LAPs to come on-line should they be selected as the preferred alternative by Councils. Moreover, several preliminary estimates for operational costs of potential LAP programs have exceeded the 3-percent cap, some by as much as 300 percent. Thus, efficient design and shared use of existing infrastructure by multiple LAPs would help close this gap.
2. An agency-wide infrastructure capability will help regions implement a new LAP more quickly by taking advantage of a robust, well-designed, secure system that can be deployed much faster than individual new, ground-up development. Framework LAP programs that have received OMB regulatory, data quality and information collection approvals and are part of programmatic LAP Environmental Impact Statements may be possible and their use may expedite the approval timeline.
3. The risk of significant problems in LAP implementation due to a failed system development effort or deployment of a flawed system will be greatly reduced. Training and system support functions can also be distributed reducing single point of failure vulnerabilities. Separate regional systems developed in isolation could result in redundant and incompatible systems that would be contrary to agency and administration policies on

program efficiency and effectiveness. For example, a LAP is defined as a permit in the MSA, and all permits must comport with NMFS policy establishing a common national permits system. A common LAP infrastructure also would help establish and meet a set of consistent objectives for permit customer service, security, and compliance with other applicable laws and regulations.

Were Councils to consider designing LAP systems in a coordinated manner at the outset, more effective use of limited funds to satisfy infrastructure needs would result in more Councils having LAPs as a viable management option. This would require extensive collaboration among management partners within a region such as the coordination of the design of LAP programs for different species or fisheries within a FMP or among one or more Councils' FMPs. Collaboration and planning by NMFS and the Councils across regions to design compatible infrastructure systems for different FMPs could similarly result in cost effective LAP programs that enhance attainment of multiple Council or ecosystem-based objectives for management.

Computation of Cost Recovery Fee

Given the language in the law, the determination of the fee is a straightforward calculation. With the 3-percent cap on the amount that can be collected, the determination of the percentage fee can be expressed as follows. Let DPC be the direct program costs measured using the process described above. Let P equal the average landings price over the season, and TAC equal the total allowable catch. The product of P times TAC is the value of the harvest. The percentage fee is then:

$$\% \text{Fee} = 100 * \text{DPC} / [\text{P} * \text{TAC}] \text{ or } 3\text{-percent whichever is lower}$$

In the Halibut/Sablefish program, the fee has always been less than the cap of 3-percent. However, preliminary calculations concerning other likely LAP candidate fisheries suggest that this will not always be the case. The Gulf of Mexico Red Snapper IFQ program, the Gulf of Mexico Reef Fish program, and the Central Gulf of Alaska Rockfish Pilot Program when fully implemented are expected to have management costs greater than the 3-percent that can be recovered.

As discussed in Section 2, Councils do have an option to use a portion of the funds collected in the mandated cost recovery program to create a loan program to assist certain entities purchase LAPs (this is not required but an option). In the Alaska Crab Rationalization Program (See 50 CFR 680.44), the Council had the unique authority for this fishery to propose an adjustment to the fee formula to at least partially compensate for funds directed to a Limited Access Privilege Purchase Program. Let L represent the percent of fees the Council can choose to allocate to the loan program, where according to the law, L can vary from 0 to 0.25. The adjusted formula would be:

$$\% \text{Fee} = 100 * \text{DPC} / \{ [\text{P} * \text{TAC}] * [1 - \text{L}] \} \text{ or } 3\text{-percent whichever is lower.}$$

In the normal case where L is equal to .25, this is equivalent to multiplying the basic equation by 1.33. Ignoring the 3-percent cap for the moment, this means that if 25 percent of everything that is collected is given to the loan fund, there will still be enough collected to cover the direct program costs. Of course the cap does remain, and so this will only work when the basic calculated fee is less than 3-percent.

The Councils may also want to evaluate the process chosen to collect the fees since it can have important implications for the business operations of the participants. Councils may wish to include certain specifications in the plan after considering the convenience and cash flow needs of participants and the existing procedures fishermen use for selling and getting paid for their fish. For example, if settlements are received monthly and not at the conclusion of each trip, it will likely be necessary to schedule fee payments accordingly (See for example the differences in cost recovery in the IFQs for red snapper and the halibut sablefish in Appendix 1).

The timing of fee collection is also important with respect to enforceability. Having a program where the fees are withheld by the fish buyer will likely be more convenient for the participant and may also result in a higher compliance rate.

This raises another issue with respect to the timing of fee collections. The fee can not be determined until the average price is set or at least approximated. It may be necessary to let the fishery go for several months without collecting fees to get an estimate of P , which could then be used for the rest of the year. At the end of the year it may be necessary to make adjustments. Whatever process is ultimately chosen must be sensitive to the business practices of the fisheries being managed, and they vary considerably around the country.

3. Monitoring and Data Collection

As introduced in the discussion of enforcement, the effective management of LAP programs requires development and implementation of a highly accurate, timely, and well-documented catch accounting system. These systems provide information that go beyond just enforcement needs. Although the system could theoretically be a manual reporting mechanism, it is almost certain that monitoring and collecting sufficient data for managing a LAP program will require an electronic reporting system. The MSA specifies in 303A(c)(1)(H) that a LAP program must include the use of observers or an electronic monitoring system.

(c) REQUIREMENTS FOR LIMITED ACCESS PRIVILEGES.—

(1) IN GENERAL.—Any limited access privilege program to harvest fish submitted by a Council or approved by the Secretary under this section shall—

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(H) include an effective system for enforcement, monitoring, and management of the program, including the use of observers or electronic monitoring systems;

Such a system should provide for landing reports that include, at a minimum the date and time of the landing, the name and official number of the vessel from which the landing is being made, the name(s) and license number(s) of the permit holder and the individual responsible for making the landing, the name(s) of the species and poundage (or numbers of fish) being landed, the name and identifying number of the processor or buyer, the ex-vessel value of the catch (if known at time of landing), and any other information deemed appropriate and necessary to manage the program such as the identification of bycatch and discards.

The data should electronically feed into a central data bank. The information in the data system should be immediately available to fishery managers and enforcement agents, as well as provide views to fish buyers and permit holders of their own data. Because of confidentiality protocols required by the MSA and other applicable law, it will be necessary to electronically “mask” certain information from certain users. For example, a skipper would not be authorized to view the delivery patterns pertaining to a given fish buyer/processor, and a processor or other member of the public would not be allowed to view a skipper’s dates and times of landing. Even with these access constraints, however, a permanent record of the landing will be entered and maintained and fully accessible to authorized users. The landing data will show the “balance” available to land on the LAP permit, and the permit holder will therefore have a permanent record of his/her landings. At the same time landing rates can be monitored and the system can be set to notify OLE if an overage is detected. Additionally, by maintaining precise in-season permit balance information, applications for transfers of permits can be more timely and accurate.

Designing a system to track landings on LAP permits should not be done in a vacuum. To the extent practicable, it should be an “umbrella” system that can accommodate landings information needed for a variety of purposes and by different jurisdictions. For example, in the Alaska Region an interagency team of programmers and managers from NOAA Fisheries (including management and law enforcement), the Alaska Department of Fish and Game, and the International Pacific Halibut Commission recently completed design of a comprehensive “e-Landing” system that is sufficiently flexible to meet the needs of all the participating agencies and which is adaptable to meet specific programmatic requirements. The system is being phased in; its first use will be in the Bering Sea Crab rationalization programs. During the 2006 season, the halibut/sablefish IFQ landings system was changed over to accommodate the requirements and improvements of the new system. The system is intended to supplant the decades-old paper “Fish Ticket” system maintained by the Alaska Department of Fish and Game.

Such a system could also be used to accept biological data provided by skippers (i.e., pilothouse “log book” information) and observers. Electronic recording of this type of information at the time of landing makes for more timely and accurate recordkeeping. Gathering complete information at the time of landing will greatly enhance future uses of the data – for analyzing possible programmatic adjustments, for reviewing and reporting on program performance, etc.

Accurate and up to date records of catch are necessary to ensure that current harvest does not surpass allowable harvest in any TAC system. It is especially true in a LAP program, and the job is more difficult because it is not only necessary to track total catch but catch against the individual permits. A rigorous, timely, and accurate electronic reporting mechanism is necessary to maximize the benefits of LAP programs. A good system will make enforcement of the program more robust and will greatly reduce the potential for data fouling. This will help to address public concern over the effectiveness of the management system.

Under the mandate for cost recovery premised on ex-vessel values of the harvests, it is critical that accurate records of these parameters be established and maintained. This is true, regardless of which sector (e.g., harvesting or processing) is obligated to submit pay the fees.

Another important element of catch accounting is “sideboard” management. Sideboards are limitations that can be placed on the activities of vessels in rationalized fisheries to prevent them from being used improperly in parallel fisheries, thus exacerbating overcapacity problems. Any sideboards imposed on vessels (or licenses) will be unique to each LAP program that is developed and may require special reporting requirements in non-targeted fisheries. Because a special “sideboard allocation” may be established in those other fisheries, electronic reporting may be appropriate to track that sub-allocation to a sub-set of vessels.

In summary, under a LAP program, it is necessary to monitor harvests at the individual level and not simply by the overall TAC. The simpler the program design, the less complex its implementation will be. This includes the design of the system to record harvests. For example, restrictive eligibility and transferability rules can make it more complex to issue and keep track of LAP ownership.

4. Permits

Permitting is at the heart of managing harvest privileges under a LAP system. The LAP permit:

1. Defines the nature of the privilege (what activity does it allow?);
2. Describes any limitation on the permitted activity (how much is allowed, by what methods and means?);
3. Delineates its duration (effective when, and for how long, may the privilege be exercised?);
4. Identifies the person or business entity that may exercise the privilege; and
5. Assigns a unique number or other identifier.

Once assembled and issued, the permit information is included in the agency database. Information in the database is accessible to managers and to enforcement. The non-confidential information components are also available to the general public and can be published on the agency’s web site.

Many LAP programs provide for the use of more than one type of permit. For example, the following permits are issued under the Bering Sea/Aleutian Island Crab Rationalization program:

1. Quota Share (QS) permit [a permit of indefinite duration that indicates, by fishery and area, the number of units of QS one holds; in the most basic sense, the number of units represents the percentage of the annual Total Allowable Catch (TAC) the QS permit holder may harvest];
2. Processing QS permit (similar to a harvesting QS permit, but issued to eligible processors to permit receiving crab from harvesters);
3. Individual Fishing Quota (IFQ) permit (the annual permit that displays the number of pounds the permit holder may harvest);
4. Individual Processing quota (IPQ) permit (the processor equivalent of the IFQ permit);
5. Registered Crab Receiver permit (a numbered permit, issued annually, to entities eligible to receive IFQ crab);
6. Crab Harvesting Cooperative permit;
7. Crab Vessel permit; and
8. Crab Hired Master permit.

In addition, the program calls for several certificates (e.g., certificate of eligibility to receive crab QA by transfer). The halibut/sablefish IFQ program also uses several different types of permits. The Bering Sea crab rationalization program is even more complex; it includes all of the types of permits outlined above, as well as processor Quota Share and annual Processing Quota amounts, vessel permits, and cooperative permits. Some permits (e.g., the QS permits) are transferable to certain eligible persons, while others are not. The point is that any LAP program requires permitting, and frequently more than one aspect of the program.

Permitting is essential to manage both the fishery and the LAP program. Permitting unambiguously establishes who is allowed to participate in the fishery, under what terms and limitations, for how long, etc. Good permitting is essential for good law enforcement. Enforcement and General Counsel personnel should be involved in designing the permitting program to ensure that the permits are sufficiently specific to clarify when violations have occurred. Additionally, enforcement personnel should have ready electronic access to permitting information at the Regional Offices, so that review of the data from the field would be possible.

Another consideration in a LAP program is accountability for individual quota accounts. Timely and accurate reporting of removals is essential to good management and such reporting can be made a permit requirement. For instance, reporting can be made an obligation of a business that holds a permit to receive LAP species from a permitted harvester. Withholding or failing to renew a permit can be used as a way to induce compliance with the reporting requirements.

5. Determination and Appeals

According to Section 303A(c)(I) of the MSA, when Councils prepare a LAP program, they must:

- (I) include an appeals process for administrative review of the Secretary's decisions regarding initial allocation of limited access privileges;

A process for making fair, honest, and accountable determinations on applications for harvest privileges and subsequent associated matters (e.g., transfer applications) must be developed and included in regulations implementing a LAP FMP. The system should contain provisions for accepting and reviewing applications, and it should establish standards against which applications will be adjudicated. Additionally, it should provide for preparation of full decisions while including time frames binding on both the applicants and the agency. Finally, it should provide a formal process for appealing administrative determinations to a separate office established for that purpose.

For purposes of initially allocating the harvest privilege (whether a license, quota, certification of catch history for cooperatives, etc.), it is necessary to create an "Official Record," derived from licensing and harvest files, as a starting point. The Official Record would contain all relevant current and historic data related to persons perceived to be eligible for the privilege. Depending on the allocation criteria, the record could be assembled to include annual vessel licensing and ownership information, vessel characteristics (LOA, displacement, predominant use, etc.), historic harvest information for identified qualifying years, by vessel or license number or however it may have been recorded, licensing information on all who appear to be eligible for initially issued harvest privilege, and any other information from an official source(s) that may be used to construct a profile of potentially eligible persons.

Once collected, the raw data should be assembled and organized in such a way that the agency can determine who is eligible for the harvest privilege. Once assembled, the Official Record is presumed to be correct. However, that presumption is refutable. Applicants must be given the opportunity to challenge the Official Record. However, those who challenge it have the burden of demonstrating that his/her contrary claims are accurate.

When a timely⁹ application is received, the information set out on the application is compared with the information in the Official Record. If the applicant has advanced a contrary claim, and has submitted sufficient evidence to support it, it can be accepted. On the other hand, if an applicant's claims are not sufficiently supported, s/he should be so notified and provided a period of time to provide additional information in support of the claims. If s/he does so, and the information is sufficient to amend the Official Record, then that should occur and the harvest privilege issued. Alternatively, if s/he does not provide sufficient information, then the claims should be formally denied.

The denial should be issued as an Initial Administrative Determination (IAD). This is a formal decision on an applicant's claims that identifies the applicant, the program, and the claim. The IAD contains a background section that summarizes the proceedings to date and then discusses the claim in light of information in the Official Record and the requirements of the regulations. The formal denial is then set out and the applicant is informed of her/his right to appeal.

The Alaska Region has established a separate "Office of Administrative Appeals" to handle all appeals of IADs. Other regions, with a smaller number of administrative determinations may not find that it is cost-effective to establish such an office and, instead, rely on appeals assistance from NOAA General Counsel. Either way, the appeals function should be separate from the regular decision-making chain of command and should be absolutely neutral with respect to considering claims from applicants.

The handling of appeals should be conducted regionally and the standards are relatively straight-forward. The appeals officer (hearing officer) should be given sufficient authority to seek documents, administer oaths, subpoena persons and documents (if permitted) and, generally, have all the powers of most administrative law judges. Upon completion of a full record on appeal, a decision should be written.

Subject to review by the Regional Administrator, advised by General Counsel, a decision should become the Final Agency Action on an applicant's claims 30 days after it is issued. At that point, the agency either approves or denies the claim. At this point an aggrieved applicant's only remedy is an appeal to a U.S. District Court.

The key to the whole process is fairness and objectivity. Every effort should be made to ensure that political intervention will not be rewarded or tolerated. It is improper and unethical for anyone other than the interested parties and their legal representatives to try to influence the outcome of any adjudication. For that reason, it is recommended that

⁹ Application deadlines can be useful for bringing the application period to a close, thus allowing implementation to move forward to the next stage; also, if there is a possibility that more than one applicant could apply for the harvest privilege premised on the same activity (e.g., vessel landings during a certain season), an application period serves to identify those conflicts and allows them to be resolved before issuing the benefit. Finally, application deadlines bring certainty and stability to the process, thus furthering the goal of seeking to implement a LAP program in the first place. On the other hand, denying and adjudicating "late" applications can be time consuming and counter-productive, especially if a small amount of quota (or other privilege) is at stake. Managers should decide on a case-by-case basis how to approach this issue.

tribunals of lay persons (e.g., Council committees) not be used to adjudicate claims or to hear appeals. The surest way to invite cries of favoritism and corruption is to allow the process to appear to be politicized.

Although this discussion has focused on the application process, the same general approach should be used whenever a person applies for a benefit accorded by a LAP program. For instance, if an application to transfer (sell or lease) quota is received, and if approving the application would violate the terms of the regulations that govern the program, the same system would be utilized to bring closure to the conflict.

LAP programs are controversial and frequently contentious. Additionally, they have the potential of conferring significant benefits on successful applicants. To be accepted by industry and the public, it is essential that the process by which the benefits are conferred, and contrary claims adjudicated, is honest, fair, clear, and incorruptible.

At the inception of a LAP program, it is necessary to determine who will, and who will not, benefit from the initial allocation of the harvest privilege. Some (“winners”) will have the harvest privilege issued to them, while others (“losers”) will not. This is true regardless of the method used to distribute the benefit.

There are distinct legal requirements (due process – notice and the right to be heard) that govern the ways in which government benefits are conferred and withdrawn. In one instance, the U.S. Court of Appeals (9th Circuit) ruled that an applicant for a harvest privilege in a LAP program (Alaska halibut and sablefish) had a “property right” in the privilege and that it could not be denied the applicant without full due process of the law. To ensure the legal sufficiency of the procedures implemented, General Counsel should be consulted.

In addition to legal obligations, effective program implementation requires that agency leadership, at both the HQ and Regional levels, stand between political pressure and staff who are implementing the program. If a phone call from a legislator or other external interest results in preferential treatment for one or more LAP applicants or participants, all is lost. The system will rightly be condemned as corrupt. If that happens, the contemptuous attitude of industry will be reflected in behavior on the grounds, to the detriment of regulatory compliance and the resource itself.

The bottom line is that it is necessary to concentrate on these aspects of a LAP program; they are both critical and very complicated. The somewhat elaborate system outlined above pertains directly (and specifically) to LAP programs. Although the basic elements of due process pertain to all government activities that affect citizens, only LAP programs depend on the alignment of certain facts to demonstrate eligibility for a benefit.

The more complex and challenging programs give rise to more (and more complex) determinations and, thus, appeals. The Alaska halibut/sablefish IFQ program is a program with many elements. At inception, an applicant was applying not only for quota, but for certain amounts of quota premised on vessel activities over a 7 year period. Additionally,

an applicant was seeking quota in a particular vessel-length, use category and in a particular area for each of the two species. With over 8,000 applications for quota, the potential number of combinations of factual administrative determinations to be made was staggering. The process did produce 11,600 IADs that gave rise to almost 170 appeals.

In contrast, the eligibility test for the Norton Sound red/blue king crab limited license program was whether, in either or both of a 2-year period an applicant had held a state of Alaska permit to participate, and whether the applicant did, in fact, participate (as demonstrated by a harvest record). There were no appeals of any IADs in that fishery.

Another source of adjudicative complexity is regulatory provisions that provide credit for “special” or “unavoidable” circumstances or hardships. For instance, if a harvesting requirement may be waived upon a showing that an “unavoidable” hardship kept an applicant’s vessel from participating, then the adjudication burden increases dramatically. Every such claim, even those apparently frivolous on their face, is inevitably complex and must be handled with considerable care. And because appropriate determinations depend almost always on the facts of a particular situation, formal hearings by trained appeals officers are frequently the only way to resolve them.

6. A Final Note on Program Complexity.

From the above discussion it can be seen that implementing and operating a LAP program can be quite complex. Further, administration costs will vary directly with program complexity. What is important is that in many cases, Councils can have a very significant effect on implementation and operation complexity by the nature of the program they design. LAP FMPs that address simple and one-dimensional problems with simple one-dimensional programs are less expensive and complex to implement. But most problems in fisheries are not simple and one-dimensional; rather, they are complex, involve several industry sectors, require thoughtful balancing of a variety of interests, and almost inevitably lead to more complex programs. While Councils should design programs to meet fishery management objectives, it is prudent to balance the relative expense of implementing a complex system against the benefits achieved, especially if there are other ways to achieve the same benefits.

Put another way, simplicity of design should not be a goal in and of itself; rather, in some rare cases, it can be viewed as a gift. Councils should focus on designing the programs they need to address the myriad complexities and pressures they face. Sacrificing program effectiveness for simplicity could be a mistake and could well lead to additional complexities in the future, as steps are taken to “retro-fit” program amendments. On the other hand adding more and more complexities to address every perceived nuance can impose costs that may not be commensurate with the real gains.

Appendix 1. Spotlights on Current Limited Access Privilege Programs

LAP Spotlight #1: Alaska Individual Fishing Quota Halibut and Sablefish Program

<http://www.fakr.noaa.gov/ram/ifqreports.htm>

Vital Stats

First year: 1995.
Type of LAP: IFQ and also a CDQ for halibut and sablefish.
Management units: Multiple area and vessel categories for sablefish and halibut.
Vessels / Gear types: Longline catcher and freezer/processor vessels. Also pots for sablefish.

Available Trend Data

Season length: Less than a week pre-IFQ to more than 8 months recently.
Ex-vessel value: 1994 ~ \$150M; 2005 ~ \$236M.
Consolidation: 1994-2005: 33% and 17% reduction in individual halibut and sablefish permit holders, respectively.
Stock status: 1998 and 2005 exploitable biomass estimates within 4%.
Currently - Overfishing: NO; Overfished: NO

Nature of Harvest Privilege

Eligibility: U.S. citizens (individuals and non-individuals) who were given initial quota share; for catcher vessel quota share, U.S. Citizens (individuals) who can document 150+ days experience harvesting fish in any U.S. fishery; and for freezer boat quota shares any entity defined as a U.S. citizen for purposes of the IFQ Program (in 50 CFR part 679). Eligible community quota entities also may purchase IFQ.
Duration: Open ended. Council can end the program through the normal Council process.
Transferability: Quota share is transferable subject to eligibility and accumulation limits designed to maintain the character of the fishery. Leasing is very restricted.
Accumulation: Unless grandfathered based on original landings history, no one can hold or control more than 0.5%-1.5% of the halibut or sablefish shares in various combinations of areas (Gulf of Alaska, Bering Sea, and Aleutians). There are similar restrictions on the amounts that can be used on any single vessel.
Initial Allocation: Quota issued to owners or leaseholders of vessels that had landings at any time in 1988-1990. Best five years of catches from 1985-1990 for sablefish and 1984-1990 for halibut were used to calculate quota shares.

Management

Identified Costs: In 2005, ~\$1.3 million for administration and ~\$2.4 million for enforcement with 75% paid for with cost recovery.
Cost recovery: Cost recovery fee was 1.6% of the ex-vessel value of the fishery in 2005, of which 25% of collected fees are reserved for loan programs (programs reimbursed with the other 75%). Other years: 1.3% (2004); 1.4% (2003); 2% (2002); 2% (2001); 1.8% (2000).
Monitoring: Each landing is reported electronically in real time by Registered Buyers (RBs). During 2002, NMFS conducted 295 dockside boardings (18% of vessels). The Coast Guard conducted 181 at-sea boardings, monitored 102

IFQ offloads, and spent more than 2,100 person-hours on after-hours surveillance. These activities resulted in the detection of 26 fisheries violations, mostly related to log books, permits not on board, and exceeding bycatch limits greater than 10 percent.

Special Insights:

- CDQ implemented to address affected western Alaskan communities.
- Anecdotal reports of lost jobs due to consolidation.
- Switch from need for crews for a brief season to need for near year-long crews.
- Processors affected by lack of need for brief, high volume processing and ability of boats to travel further given lack of time pressure in IFQ fishery.

LAP Spotlight #2: Western Alaska Community Development Quota (CDQ) Program

<http://www.fakr.noaa.gov/cdq/default.htm>

<http://www.fakr.noaa.gov/ram/ifqcdq.htm>

Vital Stats

First year: 1992.
Type of LAP: CDQs for Groundfish, Halibut, Crab, and Prohibited Species.
Management units: Six non-profit corporations (CDQ entities or CDQ groups) that represent 65 eligible communities.
Vessels / Gear types: All vessel types and sizes ranging from small catcher vessels to large catcher/processors and motherships, many gear types.

Available Trend Data

Season length: Varies by species.
Ex-vessel value: 2005 ~ \$65M
Consolidation: NA
Stock status: Varies by stock.

Nature of Harvest Privilege

Eligibility: The Western Alaska Community Development Quota (CDQ) Program allocates a percentage of all Bering Sea and Aleutian Islands quotas for groundfish, prohibited species, halibut, and crab to eligible communities. The purpose of the CDQ Program is to provide eligible western Alaska villages with the opportunity to participate and invest in fisheries in the Bering Sea and Aleutian Islands Management Area; to support economic development in western Alaska; to alleviate poverty and provide economic and social benefits for residents of western Alaska; and to achieve sustainable and diversified local economies in western Alaska.

Duration: Indefinite. CDQ allocations are required by section 305(i)(1) of the Magnuson-Stevens Act.

Transferability: CDQ allocations may be transferred among CDQ groups, but not outside the program.

Accumulation: NA

Initial Allocation: Allocations among the CDQ groups are established under section 305(i)(1)(C) of the Magnuson-Stevens Act with a limited opportunity for adjustments through the decennial review and allocation adjustment process.

Management

Identified Costs: 2007 estimated costs are \$0.664M.

Cost recovery: Cost recovery for crab CDQ is done through the crab rationalization program. The Magnuson-Stevens Act authorizes cost recovery for the other CDQ allocations, but regulations requiring cost recovery in these CDQ fisheries have not yet been implemented. Statute allows the CDQ groups to deduct from cost recovery fees any costs for observer or reporting requirements that are in addition to costs incurred by participants in non-CDQ fisheries.

Monitoring: Halibut CDQ is managed under the IFQ Program. Crab CDQ is managed by the State of Alaska. Each CDQ landing is reported electronically, in real time,

Reports of catch of groundfish and prohibited species are received daily through electronic reports from observers and weekly from the CDQ group managers.

Special Insights:

Amendments to the Magnuson-Stevens Act in the Coast Guard Act (2006) and the Magnuson-Act Reauthorization (2007) significantly revised CDQ Program requirements. These amendments addressed all aspects of management and oversight of the CDQ Program, including the purpose of the program allocations to the program, allocations among the CDQ groups, management of the CDQ fisheries, eligible communities, eligibility criteria for participation in the program, limits on allowable investments, the creation of a CDQ administrative panel made up of representatives from the CDQ groups, compliance with State of Alaska reporting requirements, a decennial review and allocation adjustment process, and removal of NMFS authority to require approval of community development plans and prior approval of investments and expenditures.

LAP Spotlight #3: Bering Sea & Aleutian Islands (BSAI) Pollock Cooperatives

http://www.fakr.noaa.gov/sustainablefisheries/afa/afa_sf.htm

Vital Stats

First year: 1998.
Type of LAP: Cooperatives.
Management units: Bering Sea & Aleutian Islands pollock.
Vessels / Gear types: Vessel types: Catcher/Processor (CP), Catcher (CV), Motherships
Gear types: Pelagic Trawl

Available Trend Data

Season length: A-season (January 20-June 10) and B-season (June 10-November 1)
Fishery stops in each season when the quotas have been reached.
Ex-vessel value: \$392.7 million (2005)
Consolidation: In 1998 there were 100 cvs and 38 cps. In 2005 these numbers were reduced to 90 cvs and 38 cps.
Stock status: Currently - Overfishing: NO; Overfished: NO

Nature of Harvest Privilege

Eligibility: Must be able to document qualified vessel under MARAD regulations.
Duration: The program is indefinite. The Council has limited authority to make changes, but measures specified by the statute are not subject to Council change.
Transferability: Long-term privileges transfer with vessel; annual allocations transferable within the sector (inshore, offshore, mothership) subject to limitations.
Accumulation: The Council adopted a 30 percent excessive processing share limit for BSAI pollock that would be applied using the same 10 percent entity rules set out in the AFA to define AFA entities for the purpose of the 17.5 percent excessive harvesting share limit contained in the AFA.
Initial Allocation: Allocation among sectors: 50% inshore, 40% offshore (catcher processors, and 10% motherships. Vessels and processors qualified by meeting activity thresholds in 1996, 1997, or 1998 except for some vessels named in statute.

Management

Operation: Cooperatives include shoreside processors and motherships. Catcher vessel cooperative eligibility based on previous year's landings with processor. Shoreside cooperatives required to deliver to member processor. Vessels choosing not to join a cooperative could operate in the limited access fishery.
Identified Costs: 2007 estimated costs are \$0.216M w/o cost recovery.
Cost recovery: None.
Monitoring: A catch accounting system including real-time electronic reporting and observer reporting components is used to monitor allocations.

**LAP Spotlight #4: Bering Sea & Aleutian Islands (BSAI)
Crab (King & Tanner) Rationalization Program**
<http://www.fakr.noaa.gov/sustainablefisheries/crab/crfaq.htm>

Vital Stats

First year: 2005.
Type of LAP: Quota Share (QS) & IFQ; Harvester Cooperatives; Processor Quota Share (PQS) & IPQ; CDQ
Management units: BSAI King & Tanner Crabs
Vessels / Gear types: Catcher vessels and catcher processors.

Available Trend Data

Season length: Bristol Bay Red King Crab (BBR) Days: 2004: 3; 2005-6: 44
Bering Sea Snow Crab (*C. opilio*) (BSS) Days: 2005: 5; 2005-6: 179
Ex-vessel value: \$125M (2004)
Consolidation: Between year before Program and first fishing year, vessel registration declined by two-thirds for the BBR fishery and by one-half for the BSS fishery, (about 15% of the decline for the BBR fishery from vessel buybacks).
BBR: 2004 – 251 vessels participated; 2005 – 89 vessels participated.
BSS: 2005 - 167 vessels participated; 2005-2006 – 78 vessels participated.
Stock status: Eight stocks under Program; Overfishing: NO; Overfished: 1 stock: Pribilof Islands blue king crab

Nature of Harvest and Processor Privileges

Initial Eligibility: QS: Qualifying License Limitation Program license holders and qualifying crew members; QS issued to U.S. citizens/companies only.
PQS: Any entity that met the qualifying criteria for participation.
Duration: Open ended. Council can amend the program through the Council process.
Transferability: QS, IFQ, PQS and IPQ transfers allowed with a variety of restrictions depending on type to shares to be transferred.
Accumulation: Variety of caps on QS, IFQ PQS, and IPQ.
Initial Allocation: QS: Historical landings. PQS: Historic processing activity.
Special Features: Harvest IFQ allocations are split with 90 percent Class A IFQ and 10 percent Class B IFQ; Class A IFQ must be delivered to a processor holding IPQ; Class B IFQ deliverable to any processor. Arbitration for resolving price disputes concerning Class A IFQ deliveries. Class A IFQ also subject to regional landing requirements to maintain processing activity in remote communities. Three percent of the QS allocated to crew members.

Management

Identified Costs: 2007 estimated management costs are \$1.071M. Enforcement costs for 2005/06 fishing year were \$398k by NOAA and \$500k by the State of AK.
Cost recovery: For crab only - NMFS can collect fees for up to 133% of the actual management, data collecting, and enforcement costs, so that after the 25% for loan programs is deducted, 100% would remain for reimbursement of program costs. However, the total fees collected are

constrained by the MSA limit that fees cannot exceed three percent of the ex-vessel value of crab harvested under the Program (MSA § 304(d)(2)(B)). For 2006-2007, actual costs were over 4 percent of the ex-vessel value of the Program fisheries, so fees were capped at 3 %.

Monitoring:

Very detailed monitoring required. VMS required on vessels. Only a Registered Crab Receiver (RCR) is able to take deliveries. An RCR has to ensure that all crab are weighed on a scale that meets NMFS specifications and that all shoreline offloading of crab is conducted in accordance with a Catch Monitoring Plan that the RCR has prepared and had approved by NMFS. RCRs submit real-time electronic landing reports through the new e-Landings system. NMFS collects effort, operating revenue, and cost data for all parties to determine the economic effects of the Program. Vessels must comply with State of Alaska observer requirements.

LAP Spotlight #5: Pacific Whiting Conservation Cooperative
<http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Whiting-Management/index.cfm>
pacificwhiting.org

Vital Stats

First year: 1997
 Type of LAP: A cooperative, but not technically a LAP program as defined by the M-S Act.
 Management units: In pacific whiting management, there are 3 non-tribal sectors: catcher/processor (CP) sector, mothership sector, and shoreside sector. Each sector receives a portion of the non-tribal commercial optimum yield (OY). The CP sector receives 34% of the annual OY. In 1997, the four companies participating in the sector formed a cooperative.
 Vessels / Gear types: The CP sector is comprised of large (250 -400 feet) vessels.

Available Trend Data

Season length: In 1996, the CP sector fished for approximately 20 days. In 2002, the sector fished for 165 days.
 Ex-vessel value: \$10 M annual additional revenue (\$2-4 M profits) for member companies derived as a direct benefit of the cooperative. This is related to the percent of edible product from total harvest increasing significantly after the first year of cooperative fishing (pers. comm. Gil Sylvia, 2006). CPs are not required to complete a landing receipt, which are, thus, not available to calculate a traditional ex-vessel value.
 Consolidation: Since 1997, only 6-7 of the 10 eligible CPs participated in the fishery per year. This occurs because companies with multiple qualified CPs choose to operate fewer vessels because of the efficiencies gained via the cooperative.
 Stock status: Currently - Overfishing: NO; Overfished: NO

Nature of Harvest Privilege

Eligibility: Based on mutual consent of the cooperative members, eligible participants hold a limited entry permit with the appropriate vessel length endorsement and agree to abide by the cooperative's membership agreement. Currently there are 4 firms with 10 eligible catcher-processor vessels.
 Duration: Open ended. The Council can change the sector allocations, which could cause dissolution of the cooperative. Changing the non-tribal whiting allocation would require a FMP amendment.
 Transferability: Transferable within cooperative. Leasing occurs.
 Accumulation: The Justice Department specifically approved this cooperative and a certain amount of accumulation could raise anti-trust issues.
 Initial Allocation: NMFS/Council determined allocation to sector, firms negotiated relative shares.

Management

Identified Costs: Management costs for the sector may have declined because industry has taken responsibility for funding real-time reporting.
 Cost recovery: PWCC members voluntarily assess themselves a tonnage fee that is used to fund co-op administrative costs, scientific research (stock assessment and bycatch avoidance) and public education.

Monitoring:

Full time observer coverage. There is a scientific data collection program and in addition 100% of all harvests are monitored independently by NMFS-certified observers. Total catch and detailed species composition are reported on a daily basis to the observer program and to a private reporting service. Individual vessel reports are shared to inform bycatch avoidance measures and improve fishing efficiency.

LAP Spotlight #6: Pacific Sablefish Permit Stacking Program

Vital Stats

First year:	2001
Type of LAP:	Permit Stacking. Fixed gear limited entry permits convey the privilege of harvesting all groundfish species. Certain permits also carry a sablefish endorsement. Limited entry permit holders with sablefish endorsements are eligible to participate in the primary sablefish fishery. Each sablefish-endorsed limited entry permit is assigned to one of three tiers, which determine the amount of sablefish that may be harvested with each permit in a particular year's primary sablefish fishery. Under the permit stacking program, a vessel owner may register up to three limited entry fixed gear, sablefish-endorsed permits for use with their vessel to harvest each of the primary season sablefish cumulative limit tier assignments associated with the stacked permits. There are three levels of tier assignments which vary annually based on the OY. For example, for 2007, the Tier 1 endorsement is 48,500 lbs, Tier II is 22,000 lbs, and Tier III is 12,500 lbs.
Management Units:	The Pacific Coast Groundfish Fishery Management Plan's limited entry fixed gear, primary sablefish fishery off Washington, Oregon, and California.
Vessels /Gear Types	Fixed Gear (Longline and/or Pot)

Available Trend Data

Season Length	Was 9-10 days before stacking program, Apr.1-Oct 31 currently.
Ex-vessel Value:	2000 (CA,OR,WA): ~\$21M; 2004 (CA,OR,WA):~17M.
Consolidation:	There continues to be 164 sablefish endorsed permits. Prior to 2001, most vessels fished one sablefish endorsed permit during the primary season. Since the implementation of the stacking program, 60 to 80 vessels participate in the fishery, typically stacking two or three sablefish-endorsed permits during primary season.
Stock Status	Currently – Overfishing: NO; Overfished: NO

Nature of Harvest Privilege

Eligibility:	Prohibition on ownership of permits by partnerships or corporations (unless grandfathered); an owner-on-board requirement; and a prohibition on at-sea processing of sablefish.
Duration:	Open ended. Council can end the program through the normal process.
Transferability:	A sablefish-endorsed permit and the remaining harvest level of the sablefish associated with the tier may be transferred to another eligible individual or entity and/or registered to another vessel. Permits may not be registered to another vessel more than once per calendar year. Neither the sablefish endorsement nor the associated cumulative limit may be transferred separately from the permit.
Accumulation:	No vessel may stack (register) more than three sablefish-endorsed permits during the sablefish primary season. No individual or entity may own or hold (lease or otherwise obtain) more than three permits

unless that individual or entity owned more than three permits as of 11/1/00.

Initial allocation: Based on historical harvest associated with the limited entry permit.

Management

Identified Costs: 2007 estimated costs are \$0.160M without cost recovery. Region has not itemized costs for this fishery but will be for future implementation of a cost recovery program.

Cost Recovery: Currently being developed.

Monitoring: This program is monitored as part of the West Coast Groundfish Observer Program administered by NMFS, Northwest Fisheries Science Center, and by the three state fish ticket and port sampling programs.

LAP Spotlight #7: Gulf of Mexico Red Snapper
<http://sero.nmfs.noaa.gov/pubann/pa06/pdfs/FB06-038.pdf>,
<http://sero.nmfs.noaa.gov/sf/RedSnapper/RedSnapperDocs.htm>

Vital Stats

First year: 2007.
Type of LAP: IFQ.
Management units: Gulf Red Snapper.
Vessels / Gear types: Bottom longlines, handlines, and bottom trawls

Available Trend Data

Season length: Fishing year will be from January 1 through December 31.
Ex-vessel value: \$10M (2004).
Consolidation: This will be dependent on the ownership cap established in the Final Rule (2% cap = 50 possible owners; 5% cap = 20 possible owners; 10% = 10 possible owners; 7% cap = 12 possible owners). (Class 1 only).
Stock status: Overfishing: YES; Overfished: YES

Nature of Harvest Privilege

Eligibility: Initial eligibility would be restricted to persons who own a Class 1 or Class 2 red snapper license. Permanent resident aliens who currently own a Class 1 or Class 2 license would be included in the initial allocation subject to any other qualifications included in this IFQ program.

Duration: There is no limit to the duration of the IFQ program. However, a program evaluation will occur every 5 years. Council can take action to end the program through the normal Council process.

Transferability: IFQ shares/allocations can be transferred only to individuals/vessels with a valid commercial reef fish permit during the first 5 years of the IFQ program, and U.S. citizens and permanent resident aliens thereafter. Eligible individuals must be U.S. citizens or permanent resident aliens.

Accumulation: For any single fishing year, no person shall own IFQ shares that represent a percentage of the total, which exceeds the maximum percentage, issued to a recipient at the time of the initial apportionment of IFQ shares.

Initial Allocation: Initial IFQ shares would be allocated proportionately among eligible participants based on the average annual landings associated with their current red snapper license(s). These data are available for the years 1990-2004 for some Class 1 license holders, 1998-2004 for Class 1 historical captains, and 1998-2004 for Class 2 license holders (see Action 5 in Amendment 26 for details).

Management

Identified Costs: 2007 estimated costs are \$0.856M w/o cost recovery, and \$0.014M with cost recovery.

Cost recovery: The fees are calculated at the time of sale to the registered IFQ dealer/processor. The IFQ dealer/processor is responsible for submitting such fees to NMFS. The collected fees are submitted quarterly. The cost recovery fee (3-percent) is based on the actual ex-vessel value of the red snapper landings.

Monitoring: New electronic reporting and monitoring system.

LAP Spotlight #8: Wreckfish

<http://www.safmc.net/Portals/6/Library/FMP/SnapGroup/SnapGroupAmend5.pdf>

Vital Stats

First year: 1992.
Type of LAP: ITQ
Management units: Wreckfish (Atlantic offshore fishery)
Vessels / Gear types: 44-76 foot vessels with hydraulic reels fishing multiple circle hooks.

Available Trend Data

Season length: NA
Ex-vessel value: NA
Consolidation: Boats left this fishery because of lower grouper prices. Wreckfish was a substitute product for grouper. In addition there were frequent closures for spawning and because of quota limitation which disrupted market channels and lowered the price. 2003 had 2 boats with landings.
Stock status: Currently - Overfishing: NO; Overfished: NO

Nature of Harvest Privilege

Eligibility: 5000+ pounds total dressed catch 1987 through 1990 and documented landings 1989-1990.
Duration: Open ended. Council can end the program through the normal Council process.
Transferability: Quota shares are transferable. Yearly allocations are transferable to other share holders.
Accumulation: 10% initial cap, no cap thereafter.
Initial Allocation: Half of shares divided equally among eligible participants, half divided according to 1987-1990 catches.

Management

Identified Costs: 2007 estimated costs are \$0.016M w/o cost recovery.
Cost recovery: None.
Monitoring: Dual entry system with coupons issued by NOAA Fisheries. Boats must have coupons for catch on board, fish houses must have dated coupons for fish in house.

LAP Spotlight #9: Surf Clam and Ocean Quahog ITQ
<http://www.mafmc.org/mid-atlantic/fmp/history/scoq.htm>
<http://www.nero.noaa.gov/sfd/clams/>

Vital Stats

First year: 1990.
Type of LAP: ITQ.
Management units: Surf Clams, Ocean Quahogs, and Maine Ocean Quahogs.
Vessels / Gear types: Mostly larger vessels with hydraulic clam dredges - landings in standard cages with cage tags. Maine fishery is smaller-scale.

Available Trend Data

Season length: Six hours every other week pre-IFQ, to full year currently.
Ex-vessel value: 1990: ~\$44M; 2004: \$59.2M.
Consolidation: From 1988 to 1994 the number of firms in the fishery declined 50% in the surf clam fishery and 29% in the ocean quahog fishery. From 1990 to 1997, numbers of active vessels declined by 74% in the surf clam fishery and 40% in the ocean quahog fishery.
Stock status: Overfishing: NO; Overfished: NO

Nature of Harvest Privilege

Eligibility: No foreign ownership but otherwise anyone can buy and fish quota.
Duration: Open ended. Council can end the program through the normal Council process.
Transferability: Fully tradable and there has been an active market.
Accumulation: None.
Initial Allocation: Initial ITQ shares of the fishery quota were issued to vessel owners based on a formula of historical catches (80%) and vessel size (20%).

Management

Identified Costs: \$274,000.
Cost recovery: None.
Monitoring: Cage-tagging requirement and mandatory reporting to NMFS by vessel owners and dealers of clams landed and purchased. Allocation permit numbers must be reported on both vessel logbook reports and dealer-processor reports. Dealers and processors must have annual permits. Enforcement relies heavily on shoreside surveillance, the cage tag system, and cross-checking logbooks between vessels and processors. At-sea and air surveillance is conducted to reduce the possibility that vessels with state permits or cage tags may stray into federal waters.

LAP Spotlight #10: Georges Bank Cod Hook Sector
<http://www.nero.noaa.gov/nero/regs/frdoc/06mulhook.pdf>
<http://www.ccchfa.org/pages/4/25/>

Vital Stats

First year: 2004.
Type of LAP: Sector Allocation.
Management units: The Georges Bank Hook Sector, fishing in the Georges Bank Cod Hook Sector Area, an area that represents only a portion of the overall Georges Bank Regulated Mesh Area. Sector has been allocated 10-13% of the total Georges Bank cod Target TAC. Most vessels participate in other fisheries.
Vessels / Gear types: In 2004, 58 vessels between 23 and 42 feet. Vessels use benthic longline (tub trawl), jigging, or handlining (non-automated).

Available Trend Data

Season length: 8.33% of the Sector's cod quota is allocated to each month of the fishing year. Quota that is not landed during a month is rolled over into the next month. Once the aggregate monthly quota is reached, no participating vessel will be authorized to use fishing gear capable of catching species managed under the Plan.
Ex-vessel value: \$110M (entire groundfish fishery, 2003 data); Sector allocation is ~ 11.5% of the Georges Bank cod TAC but only 35% of Sector TAC caught in 2004/2005
Consolidation: When/if cod recover and the hook sector can catch its TAC, it will have to deal with the issue of its overcapitalization. With the 2004/2005 TAC there are only about 1200 pounds of cod quota per boat per month
Stock status: Overfishing: YES; Overfished: YES. However, in FY 2004/05 the Hook Sector was allocated 371 metric tons and only landed approximately 130 metric tons (286,190.0 pounds) of Georges Bank cod.

Nature of Harvest Privilege

Eligibility: To qualify for membership in the Sector, each member must possess a limited access permit with Days at Sea (DAS) and must qualify with landings of Georges Bank cod. Members sign a legally binding contract that commits their vessel and permit to the Sector Agreement for the fishing year.
Duration: Open ended. Annual Operations Plan must be approved by NMFS after consultation with Council. Council can take action to end the program through the normal Council process. NMFS can withdraw approval of a Sector after consultation with the Council.
Transferability: Participating vessels and/or permits may transfer or lease DAS to other Participating vessels and/or permits, provided that the Manager has given its prior written consent to such transfer or lease.
Accumulation: A vessel may not lease in more DAS than its 2001 DAS allocation. Permanent consolidation of DAS can occur through the DAS Transfer Program.
Initial Allocation: Sector allocation set annually.

Management

Identified Costs: NMFS has estimated annual implementation and monitoring to be \$13,000.
Cost recovery: The Hook Sector assesses per pound fees to pay for administration costs.
Monitoring: Members must call or email sector manager prior to sailing. Required to turn in dealer and Vessel Trip Reports within 48 hours. About 40% has VMS.

Appendix 2. Excessive Share Details.

Economic Foundation for the Basic Principle

While the actual determination of an excessive share rate involves more than economics, a conceptualization of the economic issues can serve as a useful framework for policy formulation when applying the basic principle and for a discussion of the types and details of analysis that would ideally be necessary. The essence of the framework can be summarized in the hypothetical example presented in Figure A2.1. The choice of the share limit, s , is important because it can affect the net value of goods and services produced in the economy. Depending on the market conditions of the particular situation, the choice of s will allow for, or cause, economic inefficiencies. The dollar amount of efficiency losses will vary with the level of s as shown in Figure A2.1.

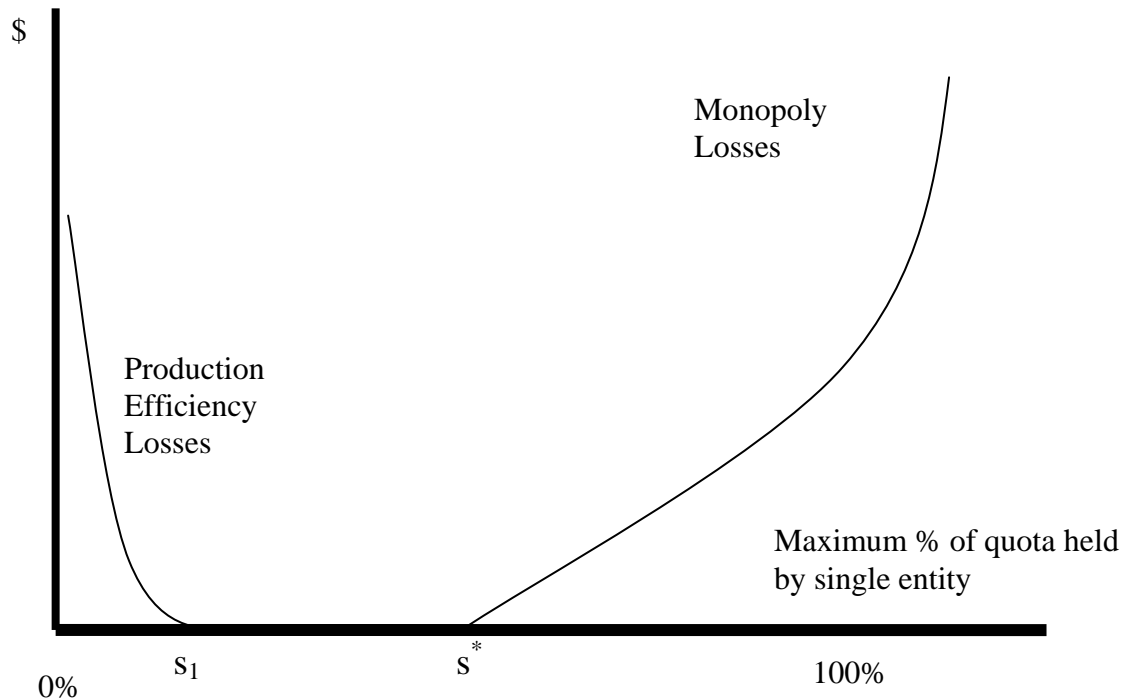


Figure A2.1 Excessive shares framework

At higher levels of s , there is the potential for efficiency losses due to monopoly pricing. Whether such losses will occur will depend upon the given set of market conditions and the TAC level. In some cases there will be no potential for monopoly losses even if s equals 1. If such losses will exist when s equals 1, (as is the case in the hypothetical situation depicted in the figure) then they will monotonically decrease as s is decreased. For purposes of this discussion, s^* has been defined as the highest share rate which will

prevent any monopoly losses. In terms of Figure A2.1, s^* is the market power excessive share limit. While it would be very difficult to estimate how monopoly losses will vary with s , when there is adequate economic information, it is relatively easy to obtain an estimate of s^* , the share rate when the monopoly losses fall to zero, which is all that is necessary for policy purposes.

On the other hand, at lower levels of s , there will be the potential for a different type of efficiency loss. If the output level of firms is constrained by the choice of the s rate, the cost of producing the TAC may be higher than necessary and, further, incentives to develop more efficient vessels and higher quality products may be blunted. The size of these losses will depend upon the number and types of vessels in the fleet and the potential technological and market innovations. In the hypothetical case here, s_1 is the share level when production constraints will start to affect at least one vessel. As s is reduced below s_1 , more vessels will be affected and the constraints will cause higher costs and so the sum of efficiency losses will increase.¹⁰

While the concept of output constraints imposing inefficiencies is straightforward, it will be a very difficult task to measure them in actual LAP programs. This would be true even if fleet size and technology remained constant. However, as permanent quota shares and annual harvest privileges (AHP) are traded, and especially if the LAP program replaces a TAC or other regime which affect vessel operation, there will be incentives for fleet size and technology to change. It would be difficult to measure the efficiency losses for the existing fleet, but it will be that much more difficult to predict how the fleet will change and then estimate how the s rate will affect efficiency. However, for policy purposes, it is the production inefficiencies that may occur with the hard to predict changes that will be important.

Ignoring the measurement difficulties for the moment, assume that the curves in Figure A2.1 show how inefficiency losses will vary with s . As far as economic efficiency is concerned the s rate should be no higher than s^* . That will correct for any possible monopoly losses. At the same time any rate between s_1 and s^* , will have exactly the same effect. All of them will correct for potential monopoly losses and yet none of them will cause any production efficiency losses.

Therefore if a Council desires to achieve a management objective by reducing the share rate, there will be no economic concern as long as the chosen rate is higher than s_1 . However, if a lower share rate is chosen, there will be efficiency losses. Conceptually if the share rate is to be less than s_1 , the gains from achieving the management objective, although they will be measured in a different metric, should be greater than the efficiency losses.

¹⁰ It is assumed, as will likely be the case, that the two curves do not cross. If they did, which would be the case if s^* is so small that curing for monopoly would lead to other economic inefficiencies, then the critical cost point would be at the s where the sum of the two curves is a minimum.

Details on Market Power Analysis

The fundamental policy question is: What is the maximum percentage of the TAC that can be given to a single entity before there will be incentives to withhold production. Using basic microeconomic principles, it is possible to derive a formula for determining what that percentage should be for any given market situation. The calculated value of s^* will prevent undue market power in both the market for fish and the market for shares.

If we let the market demand and supply curves of fish be represented as:

$$\begin{array}{ll} P_D = P_D(Q) & \text{Demand} \\ P_S = P_S(Q) & \text{Supply} \end{array}$$

where Q is the level of market output, the required formula is:

$$s^* = -[1 - \{P_S(\text{TAC})/P_D(\text{TAC})\}]/[1/e_D - \{P_S(\text{TAC})/P_D(\text{TAC})\}/e_S] \quad (1)$$

The terms e_D and e_S , represent the elasticity of demand and supply, respectively. They and P_D and P_S must be evaluated where Q equals the TAC in the LAP fishery.¹¹

Since e_D is negative, s^* will be positive. As the difference between the demand and the supply price increases, s^* will increase. Likewise as e_D and e_S get larger, s^* will increase. The calculated value can be greater than 1, which means that given the parameters values, the marginal revenue (MR) and marginal cost (MC) curves for 100 percent of the AHP intersect at an output lower than the TAC.

Looking at the two extreme cases can make interpretation somewhat simpler. If the demand curve is horizontal so e_D is equal to infinity, the equation reduces to:

$$s^* = -[P_D/P_S(\text{TAC}) - 1]e_S \quad (2)$$

If the supply curve is horizontal so the P_S equals the constant MC of production, the elasticity of supply is infinite and the s^* equation becomes:

$$s^* = -[1 - \text{MC}/P_D(\text{TAC})]e_D \quad (3)$$

In the above expression, s^* is proportional to the elasticity of demand and the ratio of proportionality will always be less than one. The higher the elasticity of demand and the lower MC is relative to price, the higher will be the value of s^* and the less concern there will be for possible monopoly actions.

¹¹ The values for P_D and P_S will be different because the price of AHP drives a wedge between the demand and the supply curve where Q equals the TAC.

Practical Applications

While the general formulation of the s^* equation is rather complex, its value can be calculated using three parameters: the elasticities of demand and supply and the ratio of P_S to P_D , all evaluated at the TAC level of output. Nonetheless, it may be difficult to obtain estimates of these parameters for practical policy analysis. The problem is made even more difficult because while the decision of an excessive share value will likely be made before a LAP program is implemented, the introduction of the program will likely change demand and supply conditions through changes in product quality and harvesting and processing technology.

To be more explicit, the market parameters used to calculate s^* must be the ones that will apply in the working LAP fishery which, for reasons discussed below, will often, after a transition period, be different than the ones that apply in the *status quo* market. Since staff will only have (incomplete) *status quo* data, the calculated value of s^* must be interpreted with care. A related point is that the analysis of the possible inefficiency costs that will be imposed by setting a MO limit less than the MP limit to obtain a management objective, should also consider the cost structure that could potentially occur under the unfettered operation of the LAP program.

But perhaps the potential inability to obtain accurate estimates of the necessary parameters may not always pose a problem. Consider Table A2.2 which shows the value of s^* for a range of P_S/P_D and elasticities of supply when the elasticity of demand is equal to -2. Except for the top left hand corner of the table, the values are quite large even for this moderate value for the elasticity of demand. As the fixed value for the elasticity of demand is increased, this becomes more pronounced. See Table A2.3 where the elasticity of demand is set at -10. In the lower right hand part of the tables, the s^* values are listed as being equal to 1, because the calculated value is greater than 1. This means that no share limit is required to prevent output reduction.

And while the elasticity of demand for a particular fishery is an empirical question, it is safe to assume that it will generally be elastic. There are many substitutes for most fish products, including other types of fish and sources of protein from other animals. Further, it should be remembered that the demand curve under consideration is the one facing the producers in the particular fishery under LAP management. That is, there may be a LAP program for “green fish” in one region but there may be other sources of the exact same fish from other regions. One could assume that the demand curve facing the producers in the LAP fishery would be quite elastic, perhaps even perfectly elastic.

Note that while the left hand column is the ratio of supply price (MC) to demand price, for practical purposes the demand price at the TAC level of output will likely be known. The important issue is the MC. Note that that the excessive share limit increases with MC. The reasoning is as follows. The benefits from withholding production are the higher

prices for the remaining output and the cost savings from the reduction in output. Therefore, all else equal, firms with higher costs will have higher benefits from restricting output and will require tighter excessive share limits.

Ps/Pd	$e_D = -2$										
0.9	0.06	0.07	0.07	0.09	0.11	0.12	0.13	0.13	0.14	0.14	0.15
0.8	0.13	0.14	0.15	0.19	0.22	0.24	0.26	0.27	0.29	0.30	0.30
0.7	0.21	0.23	0.25	0.31	0.35	0.38	0.41	0.43	0.44	0.46	0.47
0.6	0.31	0.34	0.36	0.44	0.50	0.54	0.57	0.60	0.62	0.63	0.65
0.5	0.43	0.47	0.50	0.60	0.67	0.71	0.75	0.78	0.80	0.82	0.83
0.4	0.58	0.64	0.67	0.78	0.86	0.91	0.95	0.98	1.00	1.00	1.00
0.3	0.78	0.84	0.88	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
e_s	0.75	0.90	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00

Table A2.1. Comparative Values of s^* When the Elasticity of Demand is -2 .

Again, while the ratio of MC to price in any LAP fishery is an empirical question, there are reasons to believe it will be not be excessively high and perhaps that it might be quite low. To make a long story short, it depends upon the vertical difference between the post LAP demand curve and the long-run efficient supply curve at the TAC level of output. The larger that difference, the lower the MC/P ratio.

Ps/Pd	$e_D = -10$										
0.9	0.08	0.09	0.10	0.14	0.18	0.22	0.25	0.28	0.31	0.33	0.36
0.8	0.17	0.20	0.22	0.32	0.40	0.48	0.55	0.61	0.67	0.72	0.77
0.7	0.29	0.34	0.38	0.53	0.67	0.79	0.90	1.00	1.00	1.00	1.00
0.6	0.44	0.52	0.57	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.5	0.65	0.76	0.83	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.4	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
e_s	0.75	0.90	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00

Table A2.2. Comparative Values of s^* When the Elasticity of Demand is -10 .

From a casual perusal of the two tables and the understanding that the elasticity of demand will *tend* to be high and the MC/P ratio will *tend* to be low, it does not appear that monopoly restrictions of output will be very likely in LAP fisheries. It is an indication that the concern over monopolistic excessive share is ill founded. Put another way, the excessive share limits that have been set in real world fisheries (20 percent in New

Zealand and less than one percent in the Alaska Halibut fishery) will likely prevent any monopoly problems whatever the reason for their implementation.

The above analysis suggests that in the absence of the required parameters, a useful approach to determining a s^* for a real world fishery would be to come up with the best estimate of the elasticity of demand and use it to construct a table similar to those in the text. Unless there is reason to believe that the parameters that apply to this fishery are in the range where the s^* value is less than 1, there is no need to set a monopoly excessive share limit. In the opposite case, try to come up with the best rough estimate of the other two parameters and set the s^* accordingly using a conservative approach.

Finally, it should be stressed that even if all of the values in the table equal 1, it does not follow that no excessive share limits are necessary. The analysis here has focused solely on monopoly power excessive share limits. Share limits which address fishery management objective or equity concerns have not been considered.

As a final note, it was stated above that to properly calculate the value of s^* for a particular fishery, it would be necessary to use market parameters that would exist in the fully operational LAP fishery. However, since the incentives in the LAP market will tend to reduce costs and increase price (i.e., reduce the MC/P ratio), all else equal using the *status quo* estimates of MC and P will result in a MP limit that is more restrictive than necessary, which will provide something of a safety margin.

Appendix 3. Types and Uses of Auctions

1. Single-round sealed-bid auction

In a sealed-bid auction participants simultaneously submit bids for desired quantities of fishing privileges along with the per-unit prices they are willing to pay. This auction uses only one round of bidding to allocate all the auctioned privileges. Participants each submit one or multiple bids that reflect their value of holding specific quantities of fishing privileges. For example, a bidder might be willing to pay \$100 per unit for the first 100 units, but only \$75 per unit for the next 100 units, and could submit a two-part bid to reflect these preferences. The auction authority collects the bids and orders them from highest to lowest price to form an aggregate demand schedule. The point at which the aggregate demand schedule equals the available supply of fishing privileges determines the clearing price. All bids above the clearing price are accepted. Any remaining privileges are then rationed among bids equal to the clearing price, for example by dividing them in proportion to the bid quantities or by lottery. Bids below the clearing price are rejected. See Figure A3.1 for an illustration.

Determining prices paid. With sealed-bid auctions the *quantities* that successful bidders win are determined by the quantities specified in their accepted bids. There are several standard approaches for determining the *prices* that each winning bidder pays. Different pricing rules will result in different bidding incentives and strategies, so the pricing rule is a very important component of the auction design. Under pay-your-bid pricing, participants pay the prices specified in their successful bids. Under uniform pricing, all successful bidders pay the clearing price, which is the price of the lowest successful bid.¹²

Bidding incentives, revenue, and economic efficiency. With pay-your-bid pricing, the auction in the figure above would raise revenue equal to the area under the aggregate demand schedule and to the left of the supply of fishing privileges. With uniform market-clearing pricing the auction in the figure above would raise revenue equal to the area of the rectangle bounded on top by the clearing price and on the right by the supply of fishing privilege. In the figure, pay-your-bid pricing would result in more revenue than uniform pricing.

The analysis in Figure A3.1 ignores an important consideration, however, which is that bids under uniform pricing likely will be higher overall than bids under pay-your-bid pricing. Bidders under pay-your-bid pricing have substantial incentives to “shade” their bids by bidding below their true value of holding fishing privileges in order to reduce the prices that they pay. Bids below the clearing price are not accepted, however, so bidders need to guess what the eventual clearing price will be and bid above it. Uniform pricing reduces the incentive for bidders to shade their bids.

¹² Alternatively, uniform pricing could use the price of the highest unsuccessful bid. See below for empirical evidence regarding the effects of these different pricing approaches on bidding behavior and revenues in laboratory experiments.

Which of these pricing approaches is most efficient and raises the most revenue must be determined empirically. The results of recent laboratory experiments designed to simulate New Zealand fishery auctions suggest that bids are higher under uniform market-clearing pricing than under pay-your-bid pricing, as expected, but that pay-your-bid pricing still generates more revenue. Both pricing approaches led to equally efficient initial allocations.¹³

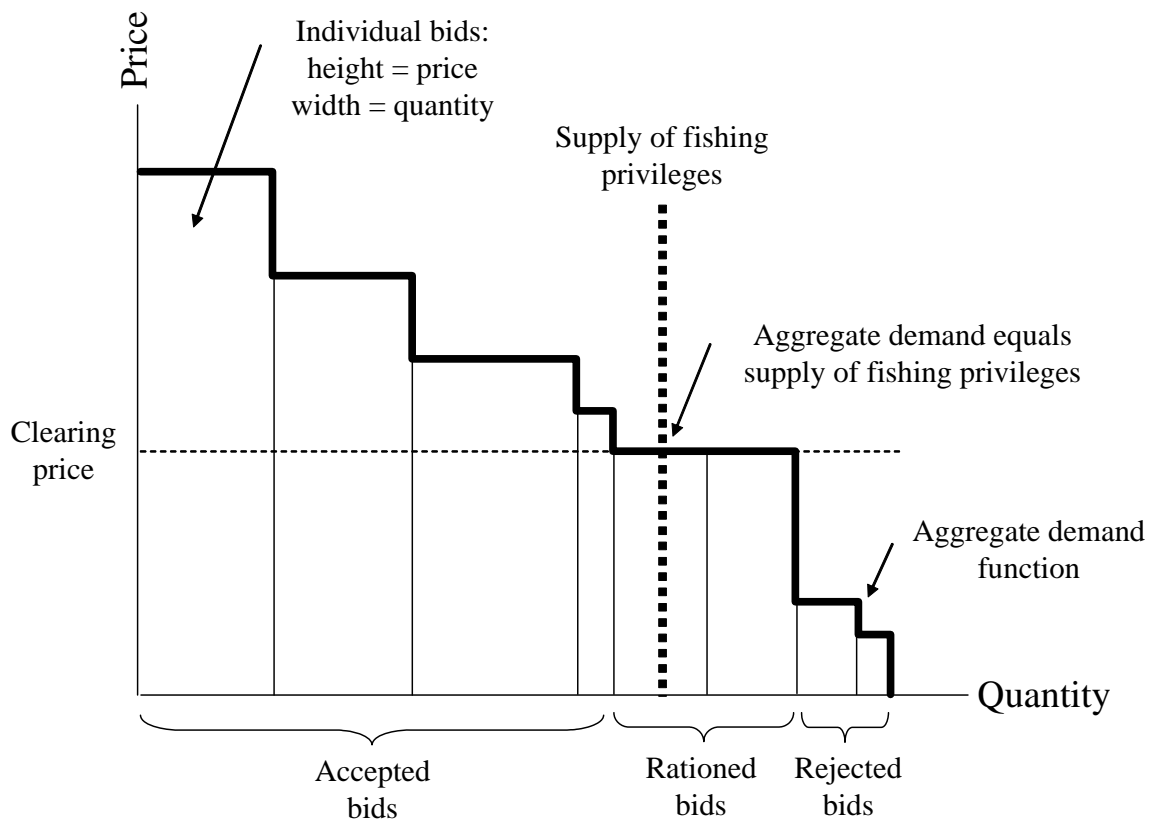


Figure A3.1. Single-round Sealed-bid Auction.

¹³ An economist named Vickrey developed a pricing approach for sealed-bid auctions that, at least in theory and under certain conditions, should result in the most economically efficient outcome. Under Vickrey pricing each participant pays an amount equal to the total value (i.e., price times quantity) of the of the unsuccessful bids submitted by the participant's competitors that would have been accepted had the participant not submitted any bids at all. The key to Vickrey pricing is that bid shading does not reduce the amount paid, because prices depend wholly on the bids of others, but bid shading does reduce the chances of winning. Bidders therefore have an incentive to submit bids that reflect their "true" value of holding different quantities of fishing privileges, resulting in economically efficient initial allocations. In practice, bidders may be reluctant to report their true values if they fear that such information, if made public, could hurt them in future auctions or negotiations. Vickrey pricing is considerably more complicated than pay-your-bid or uniform pricing, can lead to low revenues, and may be more susceptible to collusion among bidders.

2. Multiple-round clock auction

A clock auction uses multiple rounds of bidding to allocate fishing privileges. In a clock auction the “clock” indicates the current price, which starts low. Participants submit bids for the amount of fishing privileges they are willing to purchase at that price. The auction authority adds up the bids and reports the total quantity demanded at that price. If aggregate demand exceeds the supply of available fishing privileges the auction authority increases the price on the clock either by a predetermined increment, according to some rule, or based on discretion. The process repeats until aggregate demand falls below the supply of available fishing privileges. At this point the auction authority accepts all remaining bids at the previous price and rations any remaining fishing privileges among participants that reduced their demand in the final round. An “activity rule” is needed to encourage active participation in the auctions early rounds. The rule is that bidders may not increase their demand as the price increases.^{14,15}

Other Issues and Challenges in Auction Design

1 Avoiding collusion

Collusion occurs when bidders explicitly or implicitly agree to avoid bidding up prices. Collusion is most likely to be a problem in multiple round auctions, because bidders can use early rounds to signal and coordinate their behavior, and can retaliate in later rounds against bidders who deviate from potential agreements.

There are several ways to mitigate collusion. First, Councils should promote broad participation, because it is more difficult to collude when there are many bidders. Second, Councils can limit the amount of information that is made public between rounds in multiple round auctions. For example, the auction authority need only reveal the total quantity demanded between rounds in a clock auction. Finally, the auction authority

¹⁴ Ascending-bid auctions are multiple round versions of sealed-bid auctions. Each round operates just like a sealed-bid auction. The clearing price following each round is preliminary. If nobody wants to increase any bids, the auction ends, and the winning quantities are determined just as in any sealed bid auction. If any bidder wishes to improve a bid in light of the preliminary clearing price another round is offered. Councils generally will prefer an ascending-clock auction to an ascending-bid auction. Bidding is simpler in the ascending-clock auction, because bidders submit just a single quantity bid in each round. The activity rule is simpler. The auction ends sooner, because bidders only have one bid to change in each round. The auction is less susceptible to collusion, because the auction authority need only report total demand following each round.

¹⁵ An economist named Ausubel developed an ascending-clock auction with a modified allocation and pricing rule. The auction authority accepts bids as they are “clinched” and at the price where this occurs. A bidder clinches fishing privileges when the total quantity demanded by everyone else falls below the available supply. At this point the bidder is guaranteed of winning an amount equal to the total available supply minus the total quantity demanded by everyone else, so this is how much the bidder clinches. Everyone’s clinched privileges are removed from available supply following each round, and the clock then continues to increase. Analogous to the Vickrey auction above, under certain conditions Ausubel auctions give bidders the incentive to report quantities that reflect their “true” demand for fishing privileges, resulting in efficient initial allocations.

should require that participants bid in round numbers in both types of ascending auctions to prevent bidders from encoding messages in their bids.

2. Reducing the effects of the Winner's Curse

The winner's curse befalls auction participants who overestimate the value of fishing privileges and win by bidding too high. This is most likely to happen when the value of holding fishing privileges is highly uncertain at the time of the auction, such as when new species are brought under limited access management. Bidders might be uncertain about future market prices for fish products, changes in the health of the fishery, a shifting TAC, new fishery regulations, and other factors that might affect the value of holding fishing privileges. Under these circumstances bidders that win at auction may be those that overestimate the value of fishing privileges the most. Knowing this, auction participants will respond to uncertainty by lowering their bids to protect against paying too much.

Some experts argue that multiple-round auctions deal with the bid-lowering effects of the winner's curse more effectively than sealed-bid auctions. This occurs because bidders in multiple-round auctions learn how others value fishing privileges with each successive round, thereby gaining confidence in their own bids, eventually leading to higher prices. This is most likely to occur when auction participants have bidders similar to themselves (e.g., similar size and harvesting techniques) that they can look to for comparison.¹⁶

Some experts argue that a sealed-bid auction with pay-your-bid pricing will expose bidders to an increased risk of the winner's curse relative to uniform pricing, thus leading to more cautious bidding and lower expected revenue from the auction. Therefore it may be preferable to use a uniform pricing scheme for sealed-bid auctions.

3. Reducing uncertainty

While choosing an appropriate auction method has the potential to mitigate the effects of uncertainty on bidding behavior and auction revenues, Councils can do a number of things prior to the auction to reduce uncertainty directly. Such actions include disseminating scientific and market information about the fishery, establishing predictable and transparent procedures for setting TAC in future years, and dealing with foreseeable regulatory issues immediately rather than delaying such issues to the future.

Fishery participants might be particularly wary when bidding on "permanent" fishing privileges that last the full duration of the limited access program. Councils might consider auctioning only annual privileges initially and auctioning privileges lasting a

¹⁶ Some experts argue, however, that ascending-bid auctions actually may exacerbate the winner's curse when auction participants do not compete with similar bidders. The rationale is that advantaged bidders, such as those with lower harvesting costs, will bid more aggressively in the auction's initial stages, causing weaker bidders to be especially cautious, because outbidding a stronger bidder is evidence that you have overestimated value substantially. The result is that stronger bidders usually win and pay low prices. This argument suggests that sealed-bid auctions, which give weaker bidders a better chance of winning, encourage more aggressive bidding overall.

longer duration at a later date after fishery participants have had an opportunity to observe price information in secondary markets and in auctions of annual privileges.

4. Auctioning privileges for related species or fish stocks

In some cases the value of fishing privileges for different species or stocks will be interdependent. To take one extreme example, if species A and B are caught simultaneously in precisely equal quantities, the privilege to harvest a single unit of species A is worthless unless one also holds a matching privilege for species B. Conducting multiple clock auctions for different species simultaneously would allow fishermen to update their bids as the auctions progressed to ensure that they have fishing privileges in the appropriate combinations. Sealed-bid auctions do not allow fishermen to update their bids to ensure appropriate combinations and therefore could result in cautious bidding and low auction revenues, although fishermen would still have the option of acquiring appropriate combinations of fishing privileges in the secondary market. Multiple clock auctions require modified activity rules and have other unique features that are beyond the scope of this discussion, so Councils should research these auctions thoroughly before implementing them.

Some auction approaches allow bidding on particular “combinations” of fishing privileges, such as a bid on 100 units of species A and 200 units of species B for a total of \$1500. Auctions that allow bidding on particular combinations may result in more efficient initial allocations and can raise additional revenue but are complicated to implement in practice and likely beyond the needs of most Councils. Councils that determine that bidding on combinations is important should research such auctions thoroughly.

5. Determining a reserve price

The auction authority can set a reserve price below which no bids are accepted. A reserve price can limit the gains from collusion because bidders will always pay a minimum price. A reserve price also guarantees that the seller will receive a minimum amount for any privileges sold.

The reserve price should reflect the value of fishing privileges. It is easy to determine the reserve price when a secondary market for fishing privileges already exists: the reserve price should roughly equal the price of fishing privileges in the secondary market, with perhaps a modest cushion to avoid setting the reserve price too high. Even when no secondary market exists, such as when a new species is brought under limited access management, it might be possible to estimate a likely range of values based on the market price of fish, harvesting costs, and other industry data.

In cases where Councils are unable to generate a reliable estimate of the value of fishing privileges, Councils may choose not to set a reserve price. Auctions without reserve prices are most likely to be successful when Councils expect strong competition for fishing privileges. Whether or not Councils expect strong competition, however, they

might consider auctioning annual fishing privileges rather than privileges that last the full duration of the limited access program. This would limit the effects of an inappropriately low sales price to one year, and Councils subsequently could use secondary market prices to set reserve prices for future auctions.

6. Avoiding loopholes and remaining credible

Councils should scrutinize auction rules closely for any loopholes that might lead to unintended outcomes. For example, the rules should make clear that all bids accepted by the auction authority are binding. Otherwise, participants might decide to default on their commitments at a later date.

Councils also should make sure that they are able to enforce the auction rules credibly. For example, if the auction authority sets the reserve price too high and no fishing privileges are sold, it might be pressured to lower the reserve price after the fact, reducing its future credibility regarding reserve prices and other auction rules. The auction authority therefore should set a reserve price and other auction rules it knows it can commit to and select these rules with care.

Fishery managers will also have to make decisions about whether to reveal the identities of bidders and/or the magnitude of their bids. Some analysts argue that allowing bidders to know the identities and bids of other bidders can make colluding easier and disadvantage smaller bidders, particularly in multiple round auctions. In auctions for Treasury securities, even the identity of winners is considered confidential business information. Others believe transparency is valuable and appropriate for federal programs. In auctions for New Zealand fishing privileges, only the prices and quantities of winning bids are made public, while the identities of winning bidders are not. In auctions for SO₂ allowances, the identities of all bidders and their winning and losing bids are made public.

A review of existing public auctions for fisheries and other natural resources

Fisheries in New Zealand¹⁷

New Zealand introduced a quota management system (QMS) for its marine fisheries in 1986. The system is characterized by a total allowable catch (TAC) set annually for each fish stock, individual transferable quotas (ITQ) that each represent a share of the TAC, and annual catch entitlements (ACE) that flow from the ITQ and depend on the level of the TAC.

The Maori (indigenous New Zealanders) receive 20 percent of the ITQs for any new fish stock incorporated into the QMS. If harvesters' catch histories together exceed 80%

¹⁷ See Straker et al. (2002) and National Research Council (1999) for summaries of New Zealand's quota management system for marine fisheries; see Gardner Pinfold (2005) for a summary of its use of auctions to allocate fishing privileges.

percent of the initial TAC, the Ministry of Fisheries (MFish)¹⁸ allocates the remaining ITQs to harvesters in proportion to their catch histories. Otherwise each harvester receives only enough ITQs so that his ACE equals his catch history, and the remaining ITQs go to the government. In the past the government has auctioned both ITQs and ACE. Auctions of ITQs and ACE in 2004 and 2005 raised revenue totaling about U.S.\$3 million.¹⁹

MFish commissioned a study in 2005 to review options for auctioning government-held quota.²⁰ The study compared different auction mechanisms using various criteria, including to what extent the auctions resulted in efficient initial allocations, whether they provided quality price information, how much revenue they raised, their transparency and simplicity, and their acceptance by industry. The study also addressed the logistical and practical implementation of different auction approaches. The study concluded that a sealed-bid auction would be much easier to implement than an ascending auction. The study then compared pay-your-bid versus uniform pricing for sealed-bid auctions, but did not express a preference.

Bidding in the most recent New Zealand fisheries auction for ITQs in over 100 fish stocks closed in February 2006. This was a standard sealed-bid auction with pay-your-bid pricing. The auction was administered by Commercial Fisheries Services Limited (FishServe),²¹ an industry-owned organization that serves as the government's quota broker and administers some aspects of the QMS. Bidders were instructed to enter their bids on official bidding forms and submit them to FishServe by the auction's closing date.²² Withdrawal of bids was permitted prior to the close date, after which MFish acceptance of bids at specified quantities and prices was binding.

Auction instructions stated that MFish would set a reserve price for each fish stock and was unlikely to accept bids below the reserve price, but that MFish reserved the right to accept any bid. These reserve prices appear to never have been published. Many species of fish had well-developed secondary ITQ and ACE markets prior to auction, which appears to have helped MFish set reserve prices. Earlier New Zealand fisheries auctions have been conducted using similar auction approaches.

U.S. SO₂ permits

Title IV of the 1990 Clean Air Act Amendments established a national cap-and-trade system to control sulfur dioxide (SO₂) emissions, which are generated by the burning of fossil fuels, such as coal and natural gas, and are a component of acid rain. The SO₂ program is administered by the Environmental Protection Agency (EPA) and began

¹⁸ MFish commercial fishing website: <http://www.fish.govt.nz/commercial/index.html>

¹⁹ Results of ACE auction: <http://www.fish.govt.nz/commercial/info/ace-tender.html>; results of ITQ auction: <http://www.fish.govt.nz/commercial/info/crown-tender.html>.

²⁰ See Gardner Pinfold (2005).

²¹ FishServe website: <http://www.fishserve.co.nz/>

²² New Zealand fishery auction bidding form: http://www.fishserve.co.nz/news/Tender_Document_2006_01.pdf

limiting SO₂ emissions in 1995.²³ The program caps total emissions from power plants nationwide and requires that each facility hold a permit or “allowance” for each unit of SO₂ that it emits. The cap on emissions is analogous to the TAC in a limited access fishery program, and allowances are analogous to annual fishing privileges. Facilities are allowed to buy and sell allowances.

Annual allowances are allocated to electric generating units that began operating in 1995 or earlier in proportion to their historical consumption of fossil fuel energy. Units that began operating in 1996 or later do not receive annual allocations and must purchase allowances in the secondary market or in auctions. Together with trading in the secondary market, auctions promote price discovery and provide a way for newer electric generating units to obtain allowances.

The EPA sets aside a reserve of approximately 2.8 percent of each year’s allowances for auction. EPA returns the proceeds earned on the 2.8 percent of allowances it withholds for auction on a proportional basis to those units from which EPA originally withheld allowances to create the auction reserve. The SO₂ allowance auctions therefore raise no revenue for EPA. Half of the auctioned allowances are sold in “spot auctions” just prior to the first year in which they can be used, and the other half are sold in “advance auctions” seven years prior to the first year in which they can be used. Successful bidders in the most recent EPA spot auction in the spring of 2006 paid a total of over \$110 million, while successful bidders in the advance auction paid a total of over \$34 million. Total payments of about \$145 million were nearly five times larger in real terms than in 2000.

The EPA offers the allowances it sets aside for auction with a reserve price of zero. EPA spot auctions also allow participation by non-EPA sellers. This leads to two-sided auctions where buyers submit sealed bids to purchase allowances,²⁴ and sellers can submit sealed offers to sell allowances.²⁵ Bids are ordered from highest to lowest price to form an aggregate demand schedule, and offers are ordered from lowest to highest price to form an aggregate supply schedule. Then bids and offers are matched, starting with the highest bids and lowest offers, with trade occurring at the buyer’s bid. Matching stops at the point where aggregate demand meets aggregate supply. This strange pricing rule creates an incentive for sellers to bias their offers downward—perhaps even below the value to them of keeping the allowances—to be matched with the highest bidders. It turns out that this issue usually is irrelevant, however, because few allowance holders submit offers to sell their allowances. In fact, no such offers were submitted in 2005 or 2006. Nonetheless, Councils that contemplate using two-sided auctions for fishing privileges should use uniform market-clearing pricing. EPA advance *auctions* are standard (i.e., one-sided) sealed-bid auctions with pay-your-bid pricing.

²³ EPA Acid Rain Program: <http://www.epa.gov/airmarkets/arp/index.html>

²⁴ EPA SO₂ allowance bidding form: <http://www.epa.gov/airmarkets/forms/auctions/2006BidForm.pdf>

²⁵ EPA SO₂ allowance offer form: <http://www.epa.gov/airmarkets/forms/auctions/2006OfferForm.pdf>

Marketable U.S. Treasury securities

To finance the debt of the U.S. federal government, the Treasury Department sells Treasury bills, Treasury notes, Treasury bonds, and Treasury Inflation Protected Securities (TIPS) at more than 150 auctions held throughout the year.²⁶ These securities are marketable, meaning that they are fully tradable in secondary markets. At almost 4.4 trillion dollars in total bids accepted last year, these are by far the largest auctions in dollar terms conducted by the federal government.²⁷ The U.S. treasury typically raises from 6 to 24 billion dollars in total face value at each auction. Each auction offers a fixed total face value of a single kind of bill, note, or bond. Treasury auctions are similar to fishing privilege auctions in that the auction must allocate a fixed number of identical assets.

Treasury auctions allow two types of bidding: competitive and noncompetitive. Each competitive bidder enters a single bid in the form of the lowest interest rate the bidder is willing to accept and a dollar amount for the total face value desired. Noncompetitive “bidders” state only the total face value they wish to purchase and accept whatever market-clearing interest rate results from the auction. Investors who do not consider themselves expert securities traders usually bid noncompetitively. In recent years, the volume of non-competitive bids has averaged between 10 and 25 percent of the issues sold. Individual bidders cannot bid noncompetitively for more than \$5 million in any one auction. Offering a noncompetitive bidding option may be useful in some limited access fisheries in which there are a number of small operators who are not comfortable with bidding. Fishery managers must ensure, however, that there are enough competitive bidders to set an efficient price.

The Treasury posts its tentative schedule of auctions, and then confirms the date and time a few days in advance. All auctions are open to the public. The Treasury accepts sealed bids until the cutoff date. After the cutoff, a computer system ranks the interest rates offered by competitive bidders (noncompetitive bidders do not offer interest rates). The system identifies the set of winners such that the total face value of winning competitive bids plus the total of all noncompetitive bids matches the total face value that the Treasury intended to auction. In this single-price auction, all successful bidders are awarded securities at the interest rate equivalent to the highest accepted rate of the accepted competitive bids. Thus, Treasury may reject a competitive bid, grant the bidder less than the amount requested, or grant the bidder the full amount requested.

²⁶ Treasury bills are short-term government securities with maturities ranging from a few days to 26 weeks (http://www.treasurydirect.gov/indiv/products/tbills_glance.htm). Bills are sold at a discount from their face value, and do not earn interest. Treasury notes are government securities that have maturities of 2, 3, 5 and 10 years and earn interest every six months (http://www.treasurydirect.gov/indiv/products/tnotes_glance.htm). Treasury bonds have a term longer than 10 years, up to a current maximum of 30 years. Bonds earn interest every six months. TIPS are marketable securities whose principal is adjusted by changes in the Consumer Price Index.

²⁷ As determined from 2005 data available at <http://www.publicdebt.treas.gov/of/ofaicqry.htm>. February 27, 2006.

Treasury conducts only single price (i.e., uniform price) single round auctions. About eight years ago, Treasury converted from a multiple price (pay-your-bid) approach to single price auctions. The rationale for this change was that bidding in a single price auction is less risky and helped bidders avoid a “winner’s curse.” If bidders are more comfortable bidding aggressively, then in theory the Treasury could raise the required funds at lower total cost. Empirical evidence suggests that this was indeed the case.²⁸ In addition, analysts argued that since single price auctions are strategically simpler, bidders may be more inclined to bid directly in auctions rather than through specialized dealers. This behavior leads to lower transactions costs and a more efficient system.

One important feature of the Treasury bill market is the robustness of the secondary market. Investors who want to buy bills other than at regular auction and those wishing to sell their bills prior to maturity may do so easily, and with low transactions costs. The secondary market in Treasury bills is the largest and most efficient of any money market instrument. The secondary market in bills is maintained principally by a group of security dealers known as primary dealers. All Treasury bills are now issued and held electronically, which facilitates secondary transactions.

U.S. radio spectrum

In 1993, the Federal Communications Commission (FCC) received the statutory authority to use competitive bidding to allocate radio spectrum licenses. Prior to this historic legislation, the FCC mainly relied upon comparative hearings and lotteries to select a single licensee from a pool of competing applicants for a license. In general, the licenses allow users to broadcast radio signals in certain frequency bands, at specified maximum power levels, in specified locations. Some licenses have other restrictions, such as what kind of service can be provided with the airwave access.

FCC auctions are open to any eligible company or individual that submits an application and upfront payment and is found to be a qualified bidder by the FCC. FCC auctions are conducted electronically and are accessible over the Internet. The Commission has found that spectrum auctions are more effective than either comparative hearings or lotteries. Also, by using auctions the FCC has greatly reduced the average time from initial application to license grant.

The FCC applies some of the most complicated auction approaches used by the federal government. In its simultaneous multiple-round (SMR) auctions, all licenses are available for bidding throughout the entire auction, thus the term “simultaneous.” SMR auctions have discrete, successive rounds, with the length of each round announced in advance by the Commission. After each round closes, round results are processed and made public. At that time bidders learn about the bids placed by other bidders. This provides information about the value of the licenses to all bidders and increases the likelihood that

²⁸ <http://www.treas.gov/offices/domestic-finance/debt-management/auctions-study/upas2.pdf>
Uniform Price Auctions: Update of the Treasury Experience. 1998.

the licenses will be assigned to the bidders who value them the most. The period between auction rounds also allows bidders to adjust their bidding strategies. In a SMR auction, there is no preset number of rounds. Bidding continues until a round occurs in which no bids have changed, at which time the auction closes. Depending on the auction design, number of bidders, and the number of licenses being offered, an auction might run from one day to several weeks.

The FCC SMR auctions are different than the multiple round clock auctions discussed above. In particular, the set of licenses that the FCC auctions simultaneously are not necessarily identical items, and bidders bid individually on each license with an individual price. The two kinds of auctions also have different rules about how a bidder must change or can change bids from one round to another. Also, while not an inherent property of the auctions, the FCC has generally revealed the bidder identities during SMR auctions but not during clock auctions. The FCC is planning to move to anonymous bidding for its next major auction (AWS-1 with 90 MHz), so this difference will not persist.

The FCC experience is quite instructive for fishery managers who are concerned about the distributional effects of auctions. Required by law to seek diversity in granting licenses, the FCC has given preference in auctions to certain categories of bidders, called “designated entities.” Designated entities have generally included small, minority-owned, and women-owned businesses. The preferences have taken different forms. One approach was to offer designated entities a lower down payment and more time to pay for their winnings, with a low interest rate on the unpaid balance. Small businesses also received a 25 percent bidding credit, meaning that they actually paid only 75 percent of their winning bid. Although such approaches may seem like fairly simple ways to promote distributional goals, the results of the preferences are controversial, possibly quite costly, and ultimately ineffective.²⁹

First, the evidence suggests that credits for bidding have led to designated entities’ bidding up the prices for everyone else. Second, the value of the low interest loan also appears to have been capitalized into the price of the licenses. Third, some designated entities got in over their heads and defaulted on their bids, leading to delay and litigation. Finally, regulators have become concerned that large firms have been using small firms as “fronts” in the bidding. These issues have generated unpleasant press and credibility problems for the FCC. In conclusion, the lesson to fishery managers from the FCC’s experience is that adjusting auction rules for certain classes of bidders is not likely to be an effective way to produce a more socially desirable outcome. If necessary, it would probably be preferable to reserve a share of privileges for direct allocation to certain groups.

Oil and gas leases in the U.S. Outer Continental Shelf

The U.S. Department of the Interior’s Minerals Management Service (MMS) leases out access to certain oil and gas reserves in the outer continental shelf (OCS). The OCS is the submerged lands between three miles and about 200 to 300 miles from U.S. shores. State

²⁹ See a critique of the designated entity approach by Hazlett and Boliek, 1999, at <http://www.law.indiana.edu/fclj/pubs/v51/no3/BabMac17.PDF>

governments control the areas from the shoreline to three miles out. The leases grant the right to explore, develop, and produce oil and/or natural gas for a specific period of time from a specific tract of the OCS land. MMS collects about \$5 billion per year in lease payments (called “bonuses”), rental payments, and royalties from OCS minerals.³⁰

MMS schedules its offshore leasing according to a five year plan, an elaborate document that considers environmental factors, regional equities, projected energy demand, and other stakeholder interests. Once the agency issues a final notice of sale, firms may submit their sealed bids. Bidders can bid on any or all of the tracts offered. After the cutoff time, the agency opens and reads the bids publicly. MMS evaluates the bids for each tract individually (i.e., not allowing for combinatorial bidding), making sure that the high bids are legally and technically sound and that no anti-trust issues arise. The high bids are compared against a “fair market value” (i.e., reserve price) that the agency computes for the tracts. The government accepts the high bids (i.e., lease bonuses) that meet the fair market value test and grants the leases.

The lease agreement (disclosed before the bidding) specifies certain payments to the government in addition to the lease bonus paid at auction. Two additional payments generally apply. An annual rental payment applies until the production of minerals begins. Rental payments are generally \$5 to \$6.25 per acre for shallower water, \$7.50 to \$9.50 for deeper water, and more for Alaskan waters. After production begins or achieves a specified level, the lessee generally must pay the government a royalty (a percentage of the value of the mineral) for each unit of production, usually 11 to 17 percent. Rental and royalty payments reduce the amount that bidders will be willing to pay up front in auctions.

As long as the lessee is producing minerals from the tract, the lease is extended. When a field can no longer be produced economically and the lease expires, the lessee must plug and abandon all wells and remove the platform and any sub-sea devices.

³⁰ A recent write-up of the OCS program appears in “Leasing Oil and Natural Resources: Outer Continental Shelf,” by the U.S. Department of the Interior’s Minerals Management Service, available at <http://www.mms.gov/ld/PDFs/GreenBook-LeasingDocument.pdf>.

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