A PRIMER ON LIMITED ACCESS ALTERNATIVES FOR THE PACIFIC COAST GROUNDFISH FISHERY

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PREFACE

The commercial groundfish fishery off the Pacific coast grew rapidly between 1976 and 1982. Annual shoreside landings more than doubled, the foreign trawl fishery dwindled to almost nothing, and the "joint venture" fishery was born and prospered. To accomplish this growth in landings the groundfish trawl fleet expanded from less than 300 to over 440 vessels. Economic conditions, however, proved incapable of sustaining the growing fleet of new, modern trawlers. Neither the Pacific coast rockfish stocks nor the traditional flatfish and sablefish stocks provided the needed room for expansion; nor did the Alaska groundfish fishery absorb the new vessels quickly enough. Economic returns to trawl vessel operators, especially those with big mortgage loans on new vessels, fell below levels needed to justify the investments. Many vessels failed financially, and lenders began repossessing vessels from owners with delinquent loans.

During 1982 the Pacific Fishery Management Council was petitioned by a small group of trawl fishermen to adopt an "immediate emergency moratorium on all groundfish trawling". Also, both the Council's groundfish management team and Scientific and Statistical Committee noted that limiting entry to the fishery should be considered as a management tool. In the fall of 1984 the Fishermen's Marketing Association in California and the Coast Dragger's Association in Washington state jointly proposed that each of the Pacific coast states create a trawl vessel license and place a moratorium on issuing new licenses. When draft legislation failed to gain sufficient support in Oregon, the moratorium effort lost momentum. Movement toward limiting entry to the groundfish fishery ground to a halt when the Pacific Fishery Management Council voted not to consider a limited entry system for groundfish during its groundfish plan amendment process in 1985.

In 1986 economic conditions in the trawl fishery have improved due to a resurgence in the pink shrimp fishery, the reduced number of vessels in the fleet, and the lower capital costs faced by purchasers of distress-sale vessels. Although fishery management agencies are not now considering a limited access program for groundfish, the Council and the Pacific coast states may be faced with making such a decision in the future. Access limitation does afford fishery managers several benefits not achievable with traditional fishery regulations. In the first chapter below, nine objectives of limiting access are listed. Among these objectives are economic efficiency, reduced management costs, increased and stabilized fishing fleet profits, equitable distribution of fishery economic benefits, and reduced burden of regulations on the industry. While the reasons for limited access focus on social and economic aspects, it may also contribute to fish stock conservation.

To prepare a thorough examination of alternative approaches to limited access for use in future discussions, a Working Group on Limited Access was formed in November of 1984. The Working Group consisted of economists and fishery management personnel from the National Marine Fisheries Service, Pacific Fishery Management Council and Oregon State University. The attached material is taken from two chapters of that group's extensive report.

The Working Group was assisted by an advisory committee, organized by Ed Ueber of the Southwest Fisheries Center, called the Groundfish Alternatives Management group (known as the "GAM"). This group included a representative from each of the three coastal state's fishery management agencies, and several private industry people. The GAM reviewed drafts of the Working Group's report, and provided comments and suggestions during three meetings spaced over a 14-month period. Members of the GAM are not

necessarily in agreement with particular conclusions or views expressed in the final report. Nevertheless, their thorough criticism of earlier draft reports and their frank and open expression of viewpoints helped immeasurably to improve the final report. This summary report is a response to one of the GAM's suggestions. We hope that it proves useful to those members of the public that are concerned about the future direction of fisheries management and want to do something about it.

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INTRODUCTION -- LIMITED ACCESS, WHAT IS IT AND WHY?

Despite its wide acceptance in other fisheries, limited access remains a controversial topic among Pacific coast groundfish fishermen and fishery managers. It is controversial because it immediately opens a wide array of public policy issues. How should the public conserve fish stocks, and who should benefit from harvesting those fish? What are the costs and benefits to the public, the taxpayer, the fishing industry, and the coastal communities supporting the groundfish industry? Should the government push the industry to be economically efficient in harvesting, or should it discourage technical efficiency to conserve stocks? Should management policy preserve the economic status quo by protecting existing harvest shares? These are some broad issues occupying the discussions of policy-makers and academic writers concerned with resource management.

The goal of this introductory section is to define limited access, to dispel some basic misunderstandings about limited access, to clarify the optional forms of limited access, and to review the various resource management objectives addressed. This should set the stage for the following, more lengthy discussions. By reducing the scope of needless misunderstandings, it should also help to make future discussions of limited access more productive.

WHAT IS LIMITED ACCESS?

Limiting access in commercial fisheries is commonly implemented through either license limitation or assignment of quantitative harvest rights. License limitation, most commonly known as "limited entry", is the simplest and most widely used form of limited access in the United States.

A license limitation system issues permits to specific individuals (usually fishermen or fishing vessel owners) and prohibits landings by those not having a license. As will be explained at length below, licenses can be annually renewable or perpetual fishing rights; they may be openly tradeable or strictly assigned to a particular person; they may be specific to a gear type or species of fish. A wide range of conditions and limitations can be placed upon the exercise of fishing privileges bestowed through issuance of a license.

Rather than simply identifying who can fish, quantitative harvest rights designate how much each permittee can take. Like license limitation, a quantitative harvest rights system can take on a number of different characteristics. A variety of terms have been coined for the various quantitative harvest rights schemes. These include (1) individual fisherman quotas, based upon Francis Christy's original proposal in 1973, (2) individual tradeable quotas, as recently adopted in New Zealand (I.N. Clark and A.J. Duncan, 1986), (3) quota licenses as proposed by Canada's Commission on Pacific Fisheries Policy (Peter Pearse, 1982), and (4) quota shares or allocated vessel quotas (C. Clark, 1980) which represent individual shares of total allowable catch. Throughout most of the discussion we will use the term "individual fisherman quota" (IFQ), recognizing that individual quotas may be allocated to vessel owners or fishing enterprises rather than to fishermen. Regardless of what term is used, a quantitative harvest rights system controls the total harvest by distributing harvest shares among participants in the fishery.

To some degree all fishery regulations dictate the conditions under which fishermen are allowed access to fish stocks. Traditional forms of

fishery regulations -- including harvest quotas with season closures, gear requirements, size limits, and trip limits -- restrict access to fish stocks. This is an inherent part of defining terms and conditions for legal resource use. To control annual harvests, these regulations must reduce the level of fishing effort from what it would be without regulation. Hence, all fishery conservation regulations, both traditional and limited access, conserve fish stocks by controlling the level of fishing effort, and this requires placing limits on the use of stocks.

What then is the essential difference between a limited access system and the traditional approach to fishery regulation? The main difference is that traditional regulations seek todirectly control harvest levels without saying who should be allowed to take a portion of the total allowable harvest, while limited access begins by identifying who is permitted to harvest and, possibly, how much they are allowed to harvest.

Limited access does not completely replace the need for traditional regulations. License limitation, for example, does not directly control the level of harvest by license-holders. Consequently, it may need to be supplemented by fishery-wide quotas and technical restrictions on vessels and gear. Similarly, even though an individual quota system inherently controls total harvest, additional regulations may be needed to achieve optimal utilization of the fish stocks. This is especially true in multi-species, multi-gear fisheries. Recent experience indicates that individual quotas, by themselves, do not provide sufficient control of size-at-capture, incidental catches, and discards.

Limited access may exist without government regulation. Where the law (or tradition) recognizes an individual's right to portions of a resource,

such as in the famous Maine "lobster fiefs" (Acheson, 1975), limited access may operate without formal sanction. Private rights to land, forests, and other forms of private property impose similar forms of limited access and controlled use. The point is that access to the resource for harvesting purposes is limited to some identifiable set of people. Where legally defined rights exist, the owners of these rights may sell, trade and bequeath the rights to others. Thus the identity of the users may change over time. Access to the resource is limited to those who possess use rights; but, in a commercial sense, the resource is open to all those who obtain use rights by paying the market price or by complying with state-imposed qualifications.

A limited license or an individual quota does not represent a right that is as respected and reliable as a registered deed to land. Both licenses and individual fisherman quotas (IFQ's) represent use rights, not property rights to the fish stock. In the legal jargon these are termed "usufructuary rights", meaning rights to use and enjoy the fruits of property not belonging to the individual. The fish stock in the ocean remains a public resource to be managed by the state as a public trust. However, when licenses and IFQ's are marketable they take on many of the characteristics of property, including a market price. Because these limited rights are the creation of administrative decisions, they may be revised and amended by further administrative action.

WHY USE LIMITED ACCESS? WHAT IS DIFFERENT ABOUT FISHING?

Commercial fishing differs from farming, small-scale retailing and other competitive American industries in many respects; the most important is the lack of private property rights in the essential resource. Unlike

farm land and mineral deposits, marine fish populations are not owned by the users. Historically, in western Europe and North America property rights to marine fish stocks did not evolve along with rights to land-based resources. There are two principal reasons for this. First, it was not until the rapid expansion in world fishing after the World War II that conservation of marine fish stocks was recognized as a serious and widespread problem. So long as people believed in the inexhaustibility of marine fish, there was little need to develop institutions for limiting access to fisheries. Second, creation and enforcement of rights to marine fish are difficult tasks. Fish are not easily observed and fenced like a plot of land. To establish, enforce and exchange property rights in fish requires the establishment of new and expensive institutions.

In the United States marine fish stocks are either open access or common property resources. An open access resource can be accessed and harvested by anyone. There are no restrictions on who can harvest or upon individual harvest levels. An open access resource is literally no one's property (not strictly property at all). Most Pacific coast groundfish stocks are open access resources. In contrast, access to and use of a common property resource is restricted to an identifiable group of owners having co-equal use rights. The original common lands of a medieval village, for example, were used in common by members of the village owning the land. Others were excluded from using the commons. (See Ciriacy-Wantrup and Bishop, 1975.)

A license limitation system converts an open access resource into a kind of common property resource. Although the licensed fishermen are not legal owners, they are a known and exclusive group with co-equal harvest rights. With either open access or common property, competitive free

enterprise among resource users cannot be expected to assure adequate resource conservation. Group restrictions on annual harvests are needed. This need has long been recognized, and it is the reason that public management of fisheries is so common.

Collective management actions are needed for a very simple reason: economic incentives of individual fishermen rarely favor conservation. In an open access or common property fishery the fishermen may not directly sense the resource depleting effect of their own actions. Even if a fishermen does notice the effect his harvest has on the fish population, he will not restrict his harvest unless he expects to receive some future benefit from doing so. If there are others fishing on the same stock, one individual's benefit from his conservation action depends on others acting in concert. Without assurance of collective action, a fisherman's sacrifice for the sake of conservation may simply create benefits for those not restricting their harvests. Also, without limited access, increased resource abundance may attract new entrants who dilute the economic benefits of conservation available to established resource users.

Thus individual actions, based upon self-interest, cannot assure adequate conservation and cannot effectively promote long-term economic returns from a common property natural resource. However, fishermen will all gain from appropriate collective restrictions on use. Collective action is also needed to properly conserve groundwater basins and public grazing lands. Restrictions on individual resource use can be adopted through cooperative agreements among users, through certain regional resource agencies like water districts, or even through Federal regulations. In all cases optimum management requires that individual incentives for short-term economic gain be brought into line with sustainable levels of use.

Regulation of common water supplies and grazing lands normally involves quantitative limits to individual use. In medieval England many villages had commons which were regulated through "stinting" -- a term for limiting the number animals grazed by individual peasants. Similarly, sheep and cattle ranchers using public grazing lands in the western U.S. are allocated so many "animal unit months" (AUM's) which roughly corresponds to a known quantity of forage harvested. Farmers irrigating fields in Central California each have a quantity of water to which they are entitled. This entitlement may be attached to the land as a "water right". These water and grazing rights are actually a form of limited access, because they designate both (1) which individuals have use rights and (2) the amount of use allowed.

Note that these forms of limited access are not intended to prevent people from becoming farmers or cattlemen. There is no list of licensed or "qualified" farmers. If you want to try your hand at raising almonds in Kern county, you can buy or rent land and obtain the necessary water rights. There is unrestricted entry to the industry. Fishing, farming and retailing are similar in this important respect. To exercise this right of entry, a business firm must acquire the necessary implements and materials. In farming or ranching one requirement is a source of water or range land forage. In an open access fishery, however, a new entrant cannot acquire rights to a given quantity of fish. A newcomer simply dips into the common pool, often taking a portion of the available harvest away from established fishermen.

Rather than limiting the number of harvesters, groundfish managers have established aggregate harvest quotas (or guidelines), and have

instituted other restrictive rules on fishing enterprises in order to achieve economic and social objectives. Individual fishing firms then compete for fish based upon harvesting capacity and skill. When quotas are inappropriate, managers may prefer to restrict effectiveness of the gear (such as maximum allowable length of gill nets) or the portion of the stock that is vulnerable to harvest (mesh size regulations, for example). Pacific coast groundfish regulations incorporate many of these methods. While these harvest regulations may adequately prevent fish stock depletion, they do not address a number of other problems.

Economic and social problems frequently occur in quota-regulated open access fisheries. Some of these problems are:

(1) Economic profits are lost to increased fishing costs. Because individual fishermen can maintain or expand their individual harvest shares only by catching more fish, they compete by increasing fishing capacity. Despite the increased costs involved, the individual vessel owner may enjoy increased earnings. When the fish stocks are under quotas, increased fishing capacity results in no increased fish catch but does raise the total cost of taking the quota.

(2) Over-crowding and gear conflicts occur. Fishermen concentrate in the best fishing areas and during the best fishing seasons. In some cases this results in a very short and furious fishing season which may pressure individual fishermen to operate under less safe conditions. This can cause loss of gear and can increase the cost and risk in operating a fishing vessel.

(3) Economic instability is increased. Excessive numbers of new entrants are often attracted to fisheries during periods of higher-than-normal profits. Many of these new firms will go bankrupt under normal circumstances, leaving the fishing fleet over-built and with many financially-strapped firms. While cyclical instability affects many industries, this is amplified in quota-regulated commercial fisheries by changing harvest regulations. When new vessels swarm into a fishery during good years, managers tighten the harvest regulations in response.

(4) With large amounts of redundant harvesting capacity regulatory burdens and management costs become excessive. To assure adequate fish stock conservation, there must be restrictive fishing regulations. Annual quotas may be augmented by trip limits and other restrictions. To implement regulations there must many committees, hearings, and enforcement agents.

Limited access to commercial fisheries is in part a response to these social and economic issues, but it may also be used as a resource conservation tool in fisheries that are less heavily exploited. Some Australian limited access programs, for example, were adopted early enough in the developing fishery to provide a substantial measure of protection to the resources.

OTHER APPROACHES TO ECONOMIC REGULATION OF FISHERIES

It should be noted that the license limitation and IFQs are not the only alternative approaches to common property resource management currently under serious discussion. A radically different approach would be to levy taxes or royalties on fish landings. This sort of approach has been given serious consideration in designing programs to reduce air and water pollution (e.g. the so-called "pollution taxes"), and public interest groups have touted proposals to increase charges for irrigation water and public grazing lands where those resources appear to be over-used or mis-used. The basic logic of a tax charge is that it changes economic incentives in the correct direction.

Firms using common property resources and firms relying on publicly subsidized resource development projects, do not bear, nor do they adequately take into consideration, the full cost of resource use. This is related to lack of private property rights. The fishing firm does not have a direct financial interest in the economic value of the fish stock, its only interest is in the share of the stock that it can capture and sell. Consequently, the cost of reducing the fish stock (i.e. reduced catch rates for all firms and reduced future availability of fish) is not felt directly

by the firm and it does not consider that cost in deciding how much to harvest. A rancher, on the other hand, must account for the effects of a reduced herd on the book value of his livestock. Similarly, a hypothetical private fish stock owner would bear the cost of a reduction in his fish stock. The prospect of a reduced asset value associated with overfishing would act as a strong incentive to harvest at an economically efficient level. Since firms fishing on a common property stock do not experience the reduced asset value they do not have the proper incentives to conserve. One solution is for a public agency to compute the cost associated with reduced fish stock size and to levy a royalty fee equal to that cost. After that, the private firms should lose any incentive to overfish.

This proposal has been described in textbooks and academic papers, but has never been applied to a fishery. There are several good reasons why this has not been adopted elsewhere, and these reasons apply equally to the case of Pacific coast groundfish. First, fishery decision-making is strongly geared to protecting the rights and financial interests of current resource users. Since the harvest royalty would appear to reduce the income of fishermen, it would work to the disadvantage of exactly those resource users who are most clearly represented in the political process. Also, if the fishing industry is suffering economic strife it may be considered grossly unfair to impose additional taxes. These political and equity aspects raise strong objections to using royalties as a resource management tool.

Other practical reasons for not using landings taxes to manage fish stocks are (1) that computational task is extremely formidable, and (2) the necessary flexibility in levels of taxation is not suited to our legislative system. Because the royalty or tax should equal the cost

associated with reduced asset value of the fish stock, the tax would have to be adjusted as fish prices, fishing costs and fish stock abundances change. Given the imprecision in fish stock assessments and the frequency of changes in prices, it is unlikely that the tax rates could be accurately computed and adjusted. Also, authority to set tax and royalty rates is not now delegated to state fish and game agencies or to the Pacific Fishery Management Council. Thus the legislatures would have to change tax rates in a timely and appropriate fashion. This is not a likely prospect.

OBJECTIVES OF LIMITING ACCESS

Limiting access to commercial fisheries can address many different objectives. Some of the more prominent objectives are as follows:

1. To promote economic efficiency in harvesting.
2. To establish stable and secure tenure to the fishery for licensed fishermen.
3. To enhance the value of fishery products delivered to consumers.
4. To increase and stabilize the profitability of the fishing fleet.
5. To reduce the burden of management regulations on the industry.
6. To reduce the cost of fisheries management born by the public.
7. To secure an equitable distribution of benefits from the fishery.
8. To protect various segments of the fishing industry from other fishermen and non-commercial interests.
9. To help restrain fishing effort and conserve fish stocks.

This list does not include every conceivable objective, but it does illustrate the broad range of considerations that can be addressed. A brief explanation of these objectives will focus the later discussion.

Economic efficiency in harvesting requires delivering the available raw fish to dockside with the least possible cost expended on fishing and delivering the fish in appropriate condition and on a time schedule suitable for marketing. Because open access fisheries normally exhibit substantial excess fishing capacity, which is controlled by quotas and other economically inefficient regulations, substantial advances may be made toward this goal through limited access. To actually calculate an efficient harvest program is a difficult task that is rarely attempted. Huppert and Squires (1986) recently estimated that an efficiently operated Pacific coast groundfish fishery could generate between $7 million and $17 million annually in net economic profits. The precise level of potential profit depends largely on the joint venture whiting fishery and the pink shrimp fishery. The best estimate is $12 million profit, and this would require a reduction in fishing fleet size of about 40 percent in the fleet operated in 1984. Without limited access, the free entry of fishing vessels tends to dissipate these potential harvesting profits. A new limited access system may not be able to achieve the estimated level of economic gains in the short run, because it would be saddled with a large existing fleet. Nonetheless, the potential gains are sufficient to make increased economic efficiency an important objective.

Secure tenure in the fishery has at least two dimensions. With secure tenure a fisherman would not have meet some state-imposed performance standard in order to continue in the fishery. It also means that a fisherman is assured of future benefits from sacrifices made to conserve fish stocks. In open access fisheries, and in some license limited fisheries, a fisherman cannot reduce his fishing or stop fishing temporarily in hopes of harvesting larger or more numerous fish later. With

secure, individual fishing rights, however, a fisherman can afford to fish more slowly and to wait until fish are of optimal size or in optimum condition.

The quality and timing of fish delivered to market may be improved under a limited access system. Fishermen and processors operating under open access are sometimes forced to compete for fish by harvesting in a hurry. This may result in increased occurrence of spoiled or unnecessarily frozen fish products. This is especially a problem when traditional quota management results in short fishing seasons that overwhelm the processing and distribution sectors. If fishermen are given individual quotas, they are free to stretch out the fishing over a longer period of time. Recent Pacific halibut experience provides the classic example of open access fishing causing so short and furious a fishing season that the extraordinary efforts are needed to assure product quality maintenance and almost all the fish have to be frozen.

Profits are usually high when fishing fleets begin exploiting a new fish stock or have a particularly large year-class of traditional fish stocks. The usual tendency, however, is for profits to fall as additional vessels are attracted. If the fleet size grows as the fish stock is depleted, then a period of serious economic dislocation will ensue. Recent experience with rockfish stocks off the Pacific coast provides a case study in this process. A properly managed limited access system should be able to reduce the instability in profits by attenuating the growth and decline in the fishing fleet. Higher fleet profits can be earned when the numbers of fishing vessels is just sufficient to harvest the available yield. Sustained high profits require stability in market prices, costs, and fish

stocks. Limited access cannot provide stability in all these, but it does remove one common source of economic instability and should result in higher average annual profits.

Reducing the burden of fishing regulations on the industry is an appropriate goal, but it is unclear what particular change in regulations constitutes a reduced burden. Regulations on gear quantity or design, commercial fishing seasons, and "trips limits" may be viewed as a burden. From an economics perspective, all these forms of regulation cause private fishing operators to incur additional costs. By establishing a reduced and more efficient fishing fleet, limited access may permit some of the regulations to be removed. Whether such a change would result in an overall reduction in burden of regulations is largely a matter of definition and perception.

Reducing the public expenditures on management would relieve the taxpayer's burden of fishery regulations. The current groundfish management system uses public resources to perform necessary biological research and fish stock assessments, to monitor fish landings, to support Coast Guard and State marine enforcement operations, to carry out legal sanctions against violators of regulations, and to make public decisions on management plans. A recent rough estimate of costs associated with Pacific coast groundfish indicates that about $4.5 million is spent on resource assessment, and $5.6 million on management, enforcement, coordination and communications. Costs of managing a fishery will, of course, depend partly upon the character of the fishery and partly upon the types of regulations promulgated. If limited access is conducive to lower management costs, this should be an important consideration.

Everyone agrees that fishing regulations should entail an "equitable" distribution of benefits. Although there is no widely recognized definition of equity, there are clear patterns in management practice. In a recent study of twelve government programs that allocate property rights, Elizabeth Rolph (1983) found that policymakers deal with the equity issue by designing regulations to minimize any redistribution of wealth. Where established resource users enjoy benefits of a communal resource (such as in land development, air pollution, groundwater pumping) "the judicial, the legislative, and the executive branches have uniformly supported the claims of historic users when allocating rights". This principle seems to be honored by existing fishery limited access systems as well. A reasonable way of dealing with the equity question, therefore, may be to assure that no established fishermen suffer a measurable loss due to the access regulations. As a first approximation this can be accomplished by retaining historic allocations of catch among existing gear types, vessel size classes, and geographic sub-divisions. However, if rapid changes have been occurring in the fishery, it is not clear that historic shares provide an equitable solution. New entrants and previous operators with new vessels may claim a right to increased shares. Nevertheless, initial preservation of historic catch shares under a limited access system provides one simple and operational means of dealing with the equity issue.

To protect various segments of the fishery from one another may be more than just another form of the equity issue. Where recreational or environmental interests collide with commercial fishing interests, a limit to commercial fleet size may help to quell strong political and economic forces that could eliminate the fishery entirely. California has adopted license limitation programs in the swordfish and shark drift gill net

fishery and in the northern California set gill and trammel net fishery in order to deal with politically potent rivalries between user groups (Huppert and Odemar, 1986). Limited access has proved to be a useful tool for staking out territories and limiting the range of conflict.

Finally, limited entry can assist in conserving fish stocks. In the case of license limitation, the control over fishing effort may be too weak and ineffectual to assure fish stock conservation. On the other hand, an individual quota system provides direct controls over total harvests and may be a useful substitute for other forms of effort regulation.

No single system of regulation could address all nine of these objectives simultaneously and with equal success. A limited access system must be tailored to the specific objectives sought. And it must address the various private and public interests reflected in the objectives discussed here.

CONCLUSIONS

Several conclusions from the preceding discussion are worth repeating and summarizing. First, a limited access system is basically a social mechanism for reducing the excessive competition for fish that occurs when fish stocks are open to all comers. It is an alternative or a complement to traditional quota, season and gear regulations. Among the alternative regulatory systems, it is uniquely able to address economic efficiency of the commercial fishing industry. In fisheries that are already highly regulated like Pacific groundfish, limited entry should be viewed as one component of a multi-dimensional management strategy. The choice is not between limiting access to the fishery or having a free and open commercial fishery. Rather it is between one set of regulations on

competitive fishing and another set.

Second, there are several kinds of limited access. The two alternatives receiving the most attention are license limitation and IFQs. With either major type of limited access there are numerous variations in detailed application. Much public discussion and participation should be devoted to determining exactly what features to include in a limited access program for any particular fishery. The ultimate allocation of benefits from the fishery would depend upon the detailed decisions made in designing an actual limited access program.

Third, the problems of economic competition for common property or open access resources are not unique to fisheries; adoption of limited access rules are implicit in many other economic systems, including that of private property resource ownership. Rules for use of range land, groundwater supplies, and the air have similar features to fishery regulations. While the elusive marine fish populations are not susceptible to subdivision into pieces of private property, the limited access approach attempts to generate some of the conservation and economic benefits that flow from a free enterprise, private property system.

Finally, although it has not been explicitly stated, it should be clear to the reader that selection of fishery management methods determines what fishing rights or privileges, with corresponding economic benefits, the community bestows upon commercial users of the fishery resource. When a season closure or a license limitation is adopted by the fishery management authorities, the fisherman's economic gain from fishing is altered. Thus it is clear that the nature of fishing rights or privileges are subject to change at the discretion of fishery councils. Commercial fishing rights are

not "inalienable rights" like the right to free speech. They are even less secure from political meddling than standard property rights applying to one's personal possessions. To the extent that a limited access system does establish broader and more secure fishing rights, it will place the fisherman in a position much closer to that of a property owner. But the key decisions will remain those of the public managers whose trust responsibility is established by the various state and federal laws.

BASIC ELEMENTS OF A LIMITED ACCESS PROGRAM

This section presents the basic "nuts and bolts" of limited access, and carries the discussion of limited entry beyond the general considerations reviewed in the previous sections to look at specific elements. A proposed checklist of items for consideration, along with a brief description of the main options is presented in Table 1 below. Seven basic decision categories are:

(1) Scope of the fishing activity to be restricted or allocated,

(2) Method of limiting access,

(3) Initial allocation of harvest rights,

(4) Transferability of harvest rights,

(5) Longevity of harvest rights,

(6) Mechanisms for adjusting the number of harvest rights,

(7) Handling disputes regarding issuance and transfer of rights.

The discussion of these seven elements will focus on Table 1 and the trawl license limitation proposal developed by the Fisherman's Marketing Association and Coast Draggers Association in 1984 (Attachment 1). Although that proposal was called a moratorium, it has the essential features of a license limitation program. Of interest here is the contrast between the features outlined in that specific proposal and the alternatives listed in Table 1. The seven categories are discussed in order.

SCOPE

The FMA/CDA proposal envisions a relatively narrow scope for the license limitation program in some respects (limited to trawl vessels) and a rather broad scope in other respects (covers entire coast and all

species of groundfish listed in the Management Plan). It leaves out all other commercial gear types and recreational fishing. Except in southern California, the recreational component of groundfish catch is too small (and will probably remain too small) for this exemption to matter much. Ignoring other gear types, however, is a more substantive deletion. Although trawl gear dominates the total catch, traps and longlines take a substantial amount of some species, and gill net fishing has grown to significant proportions in California. One strength of trawl-only approach is that it limits the most important element of the commercial fleet while minimizing the number of individual fishing operations that must be regulated.

By including all groundfish species and all fishing sites on the West coast, the FMA/CDA proposal would preserve great latitude in trawl fishing operations. Trawl vessel operators have suggested that they need to have many options open to them under any regulatory system. Geographic area and fish species are important dimensions of operational flexibility. Trawlers may move seasonally from northern to southern ports, they may switch from shoreside operations to at-sea joint venture fishing, and they may move from bottom dragging to mid-water trawling. Beyond the confines of groundfish, trawl vessels may shift between pink shrimp and groundfish trawling. These are all important aspects of operational fexibility for vessel owners.

Three alternatives to the FMA/CDA proposal meriting consideration are (1) to include all gear types in the license limitation program, (2) to limit the scope to "major" groundfish species, and (3) to permit small catch levels by unlicensed vessels. Extension to all gear types would increase the size of the licensed fleet by an order of magnitude, but would

bring the various fixed gear vessels under control early. This would address the potential future problem of expanding harvest capacity by an unregulated portion of the fishing fleet. Second, the idea of licensing only those vessels fishing "major" species would alleviate the need to include in the limited fleet every vessel that catches an occasional spiny dogfish or soupfin shark. Without restricting the program to major species, the extension to all gear types would undoubtedly make the system too all-inclusive and cumbersome.

A third option might be to allow unlicensed vessels to land groundfish so long as they remain below some low limit. All unlicensed vessels could be allowed, for example, to land up to 1,000 pounds of groundfish on any trip, or up to 10,000 pounds per year. This would permit the minor incidental catch of groundfish by trollers, shrimp vessels and purse seiners without adding these vessels (and the redundant harvest capacity they might represent) to a permanent licensed groundfish fleet.

MEANS OF LIMITING ACCESS

The FMA/CDA proposal is for a groundfish fishing license attached to the vessel. The principal alternative form of licensing, the personal fishing license, has been adopted in Alaska and elsewhere. The consequences of assignment to fishermen versus vessel owners are not immediately obvious. In Alaska it was thought that licensing fishermen would prevent cannery owners with corporate fishing fleets from financially dominating the local fishing labor force (Adasiak, 1978). The bargaining strength of vessel owners relative to licensed crewmen is weakened when the vessels owners cannot tap a large pool of new fishermen. Also in Alaska salmon fishing licenses cannot be used as collateral for loans and cannot be owned

by corporations. These provisions were supposed to protect licensed fishermen from some possible threats to their continued participation in the fishery. Where vessel ownership is not divorced from fishing this issue is less important.

Choice between attachment to individuals or vessels must be made in designing IFQ's as well. If the 10,000 ton sablefish ABC were allocated as 500 20-ton IFQ's, these could be assigned on the basis of historical share to fishermen, to vessel owners, or even to corporations involved in fish processing. With personal IFQ's a trawl vessel owner would need to hire a skipper or crew member holding an IFQ. With shares assigned to vessels the owner would have control of the harvest right and fishermen not owning vessels would be at a disadvantage; and with corporate ownership of shares the processors could more easily plan and manage the fleet fishing for them.

A sub-option for IFQ's is the partial implementation of the system for a subset of groundfish stocks. One could allocate the estimated annual allowable catch of widow rockfish, sablefish or Dover sole while leaving other species out of the IFQ system. Also, as suggested by Robert Stokes in his study of north Pacific halibut, one could establish IFQ's for a portion of the total harvest of a given species while retaining a communal fishery for the remainder of the harvest. This option has the advantage of providing a choice to fishermen who, for whatever reason, do not want to join a quantitative rights system. If one-half of the traditional harvesters of Dover sole object to an IFQ system, one could distribute IFQ's for half the annual yield to those wishing to join the system. The traditional harvest sector would fish from January 1 until one-half of the annual ABC is taken. Fishermen with IFQ's could fish whenever they wish,

and would probably schedule their harvest to maximize its landed value.

INITIAL ALLOCATION OF FISHING PRIVILEGES

The FMA/CDA proposal would allocate trawl licenses only to certain groundfish trawlers (1) landing at least 100,000 pounds, or (2) making at least 12 deliveries during 1984, or (3) demonstrating to an industry governing Board that they had prior involvement in the fishery and were active in the north Pacific or Bering Sea trawl fishery in 1984, or (4) demonstrating to the Board that they signed a contract or began construction or conversion of a trawl vessel during 1984. These qualifications would exclude very few groundfish trawl fishing vessels from the licensed fleet. For that reason, this initial allocation of harvest rights would create no significant reduction in harvesting capacity.

Whether licenses or IFQ's are considered, the basic choice here is between administrative assignment and some kind of "market allocation". Administrative assignments are universally chosen in existing limited access programs, largely because government agencies (and legislators) are reluctant to take away historically established fishing rights. As noted in the previous chapter, when government regulations are designed to correct technical problems of communal resource use. use rights are generally assigned to actual, historic users in order to avoid causing a redistribution of wealth. When developing new resources (offshore oil) or distributing public resources not previously used (National Forest timber), however, government mechanisms tend to use more market-oriented allocations (auctions and royalties) which extract resource value from the users.

A case could be made that both historic use and new uses are found in

the Pacific groundfish fishery. Extensive historic use of most flatfish, rockfish and sablefish by commercial fishing fleets could establish an informal "ownership" of the right to harvest. At the same time, however, new or developing fisheries have no such specific historic use. Pacific whiting, shortbelly rockfish, sanddabs and possibly other groundfish stocks would be essentially "new" from this perspective. A mix of administrative and market allocation of initial harvest rights could be justified on this basis. Ultimately, there is no technically correct answer to the initial allocation question. Distribution of public resources can and has been done in many ways.

TRANSFERABILITY OF LICENSES AND QUOTAS

Under the FMA/CDA proposal the trawl licenses would be transferred with sale of the vessel, and could be shifted from one vessel to another by the owner if the licensed vessel is lost or if the owner wants to "up grade" or "down grade" his vessel. Although the license itself would not be salable under this system, it would be fairly easy to perform almost any kind of transfer. For example, if a licensed vessel owner wants to take his vessel to a different fishery, he could replace his vessel with another and then sell the new vessel with license. Or, he could sell the original vessel with license to another fisherman, who would then replace the vessel and sell the original vessel back to the original owner. There would be no apparent market value to a license, but the difference between vessel prices with and without a license would provide a good indication of license value. The restriction on salability simply makes transactions involving limited harvest rights a cumbersome and roundabout process.

An alternative to this is a fully salable license. If sufficient

numbers of licenses or quantitative harvest rights (IFQ's) change hands on a routine basis, the market allocation of fishing rights would have all the advantages and disadvantages of market allocations that are experienced in other sectors of the economy. Market allocations are presumed to facilitate the efficient entry and exit of resource users. Less adept or profitable harvesters would be encouraged to sell their rights and enter a different line of work, while more efficient operators could expand. No coercion would be necessary, since anyone with a license or harvest right would have the option of not selling.

With vessel licenses as proposed by FMA/CDA sufficient transferability seems to be incorporated. For an IFQ system to work, however, true market sales would be almost a necessity. One alternative is for annual harvest quotas to be initially allocated among vessel owners in proportion to their historic shares. A vessel owner with a vessel that breaks down for an extended time would want to sell any quotas he owns to another operator. Also, a vessel which is harvesting mostly rockfish may want to shift into shrimp or Dover sole fishing. The owner will need to sell one set of quotas and buy a new set. Without the freedom of market sales, it would be difficult to maintain operating flexibility with quantitative harvest rights.

LONGEVITY OF HARVEST RIGHTS

In view of the long-lived investments inherent in both fishing vessels and fishing know-how, there seems to be no logical reason to have licenses or IFQ's expire annually or over a short period of years. The FMA/CDA proposal allows perpetual trawl licenses. Only if a vessel owner failed to meet minimum landing requirements and failed to seek an exemption for his

vessel would a license be automatically retired. Personal licenses in Alaska and elsewhere are also perpetual. The Pearse Commission recommended that British Columbia salmon licenses be issued with a ten-year term, but that proposal was part of an intended fleet reduction program that would end with issuance of a smaller number of perpetual licenses.

In a limited access program incorporating all gear types, however, it might be useful to issue short-term licenses to vessels that really intend to fish only for a short time or which temporarily exceed some maximum harvest level allowed for unlicensed vessels. With a fully marketable IFQ system, anyone wanting to enter or leave the groundfish fishery temporarily would have the opportunity to do so.

MECHANISMS FOR ADJUSTING NUMBERS OF HARVEST RIGHTS

Under the FMA/CDA proposal the number of trawl licenses, once established, would change only where individual owners allowed their licenses to lapse. Because these licenses would be potentially valuable in the future, it would be unlikely that significant numbers of vessel owners would voluntarily withdraw from the licensed fleet. Assuming that there will be slow attrition from the trawl fishery, the FMA/CDA proposal calls for an annual review of the size and condition of the fleet. No specific procedures are included, however, for either causing more rapid decrease in the fleet or for increasing the number of licenses at some future time.

To achieve an economically efficient fleet size, some reduction in number of vessels would be necessary under a license limitation program. On the other hand, an expansion of the currently developable fisheries for Pacific whiting and shortbelly rockfish might justify adding to the fleet.

For fleet reduction, attrition and buyback programs are the only frequently discussed alternatives. For attrition to have much effect, there must be fairly stringent annual requirements for renewal of licenses, and the licenses must not be transferable to new fishermen. This approach, therefore, seems to impose a rather arbitrary distribution of fleet reduction burden among fishermen. Also, while waiting for attrition to take its toll, many fishermen may remain in the fishery after they should have left for health or safety reasons.

Buyback of vessel licenses provides a positive means of reducing the number of vessels, but it requires a source of funding. In their extensive review of buyback of fishing rights, Schelle and Muse (1984) found only one that was not a government subsidized program. If Congress and state legislatures are not prepared to provide financing, then fees and royalties from the fishery could be used to create a fund for buyback. A large number of technical issues need to be addressed in designing a buyback system, including (1) determining the target fleet size, (2) choosing whether to buy licenses only or to include vessels and gear, (3) whether to target the buyback on a specific distribution of vessel sizes and capacities, and (4) the specifics of the application and offer system.

An innovative means of reducing vessel numbers was implemented in the British Columbia roe herring license system (Macgillivray, 1986). The fishery was divided into three subareas and each licensed fishermen was allowed to choose one area. Licenses are salable, however, and a license owner may buy up licenses from all three areas. If management authorities stagger the openings of herring fishing seasons in the three areas, this method of fleet reduction allows consolidation of fishing operations with attendant reductions in fishing costs. Potentially, the total number of

participants could fall to one-third the original number. In fact, from 1981 to 1985 the total number of licenses fell from 1557 to 1132. As of 1985 only 17 vessels had three licenses. It has been reported that the British Columbia system resulted in both improved product quality and reduced fishing costs.

Under an IFQ system, numbers of participants need not be adjusted directly. Instead, the quota initially allocated will be redistributed in private market transactions to determine the number of participants. With marketable IFQ's, adjustment of numbers of vessels or fishermen is not administered by the management program. Nevertheless, ownership of IFQ's may be restricted to some defined class of "qualified" fishermen, and the number of such fishermen may be of concern. It is difficult to anticipate what issues might arise under such a system in the absence of any experience with it or a specific proposal.

HANDLING DISPUTES

Disputes are likely to arise concerning the initial allocation of harvest rights (whether licenses or IFQ's), and in exercising the mechanisms for license transfer, renewal and termination. Most existing license limitation programs avoid disputes regarding initial allocation by including almost every conceivable claimant. Alaska's salmon license program did not, much to the chagrin of the Commercial Fisheries Entry Commission. The Alaska system required the Entry Commission to establish means of determining the extent to which applicants met various criteria concerning historic participation, and dependence on the fishery. Challenges of the Commission's procedures and decisions still, after ten years of operation, constitutes a significant portion of the Commission's

business. This could be avoided by establishing quantitative criteria in law or regulation at the outset, rather than leaving interpretation of some vague criteria to a quasi-regulatory body.

To deal with the disputes that occur, several alternative procedures could be established. A review board dominated by fishermen and other industry members could decide whether individuals should be given licenses and whether proposed license of vessel tranfers should be allowed. A variant on this is to use the board to make recommendations to an agency administrator (e.g. an NMFS Regional Director) who would make an official ruling. Fishermen affected by decisions of the Board may feel that they will get a more sympathetic hearing before their peers than before a non-fishing administrative or judicial panel. On the other hand, both fishermen and the public at large may occasionally fear that conflicts of interest or favoritism are more likely to affect the decisions of an industry-dominated review board.

Other approaches could include use of an Administrative Law Judge (ALJ) to hear evidence and make recommendations or rulings. Agency administrative procedures could be used to hear grievances and make rulings. In any case, a fisherman has access to the courts to seek redress of arbitrary or wrongful actions by the management agency.

CONCLUSIONS

The basic elements of a limited access program can be developed and combined in almost infinite variety to meet the specific needs of a particular fishery and its circumstances. This chapter has introduced and explained many of the most commonly-discussed alternatives. These were grouped into seven categories ranging from scope of the fishery to means of dispute settlement. The trawl license moratorium proposal submitted by the Fishermen's marketing Association and Coast Dragger's Association provided a useful benchmark for comparison which helped to clarify the explanation of other options. Further innovation in developing variants on these alternatives will be important for fishermen, managers and scientists involved in using limited access programs for public fisheries management.

TABLE 1. **LIMITED ACCESS PROGRAM ELEMENTS AND OPTIONS**

1. Scope of Fishing Activities to be Restricted or Allocated	
A. Types of Fishing to be Included	1. All commercial and recreational
	2. All commercial plus for-profit party and charter boat fishing
	3. All commercial fishing
	4. Just "big-time" commercial operations, such as those landing at least 50 tons of groundfish per year.
B. Geographical extent	1. All Pacific coast including at-sea sales
	2. All Pacific coast shoreside landings
	3. Pacific coast shoreside harvests from the 3-200 nautical mile zone (FCZ, excluding State waters) .
	4. Harvests in certain selected INPFC areas such as the Vancouver or Columbia areas.
C. Fishing Gear Types	1. All gear including groundfish trawl, hook and line, fish pots, gill nets and shrimp trawls.
	2. Control only "directed" fishing with trawl gear, fish pots and gill nets.
	3. Control only the major gear type - trawls (see FMA Proposal).
D. Species of Fish	1. All species listed in Groundfish Fishery Management Plan
	2. Include only "important" groundfish species (e.g. all rockfishes, whiting, sablefish, Dover sole, English sole, petrale sole, Pacific cod, ling cod).
	3. Focus harvest permits or rights on single species or logical groups of species. For example, a "rockfish" permit or a "whiting" joint venture permit.

Figure 1 continued.

II. Means of Limiting Access to the Fishery

A. License Limitation	1. Personal License to fish (with or without limiting to "natural persons").
	2. License attached to vessel
	3. License attached to gear (e.g. net)
	4. Dual system: fishing license for people plus vessel or gear permits.
B. Individual Fisherman Quota (IFQ)	1. IFQ conveys right to take a share of the allowable yield of specific stocks.
	2. IFQ conveys right to take annually a specified quantity from a specific stock.
	3. Annual yield is assigned to a company or fisherman's cooperative to be sub-divided among fishermen. ("Enterprise quotas")
C. Taxes, Royalties and Fees	1. Set initial entry fees high enough to discourage excessive participation.
	2. Establish landings royalties for fully utilized species.
	3. Establish annual license renewal fees.

III. Basis for Initial Allocation of Harvest Rights

A. Administrative Assignments	1. Include all persons or firms with recent record of landings. (e.g. landed at least one fish in the past five years)
	2. Include all applicants within a specified time period.
	3. Include all persons or firms meeting minimum landings requirements.
	4. Hold a lottery among all applicants.
	5. Include all persons meeting certain qualifications as commercial fishermen.
B. Competitive Market Allocation	1. Auction off limited number of fishing licenses or IFQ's.
	2. Sell licenses or IFQ's at prices calculated to reflect market values.

Figure 1 continued

IV. Transferability

A. Non-transferable	1. Retirement or death causes termination of fishing license or harvest right; may revert to State to be re-issued.
	2. Ownership transfer no allowed, but owner may lease or lend fishing right.
B. License or IFQ attached to specific vessel or gear.	1. Transfer requires sale of vessel or gear.
	2. May be transferred among vessels of equal fishing capacity.
	3. May be subject to clearance by State and qualification of new owner.
C. Fully transferable at discretion of owner.	1. Market sales may be subject to clearance by State fisheries agency or review board
	2. State may require that new vessel have no more harvest capacity that previously licensed vessel.

V. Duration of Term of Fishing Right

1. Perpetual. The license or IFQ can be used as long as the owner wishes.
2. Annual, renewable or non-renewable. Renewal could be automatic or could depend upon continued participation in fishery.
3. Dependent upon lifetime or career of permit holder. License or right expires upon death or retirement of holder.
4. Fixed, multi-year term. License or IFQ might confer right to fish for, say, ten years.

Figure 1 continued

VI. Means of Altering Number of Licenses or Fishing Rights

A. Fleet Reduction	1. Attrition through retirement, termination, revocation for cause.
	2. Buy-back of perpetual or long-lived licenses by State or Federal agency.
	3. Automatic expiration of fixed-term licenses in conjunction with issue or sale of reduced number of new licenses.
B. Increase in number licenses or rights.	1. Lottery among "qualified applicants".
	2. Sale to applicants at agency-established price.
	3. Selection of new licensees on first-come, first-served basis.
	4. Auction of new licenses or rights in competitive market open to all.

VII. Settling Disputes Regarding Issuance and Transfer of Fishing Rights

A. State/Federal Court	The fishermen can ultimately seek redress in the courts under any of the options.
B. Administrative Law Judge (ALJ)	1. ALJ could make a final administrative ruling after hearing with fisherman
	2. ALJ could make recommendation to agency administrator after hearing issue.
C. Special Appeals or Review Board	1. A board of peers (industry representatives) could make rulings or recommendations to agency administrator.
	2. A board of disinterested citizens could hear disputes.
D. Agency Administrator	1. Administrator could make final rulings for agency (e.g. NMFS Regional Director).
	2. Administrator could be bound to pass issue to Federal department head.

Elements of a Proposal for a Groundfish Trawl License Moratorium by the Fishermen's Marketing Association and Coast Draggers Association

1. A trawl license would be established by legislation in the states of California, Oregon and Washington which would create a groundfish trawl license and simultaneously place a moratorium upon their issuance. The legislation would become effective only when all three states have adopted similar legislation.

2. A regional groundfish trawl license would be established with the license assigned to a particular vessel. This license would allow the vessel to operate in the waters adjacent to and deliver groundfish to the states of Washington, Oregon, and California. The license may be transferred with sale of the vessel.

3. An industry governing Board should be established. This should be a tri-state Board composed of one person representing the directors of the three state fisheries departments and nine active trawl vessel owners. The director's representative should act as chairman of the Board and vote only in case of a tie. The person selected to represent th directors should rotate annually amongst the three states. There should be three vessel owners selected by the Governor or Director of each state. The selection should be made from a list of names submitted by a trawl association or individuals at large. The vessel owners should serve three year terms staggered on one year intervals.

A quorum for the Board should be five vessel owners with at least one vessel owner form each state present. Actions requiring the approval of a vote should pass with a simple majority of members present.

4. Funding of the administration and cost of the Board meetings should be covered by the levy of a flat fee of $100 per vessel. This fee should be collected when the vessel owner purchases his commercial license.

5. In order to receive a license a vessel must meet an initial qualification of either delivering 100,000 pounds of groundfish or making at least 12 deliveries of groundfish during 1984 using legal trawl gear for groundfish as defined by the Pacific Coast Groundfish Management Plan. This qualification cannot be met by delivering incidentally caught groudnfish from another fishery.

6. In order to maintain a license a vessel must continue to meet the initial qualifications of 100,000 pounds or 12 deliveries on an annual basis. If a vessel owner knows beforehand that his boat will not be able to meet the continuing qualifications because of removal of the vessel from the groundfish fishery into another fishery, he may request an exemption form the governing Board in advance.

7. Individuals with a contract signed during 1984 or have begun new construction or conversion during 1984 shall qualify for a license. However, the governing Board must first verify the validity of such contracts for or initiation of construction or conversion.

8. The governing Board may grant licenses to anyone based upon prior involvement in the fishery, provided they have remained active in the trawl fishery in the Northeast Pacific or Bering Sea and they appeal for the license during the first year of this moratorium.

9. Unconditional replacement of vessels should be allowed. Replacement of vessels lost due to sinking or the desire to upgrade or down-grade should be allowed. If a person wishes to up-grade or down-grade with a second vessel the original vessel must be removed from the fishery.

10. The size and condition of the fleet should be revlewed annually. The size of the fleet will slowly decrease through attrition. An annual review should establish if the fleet is higher than, equal to, or below the optimum level in relationship to stock size and market demand.

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