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Fishery Management

***813 PROPERTY RIGHTS AND ECOSYSTEM MANAGEMENT IN U.S. FISHERIES: CONTRACTING
FOR THE COMMONS?**

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INTRODUCTION

The New England groundfish stocks collapsed despite government efforts to avoid such a catastrophe by creating a decentralized management system intended to reflect regional variations in fisheries and ecosystems. [\[FN1\]](#) Given this spectacular failure of the government-centered regulatory program, regional strategies and institutions must be reconsidered if groundfish and other stocks are to see any improvement.

The public debate over property rights in fisheries has focused almost exclusively on the advantages and drawbacks of private individual ownership rights. This narrow focus neglects alternative property ***814** regimes that have an equal or even greater likelihood of engendering an ecosystem approach to fisheries management. If we are to protect fish stocks effectively, we must consider a property regime that reflects both the public property rights in the ecological condition of the marine environment and the private or common ownership rights of access, harvesting, and management. Fisheries contractual co-management, a concept that embraces several forms of ownership, may be the solution to the problems that led to the stocks' collapse.

This Article examines the positions of critics of the current system and reviews the advantages and drawbacks of the two traditionally touted property rights regimes: private and communal ownership. As an alternative to these two systems of ownership, this Article proposes adopting a system of contractual co-management. At the same time, it notes that any property regime ultimately chosen will need to exist within the confines of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). [\[FN2\]](#) This Article describes the North Pacific Fishery Management Council's use of a community development quota program as an example of a potential system of co-management consistent with the Magnuson-Stevens Act. Finally, this Article advocates a greater community role in designing and operating our marine resources management institutions.

I BACKGROUND

Critics vary in their assessment of the current fisheries management system. Some blame the federal system's reliance upon industry-dominated consultative structures as its source of management policies and extraction controls. They argue economic self-interest is the root cause of poor management decisions that were insufficiently overseen by federal managers. [\[FN3\]](#) To them, overfishing occurs because resource appropriators, competing in an open access system, are unwilling to incur certain short-term losses to achieve uncertain long-term gains. Such critics view Garrett Hardin's "tragedy of the commons" as the best metaphor for the severe depletion of stocks such as the New England cod and haddock. [\[FN4\]](#) They also embrace the first of *815 the two stark alternatives Hardin presented to avoid the tragedy: private ownership or government control. [\[FN5\]](#) Assigning individual "property" rights in the form of Individual Fishing Quotas (IFQs) is their preferred solution to the problem of common pool losses. [\[FN6\]](#)

Other critics fault the basic assumptions that are the key elements of most centralized governmental approaches to fishery management. [\[FN7\]](#) For example, many management programs use single-species population dynamics approaches that focus on controlling fish mortality to achieve a target population level that theoretically will produce a sustainable yield. Critics note that controlling fish mortality is more difficult than it seems; fishing practices vary in how they disrupt critical ecological parameters. Thus, it is not enough to control the amount of effort expended in fishing. Overfishing is often the result of failure to *816 control when, where, and how fishing occurs. [\[FN8\]](#) According to these critics, IFQs, by focusing only on fishing effort, address the wrong problem and will therefore not help achieve sustainability.

Adherents of this view suggest following a paradigm more like conservation biology, and call for a system of institutions that can operate at multiple ecological scales. These and other opponents of IFQs also seek solutions grounded in the recognition of property rights, but not the individual property rights Hardin offered as the first alternative. Their reading of the Hardin metaphor is that the true commons were not tragic at all. [\[FN9\]](#) The tragedy only came about when forces of the market economy destroyed the communal property regime and its system of self-governance. These commentators argue for a "return" to communal ownership rather than the more radical development of private individual ownership with its uncertain conservation gains and tendency to disrupt the existing culture of fishing communities. They draw on principles of resource self-governance and co-management emanating from the common property resources literature that has grown in the years since Hardin's publication of the Tragedy of the Commons. [\[FN10\]](#)

The theory of common property refutes the conventional wisdom surrounding Hardin's work and suggests alternatives to the individual fishing quota model. Empirical studies suggest that management decisions emanating from communal ownership or community-based management institutions are more likely to generate superior information, reflect local ecological conditions, control pressure on fish stocks, and have greater legitimacy, and thus higher rates of regulatory compliance among resource users. [\[FN11\]](#)

To redesign our institutions for managing fisheries, particularly if we hope to achieve something akin to an ecosystem approach, we must analyze the full range of property rights that are available to control and allocate access to fishery resources. In doing so, we *817 should consider evidence and arguments from both the common property literature and economic theory, as well as review the behaviors and incentives associated with each regime of property rights.

The public debate over the role of property rights in fisheries has focused almost exclusively on the advantages and drawbacks of IFQs. [FN12] This narrow focus has led us to ignore the option of combining several forms of ownership, which would allow us to recognize simultaneously the public, common ownership of ocean resources and public property rights in the ecological condition of the marine environment, [FN13] with the private or common ownership of rights of access, harvesting, and management.

Fisheries co-management, a concept that can combine several forms of ownership by including a contractual assignment of both communal and individual ownership rights, can overcome IFQs' shortcomings. A more careful review of the nature of the property rights contained in IFQs reveals the absence of certain key attributes of ownership. While IFQs may reduce overcapitalization and inefficiency in U.S. fisheries, they do not lead to ecosystem protection and sustainable fisheries. Managing marine ecosystems for sustainability is likely to require a diversity of management regimes and institutions. [FN14] No one prescription will fit all situations and fisheries. As Elinor Ostrom argues, we need institutional complexity to manage biological complexity; this includes a system of complex, nested institutions that can operate at the multiple scales on which ecological systems function. [FN15] Thus, the concept of fisheries co-management can play a crucial role.

Finally, any redesign and redefinition of property rights in U.S. fisheries, whether individual, communal, governmental, or mixed, will have to occur within the structure and politics of the Magnuson-Stevens Act. [FN16] A number of features of the Act inhibit the emergence of property rights-based regimes, both individual and communal. [FN17] *818 However, the Magnuson-Stevens Act does provide a basis for designing property rights to achieve an ecosystem approach. [FN18] The Act now recognizes the concept of a "fishing community" [FN19] and authorizes the allocation of fishing quotas to certain communities for economic development and other social goals. [FN20] These and other provisions of the Act should be interpreted and applied, and amended if necessary, to encourage experimentation and diversity in property rights regimes and arrangements for making management decisions at the community level. Through this experimentation, we may also promote the emergence of new scientific and management paradigms that may be better suited to the complex and dynamic ecosystems we are attempting to manage.

II

A TAXONOMY OF PROPERTY RIGHTS IN FISHERIES

Until recently, economics literature tended to describe property in black and white terms: something is either privately owned or it is an open access commons. With few exceptions, economists rarely acknowledged the many distinctions among property rights that Anglo-American common law has developed. The earlier writings that prescribed sole ownership as a solution to the fisheries externalities problem followed this view. [FN21]

The taxonomy of property rights used in the common property literature is more complete. Property is defined not as a physical object, *819 but as "a benefit (or income) stream" that flows from an object or asset. [FN22] A property right is a claim to the benefit stream that some higher body--usually the state-- will agree to protect through the assignment of duty to others who may covet, or somehow interfere with, the benefit stream. . . . Property is a social instrument, and particular property regimes are chosen for particular social purposes. [FN23]

Property law has given us the metaphor of property as a bundle of rights composed of several "sticks," each stick consisting

of a distinct right or power that ownership conveys: the power to use an asset, to manage it, to take its yield, and to dispose of it. [\[FN24\]](#) The common property regime literature has applied the bundle of rights metaphor to fishing and developed a more extensive classification of property rights regimes than the early economics writing. Recent common property literature identifies four principal regimes: open access (no ownership), government ownership, private ownership, and communal ownership. [\[FN25\]](#)

This literature has also used the bundle metaphor to clarify the actual and potential rights that people who fish may obtain under each of these regimes. If a fishery consists of a bundle of rights, the sticks include the right of access to fishing grounds, the right to catch and enjoy the yield, the right to manage, the right to exclude others from the resource, and the right to alienate all or some of the previous rights. [\[FN26\]](#) The right to manage is a more extensive right, encompassing authority to determine use patterns, to take action to enhance stocks, and to challenge other activities affecting the resource's condition. [\[FN27\]](#)

***820** In most fisheries, fishermen do not own any of these rights exclusively. They hold the right to take the yield from fish stocks in common with all other fishermen. [\[FN28\]](#) In U.S. law, the "public right of fishing" doctrine tends to maintain this condition of non-exclusivity. [\[FN29\]](#) While this doctrine may not preclude private or common ownership of some or all of the sticks in the fishery bundle, it generally is used to justify maintaining a condition of open access, and often appears to further a system that recognizes no ownership. State or government ownership is the de jure property regime. Where an IFQ or limited access license system is not in place, the individual fisherman has no right to use, dispose, or manage the fishery resources upon which his or her livelihood depends. Where an IFQ or limited license system is in place, the non-exclusivity condition changes, but the right to manage remains vested in the state owner.

Under common law, if one entity holds the right to manage (and/or to exclude and alienate), and another holds the rights of access and use, the use rights are considered usufructuary rights. A usufruct is a right to use and enjoy the profits and advantages of something belonging to another. [\[FN30\]](#) In fisheries, limited access fishing licenses or IFQs grant the usufruct to fishing men and women and vest the right to manage in the government regulatory body or collective management entity. Holders of usufructuary rights of access and harvest are not prohibited from making investments in resource enhancement; however, they have no guarantee that management decisions by the owner will respect these investments. [\[FN31\]](#)

A. The Limitations of the IFQ as a Property Right

U.S. fisheries law has implicitly embraced government ownership coupled with an open access regime of property rights. [\[FN32\]](#) In the late 1980s, however, the policy on property regimes began to shift from an ***821** emphasis on open access to one that increasingly employed limited access fishing licenses or individual harvesting rights such as individual transferable fishing quotas (ITQs) or IFQs. [\[FN33\]](#) By late 1996, three fisheries managed by the Federal Government's regional council system were under some form of IFQ regime: the Atlantic surf clam and ocean quahog fishery, the Alaska halibut and sablefish fixed gear fishery, and the South Atlantic weakfish fishery. [\[FN34\]](#)

In the 1995-1996 reauthorization of the Magnuson-Stevens Act, Congress perceived a backlash against this policy trend. It reflected this in its 1996 amendments, the Sustainable Fisheries Act, [\[FN35\]](#) where it tried to disassociate the creation of IFQs from the establishment of a legal interest in property or a property right. In addition to a four year moratorium on new IFQ systems, the Act adopted a narrow definition of the kind of rights-based regimes it authorizes. [\[FN36\]](#) The Act now defines an IFQ as a:

Federal permit under a limited access system to harvest a quantity of fish, expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for the exclusive use by a person. [\[FN37\]](#)

An IFQ may be revoked or limited at any time. It does not confer any right of compensation to its holder if it is revoked or limited, and "shall not create, or be construed to create, any right, title or interest in or to any fish before the fish is harvested." [\[FN38\]](#) The intent behind this language is clearly to prevent IFQ holders from developing "investment-backed expectations" that could require the government to compensate them for the elimination of such rights.

The IFQ nevertheless does convey a property right, though far from the full (or "sole") ownership contemplated in the early economics literature. [\[FN39\]](#) An IFQ grants the right to access and enjoy the yield produced by the government-owned and managed fish stocks. Acknowledging that an IFQ is a usufruct is not likely to make regulatory ***822** takings challenges any more likely or successful. This recognition, however, may help explain why IFQs result in only limited conservation or ecological benefits in some fisheries. Whenever a usufruct is created, the owner of the resource (in the fisheries case, the government) may still expropriate the resource or fail to renew the use rights. [\[FN40\]](#) As long as this is the case, the holder of the use right is not likely to have sufficient certainty or incentive to invest in the long-term value of the resource.

The Magnuson-Stevens Act's language disavowing any duty to compensate IFQ holders in the event the IFQ system is eliminated only adds to this uncertainty and works against the creation of stewardship incentives. [\[FN41\]](#) Further, because regulations tend to restrict IFQ transfers to protect the social structure of existing fishing communities, [\[FN42\]](#) the holders of these exclusive use rights have even fewer incentives to consider how others value the right, including future generations. [\[FN43\]](#)

Many of the other objections to IFQs likewise stem from the limited property interest they encompass. [\[FN44\]](#) Some critics believe IFQs carry high enforcement costs because the rewards for cheating and landing more than one's quota are immediate, while the costs or losses are future and uncertain. [\[FN45\]](#) Also, because IFQs are usually adopted late in the management history of a fishery, the number of units or eligible holders is often too high to allow each potential holder a quota size that can support their operation. [\[FN46\]](#) Thus, government managers are under pressure to set an excessively high annual catch level from which individual quotas are then calculated. [\[FN47\]](#)

Once the government creates IFQs in a fishery, "rent-seeking" further undermines the management regime. "Rent-seeking" is where "[o]wners of state usufruct rights still battle over catch limits and effort restrictions, and those not receiving rights still seek access." [\[FN48\]](#) Thus, IFQs do not guarantee that holders will practice good stewardship. ***823** [\[FN49\]](#) Under the Magnuson-Stevens Act system, the government may be encouraging this rent-seeking behavior by insisting that the moratoria on new fishing permits are indefinite in duration and that IFQs are harvesting privileges that the government can readily destroy. [\[FN50\]](#) Finally, IFQ programs, once in place, may be difficult or costly to change if fishermen pay substantial prices to obtain IFQs. The inability of programs to switch to alternative management tools makes them less responsive to changes in ecological, technological, or other conditions. [\[FN51\]](#)

Despite their shortcomings, IFQs, particularly when transferable, do have two of the essential attributes of property: exclusivity and transferability. [\[FN52\]](#) These attributes reduce costs by eliminating the race to fish and by allowing the market to allocate fishing rights to lower cost fishermen and fishing methods. Fishermen with lower harvesting costs, in turn, have more money to invest in resource improvement. Moreover, IFQs can improve conditions on the fishing grounds by reducing overcrowding, the race to harvest in an increasingly shorter season, landing gluts, and poor quality. [\[FN53\]](#) The bycatch and discarding problem is not necessarily worse in a fishery managed through IFQs than in a regulated fishery (i.e., a fishery in which fishing seasons, areas, gear type, and landings per trip are limited). [\[FN54\]](#) There is some evidence that fishermen who acquire IFQs coordinate their actions to protect and enhance fish stocks and their habitat. In New Zealand, where a proportional IFQ system with share quotas has governed all fisheries since 1990, [\[FN55\]](#) quota holders are beginning to engage in beneficial management behaviors such as monitoring catches, studying stock ***824** abundance, and funding

exploratory fishing operations to develop new fisheries. [\[FN56\]](#)

As resource economist Anthony Scott notes, however, "even when [IFQs] work perfectly, they still leave each fishery in the hunting-and-gathering stage of economic production." [\[FN57\]](#) By construing fishing as a "highly individualistic mode of production," IFQs tend to prevent fishery participants from collecting and sharing information; conserving, protecting, and enhancing fish stocks; and achieving economies of scale. [\[FN58\]](#) IFQ holders do not have a vehicle for collectively advancing the "new concern for the future value of their property" that they share. [\[FN59\]](#)

In contrast, self-governing fisheries, often associated with communally owned fisheries, can produce many of the same positive results of IFQ fisheries. In addition, they encourage actions to protect and enhance the fishery ecosystem, including regulation and enforcement to prevent pollution, protect habitat, and coordinate with other fisheries on the same migratory stocks. [\[FN60\]](#)

B. The Common Ownership Alternative to IFQs

Common ownership of a fishery can take a variety of forms. Private ownership of some or all of the attributes of ownership may be held in common by a group, such as a fisheries association, a cooperative, a local community association or corporation, or even an environmental organization. De facto and de jure common ownership fisheries exist in many places around the world. In the U.S., one of the most frequently cited examples is the Maine lobster fishery. [\[FN61\]](#) Discussions of this system of fisheries management appear with increasing frequency in the literature. [\[FN62\]](#)

***825** As mentioned above, advantages of common ownership over private individual ownership include the regime's ability to promote a greater range of interests and the regimes broader geographical and temporal scope. These characteristics engender the capacity to make decisions and coordinate behaviors to accommodate ecological conditions more effectively. Common ownership regimes can thus "own" the right to manage, as well as the rights of access and use. By owning the right to manage, local institutions may be less vulnerable to rent-seeking than state-run fisheries, [\[FN63\]](#) and may be better able to internalize the ecological and other costs of fishing practices than individuals. [\[FN64\]](#)

C. Co-Management

A variation on the common ownership regime is the concept of "co-management," where local community groups or fishing associations work with the government to create a cooperative arrangement for sharing power to manage a natural resource. Co-management has been defined as entailing "mutual coercion, mutually agreed upon by the majority of people affected," as envisioned in Hardin's second prescription. [\[FN65\]](#) Co-management of fisheries has a long history in some regions of the world. In coastal Japan, fisheries cooperative associations--descendants of village guilds--manage all aspects of inshore fishing. [\[FN66\]](#) In the Lofoten region of Norway, community groups manage the northern cod fishery, despite heterogeneity in gear types and vessel size. [\[FN67\]](#)

Fisheries co-management combines the property regimes of state property and communal property. Where a fishery operates under traditional norms formulated by local institutions like the Maine lobster harbor "gangs," the government can reinforce these norms by delegating de jure management authority. Delegated management decisions can include the administration of fishing rights and the authority to determine whether to employ an open access system or individual quotas to control harvesting, as well as the formulation of ***826** specific rules and regulations governing access, use, and resource enhancement.

Proponents of co-management, including those who have studied these institutions in the field, contend that the regime has many advantages over the state ownership, government management model with which we are more familiar. [\[FN68\]](#) Public choice literature shows us that the state-property/government regulatory approach is vulnerable to the pressures of special

interest groups of residual claimants and to the self-interest of governmental officials and politicians. [\[FN69\]](#) Co-management in theory can reduce the incidence of rent-seeking behavior, because owning the right to manage allows the residual claimants to internalize benefits and costs and makes them better able to respond to changes in the resource and the market. [\[FN70\]](#) Further, when government agencies regulate fisheries, fishermen often selectively provide managers with information about the resource and the technology they use. If they themselves are the managers, they are, at least in theory, likely to use more comprehensive and accurate information and thus design more effective rules.

The right to exclude others from participating in the fishery, however, appears to be essential to the success of co-management institutions. Indeed, the government can fatally undermine co-management arrangements by denying this right to local fisheries management groups. [\[FN71\]](#) The government can grant the power to exclude by assigning management groups property rights that include this power. Examples of such a delegation of power that are in use around the world include territorial use rights to fishing, or TURFs. [\[FN72\]](#) Assigning the right to exclude does not require a complete alienation of state or public ownership in the resources--an important characteristic, given notions of public ownership in the current regime of wildlife and fishing law in the United States.

D. The Contractual Co-Management Model of Fisheries Governance

Local ownership and management exercised through community-based groups has many advantages over externally imposed governmental regulation. The principal advantage lies in the different incentives associated with the ownership of rights in a resource versus the regulated use of that resource. Moreover, when a community holds ***827** the rights to a resource, it can in turn subdivide those rights and allocate them among members of the community in a variety of complex and highly nuanced ways, reflecting peculiar aspects of the resource and its environment. Government regulation is much less likely to achieve these subtleties, even if it creates individual rights of access and harvesting.

There are, however, several obstacles to effective local control. First, U.S. legal doctrines hinder the emergence of fisheries self-governance. [\[FN73\]](#) Further, there is no guarantee that local communities or the fishing industry can overcome legal disincentives and cooperate to organize themselves into effective governance institutions. Moreover, complete governmental devolution of management in a fishing community is neither politically feasible nor desirable. The national government has interests in and obligations concerning fishery resources that differ in kind and scope from those of the community or industry, including the protection of biodiversity and other environmental values. [\[FN74\]](#) Therefore, some form of shared ownership between the government and fishing community is necessary.

To make a chiefly self-governing model work, the government must fulfill two key functions. It should provide compulsory membership to prevent "free-riding," and assurances to each individual fisherman who is required to participate that he or she will not be unfairly disadvantaged by the group's decisions. [\[FN75\]](#) This assurance is necessary to motivate fishermen to participate in the cooperative regulation and enforcement of the fishery. [\[FN76\]](#)

However, government participation should occur within well-established limits. Co-management can lead to a power imbalance when the government retains the power to remove management authority from the local entity. Because the government creates the regime, it has at least an implicit veto power or ability to change the regime. Under such conditions, the government and the community are not equal players. This power imbalance can weaken the local management entity's internal authority and cohesion. [\[FN77\]](#)

Contractual co-management can avoid the imbalance problem. Under such an arrangement the government defines and delegates a set of rights and responsibilities concerning the condition of the fishery and then cedes these rights for a contractual period to a local fisheries ***828** management institution, such as a community agency or association. [\[FN78\]](#)

During the contractual period, and any subsequent renewal periods, the local group enjoys all the attributes and incentives of a "sole owner," and defines conditions of access and prescribes management controls. The government retains responsibility for the broader environmental variables of national interest. The contract could include conditions under which the local group will fulfill these broader obligations, to provide an additional measure of accountability to the local resource group. [\[FN79\]](#)

This contractual arrangement is very different from the limited shared governance associated with limited access licenses or IFQs. In those regimes, the individual harvester can only make decisions an individual could make, i.e., when and where to fish. The government retains the power to make all decisions concerning the stock's condition. [\[FN80\]](#)

To create a regime of contractual co-management, the government could begin by defining a permanent set of well-defined rights related to commercial catches of a fish stock, subject to restrictions that would prevent excessive environmental damage to other species or to the habitat. The government would then negotiate with a local, non-governmental, fishery-based organization a renewable operating contract governing the exercise of the local organization's harvesting right. It could structure the renewal process so that both parties have the power to influence the result of the negotiations and to overcome the "end-point incentive" to clean out the stocks that the absence of a guarantee of renewal creates. [\[FN81\]](#)

Although potentially dangerous to the principle of co-management, the government could consider conditioning the contract on the local management entity's adoption of particular internal governing arrangements. There are good theoretical reasons why the government should encourage the adoption of a corporate decisionmaking or ownership model (one share-one vote) over the cooperative, democratic model (one person-one vote). The chief proponent of contractual local management believes the corporate model is associated with superior, long-term incentives and a longer planning horizon, because future benefits from stock rebuilding are made on the basis of ownership shares. [\[FN82\]](#) Members vote on management decisions, and benefit *829 from them, according to the number of shares they hold. Under this model, costs are also distributed according to ownership share. In a cooperative model, on the other hand, present members are likely to be more risk-averse in deciding on rebuilding programs because they have no assurance that future boards of the local body will vote to award them benefits. [\[FN83\]](#)

By dictating the contract terms, the government can ensure that the local entity adopts a corporate structure of ownership and decisionmaking to obtain these superior incentives. The government can essentially create a form of collective private property by determining the initial ownership of shares in the local management entity. Each share reflects the right to manage and make decisions about access to and harvesting of a particular fishery. This is likely to raise fewer distributional problems than the initial allocation of quota shares in an IFQ system or a limited access licensing system because the qualification for receiving one or more shares is not tied to past participation in the fishery. [\[FN84\]](#) The pool of potential share holders is much larger under the contractual co-management model; therefore, the allocation process can be used to empower other members of the local community who do not fish but who have a stake in the fishery. For example, the government could insist on awarding shares to the local port authority, citizen environmental groups, or even a local governmental agency responsible for economic or community development. The contract would thus create renewable semi-permanent community rights subject to contractual obligations to manage and conserve a local fishery resource.

III

PROPERTY RIGHTS APPROACHES UNDER THE MAGNUSON-STEVENSON ACT

The current management system under the Magnuson-Stevens Act is based on a property regime of state ownership with government-devised regulation, although an industry-dominated consultative system plays a substantial role. The U.S. system follows neither fisheries co-management nor fisheries self-governance; it is a decentralized management system heavily

structured and constrained by national procedural requirements and standards.

IFQ programs leave most decisions concerning the condition of the fish stocks and related ecosystems to the governments acting through regional fishery councils. Given the antagonism that years of management under the Act have engendered between the fishing industry *830 and the government, it will not be surprising if after five or ten years of IFQ management both target and ecologically associated fish stocks are still in poor condition. Because the current system gives IFQ holders only limited responsibility to engage in management, existing IFQ programs are unlikely to foster a greater degree of stewardship behavior by the fishing industry.

The issue now at stake is how the use of IFQ usufruct rights can evolve into or be used in conjunction with a system of common property rights or co-management. The Magnuson-Stevens Act at present does not encourage experimentation with property rights-based tools for management. However, there is one notable exception: the community development quota (CDQ) program, a form of communal governance that has arisen under the regional council system and that may have the potential to evolve into an effective arrangement for contractual, shared governance. [FN85] Indeed, the CDQ program has been called "an interesting experiment in organized community governance." [FN86]

The North Pacific Fishery Management Council adopted the CDQ program for Bering Sea pollock in 1992, shortly after the release of a report describing serious social problems in Native Alaskan communities. [FN87] Initially, the government intended to bring the lucrative Alaska pollock fishery under some sort of rights-based management. Shares in the fishery were to go to those currently participating in the fishery, and would not be available to fishermen in Native Alaskan communities unless the shares were made transferable and the government made capital available to the communities to finance the purchase of rights. The Secretary of Commerce eventually accepted the regional council's plan to reserve 7.5% of the annual total allowable catch of pollock for allocation to Native Alaskan community organizations in western Alaska. [FN88] The government also subsequently approved and implemented a CDQ reserve in the IFQ-based fishery for Pacific halibut and sablefish.

The CDQ is like an IFQ given to a community development corporation, which in turn can lease or contract with fishing firms for the harvesting of their share of the reserve. Communities apply for a portion of the 7.5% allocation by submitting a community development plan to the State of Alaska. The Governor then recommends to the *831 regional council whether a particular application should be approved. The community development plan identifies how the revenue from the fishery will be used to generate jobs and economic infrastructure for the community. [FN89]

In the first two years of the program, lease payments for the CDQ allocations generated \$53 million to the CDQ corporations for the development of regionally-based seafood and related businesses. [FN90] While the CDQ corporations are not sharing in the management responsibility, there is some evidence that CDQ-leased fishing operations have lower discard rates, and thus create an indirect conservation benefit. [FN91] But without management responsibility for the allocated reserve, the corporations are unlikely to have a direct incentive to avoid contributing to the overcapitalization in the pollock fishery.

In the 1996 amendments to the Magnuson-Stevens Act, Congress specifically authorized the Bering Sea CDQ program and gave the Western Pacific Fishery Management Council authority to develop CDQs for fisheries under its jurisdiction. Congress, however, placed a moratorium on the creation of new Alaskan CDQs until after October 1, 2001, and required the phasing in of the CDQ program previously adopted for the Bering Sea crab fisheries. [FN92] The amendments call for a comprehensive report by the National Academy of Sciences on the performance and effectiveness of the CDQ programs. [FN93] In view of this action, further experimentation with community-based management, at least in the communities of western Alaska and the western Pacific islands, is unlikely until the Academy submits the report to Congress on October 1,

1998.

CONCLUSION

With the reauthorization of the Magnuson-Stevens Act, a political compromise resolved in the short-term the controversy over IFQs and the resistance to CDQs. This pact accepted the moratoria on the creation of new programs while giving the CDQ legitimacy by calling upon a neutral third-party, the National Academy of Sciences, to study such experiments in property rights-based regimes for fisheries management. The membership of these study committees is expected *832 to be drawn largely from academia. Given the extensive literature now available on co-management and common property approaches to natural resources generally, and fisheries in particular, one or both studies will likely consider the advantages of the contractual common governance model described above and describe its theoretical and practical implications.

Once the Magnuson-Stevens Act's moratoria on new IFQ and CDQ programs expire, a regional fishery management council could conceivably adopt a community governance institution without the "development" element of the CDQs. Individual states are already free to do so for fisheries that occur primarily in state waters or for which the appropriate fishery council has delegated management in an exclusive economic zone (EEZ). [FN94] Meanwhile, it is also conceivable that existing IFQ programs will evolve into fisheries self-governance or co-management regimes, as quota holders become more aware of the limitations of their current property rights and the advantages of more direct participation in the assessment and management of the fish stocks and associated environments.

It is clear from the theoretical and empirical work done to date that we should use property rights regimes to redesign our management institutions for marine resources. We should not, however, limit our choices to a narrow set of regimes. The regional contests and controversy over IFQs have provided an opportunity to explore a diverse array of property-based arrangements to manage competing demands on these limited resources. The community, in the many ways in which that term can be defined, has a role to play in these efforts. To the extent the government adopts a contractual co-management system, the government may turn out to be the most essential player in the search for ecosystem approaches to manage our marine resources and environment.

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[FN1]. See generally Peter Shelley et al., [The New England Fisheries Crisis: What Have We Learned?](#), 9 *Tul. Envtl. L.J.* 221 (1996).

[FN2]. [16 U.S.C. §§ 1801-1882 \(1997\)](#) (as amended by Sustainable Fisheries Act, [Pub. L. No. 104-297](#), 1996 U.S.C.C.A.N. (110 Stat.) 3559 (1996)).

[FN3]. See, e.g., Teresa M. Cloutier, Comment, [Conflict of Interest on Regional Fishery Management Councils: Corruption or Cooperative Management?](#), 2 *Ocean & Coastal L.J.* 101 (1996); National Research Council, *Improving the Management of U.S. Marine Fisheries* 23 (1994).

[FN4]. Garrett Hardin, *The Tragedy of the Commons*, 162 *Science* 1243 (1968) (describing the inevitable destruction of a limited resource where an expanding population has unlimited access to it and its use). Cf. Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* 2 (1990) [hereinafter *Governing the Commons*] (Hardin's

metaphor is one of three influential models used to justify policy prescription of externally imposed regulation of users of common pool resources despite evidence of successful self-regulation). Fisheries have long been considered the classic example of the tragedy of the commons. See H. Scott Gordon, *The Economic Theory of a Common-Property Resource: The Fishery*, 62 *J. Pol. Econ.* 124, 135 (1954) ("[t]he fish in the sea are valueless to the fisherman, because there is no assurance that they will be there for him tomorrow if they are left behind today."); Ralph Townsend & James A. Wilson, *An Economic View of the Tragedy of the Commons*, in *The Question of the Commons* (Bonnie J. McCay & James M. Acheson eds., 1987) [hereinafter *The Question of the Commons*]. For specific fisheries examples of the commons dilemma, see James L. McHugh, *Jeffersonian Democracy and the Fisheries*, in *World Fisheries Policy: Multidisciplinary Views* 134-55 (B.J. Rothschild ed., 1972) (Chesapeake Bay oyster, blue crab, and Atlantic Coast menhaden fisheries) and Colin W. Clark, *The Economics of Overexploitation*, in *Managing the Commons* 82-95 (Garrett Hardin & John Baden eds., 1977) (discussing the demise of the Antarctic blue whale fishery).

[FN5]. See generally Elinor Ostrom, *Institutional Arrangements for Resolving the Commons Dilemma: Some Contending Approaches*, in *Question of the Commons*, supra note 4, at 250.

[FN6]. See, e.g., Francis T. Christy, *Fisherman Quotas: A Tentative Suggestion for Domestic Management* (Law of the Sea Inst., Univ. of Rhode Island, Occasional Paper No. 19, 1973); Franz Thomas Litz, [Harnessing Market Forces in Natural Resources Management: Lessons from the Surf Clam Fishery](#), 21 *B.C. Envtl. Aff. L. Rev.* 335 (1994); Katherine A. Marvin, Note, *Protecting Common Property Resources Through the Marketplace: Individual Transferable Quotas for Surf Clams and Ocean Quahogs*, 16 *Vt. L. Rev.* 1127 (1992).

[FN7]. For a criticism of assumptions regarding the relationship of fishing mortality rates to stock size, see James A. Wilson et al., *Chaos, Complexity, and Community Management of Fisheries*, 18 *Marine Pol'y* 291 (1994) [hereinafter *Wilson, Chaos, Complexity*]. But see Ray Hilborn & Don Gunderson, *Chaos and Paradigms for Fisheries Management*, 20 *Marine Pol'y* 87 (1995) (rejecting the fisheries biology implicit in the proposed parametric (how and when) approach, concluding that fishermen involvement in and support for management is not inconsistent with traditional approaches, and finding that how and when restrictions are not usually sufficient without direct controls on fishing effort); G.L. Kesteven, *Chaos, Complexity and Community Management*, 19 *Marine Pol'y* 247 (1995); Michael Fogarty, *Chaos, Complexity and Community Management of Fisheries: An Appraisal*, 19 *Marine Pol'y* 437 (1995). See also James A. Wilson et al., *Chaos and Parametric Management*, 20 *Marine Pol'y* 429 (1996).

[FN8]. See *Wilson, Chaos, Complexity*, supra note 7, at 297.

[FN9]. See, e.g., Susan J.B. Cox, *No Tragedy on the Commons*, 7 *Envtl. Ethics* 49 (1985).

[FN10]. For a selection of the common property resources literature, see *The Question of the Commons*, supra note 4; *Common Property Resources: Ecology and Community-Based Sustainable Development* (Fikret Berkes ed., 1989); *Governing the Commons*, supra note 4; D.W. Bromley, *Environment & Economy: Property Rights and Public Policy* (1991); *Making the Commons Work: Theory, Practice, and Policy* (Daniel W. Bromley et al., eds., 1992) [hereinafter *Making the Commons Work*]; E. Schlager, *Fishers' Institutional Responses to Common-Pool Resource Dilemmas*, in *Rules, Games, & Common-Pool Resources* 247-65 (Elinor Ostrom et al., eds., 1994); Edella Schlager & Elinor Ostrom, *Property-Rights Regimes in Natural Resources: A Conceptual Analysis*, 68 *Land Econ.* 249 (1992).

[FN11]. See generally Svein Jentoft, *Fisheries Co-management: Delegating Government Responsibility to Fisherman's Organizations*, 13 *Marine Pol'y* 137 (1989); Anthony D. Scott, *Obstacles to Fishery Self-Government*, 8 *Marine Resource Econ.* 187 (1993).

[FN12]. See, e.g., Transferable Quotas Under the Magnuson Act: Hearings Before the Subcomm. on Fisheries Management of the House Comm. on Merchant Marine and Fisheries, [H.R. Rep. No. 103-83](#) (Feb. 9, 1994).

[FN13]. See generally [Alison Rieser, Ecological Preservation as a Public Property Right: An Emerging Doctrine in Search of a Theory](#), 15 *Harv. Envtl. L. Rev.* 393 (1991).

[FN14]. Elinor Ostrom, Designing Complexity to Govern Complexity, in *Property Rights and the Environment* 33, 43 (Susan Hanna & Mohan Munasinghe eds., 1995) [hereinafter *Property Rights*].

[FN15]. "Since many biological processes occur at small, medium, and large scales, governance arrangements that can cope with this level of complexity also need to be organized as multiple scales and linked effectively together." *Id.* at 33.

[FN16]. See Shi-Ling Hsu & James E. Wilen, Ecosystem Management and the 1996 Sustainable Fisheries Act, 24 *Ecology L.Q.* __ (1997) (this issue).

[FN17]. See Wilen & Hsu, *supra* note 16. The principal impediments, however, are the structure and scope of the existing regional councils, which tend to pit fishing sectors against one another and engender an adversarial relationship between the industry and the Secretary of Commerce. See Robert J. McManus, [America's Saltwater Fisheries: So Few Fish, So Many Fishermen](#), 9 *Nat. Resources & Env't.* 13, 14-16 (1995).

[FN18]. See discussion *infra* Part III.

[FN19]. The Act defines a fishing community as one "which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community." [16 U.S.C. § 1802\(16\)](#) (as amended by the Sustainable Fisheries Act, [Pub. L. No. 104-297, § 102\(3\), 1996](#) U.S.C.C.A.N. (110 Stat.) 3559, 3561 (1996)). The eighth national standard for fishery management requires conservation and management measures to "take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities." [16 U.S.C. § 1851\(a\)\(8\)](#) (as amended by § 106(b), 1996 U.S.C.C.A.N. (110 Stat.) at 3570).

[FN20]. See [16 U.S.C. § 1855\(i\)](#) (as amended by § 111, 1996 U.S.C.C.A.N. (110 Stat.) 3592).

[FN21]. See, e.g., Christy, *supra* note 6; H. Scott Gordon, The Economic Theory of a Common Property Resource: The Fishery, 62 *J. Pol. Econ.* 124 (1954). But see Peter H. Pearse, From Open Access to Private Property: Recent Innovations in Fishing Rights as Instruments of Fisheries Policy, 23 *Ocean Dev. & Int'l L.* 71 (1992); Anthony D. Scott, Conceptual Origins of Rights Based Fishing, in *Rights Based Fishing* 11 (P.A. Neher et al. eds., 1988).

[FN22]. Daniel W. Bromley, The Commons, Property, and Common-Property Regimes, in *Making the Commons Work*, *supra* note 10, at 4. Bromley points out that the traditional writings on the commons, presumably including Hardin, failed to understand the social nature of property, often assuming that inherent characteristics of a natural resource determine the property regime used to control it, and failed to study the numerous cases of successful (non-tragic) common-property regimes. See *id.*

[FN23]. *Id.*

[FN24]. See Anthony D. Scott, The ITQ as a Property Right: Where it Came From, How It Works, and Where It Is Going, in

Taking Ownership: Property Rights and Fishery Management on the Atlantic Coast 31, 35-36 (Brian Lee Crowley ed., 1996) [hereinafter Taking Ownership].

[FN25]. See *Governing the Commons*, supra note 4, at 1-28 (1990). The literature on co-management suggests that this classification must be extended to encompass shared ownership and governance. See, e.g., Ralph E. Townsend & Samuel G. Pooley, *Distributed Governance in Fisheries*, in *Property Rights*, supra note 14.

[FN26]. See generally Edella Schlager & Elinor Ostrom, *Property-Rights Regimes in Natural Resources: A Conceptual Analysis*, 68 *Land Econ.* 249 (1992).

[FN27]. A noted resource economist has added to the bundle metaphor a number of characteristics of property rights, the presence or absence of which can indicate the quality of the property right. These qualities include quality of title, exclusivity of use, duration of the property right, divisibility, and transferability. The more of each of these characteristics a right has, the higher its quality as a property right. See Anthony D. Scott, *Conceptual Origins of Rights-Based Fishing*, in *Rights Based Fishing*, supra note 21, at 11- 38.

[FN28]. Scott, supra note 24, at 36.

[FN29]. See Gary D. Libecap, *Contracting for Property Rights* 79-80 (1988) (discussing how early American common law rules on free access to all fish and wildlife, public ownership in trust by the government, and no private ownership until capture inhibits the design of institutions to control fishing); Ronald N. Johnson & Gary D. Libecap, *Contracting Problems and Regulations: The Case of the Fishery*, 72 *Am. Econ. Rev.* 1005, 1006-07 (1982).

[FN30]. *The American Heritage Dictionary* 1967 (3d ed. 1996).

[FN31]. Note that some New Zealand IFQ holders have invested in resource enhancement without owning the right to manage de jure. See discussion infra note 56. But see Pamela M. Mace, *Will Private Owners Practice Prudent Resource Management?*, 18 *Fisheries* 29 (1993).

[FN32]. See Steven F. Edwards, *Ownership of Renewable Ocean Resources*, 9 *Marine Resource Econ.* 253, 257 (1994).

[FN33]. Id.; see also Bonnie J. McCay et al., *Individual Transferable Quota as (ITQs) in Canadian and US Fisheries*, 26 *Ocean & Coastal Mgmt.* 1 (1996).

[FN34]. For decisions upholding these programs under the Magnuson-Stevens Act, see [Sea Watch International v. Mosbacher](#), 762 F. Supp. 370 (D.D.C. 1991) and [Alliance Against IFQs v. Brown](#), 84 F.3d 343 (9th Cir. 1996).

[FN35]. Sustainable Fisheries Act, [Pub. L. No. 104-297](#), 1996 U.S.C.C.A.N. (110 Stat.) 3559 (1996).

[FN36]. See § 108(e), 1996 U.S.C.C.A.N. (110 Stat.) at 3576.

[FN37]. [16 U.S.C. § 1802\(21\)](#) (as amended by § 102(5), 1996 U.S.C.C.A.N. (110 Stat.) at 3562). The term does not include community development quotas as that term is described in [16 U.S.C. § 1855\(i\)](#) (as amended by § 111, 1996 U.S.C.C.A.N. (110 Stat.) 3592).

[FN38]. [16 U.S.C. § 1853\(d\)\(2\)\(A\), \(3\)\(D\) \(1997\)](#) (as amended by § 108(e), 1996 U.S.C.C.A.N. (110 Stat.) at 3576-77).

[FN39]. See Congressional Research Service, Report for Congress, No. 95- 849 ENR, Individual Transferable Quotas in Fishery Management 4-5 (1995) [[[hereinafter Congressional Research Service].

[FN40]. See Edwards, *supra* note 32, at 256-257.

[FN41]. See *supra* text accompanying note 27.

[FN42]. See, e.g., [50 C.F.R. § 679.31 \(1996\)](#) (discussing transfers of sablefish and halibut quota shares).

[FN43]. See Edwards, *supra* note 32 at 256-257.

[FN44]. See Congressional Research Service, *supra* note 39, at 8-19.

[FN45]. *Id.*

[FN46]. See generally Ralph E. Townsend, A Fractional Licensing Program for Fisheries, 68 Land Econ. 185 (1992).

[FN47]. See *id.*

[FN48]. Edwards, *supra* note 32, at 258; see also Rodney P. Hide & Peter Ackroyd, Depoliticizing Fisheries Management: Chatham Islands' Paua (Abalone) as a Case Study 1-2 (1990) (unpublished report for R.D. Beattie Ltd., Centre for Resource Management, Lincoln University) (stating that "[t]he spectre of too many fishermen chasing too few fish has been removed by the [ITQ] system only to be replaced by special interest groups fishing politically on land for a share of the resource.") (quoted in Elizabeth Brubaker, The Ecological Implications of Establishing Property Rights in Atlantic Fisheries, in Taking Ownership, *supra* note 24, at 241, 244).

[FN49]. See Ralph E. Townsend, Bankable Individual Transferable Quotas, 16 Marine Pol'y 345 (1992); see also Ralph E. Townsend, Transferable Dynamic Stock Rights, 19 Marine Pol'y 153 (1995) (suggesting bankable ITQs or transferable dynamic stock rights to avoid this problem).

[FN50]. See *id.* See, e.g., [Sea Watch International v. Mosbacher, 762 F. Supp. 370, 376 \(D.D.C. 1991\)](#) (the surf clam/ocean quahog ITQ regulations are valid under the Magnuson Act but do not create permanent property rights but only revokable harvesting privileges); [50 C.F.R. § 679.40\(f\) \(1996\)](#) (stating that quota shares in the sablefish and halibut fisheries off the coast of Alaska represent mere harvesting privileges and are not protected by the Fifth Amendment's takings provision).

[FN51]. This is symbolized in the "takings" rhetoric that appears frequently in discussions of ITQs and IFQs. See, e.g., [50 C.F.R. § 679.40\(f\) \(1996\)](#).

[FN52]. See Scott, *supra* note 24, at 58.

[FN53]. See *id.* at 79-80.

[FN54]. See Hsu & Wilen, *supra* note 16.

[FN55]. See Ragnar Arnason, Property Rights as an Organizational Framework in Fisheries: The Case of Six Fishing Nations, in Taking Ownership, *supra* note 24, at 132.

[FN56]. See Peter H. Pearse & Carl J. Walters, Harvesting Regulation Under Quota Management Systems for Ocean

Fisheries: Decision Making in the Face of Natural Variability, Weak Information, Risks and Conflicting Incentives, 16 Marine Pol'y 167, 175-76 (1992). The ITQ owners in the Chatham Islands, New Zealand abalone fishery levy a 1% charge on their fish sales to fund their association's research and stock enhancement programs, including reseeding abalone beds. See also Brubaker, *supra* note 24, at 238-39.

[FN57]. See Scott, *supra* note 24, at 79.

[FN58]. *Id.* at 79-80.

[FN59]. Cf. *id.* at 85 (contending that if fishers were responsible for collecting and processing data then "[t]heir new concern for the future value of their property [would] help unite them when they set about interpreting the recommendations they receive.").

See also Brubaker, *supra* note 56, at 221, 242.

[FN60]. See Scott, *supra* note 24, at 85-86. See also Brubaker, *supra* note 48, at 227-233, 247.

[FN61]. See James M. Acheson, *The Lobster Feifs Revisited: Economic and Ecological Effects of Territoriality in Maine Lobster Fishing*, in *The Question of the Commons*, *supra* note 4, at 37.

[FN62]. See, e.g., Donald R. Leal, *Community-run Fisheries: Preventing the Tragedy of the Commons*, in *Taking Ownership*, *supra* note 24, at 183; Evelyn Pinkerton & Martin Weinstein, *Fisheries that Work: Sustainability Through Community-Based Management* (1995); *Co-Operative Management of Local Fisheries* (Evelyn Pinkerton ed., 1989).

[FN63]. Edwards, *supra* note 32, at 260-61.

[FN64]. Carol M. Rose, *Predicting Property*, Address at the American Association of Law Schools Conference on Property Law 34-35 (June 7, 1997) (transcript on file with author).

[FN65]. Cristina P. Lim et al., *Co-Management in Marine Fisheries: The Japanese Experience*, 23 *Coastal Mgmt.* 195, 195 (1995).

[FN66]. *Id.* at 199-200.

[FN67]. See Svein Jentoft & Trond Kristoffersen, *Fishermen's Co-management: The Case of the Lofoten Fishery*, 48 *Hum. Org.* 355, 357 (1989).

[FN68]. See, e.g., Jentoft, *supra* note 11.

[FN69]. See Edwards, *supra* note 32, at 257-61.

[FN70]. See *id.* at 261.

[FN71]. See Jentoft, *supra* note 11, at 141 (co-management in Canada's Bay of Fundy herring fishery failed, *inter alia*, when government withheld power to exclude).

[FN72]. See *id.* at 144.

[FN73]. See Libecap, *supra* note 29, at 79-80; see also Ronald N. Johnson & Gary D. Libecap, *Contracting Problems and*

Regulation: The Case of the Fishery, 72 Am. Econ. Rev. 1005, 1008-10 (1982) (enforcement of Sherman Antitrust Act against fishing unions destroyed self-governance of the Gulf of Mexico shrimp fishery).

[FN74]. See Townsend & Pooley, *supra* note 25, at 49.

[FN75]. See Scott, *supra* note 24, at 91-93.

[FN76]. See *id.*

[FN77]. Townsend & Pooley, *supra* note 25, at 50.

[FN78]. Carol M. Rose calls this "property on the outside, contract (or norms) on the inside." Rose, *supra* note 64, at 34-35.

[FN79]. See Townsend & Pooley, *supra* note 25, at 51-53.

[FN80]. See *id.*; see also Scott, *supra* note 24, at 79-81.

[FN81]. See Townsend & Pooley, *supra* note 25, at 52 (suggesting contract renewal at the mid-point of the contract, e.g., after 5 years of a 10 year contract).

[FN82]. See Ralph E. Townsend, Fisheries Self-Governance: Corporate or Cooperative Structures?, 19 Marine Pol'y 39, 42-43 (1995).

[FN83]. See *id.*

[FN84]. See *id.* at 43.

[FN85]. See, e.g., [50 C.F.R. § 679.30-.34 \(1996\)](#) (Western Alaska Community Development Program for fisheries off the coast of Alaska).

[FN86]. Townsend & Pooley, *supra* note 25, at 54. But see Ralph E. Townsend, An Economic Assessment of Alaskan Community Development Quotas (May 17, 1996) (unpublished manuscript, on file with the author).

[FN87]. See 142 Cong. Rec. S10821 (daily ed. Sept. 18, 1996) (statement of Sen. Inouye).

[FN88]. See Leeanne E. Tryon, An Overview of the CDQ Fishery Program for Western Alaskan Native Communities, 21 Coastal Mgmt. 315, 315 (1993).

[FN89]. See [50 C.F.R. § 679.30 \(1996\)](#) (discussing the process for review and approval of CDPs and pollock CDQs for subareas and districts--NMFS accepts Governor's recommended CDPs and pollock CDQs); [Fisheries of the Exclusive Economic Zone Off Alaska, 61 Fed. Reg. 31227-29 \(1996\)](#) (rules implementing the current CDQ program).

[FN90]. Ginter, *supra* note 88.

[FN91]. *Id.*

[FN92]. See [16 U.S.C. § 1855\(i\) \(1996\)](#) (as amended by Sustainable Fisheries Act, [Pub. L. No. 104-297, § 111, 1996 U.S.C.C.A.N. \(110 Stat.\) 3559, 3592](#)).

[\[FN93\]](#). See § 108(h), 1996 U.S.C.C.A.N. (110 Stat.) 3580.

[\[FN94\]](#). See [16 U.S.C. § 1856\(a\) \(1997\)](#).

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