Individual Transferable Quotas in Fishery Management

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Summary

An individual transferable quota (ITQ) is an allocated privilege of landing a specified portion of the total annual fish catch in the form of quota shares. This differs from the traditional open-access approach to commercial fisheries. ITQs divide the total annual catch quota into smaller individual portions. ITQs are generally transferable, which means fishing vessel owners can sell their ITQ certificates or buy others' certificates or, in some cases, lease their quota shares depending on how much (or whether) they want to participate in the fishery. ITQs are not considered property, but a privilege to catch a share of the total allowable catch of fish or shellfish in a given year. The initial allocation criteria for ITQs are controversial decisions established by Regional Fishery Management Councils, usually based on the historical catch of vessels, to benefit current active fishing vessel owners.

Currently, three Federal ITQ programs operate in the United States — for surf clam and ocean quahog in Mid-Atlantic and New England waters; for wreckfish along the South Atlantic coast; and for halibut and sablefish off Alaska. Internationally, New Zealand introduced the first major ITQ program in 1986. Other countries with ITQ management programs include Australia, Canada, Iceland, Italy, the Netherlands, and South Africa.

ITQ programs are intended to reduce overcapitalization, promote conservation of stocks, improve market conditions, and promote safety in the fishing fleet. ITQ programs guarantee a share of the catch, thus generally slowing or eliminating the "race to fish" and allowing fishermen flexibility over the rate and timing of their fishing.

ITQ programs have been criticized for increasing the incentive for fishermen to file false catch reports and to "high-grade" their catch. In some cases, it is also possible for processors or wholesalers to obtain effective monopoly control over the landings. ITQs could discourage new entrants into a fishery because of the additional capital investment required to purchase or lease quota shares. In addition, ITQ programs may require additional enforcement expense and could cause substantial unemployment and socio-economic dislocation in coastal communities. Finally, the equity of current approaches to initial allocation of ITQ shares is questioned for their creation of wealth and windfall profits and their exclusion of processors and crew.

Knowledge and understanding of ITQ programs is evolving rapidly and much is being learned. Many of the early problems with ITQs resulted from program design and may not be inherent in the concept of ITQ management. However, analysis of ITQ program implementation is scant, to date. ITQ programs have generated substantial concerns, but how much of that criticism will prove valid and how much of the benefits claimed by proponents might be realized is still to be determined.

ABSTRACT

Individual transferable quotas (ITQs) are controversial fishery management measures allocating privileges of landing a specified portion of the total annual fish catch in the form of quota shares. This management option differs from the traditional open-access approach to commercial fisheries, and allows fishing vessel owners to sell their ITQ certificates or buy others' certificates or, in some cases, lease their quota shares depending on how much (or whether) they want to participate in the fishery. ITQ programs are intended to reduce overcapitalization, promote conservation of stocks, improve market conditions, and promote safety in the fishing fleet. ITQ programs guarantee a share of the catch, thus generally slowing or eliminating the "race to fish" and allowing fishermen flexibility over the rate and timing of their fishing. Amendments to the Magnuson-Stevens Fishery Conservation and Management Act in 1996 suspended consideration of new ITQ programs while the National Academy of Science conducted a study of three existing federal ITQ programs and their merits.

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Individual Transferable Quotas in Fishery Management[1]

In 1976, Congress enacted the Magnuson Fishery Conservation and Management Act, authorizing the Federal Government, coastal States, the fishing industry, and other interested parties to work together through eight Regional Fishery Management Councils to manage the Nation's fishery resources (16 *U.S.C.* 1801-1882). The initial goal of the Magnuson Act was to convert the fishery off U.S. shores from foreign dominance to a domestic industry. This was accomplished within 15 years, resulting in the industrialization of some portions of the U.S. fishing fleet. Another central goal of the Magnuson Act is to achieve long-term health and stability of various fisheries, prevent overfishing, and protect, restore, and promote the fishery through conservation and management (16 *U.S.C.* 1853(a)(1)(A)). However, progress toward this goal has been much slower.

Within the Magnuson Act, Congress authorized Regional Councils and the Secretary of Commerce to limit fishing effort (16 *U.S.C.* 1853(b)(6)). Individual transferable quotas (ITQs) — as well as the related individual fishing quotas (IFQs) — are measures that may be used to reduce effort and fishery overcapitalization. What role ITQs/IFQs might play in accomplishing Federal fishery management objectives is an issue in the 104th Congress's debate on reauthorization of the Magnuson Act.

What is an Individual Transferable Quota?

An ITQ (or IFQ) is an allocated privilege of landing a specified portion of the total annual fish catch in the form of quota shares. Quota shares designate how the total annual fish catch (*i.e.*, the total allowable catch or TAC)[2] is to be subdivided into specified portions for individual quota holders. ITQ management differs from the traditional open access for commercial fisheries, in which there is no limitation on who can catch the fish, as well as from license limitation programs.

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[1] Maribeth F. Dulay, Master's degree candidate at the University of San Diego, researched and prepared a draft of this report under the supervision of Eugene H. Buck, Senior Analyst in Natural Resources Policy.

[2] Management biologists calculate a TAC in each fishery. The TAC is the total amount of fish that may be harvested in a fishing season, in accordance with a fishery management plan for that fishery, with adjustments or reductions to compensate for amounts of the species taken as bycatch in other fisheries. The TACs are set annually by Regional Fishery Management Councils and approved by the Secretary of Commerce. The TACs are intended to ensure the long-term health and stability of the fishery. In managing through use of TACs, catch reporting is essential to verify individual harvest as well as the total harvest for the fishery.

ITQ shares are transferable; fishing vessel owners can buy or sell ITQ certificates or, in many programs, can lease their quota shares, depending on how much (or whether) they elect to participate in the fishery. IFQ shares might or might not be transferable.

Purpose of ITQs

The primary purpose of an ITQ program is to provide an incentive to manage capital (*i.e.*, reduce or control overcapitalization) in commercial fisheries,[3] and to improve the overall economic efficiency of the fishing industry. ITQs provide an alternative to open access. Market, safety, and social benefits are anticipated from controlling overcapitalization. Thus, ITQ programs are also intended to create a more stable and profitable market-based system for commercial fishing.

Allocations, Transfers, and Property Rights

Regional Fishery Management Councils decide allocation criteria and transfer guidelines for ITQ shares and may choose a variety of ways to design ITQ programs. Thus, individual ITQ programs may differ, reflecting an active and rapid evolution in the understanding of this management approach as well as differences in the fisheries being managed and the objectives of the Councils' management plans.

Initial Quota Share Allocations

Regional Councils recommend initial allocation criteria (*i.e.*, qualifying schemes), which must comply with the National Standards of the Magnuson Act (16 *U.S.C.* 1851(a)). A Council decides who can participate. In the U.S. surf clam and ocean quahog ITQ fishery, for example, anyone — domestic or foreign — can own ITQ quota shares,[4] but only U.S. vessels may harvest and land the product. In the Alaska halibut and sablefish ITQ fishery, quota shares were initially allocated only to qualified vessel owners, who generally must be U.S. citizens, or corporations, partnerships, associations, or other entities that meet the Federal standards for documenting a vessel in the United States.

The "individual" part of ITQs is determined by dividing the annual TAC into smaller individual shares. Fishing vessel owners receive ITQ certificates that allow them to catch a fixed number of shares, representing a specific percentage[5] of the

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[3] For additional background on overcapitalization, see CRS Report 95-296 ENR, Overcapitalization in the U.S. Commercial Fishing Industry.

[4] Although beyond the scope of this paper, it is an interesting issue whether foreign ownership of ITQ quota shares might contravene the intent of the Magnuson Act to extend U.S. control over all fisheries within U.S. 200-mile jurisdiction.

[5] All the initial New Zealand ITQs in 1986 were allocated on a tonnage basis. New Zealand law provided that, if necessary, the Government would enter the market and purchase (continued...)

TAC. ITQs have often been allocated to fishing vessel owners without charge,[6] based on historical catch during a specified qualifying period. Such an allocation is designed to benefit active fishing vessel owners, according to the history of their vessels' participation in the fishery.[7] Vessel owners with extensive historic catches during the specified qualifying period of years receive larger ITQ shares than vessel owners with minimal catch during this same period.[8] Vessel size has also been used as a factor in some programs for determining initial ITQ share allocation. Participation in an ITQ program can be separated into ownership of quota shares and ownership/ operation of fishing vessels used to catch the fish or shellfish granted through those shares, by leasing or another arrangement that permits fishing for someone else's quota shares.

There is growing interest in developing initial allocation formulas that reflect factors other than historic catch record that are important to the fishing community, such as compliance with fishery regulations, use of "clean" fishing techniques (*i.e.*, minimal incidental bycatch), and historic participation even if current catches are relatively small. In addition, critics of current ITQ practice are expressing increasing concern that vessel owners are not the only parties that should receive an initial allocation of quota shares. Initial allocation can easily be the most controversial part of ITQ program development, but once it is completed (ideally through a consensus of stakeholders), it need not be repeated, unlike the time-consuming and contentious battles over allocation that occur frequently in open-access and license limitation regimes.

Transfers

Fishing vessel owners may sell, lease, or trade their entire quota or parts of their quota to others.[9] Because, in theory, any qualified individual can acquire quota

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[5] (...continued)
sufficient quota to cover any required harvest reduction. When faced with a potentially large reduction in orange roughy TAC, the Government shifted the risk to the fishing industry by amending law to provide for proportional quotas with TAC changes allowed at the beginning of the fishing year.

[6] No fees are collected for ITQs because the Magnuson Act currently prevents charging a royalty for use of the resource (16 U.S.C. 1854(d)) and because vessel owners would not support such a program if royalties were charged.

[7] However, because of the lengthy administrative process, as long as five years or more can elapse between the time a Regional Council determines the method of allocation and when the plan is actually implemented, creating the impression that inadequate consideration was given to "current" participants in the fishery. This problem contributed to public opposition to the Alaska halibut and sablefish IFQ program.

[8] The choice of years for the qualifying period is often very controversial since it may benefit one segment of vessel owners relative to another.

[9] Although beyond the scope of this report, alternative approaches exist wherein transfer is not permitted. Such an individual quota (IQ) program would not authorize sales and transfers. New entry would be provided when allocated shares reverted to the government upon retirement or exit from the fishery, and could then be reallocated by lottery, auction, or other
(continued...)

shares, the sales and/or leases operate in an essentially free market, and sale prices and lease rates fluctuate, depending on expectations of catch levels and fish/shellfish prices. However, in practice, Regional Councils can and do place restrictions on the market by dictating whether and how ITQs can be transferred. The market can be restricted to prevent excessive consolidation of effort and other undesirable effects with measures such as requirements that the quota share owner be onboard the vessel (to prevent absentee ownership), caps on the amount of quota share that can be accumulated by an individual or firm, and restrictions on trading outside of specified vessel classes or outside of the pool of eligible quota share owners.[10] Those who quit the fishery may sell their quota shares.

Property Rights

Technically, ITQs can be construed as exclusive, perpetual rights. However, in the United States, the National Oceanic and Atmospheric Administration considers ITQ quota shares not to be property, but to convey a *privilege* to catch an amount of fish or shellfish in a given year that can be renewed or revoked. ITQs, as currently implemented in the United States, are not permanent, and quota shares may represent a different resource quantity every year as the TAC may vary from year to year.[11] Nonetheless, the ability to sell or lease ITQ shares implies a more enduring, if not permanent, fishing access privilege.[12] While some fishermen have sought congressional clarification that ITQs represent only a harvest privilege, others have argued that an allocation of ITQ shares is, in effect, a taking of their current right to fish in the open-access fishery.[13] The legal basis for this assertion has not been tested extensively in the courts. In addition, no one has yet successfully argued that the

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[9] (...continued)
means. Non-transferability provisions are most often included when compensation or buyback options for fleet reduction are not acceptable. Thus, non-transferability leads, through natural attrition and retirement, to a smaller fishery. At some later point in the fishery, modifications to allow transfers or other means for new entry may be considered.

[10] National Standard 4 of the Magnuson Act (16 U.S.C. 1851(a)(4)) requires that fishing privilege allocations be carried out so that "no particular individual, corporation, or other entity acquires an excessive share of such privileges." Experience in eastern Canada indicates that shadow markets may develop wherein limits on the total quota that an individual or company can control are exceeded by formal, but illegal, private arrangements.

[11] There is interest in the 104th Congress in having regular or periodic review and renewal built into ITQ programs, making it even clearer that these privileges are not permanent.

[12] The Internal Revenue Service has treated quota shares as property, seizing (April 1995) and auctioning (May 1995) more than $1.5 million worth of Alaska halibut and sablefish IFQ shares from 65 fishing vessel owners for non-payment of back taxes.

[13] Indeed, it could be conceived that, under ITQ management where quota shares are awarded to past participants in the fishery, U.S. citizens could argue, as a class, that their traditional right to participate in an open access fishery had been taken.

Federal Government's ability to adjust and modify an ITQ program constitutes grounds for a regulatory "taking."[14]

To date, few private banks accept ITQs as collateral for loans, primarily because they are not comfortable with the existing system for determining the history of previous liens and because banks have difficulty in establishing the value (*i.e.*, long-term earnings potential) of ITQs.[15] The collateral value of Alaska halibut and sablefish IFQ shares is minimal (generally about 20 percent of their market value). Provisions have been included in several bills introduced in the 104th Congress to establish a central registry of ITQs to better track liens and share ownership.

The concern remains that the substantial capital value and investment in ITQs (*e.g.*, possibly $500 million or more in North Pacific halibut and sablefish IFQs) will make these programs very difficult to terminate, and that Federal buyouts may become necessary. Ultimately, only Congress, as interpreted by the courts, can determine whether ITQ quota shares (or the opportunity to fish in an open-access fishery) convey a right in perpetuity to the owner.[16] However, the chances of a successful takings claim based on revocation of an ITQ are remote, since the Federal Government explicitly reserves the right to revoke ITQs or terminate the program. The sunset provisions for ITQs in some of the bills proposing to amend the Magnuson Act in the 104th Congress create a substantial climate of uncertainty among people considering whether to buy or sell ITQ shares. Such uncertainty could be very costly to people who are facing decisions on whether to sell or buy more ITQs, especially those who choose to buy now should the ITQ program terminate in a short time period.

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[14] For the surf clam and ocean quahog ITQ program, see Sea Watch International v. Mosbacher, 762 F.Supp. 370 (D.D.C. 1991).

[15] The Cristiania Bank of Norway and the Key Bank of Seattle have accepted ITQs as collateral for factory trawler loans. (Early in 1995, the Cristiania Bank of Norway sold its factory trawler loans to Trust Company of the West and other financial groups.) The National Westminster Bank of Jersey is currently one of the largest holders of ITQ shares in the Mid-Atlantic and New England surf clam and ocean quahog fishery.

[16] This situation parallels the debate over grazing leases and permits on Federal lands. The law clearly identifies grazing as a privilege, subject to renewal or revocation (for cause) by the Federal Government, and not salable or transferable (but some are sub-leasable). Nonetheless, the value of grazing leases and permits is capitalized into the value of the lessees' or permitees' ranches, and is used for loan collateral.

Current ITQ Programs

U.S. ITQ Programs

Currently, three Federal ITQ/IFQ programs exist in the United States: for surf clams and ocean quahogs in Mid-Atlantic and New England waters; for wreckfish along the South Atlantic coast; and for halibut and sablefish in Alaskan waters.[17]

The surf clam and ocean quahog ITQ program was developed by the Mid-Atlantic and New England Fishery Management Councils and implemented by the National Marine Fisheries Service (NMFS) in October 1990. This was the first Federal ITQ program in the United States. The fishery is pursued from offshore of Virginia northward to the Canadian boundary. Before the ITQ program, the Council tried a license limitation program, but vessel owners only made their vessels more powerful and efficient, increasing fleet capitalization. For surf clams, ITQs were initially allocated to vessel owners based on their historical catch record in 1986, 1987, 1988, or 1989. ITQs for ocean quahogs were allocated according to average catches for years between 1979 and 1987 when vessels reported landings. ITQs can be traded or leased, with no requirement for vessel ownership or restriction on the total amount of ITQ shares owned. In 1994, 48 vessels landed surf clams, while 36 vessels landed ocean quahogs; before the ITQ program, in 1989, 135 vessels fished surf clams and 69 vessels fished ocean quahogs. Previous fishing time restrictions on the surf clam fishery were lifted under the ITQ program. For administrative purposes, no quota share transfers can occur during the last two months of the season.

The wreckfish ITQ program was developed by the South Atlantic Fishery Management Council and implemented by NMFS in April 1992. These ITQs were allocated to vessel owners based 50 percent on their historical catch record in either 1989 or 1990, with the remaining 50 percent divided equally among all those who qualified to receive quota shares. To be eligible, a vessel owner had to document catches of at least 5,000 pounds of wreckfish. Wreckfish ITQs are fully marketable and can be sold, traded, or leased within the management area. The wreckfish ITQ program does not restrict gear, type of vessel, or the amount of shares one can hold. In the 1994 season, 17 vessels landed wreckfish; 38 vessels had landed wreckfish in 1991, before the ITQ program.

The halibut and sablefish IFQ program[18] off Alaska was developed by the North Pacific Fishery Management Council in 1992 and implemented by NMFS in March 1995. In 1993, the Alaska halibut fleet was estimated at 3,460 vessels, while the sablefish fleet was estimated at 740 vessels. IFQs were allocated to vessel owners and lessors who landed fish in 1988, 1989, or 1990, and based on total landings in their

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[17] In addition, the spiny lobster fishery off Florida features an ITP (individual transferable pot) certificate program, administered by the State of Florida. Participation in this program is compulsory for spiny lobster fishing in Federal offshore waters. This program will not be discussed further.

[18] This is an IFQ program, rather than an ITQ program, because transferability of shares is restricted by several criteria.

best 5 of the 7 years from 1984 through 1990 (halibut) or best 5 of the 6 years from 1985 through 1990 (sablefish). Shares were allocated within separate management areas and for specific vessel size classes. In addition, quota shares issued in amounts less than 20,000 pounds of IFQ in the implementation years were issued as "blocks" which are indivisible upon transfer. No such transfer restrictions exist for quota shares initially issued in amounts greater than 20,000 pounds of IFQ. Halibut and sablefish IFQs are marketable, but can be sold or traded only within each management area, within the same vessel size category, and with restrictions on the total amount and type of quota held. Although most original IFQ recipients can use hired skippers to fish their shares, new entrants must be onboard the vessel when their shares are caught. As much as 10 percent of IFQ shares in catcher vessel categories may be leased, and there are no restrictions on leasing freezer vessel category IFQs. The lease provisions have a three-year sunset and will expire at the end of 1997. In addition, the program limits who can own IFQs and the total amount.

International ITQ Programs

New Zealand introduced the first major ITQ program in 1986; currently, this program applies to 32 species in 10 management areas. Industry-funded stock assessments are common for New Zealand ITQ fisheries. Italy has a clam ITQ program. Australia has an ITQ program regulating the southern bluefin tuna fishery and the Tasmanian, Victorian, and South Australian abalone fisheries. South Africa manages its abalone fishery by ITQs. Canada has several fisheries that are managed by ITQs along both Atlantic and Pacific coasts and in the Great Lakes. ITQs also are also used to manage most Icelandic fisheries as well as the Netherlands sole and plaice fishery. Although this is not a comprehensive list of all non-U.S. ITQ programs, it indicates that ITQ management is widely used, internationally.

The international record so far indicates that ITQs can be very effective in reducing or eliminating overcapitalization and the race for fish; also profits and overall economic efficiency can increase, sometimes dramatically. The limited data on conservation that have been collected indicate that ITQ management increases compliance with TACs and other fishery regulations, and that ITQ holders have more vested interest in the future of the fishery than do fishermen in open-access fisheries (as indicated by the value of quota shares many times higher than the value of the catch that the shares represent in a given year).[19]

The Controversy

ITQ have become quite controversial, with different constituencies claiming a variety of effects on the fisheries. This section looks at seven topics — capitalization and consolidation; conservation; seafood market and price; safety; enforcement and administration; employment and community stability; and equity and wealth creation. Each topic is discussed presenting the arguments voice in support of ITQs, the

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[19] See, for example, M.P. Sissenwine and P.M. Mace. "ITQs in New Zealand: The Era of Fixed Quota in Perpetuity." Fishery Bulletin, v. 90, no. 1 (1992): 147-160.

criticisms and limitations cited by opponents, and an assessment of the experience and performance for implemented U.S. ITQ programs.

Capitalization and Concentration

Pro. Under the open-access race for fish, early entrants into a fishery find their investment and profits eroded or eliminated by subsequent entrants. Under an ITQ program, large capital investment to purchase more equipment and hire more crew members to attain greater short-term fishing power is unnecessary. And since fishermen have a secure catch share, they can fish throughout the entire season and use the most economical way of fishing. Thus, competition to increase fishing power (speed) on each vessel is reduced by ITQ programs, allowing vessel owners to match capital equipment investment more closely with the amount needed to harvest the quota shares held (rather than trying to plan for an unpredictable catch), with extraneous capital employed more productively elsewhere in the economy. This reduces overcapitalization. If fishermen do not fish, then they lease their quota shares. Or if they believe their quota share is too small to make a profit, then they may buy or lease ITQs from other fishermen, or sell their shares and leave the fishery.

The transferability of ITQs improves the overall economic efficiency in the fishery by encouraging some fishing vessel owners to sell or lease their ITQs, rather than to continue fishing.[20] Fleet efficiency improves under an ITQ program because fewer fishermen are able to catch the same amount of product that a larger fleet landed under open access. Fishing vessel owners can liquidate their stake in the fishery by selling quota shares and taking boats off the water or moving to other fisheries. Fishermen often find it uneconomic to operate with small quantities of quota shares, and may opt to sell their ITQs, receiving some financial return for their investment in the fishery as opposed to receiving no return if they go out of business in an open-access fishery.

Con. In an unrestricted ITQ program, an individual or group of individuals could influence the market by obtaining a disproportionate share of allocations. Processors or wholesalers could also exert substantial control over the industry by obtaining a large portion of the quota shares. Under an ITQ program, operators with access to capital at the lowest interest rates will be in the best position to acquire additional quota shares. Thus, corporate investors, rather than more efficient fishermen, are likely to purchase available ITQ shares. In addition, expectations for an essentially free market in quota share trading could prove unfounded because of the limited size of the market and uncertainty in share pricing.

Success in commercial fishing has traditionally depended upon the ability to switch among fisheries as conditions (*e.g.*, fishing pressure, environmental conditions, market forces, natural fish stock fluctuations) warrant. Such flexibility may be lost as if many fisheries are managed under ITQ programs.

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[20] However, some people may choose to remain in a fishery for lifestyle reasons rather than for making a living efficiently.

Lacking sufficient quota shares to operate economically, some fishing vessel operators may leave an ITQ fishery, selling shares to those who have more capital. ITQs may discourage new entrants into a fishery because of the additional capital investment required to purchase or lease quota shares in addition to vessel and gear required to enter an open-access fishery. All the above concentrate shares.

Assessment of Performance. In the surf clam ITQ program, substantial capital savings have accrued. Before the ITQ program, fishing was permitted only six hours every other week, leading to low use of existing capacity and low efficiency. Once ITQs were implemented, fleet size quickly shrank from 128 vessels (1990) to 59 vessels (1992). Vessels were consolidated or retired and remaining fishing vessels improved their productivity. This reduction occurred while the TACs for surf clams and ocean quahogs were reduced by 12 percent and 8 percent, respectively. At the same time, landings were close to optimum (defined as TAC), with landings of surf clams down only 4 percent and ocean quahogs actually increasing by 4 percent. In addition, surf clam vessels appeared to operate more efficiently — average number of fishing trips per vessel increased from 47 in 1990 to 83 in 1992.

In the surf clam and ocean quahog ITQ program, large companies control a substantial portion of the quota shares.[21] Borden, a major food company, had attained control of 40 percent of the quahog and 25 to 30 percent of the surf clam shares in 1990.[22] Currently, National Westminster Bank of Jersey and KPMG, an accounting firm, are the largest holders of ITQs in the surf clam and ocean quahog fishery.[23] Thus, substantial consolidation was already in progress when the ITQ program was implemented for this fishery. However, control can be exerted in open-access fisheries where a relatively few processors may determine the price offered to fishermen.

Consolidation also occurred in the wreckfish ITQ program, but with little concentration of shares by processors or other corporate owners. The halibut and sablefish IFQ program apportioned IFQ shares to different size vessels and restricted transfer to vessels in the same size class. Thus, small vessel shares cannot be bought out by larger vessels.

In response to concerns that ITQs may be detrimental by restricting flexible movement of fishermen among fisheries, advocates of ITQs point out that flexible movement among fisheries was primarily a fisherman's response to short "derby" fishing and a flight from intense competition. As such, the stability provided by an ITQ program may make such flexibility less important. In addition, even under an

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[21] Even prior to ITQs, this fishery was controlled by a handful of vertically integrated processors along with a few independents, some of which had very large fleets. Although vessel consolidation has occurred, the pattern of control is not markedly different from what it was before the ITQ program, except that almost all the original owner-operated boats are no longer fishing. A few new entrants have entered this fishery.

[22] Borden sold all its quota shares in this fishery in 1994.

[23] Most of these shares are held as escrow or in lieu of collateral, and do not necessarily mean control is exercised by these entities.

ITQ program, fishermen have the option of purchasing shares in several different fisheries to preserve the flexible option of moving between fisheries.

Criticism that ITQs make it difficult to enter a fishery indicates that ITQ programs are indeed addressing their objective of reducing overcapitalization. Lacking sufficient quota shares to operate economically, some fishing vessel operators may choose to leave an ITQ fishery, selling shares to those with capital. ITQ programs do discourage casual new entrants into a fishery because of the additional capital investment required to purchase or lease quota shares. However, ITQ program design can incorporate a lottery or other means to allocate reserved TAC or revoked quota shares to potential serious new entrants. Thus, new entrants replace existing effort. In the first year of the Alaska halibut and sablefish IFQ program, sales of IFQ shares appeared brisk with many new entrants to the fishery. Thus, the initial conclusion might be that a reasonable balance might have been achieved by consolidating the fishing fleet, not by restricting new entry.

The general pattern in ITQ programs has been fleet consolidation. Indeed, it appears inevitable, although not necessarily bad, that ITQ programs will contribute to greater wealth concentration within the commercial fishing industry. However, ITQ program design can alleviate or eliminate excessive share consolidation through ownership limits, requirements that quota share owners participate in the fishing, or other similar measures restricting quota share trading, such as were incorporated in the Alaska halibut and sablefish IFQ program. Alternatively, fleet expansion could occur if market conditions favor smaller fishing operations or should technological advances favor certain economies of scale which prompt additional capitalization. In addition, the number of vessels and participating shareholders in an ITQ fishery could increase if large shareholders subdivide and sell all or portions of their quotas. In some circumstances, therefore, ITQ programs alone may not promote consolidation sufficiently to reduce overcapitalization without a companion effort-reduction program, involving compensation or other buyout mechanisms to reduce fleet size.

Conservation

Pro. An ITQ program grants a fishing vessel owner a share of the fishery. To the degree that fishing vessel owners react as if they were "owners" of the fishery and that the fishery were no longer a "commons," overexploitation or resource waste that reduces the value of their fishing privileges will be minimized. And to the extent that fishing vessel owners perceive an increased security in their interests in the fishery, they have incentives to conserve and manage the resource, to protect the value of those interests. Also, when the race to fish is eliminated and time is no longer a constraint, fishermen tend to operate more efficiently. The potential for reducing incidental bycatch is an additional benefit, since it is believed that fishermen will fish more cleanly (*i.e.*, minimize their bycatch) if they can fish in a less hurried fashion.[24]

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[24] Under open access, a fisherman who moves to avoid high bycatch could lose in the race to fish. Under ITQ programs, however, no such disincentive exists to discourage vessel owners from ceasing fishing operations and moving to a new location. ITQ programs create an incentive to move since bycatch can be more effectively monitored on an individual basis.

(continued...)

In addition, ITQ programs could be designed to penalize poor bycatch performance through forfeiture of ITQ privileges. A primary objective of IFQ programs is to give incentives to conserve the resource, showing participants that the fish they protect and save have a greater likelihood of benefitting themselves and not others.

Con. As long as only retained catch must be reported rather than total catch, ITQ programs may encourage high-grading. Under individual quotas, fishermen seek to deliver the best quality of fish to maximize the price received. The fisherman has an incentive to "high-grade" the catch, by discarding lower quality fish that count against the quota. This situation is less problematic in open-access fisheries, because the race to fish usually provides a substantial incentive for fishermen to deliver as much as they can catch as quickly as possible. In addition, migratory resources exploited by several user groups in different locations may not be amenable to a slower pace of fishing throughout the year under an ITQ system.

In anticipation of ITQ program implementation, fishermen may over-report their catch in an attempt to gain an advantage in any quota share allocation scheme based on historical performance in the fishery. This erroneous reporting could seriously impair the factual basis for managing the fishery.

Making a profit is the prime objective of commercial fishing. Thus, incentives to conserve the fishery resource may be less effective where only the fishing vessel owner, and not the crew and skipper, own the ITQ shares. And with thousands of boats in the Alaska halibut fishery, even a vessel owner holding ITQ shares has every reason to believe that what his single vessel does will have little effect on the fishery.

Assessment of Performance. High-grading is likely whenever the quantity of fish that may be landed is limited, as much by vessel capacity and trip limits as by an ITQ program, especially where large price differentials exist for fish of different size or sex.[25] Thus, high-grading problems are not limited to ITQ fisheries, but also occur in an open-access fishery.[26] An ITQ program designed to account for total catch, rather than just retained catch, and including a well-designed observer program will minimize high-grading and may be necessary to assure that ITQ program design benefits are attained. The surf clam and ocean quahog and the wreckfish ITQ

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[24] (...continued)

Variations of ITQ programs have been discussed that allocate separate ITQs for bycatch of certain prohibited species. Under such a system, a vessel could be required to stop fishing if the bycatch ITQ was reached before the target species ITQ, thus providing additional incentive to minimize bycatch, as long as observers were sufficient to assure that all bycatch was reported.

For additional information on incidental bycatch, see CRS Report 90-575 ENR, Waste from Fish Harvesting and Processing: Growing Environmental Concerns.

[25] In the Alaska halibut and sablefish fisheries before IFQ implementation, some processors paid different prices while others did not. It is uncertain how this practice might change under the IFQ program.

[26] Pacific coast (not Alaska) sablefish are managed by trip limits. With price differences of as much as $1.00 based on size, the incentive to high-grade is this open access fishery is obvious.

programs do not require fleet observers, so current at-sea bycatch and discards cannot easily be estimated.

A July 20, 1995, report from Fisheries Information Systems in Juneau, Alaska, noted that, after IFQ implementation, groundfish bycatch discards declined from 24 percent to less than 10 percent in the sablefish fishery. In addition, incidental catch declined, while small sablefish discard declined from more than 3 percent to less than 2 percent. The presence of NMFS fishery observers on larger vessels in the Alaska IFQ program undoubtedly restricts the opportunity to high-grade (smaller vessels are unable to carry observers). The initial flat prices offered by processors across different size classes of halibut during early 1995 suggest little incentive to high-grade. However, the increased landing size of sablefish reported for the Canadian ITQ program suggests that high-grading can be a concern. A decrease in vessels fishing achieved under an ITQ program probably will result in decreased fishing mortality, as long as high-grading is not excessive. Even with high-grading, survival of discards under an ITQ program may be higher, because fish can be handled properly. Although not used in current programs, an alternative approach could set quotas low enough to compensate for expected overfishing or high-grading, thus arguably attaining a more optimal catch.

Opposition to a proposed 50-percent reduction in wreckfish TAC declined substantially after ITQs were implemented, due to "new" concerns for the long-term health of the resource. Although, under ITQ programs, fishery managers may be able to concentrate more on conservation issues, stock assessments often become embroiled in seasonal controversies, since they influence TAC and the value of quota shares.

Conservation benefits of ITQ programs, derived from the implied "ownership" of the resource through quota shares, could be eroded by insecure expectations about the duration and conditions of ITQ privileges. Anxiety and uncertainty about the future can cause ITQ share owners to become just as oriented to short-term profits, as opposed to long-term sustainability, as open-access fishermen.

Seafood Market and Price

Pro. ITQs generally should eliminate or at least slow the race to catch fish common in many open-access fisheries by allowing fishermen flexibility over the rate and timing of fishing and providing them more freedom to customize their operations.[27] ITQs increase the flexibility of fishing operations within a fishery by imposing fewer restrictions on fishing period and choice of gear, vessel, or technique than in open-access fisheries. Fishing vessel owners decide on the time, location, and fishing method. Fishermen can fish at different times and thus supply processors with a more continuous flow of high-quality product. In addition, financial incentives for retaining

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[27] However, even ITQs will be unable to slow the pace where the fishing season is compressed due to specific biological or behavioral features of the species targeted (e.g., brief spawning aggregations of herring, adult salmon returning to ascend rivers and spawn). Regional Councils will likely impose some restrictions on fishing flexibility and freedom (e.g., restrictions on time, location, and methods of fishing) to attain conservation goals.

and marketing non-target species will likely increase under ITQ programs. Processors will not be bombarded with a huge amount of raw product during a compressed season that may exceed their handling capacity and might have to be frozen for future processing. With the moderate and regular landings under an ITQ program, more raw product can be processed for the higher-value fresh market. Processors will also achieve higher utilization rates by slowing down processing operations. Thus, fishermen have more bargaining power with buyers/processors and are likely to receive higher prices. And the fishery should produce a stable or increasing supply for consumers. Seafood quality is also likely to improve.

Con. ITQs could increase seafood costs because consumers will miss the low prices that occur during, and because of, the race to fish. In addition, the market power created by consolidation of ITQ shares in a smaller number of owners could lead to price-fixing, and consumers would pay more than in an open-access fishery.

Assessment of Performance. Under an ITQ program, competition for market price will likely replace competition for speed in catching fish, which prevails in open-access fisheries. Under an ITQ system, the most successful fisherman will more likely be the one who best minimizes costs and maximizes product value. Thus physical competition may be replaced by economic or market competition.

Before ITQs, surf clams averaged $8.00 per bushel, while ocean quahogs were $3.00 per bushel. At the end of 1994, the average price of surf clams had risen to $12.00-$14.00 per bushel, and ocean quahogs to $4.00-$4.50 per bushel.

Before implementing the wreckfish ITQ program, fishermen occasionally flooded the market with wreckfish; the fishery closed in August 1991 when the entire 2 million-pound annual TAC had been reached. During the 1991-1992 season, wreckfish sold for between $1.10 and $1.55 per pound. Since the ITQ program, supply of wreckfish has been constant and average price per pound stable at $1.69 in 1992-1993, $1.84 in 1993-1994, and $1.86 in 1994-1995.

In the North Pacific, sablefish prices have increased from $1.22 per pound in 1994 to $1.75 or more per pound since IFQ implementation. Similar increases are reported for halibut, likely because more product is going into the fresh market rather than being frozen. In the British Columbia halibut fishery, the price paid to fishermen has become quite volatile; how much of this may be attributable to implementation of an ITQ program is conjecture.

Willingness of consumers to pay more for ITQ fish derives from perceptions of higher fish quality and increased availability of fresh product throughout more of the year. In addition, consumers have the potential to influence product form more under an ITQ program, where processing need not be hurried or large-scale.

Safety

Pro. Increased flexibility in choosing when to fish should improve safety; fishermen can fish at a more leisurely pace and avoid fishing in dangerous weather or dangerous locations.

Con. Market forces could reduce potential safety benefits, if processors offer premium prices during inconvenient or less safe times.

Assessment of Performance. Because ITQs guarantee that one's allocated catch will be available later, they provide the option of choosing when to fish. Under ITQ programs, fishermen may still choose to fish in bad weather, competing to supply processors since the best price for catch may be offered during and immediately after storm periods. In addition, the race to fish may not be completely eliminated by ITQs since the catch per unit of fishing effort expended is still likely to be higher at the beginning of the fishing season. Although some incentive may remain to fish in less than optimum conditions under ITQ programs, fewer personal injuries and fatalities and less gear destruction should occur than under comparable open-access conditions. A July 18, 1995, report from a liability pool, Marine Safety Reserve, noted a substantial decline in the longline vessel accident rate (injuries per fishing day) following implementation of the halibut and sablefish IFQ program.

Enforcement and Administration

Pro. ITQ shareholders will have increased interest in fishery enforcement by NMFS personnel who monitor ITQ landings, since this enforcement effort protects the value (and possibly the size) of their future share in the fishery. Elements of the fishing industry advocate 100-percent observer coverage for all fishing vessels in ITQ programs. Quota shareholders have an incentive to report on each other, since cheating directly harms individual quota holders. Additional incentive to report can be created by pooling quota shares revoked from cheaters and reallocating it to remaining quota holders.

The fear of losing ITQ shares, temporarily or permanently, may also provide an incentive that encourages compliance with regulations in ITQ fisheries. However, this is complicated by determinations of who is responsible for the illegal activity — those operating the vessel, the vessel owner, or the ITQ share holder.

Con. With an ITQ program, a fisherman personally benefits from poaching, quota busting, and false catch accounting (*i.e.*, under-reporting the quantity of fish landed); with open access, only aggregate catches increase from false catch reports, and one fisherman filing a false report might not benefit. Thus, ITQs increase the incentive to operate illegally. ITQs may increase the incentive to cheat because unreported landings would supplement the short-term value of guaranteed quota shares. The increased dockside monitoring and enforcement staff across the North Pacific for halibut and sablefish, especially, makes enforcement expensive, while the sale of illegal halibut can be quite profitable.

Assessment of Performance. In the surf clam and ocean quahog fishery, administration and enforcement costs have plummeted since the ITQ program began. Before the ITQ program, enforcement costs in this fishery were exceptionally high because unusually stringent management regulations were in effect — the Coast Guard closely monitored the number of trips and fishing hours of each individual vessel. Now extensive monitoring is no longer necessary; dockside monitoring alone is considered adequate. In the British Columbia halibut ITQ program, ITQ holders became actively involved in efforts to achieve good monitoring and enforcement, and the few offenders were turned in by other fishermen. The South Atlantic Regional Council reports that wreckfish ITQ holders have been cooperative, that compliance with ITQ program regulations has been good, and that administrative and enforcement costs are low. However, this optimistic view is less persuasive given the small number of vessels and limited area fished in these fisheries. Simplified enforcement is more likely to be found in smaller fisheries arising from peer pressure and based on mutual interests of ITQ shareholders.

On the other hand, NMFS estimated that increased monitoring and enforcement costs to cover additional landing ports and vessel observers for the halibut and sablefish IFQ program would be approximately $2 million annually, to counter high-grading and bycatch concerns, and deal with the large fleet and area covered. Thus, the outlook is less optimistic; larger ITQ programs will likely require an extensive enforcement effort and the number of violations could be substantial. However, regional managers believe that the estimated economic benefits of the IFQ program will far outweigh the increase in management costs.

Employment and Community Stability

Pro. Under an ITQ program, jobs in the fishing industry are anticipated to become more stable and permanent, replacing the short, temporary or seasonal jobs characteristic of many open-access fisheries. In addition, smaller, less technologically sophisticated vessels may prove to be more economically efficient under an ITQ system because they can catch a unit of fish with less input of technology, labor, and capital.

Con. ITQs will lead to a smaller fishing workforce, and potentially increase unemployment. Some may be unable to find employment elsewhere, and those who do find jobs may earn less. The most significant loss is likely to be part-time fishermen and deck hands. Vessels will not need the dozen or so deck hands to participate in frantic "derby" openings. They will be able to fish more efficiently with fewer deck hands under ITQ management.

Commercial fishing is labor-intensive, located in relatively isolated communities. ITQs could harm such communities, should a reduction in fleet size, fewer employees, and relatively stable landings following ITQ implementation reduce the number of processors and demand for associated shoreside services. These effects can disrupt economics of small communities that depend on commercial fishing, especially during the transition from open access to an ITQ program. Such impacts, if abrupt, are likely to be painful for small communities.

Assessment of Performance. In an ITQ program or any limited-access management program, a reduction in the number of individuals allocated shares and reduction in fleet size and capacity will likely result in net job loss. However, job loss is inevitable in an overcapitalized fishery, with or without ITQs, due to a fishery collapse, declining profits, or shortened seasons. In addition, working conditions are likely to improve under an ITQ program due to the slower pace of fishing. In the surf clam and ocean quahog fishery, where many smaller vessels were retired from the fishery, one-third of the people working in the fishery lost their jobs when the former small-vessel quota shares were sold to large companies in 1992. However, jobs shifted from infrequent trips at sea or rotation among several different vessels to fewer jobs requiring more labor time at sea and on shore with longer periods on the same vessel. Less crew employed for a longer period may result in the same over-all level of employment with less turnover.

Under certain situations, the reduced competition for experienced crew under ITQ programs may depress wages. Especially where large corporations own ITQ shares, employment may be less secure and totally dependent upon whether and to whom shares might be leased. In the surf clam and ocean quahog fishery, crew report that they have to work longer hours under ITQ management for roughly the same wages they received previously. In addition, companies have attempted to change the basis for giving wages, with crew shares being reduced in most cases.[28] Others are more optimistic and believe that crewing jobs will more often be better paid under an ITQ system, leading the Deep Sea Fisherman's Union of Seattle to support the creation of the Alaska halibut and sablefish IFQ program.

It is still too early to assess the impacts of ITQ programs on small coastal communities, because early U.S. ITQ programs involved small fisheries in more developed coastal regions. However, in some situations, a shift from many short-term, seasonal jobs to fewer, long-term jobs, may lead to more stability and thus could be better for small coastal communities. The transition from current circumstances to an ITQ program with fewer fishermen, different supply industries, and communities that form different links with the smaller, possibly healthier, fishing industry may be long and traumatic for some communities. However, safeguards to impede or minimize community change can be built into an ITQ program, especially through geographical restrictions on quota trade. The Alaska halibut and sablefish IFQ program should be watched closely, because it included measures to protect small vessels operating from small coastal communities. It comes down to a value judgment as to whether a boom-and-bust economy is better than a smaller but more stable economy for a small coastal fishing community. How well the Federal Government works with small communities in transition will ease or exacerbate the pain associated with these changes.

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[28] McCay, Bonnie J., and Carolyn F. Creed. Social Impacts of ITQs in the Sea Clam Fishery. Final Report to the New Jersey Sea Grant Collect Program, New Jersey Marine Sciences Consortium, February 1994.

Equity and Wealth Creation

Pro. The Magnuson Act provides for equity through significant direction for determining how allocations are to be made, both in the National Standards (16 *U.S.C.* 1851(a)) and in the limited-entry provisions (16 *U.S.C.* 1853(b)(6)). ITQ programs ensure equity through a market mechanism that allows entry into the fishery for those not receiving an initial allocation of quota shares, contrary to other management approaches, such as the decommercialization of the billfish and redfish fisheries, that completely and permanently disenfranchise commercial fishermen.

Con. ITQs can disproportionally benefit those who own the quota shares over others in industry, including crew, skippers, and processors.[29] Allocation of quota shares to vessel owners alone does not recognize the traditional composite roles of all parties in creating an historic catch record. Critics wonder why vessel owners alone should be recognized in the initial share allocation process.

Additional concerns arise from the usual situation where ITQ shares are allocated to fishing vessel owners and not to processors. Processors, like fishermen, capitalized to support the race to fish under prevailing open-access conditions. Critics suggest that ITQ allocation to only the harvesting sector ignores the effects of processor capitalization and results in a redistribution of wealth from the processing sector to the harvesting sector, through price concessions, due to fishing season elongation and the power fishermen attain through their greater ability to choose when and how to place fish in the market.[30] Inattention to such distributional conflicts are the source of considerable controversy in deciding whether or not to implement an ITQ program and, if so, how it might best be designed. Compensation of processors or a symmetrical initial allocation of ITQ privileges to both harvester and processor sectors (sometimes referred to as a "two-pie" allocation scheme[31]) are suggested remedies.

The potential arbitrariness of the initial ITQ allocation is a large concern, because it can convey windfall profits and create considerable wealth. Currently, there are no standards on how allocations might be done fairly and equitably. For example, regardless of one's record in the Alaska halibut and sablefish fishery, vessel owners who did not fish between 1988 and 1990 were ineligible to receive initial IFQ shares. Conversely, someone who last fished in or retired after 1988 would have received (or their estate would have received) quota shares, while someone who entered the fishery in 1991 would receive none.

Assessment of Performance. What constitutes an equitable approach to the initial allocation of ITQ shares has yet to be answered. Who should share in the initial

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[29] Although in some ITQ fisheries, processors may own ITQs (e.g., the surf clam and ocean quahog fishery).

[30] Matulich, Scott C., et al. "Towards a More Complete Model of Individual Transferable Fishing Quotas (ITQs): Implications of Incorporating the Processing Sector." Journal of Economics and Management (in press).

[31] Catching privileges allocated to fishermen; processing privileges allocated to processors.

allocation of quota shares is one of the most critical questions. Allocations based on historic participation in the fishery must use sufficiently recent performance data to reward currently active fishermen, but not use such recent years' landings that intentional over-reporting of catch in anticipation of ITQs can introduce other inequities into the process. Others consider historic catch to be a seriously flawed basis on which to allocate ITQs, since it rewards inappropriate behavior such as illegal fishing. In addition, policymakers will continue to wrestle with questions of whether some wealth, created through ITQ shares, should be returned to the government as resource "rent."

Cost Recovery

Although not specifically provided for in the Magnuson Act, Congress could choose to amend this Act to provide for the use of any of several alternative initial allocation methods focusing on the collection of "economic rent."[32] For example, ITQs could also be sold initially by auction. This would generate substantial revenues for the allocator (*i.e.*, the Federal Government) at the expense of the purchasing fishermen. In addition, periodic sales or renewals of ITQ shares might be conducted by auction to increase the return to the public. Alternatively, an initial fee and an annual *ad valorem* fee for program administration could legitimately be collected in exchange for the granting of an exclusive catch privilege that ITQs represent. Another alternative might be a lottery,[33] where the Federal Government might require winners to pay a portion of the quota's value before taking possession. Another option focuses on the collection of transfer fees whenever quota shares change hands. Other means for collecting "economic rent" undoubtedly also exist.[34]

Most ITQ programs are adopted when fisheries are heavily overcapitalized and going through substantial economic stress. Although ITQ program designers may anticipate that economic rent can be collected over time, there is also the presumption that operators in an overcapitalized fishery would first have to survive a difficult adjustment period. Participants and managers of older ITQ programs, which did not provide initially for the collection of economic rent, are engaging in heated debate on whether some fee structure is appropriate and should be implemented.

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[32] Economic (or scarcity) rents are the returns to land, labor, and capital in excess of the minimum necessary for production. In free markets with private ownership of the factors of production, rents assure efficient allocation of resources. ITQs have been developed as an allocation system where one factor of production — fish — is not privately owned. However, section 16 U.S.C. 1854(d) of the Magnuson Act restricts revenue collections to no more than the amount required to cover administrative costs.

[33] Either an open lottery or a lottery among a pool of applicants meeting certain qualifying conditions.

[34] Although beyond the scope of this report, other measures include harvesters gaining management control over certain fisheries.

Summary

Accumulated knowledge and understanding of ITQ programs are rapidly evolving and much is being learned. ITQ programs are very flexible, and the major concern is how well Regional Fishery Management Councils design an effective program to address the characteristics of the regional fishery and its problems. Early U.S. programs were small, with less than 200 vessels; conclusions based on these efforts, while informative, might be of limited practical application. However, the halibut and sablefish IFQ program will provide essential new information about program design to address regional concerns. Nevertheless, ITQs may be more difficult or even impossible to use in managing the complexities of multispecies fisheries and fisheries for species whose abundance is highly variable.

Many early problems with ITQs are attributable to program design and may not be inherent problems with the concept of ITQ management. Proponents claim that ITQ systems can be designed to mitigate or obviate almost every criticism. Although the results to date are scant, critics warn that ITQs can create dynamics that threaten to overwhelm many design features intended to meet regionally determined goals incorporating equity and stewardship. ITQ programs have generated substantial concerns, but how much of that criticism will prove valid and how many of the benefits claimed by proponents might be realized is yet to be determined. Regardless, there is an abiding fear among some fishermen that the character of the commercial fishing industry and small fishing communities will be sacrificed or lost, particularly if ITQs result in large corporations or other absentee owners controlling the industry with focused interest in market share rather than on the resource and the people. Fishermen fear that a large corporation may seek to dominate the North Pacific groundfish trawl fishery similar to the way shares were consolidated in the surf clam and ocean quahog fishery. In the rush to address overcapitalization concerns, these critics of ITQs fear that social and economic concerns may be inadequately considered and that the independent fisherman's traditional freedom and flexibility to "follow the fish" will be sacrificed.

Propriety interests, related to holding ITQ quota shares, are likely to provide conservation incentives. However, these incentives are eroded when ITQs are delimited as revocable privileges, and could be further diminished if sunset provisions are enacted to terminate ITQs after a specific time period. Conservation incentives are most effective when fishing vessel owners feel most secure, participate in the fishing, and are relatively immobile. Where the linkage between these is incomplete, conservation may suffer and enforcement costs climb. A key issue is whether, and if so how, Congress should provide guidance to NMFS and the Regional Councils about designing ITQ programs to provide secure expectations about the duration and conditions of ITQ privileges and about the length of tenure of those privileges necessary to bring about hoped-for improvements in resource stewardship. It remains uncertain whether any increase in potential legal challenges to ITQ programs will diminish the will and ability of NMFS to deal effectively with conservation and enforcement concerns.

The behavioral response of consumers, processors, and fishermen to ITQ programs will play a large role in determining whether the impacts of ITQ

implementation are positive or negative. Consumers may pay higher prices for ITQ fish, but do so with the perception that they are receiving a higher value product, since consumers could easily substitute other lower-priced protein sources for seafood. Processors could choose to emphasize ITQ species to fill slack time between other episodic (*i.e.*, migratory or seasonal) fisheries. Fishermen could precipitate a "domino effect" of management problems if large-scale movement into remaining open-access fisheries occurs as ITQ programs consolidate effort in selected traditional fisheries.

An additional concern is the potential for ITQ programs to dramatically alter the balance between the harvesting and processing sectors of the commercial fishing industry. Under open-access conditions with short seasons, processors can exert substantial control over markets and prices. However, the power of the processing sector is greatly diminished by an ITQ program, since fishermen have much more freedom to choose when to provide fish. Thus, how much ITQs might empower fishermen and allow them to derive concessions that could harm the consumer or blunt conservation efforts is problematic. One could easily say that we have lived the past century with processors wielding the balance of this same power.

Finally, some of the criticisms leveled at ITQ programs are common to all fishery management, and one should take care to judge ITQ programs by appropriate measures, *i.e.*, differences from the fishery under open access. Commercial fishing is very complex. ITQs must not be seen as providing the final or sole solution to fishery management concerns, but are only one tool to be used in conjunction with more traditional fishery management options. ITQs alone can address only some of the present concerns (*e.g.*, ITQs alone will not bring about restoration of any fishery, because ITQs do not address habitat quality and other environmental issues).

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