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Commercial Fishing: Economic Aid and Capacity Reduction

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ABSTRACT

In the absence of enforceable access or catch restrictions, competition among commercial fishermen results in an expansion of fishing capacity, and resultant fishing effort, beyond the sustainable limits of the fish population being pursued. Congress has considered several approaches to address concerns about overcapitalization and excess capacity in the fishing industry. The economic aid and capacity reduction programs discussed in this document are some possible approaches to reducing overcapitalization and overfishing. Although sometimes conceived as a means for easing financial hardship caused by reduced landings of fish, capacity reduction is more often viewed as a measure to realign effort and eventually increase sustainable catch levels. Unlike economic aid, however, capacity reduction aims to provide long-term benefits to those choosing, or able, to remain within the industry and may thus indirectly confer benefits to some of the communities that these fisheries support.

Commercial Fishing: Economic Aid and Capacity Reduction

Summary

Both experience and economic models show that, in the absence of enforceable access or catch restrictions, competition among commercial fishermen results in an expansion of fishing capacity, and resultant fishing effort, beyond the sustainable limits of the fish population being pursued. The spiral of increasing effort and diminishing returns (*i.e.*, rent dissipation) has helped to fuel increases in fish prices that reduce benefits to consumers and processors; has shifted many fish populations toward smaller, younger fish that typically command lower prices; and in many cases has reduced yields far below achievable levels.

Congress has considered several approaches to address concerns about overcapitalization and excess capacity in the fishing industry. The economic aid and capacity reduction programs discussed in this document are some possible approaches to reducing overcapitalization and overfishing. Alternative approaches, such as community development quotas and individual transferable quotas, seek to meet some of the same objectives, but are not discussed in this report.

Although some U.S. fisheries remain open to new entrants, access to many fisheries is limited or restricted. If new entry to a fishery is permitted, any capacity removed could be replaced or increased, negating the effects of any capacity reduction scheme. Capacity reduction in a limited access fishery may be feasible if vessels or licenses that are removed cannot be replaced. However, without measures to prevent upgrading (*i.e.*, “capital stuffing”) — increasing the size or fishing power (*i.e.*, efficiency or effectiveness) — of remaining vessels, the benefits of capacity removal could again be negated.

Bodies governing limited access fisheries at local, state, national, and international levels have initiated various “buyback” or retirement schemes to reduce overcapacity and the consequent overfishing. The nature and scope of these programs have been as varied as the fisheries they have covered. The common objective of vessel buybacks or license retirement is the permanent withdrawal of effort (*i.e.*, fishermen and their vessels) from a particular fishery. In most cases, however, the reduction in the number of vessels or licenses has had a relatively modest effect on fleet capacity, since the first to accept buybacks are usually the oldest and least efficient units.

Although sometimes conceived as a means for easing financial hardship caused by reduced landings of fish, capacity reduction is more often viewed as a measure to realign effort and eventually increase sustainable catch levels. Unlike economic aid, however, capacity reduction aims to provide long-term benefits to those choosing, or able, to remain within the industry and may thus indirectly confer benefits to some of the communities that these fisheries support.

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Commercial Fishing: Economic Aid and Capacity Reduction

Background

The Magnuson-Stevens Fishery Conservation and Management Act of 1976 had as one of its original aims expanding the U.S. commercial fishing fleet and displacing other nations that were fishing within 200 miles of the U.S. coast. By 1993, U.S. landings had risen by 50%, and employment on U.S. fishing vessels by 60%. This expansion was aided by rising prices and demand for fish products, government encouragement, and open access to most fisheries.¹

Both experience and economic models show that, in the absence of enforceable access or catch restrictions, competition among commercial fishermen results in an expansion of fishing capacity,² and resultant fishing effort, beyond the sustainable limits of the fish population being pursued. This unsustainable harvesting causes catch rates to fall, inducing investments in more effective equipment to maintain short-term profits, regardless of the consequences for the fish stocks. The absence of individual property rights to the fishery resource effectively deters individual fishermen from taking action based on a long-term view of fish stocks, because individual decreases in short-term landings from the fishery are likely to be taken by current competitors or new entrants. Attempts to regulate the total amount of fish captured (*e.g.*, through total allowable catch [TAC] restrictions) may induce further investment, as the fastest vessels with the best equipment will probably fare best in the “race for fish” that usually results from closed seasons or overall harvest quotas.

Overcapitalization³ — investments in fishing capacity that are currently or are likely to become idle for significant periods — within the world’s fishing industries has been well documented, and is a phenomenon seen within most U.S. fisheries. The

¹Open access to fisheries becomes more common as central governments assume fishery management responsibilities. In the absence of central government management, access to fishing and landing sites may be rigorously controlled by private vested interests.

²Fishing capacity is an expression of the combination of all physical means that affect one’s ability to harvest fish, such as hold capacity, engine size, electronic equipment, and other factors.

³In a purely static sense, overcapitalization refers to the existence of more capital applied in an industry than is necessary for the most efficient operation. However, the fishing industry is not static, and the optimum fleet size to harvest a fishery resource may necessitate certain “inefficiencies.” See CRS Report 95-296 ENR, Overcapitalization in the U.S. Commercial Fishing Industry.

legacy of this overcapitalization is now becoming apparent: by 1995, 56 of the 201 U.S. fish stocks (28%), were classified as “overutilized,” including almost all of the higher-valued species.⁴ In several areas, aid has been provided to mitigate local economic distress following fishery collapses and/or complete bans or major harvest reductions to stave off commercial extinction of fish stocks. The spiral of increasing effort and diminishing returns (*i.e.*, rent dissipation) has helped to fuel increases in fish prices that reduce benefits to consumers and processors; has shifted many fish populations toward smaller, younger fish that typically command lower prices; and in many cases has reduced yields far below achievable levels.

Congress has considered several approaches to address concerns about overcapitalization and excess capacity in the fishing industry. The economic aid and capacity reduction programs discussed in this document are some possible approaches to reducing overcapitalization and overfishing. Alternative approaches, such as community development quotas and individual transferable quotas, seek to meet some of the same objectives, but are not discussed in this report.⁵ Some of these alternatives may be government programs, akin to capacity reduction programs, but others attempt to use market forces to address these concerns.

Government Response

Economic Aid

Economic aid is usually a short-term measure, designed to alleviate individual and community losses resulting from a natural disaster (such as a hurricane) as well as longer-developing fish stock collapses, often resulting from a combination of human action and environmental factors. Financing normally comes from government funds, as grants or low-interest loans, and may be designed to help owners and/or crew of affected vessels. Cash compensation for uninsured losses within the fishery as well as other measures, such as extended eligibility for unemployment benefits or help in procuring low-interest loans from state or other agencies, may be included.

In the United States, economic aid for the commercial fishing industry has been provided under the authority of the Interjurisdictional Fisheries Act of 1986 (16 USC 4101 *et seq.*) which established a formula-based financial assistance program. Under this Act, the Secretary of Commerce is authorized to declare a fishery disaster following a commercial fishing failure, but only after it has been determined that adequate conservation and management measures are in place in the fishery.

Some have criticized economic aid programs for fisheries as blaming climatic and/or environmental conditions for circumstances caused by overfishing. These

⁴U.S. Dept. Of Commerce, National Marine Fisheries Service. Our Living Oceans: Report on the Status of U.S. Living Marine Resources, 1995. NOAA Tech. Memo. NMFS-F/SPO-19. Washington, DC: February 1996. P. 10.

⁵See CRS Report 95-849 ENR, Individual Transferable Quotas in Fishery Management; and CRS Report No. 95-553 ENR, Social Aspects of Federal Fishery Management.

critics fault fishermen, fishery managers, and politicians for using economic aid as a means of forestalling, and possibly exacerbating, the inevitable distress that will likely come when overfishing and stock recovery must eventually be addressed.

Capacity Reduction

Although some U.S. fisheries remain open to new entrants, access to many fisheries is limited or restricted.⁶ If new entry to a fishery is permitted, capacity removed could be replaced or increased, negating the effects of any capacity reduction scheme. Even in many U.S. fisheries where access has been limited, either the number of participants had already expanded well beyond what the fishery could sustain or qualification requirements for limited access eligibility were extremely liberal. Thus, although new entrants may be limited in many U.S. fisheries, managers must cope with so much excess capacity that these fisheries may be virtually indistinguishable from open access fisheries. Capacity reduction in a limited access fishery may be feasible if vessels or licenses that are removed cannot be replaced. However, without measures to prevent upgrading (*i.e.*, “capital stuffing”) — increasing the size or fishing power (*i.e.*, efficiency or effectiveness) — of remaining vessels, the benefits of capacity removal could again be negated.

Bodies governing limited access fisheries at local, state, national, and international levels have initiated various buyback or retirement schemes⁷ to reduce overcapacity and the consequent overfishing. The nature and scope of these programs have been as varied as the fisheries they have covered. In some fisheries, buybacks have been attempted to prevent the collapse of seriously depleted stocks, or after a stock collapse serious enough to have caused the closure of a fishery. In others, the aim has been to increase profitability for vessels remaining in the fishery. The common objective of vessel buybacks or license retirement is the permanent withdrawal of effort (*i.e.*, fishermen and their vessels) from a particular fishery. In most cases, however, the reduction in the number of vessels or licenses has had a relatively modest effect on fleet capacity, since the first to accept buybacks are usually the oldest and least efficient units.

Although sometimes conceived as a means for easing financial hardship caused by reduced landings of fish, capacity reduction is more often viewed as a measure to realign effort and eventually increase sustainable catch levels. Unlike economic aid, however, capacity reduction aims to provide long-term benefits to those choosing, or able, to remain within the industry and may thus indirectly confer benefits to some of the communities that the fishery supports. In some cases, the demand for vessels created by a buyback scheme has caused vessel prices to rise. This may allow some vessel owners to receive more compensation for the capital they have invested, and also may help prevent entry into other marginal fisheries that is only profitable when vessel prices are very low, but it also raises the cost of the retirement program.

⁶See the appendix for a list of U.S. fisheries with restricted access.

⁷Although “buyback” is more commonly used, “retirement” might more precisely indicate that commercial fishing is usually a privilege rather than a right, especially when dealing with licenses or quotas.

The ultimate aim of most capacity reduction schemes is to improve the economics of the fishery for those fishermen choosing (and able) to remain as well as to provide some economic aid for those exiting the fishery. Methods of effort limitation other than capacity reduction are possible, and many have been tried in conjunction with capacity reduction measures. Quotas, closed areas, and closed seasons have all been tried, with varying degrees of success. These same alternatives, however, often have provided the very incentives that encourage further capital stuffing — the frantic derby fishing that often occurs in open access fisheries managed by TAC quotas.

In fisheries where effort is controlled by individual quota shares (either transferable or not), buyback of quota shares is an option. Although this does not reduce capacity in itself, economic forces after a quota share buyback can lead to rationalization (*i.e.*, realigning effort and sustainable catch levels) of the fleet concerned and a subsequent reduction of the capacity within it, until there is a better balance between capacity and sustainable yield.⁸

Vessel Buyback. Vessel buyback schemes generally rely on a “reverse bid” approach — fishermen offer bids for government purchase of their vessels, which are accepted if they are lower than other bids tendered. Methods of deciding the lowest price for very different types or sizes of vessel may depend on the vessels’ landings (track) record, length, tonnage, engine size, or a combination of these and other factors. In a few cases, vessels were purchased on a first-come/first-served basis, with compensation based on appraised vessel value.

Vessels purchased may be disposed of in various ways. Some schemes have involved the resale of vessels into any fishery other than the one from which it was purchased. Other schemes have allowed the vessels to be sold to fisheries outside the affected area or country. Elsewhere, buyback has involved either the mandatory destruction of the vessel or permanent withdrawal of its ability to join any commercial fishing register. These latter two options alleviate the problem of exporting overcapacity to other fisheries, which may, in turn, suffer the same problems as those in the original fishery.

License Retirement. In many cases, license retirement involves tendering processes similar to those described for vessels. However, in other cases across-the-board payments for individual licenses have been made, with no regard to the history or potential effort of each licensee. Prices may be set at the market rate (although expectation of increased revenues after capacity reduction may cause license prices to rise sharply) or at the value required to encourage the chosen proportion of fishermen to surrender their licenses.

In some cases, compulsory purchase has been used. Where licenses are measured in capacity or effort units of some sort (*i.e.*, fractional licensing), a

⁸Although theoretically any level of capacity could yield a sustainable fishery as long as quotas were strictly enforced, such a program would become increasingly difficult to enforce effectively at extreme capacities due to the ability of such a fleet to harvest large amounts of the resource in a short time.

percentage of each vessel's units must be sold back to the management authority. Every vessel wishing to remain in the fishery must then purchase additional units from vessels choosing to retire to regain the required number of units. An alternative approach is where the management authority announces that, at some future date, an increased number of units will be required for continued participation in the fishery. After this announcement, fishery participants must purchase additional units from within the fishery, and the ensuing capacity reduction is industry- rather than government-financed.

Gear Retirement. In addition to reducing overall effort, as in vessel buybacks and license retirement, gear retirement can be used to reduce specific types of effort, or to change overall effort patterns. Gear retirement can be used, for example, to reduce discards, bycatches, or environmental damage; to reduce the take of a certain species within a mixed (multispecies) fishery; or to enhance the profitability of certain sectors within a fleet. A gear retirement program may involve destruction of the gear, or storage and subsequent sale to another fishery, but all will subsequently prohibit or restrict use of that type of gear in the fishery from which it was purchased. Alternatively, compensation may be paid after use of a gear type has been prohibited or, in the case of fixed gear (such as traps or pots), after reductions in the amount of gear allowed per vessel have been introduced.

An alternative approach is through gear limitation or restriction. This may, for example, limit the number of traps a vessel may set, or the size of a trawl net. Other technical measures, such as increasing mesh size (which increases the average size at first capture of a species) may allow more individuals within a stock to spawn as well as increase the economic yield per unit of fishing effort invested by allowing fish to reach more marketable size.⁹ Although catch may be reduced, this approach tends to increase individual effort.

Sources of Financing

Financing for buyback and retirement schemes has come from a number of sources:

- (i) from the federal government (annual appropriations and other means);
- (ii) from government sources initially, but funded in the long-term by an industry levy paid by those remaining in the fishery;
- (iii) directly by those wishing to remain in the fishery; or
- (iv) by third parties, such as angling or environmental groups.

Government funding has to date proved to be the greatest source of funds, although in many cases industry levies and increased tax revenues have repaid this initial capital expenditure. In some cases (*e.g.*, Australian northern prawn and barramundi fisheries), the federal government has provided guarantees, while the fishing industry has paid for most of the buyback. With the exception of Australia and

⁹This approach is more effective for some types of nets than for others. It is fairly ineffective for trawls because once the cod-end mesh is filled, fish of all sizes are caught. However, minimum mesh size requirements can be quite effective in making gillnets more selective.

a few salmonid fisheries, the latter two sources have primarily been used to provide supplementary funding rather than as the main source of financing.

Program Experience

Economic aid programs providing disaster assistance and capacity reduction are presented chronologically within each category below. Most recent U.S. programs are described, along with a selection of Canadian and other foreign programs for comparison. Although Japanese, Danish, and Dutch buyout and capacity reduction programs are believed to have been successful, information could not readily be obtained to summarize them in this report.

Economic Aid

North Carolina. Massive algal blooms (so called “red-tides”) led to the closure of shellfish fisheries off the coast of North Carolina on November 2, 1987. Unlike the other instances of economic aid described below, this disaster was initially declared by Congress in Title V of P.L. 100-220. Aid was made possible following the declaration of a disaster by the Small Business Administration on December 29, 1987, allowing access by affected fishermen and processors to low-interest loans.¹⁰

Atlantic Canada — Severe Ice Conditions. In 1990 and 1991, Canadians fishing for cod in the northern Gulf of St. Lawrence and northeastern Newfoundland were given disaster aid because of severe ice conditions that prevented them from fishing.

West Coast Salmon — the Northwest Emergency Assistance Plan. A fishery disaster was declared by the Secretary of Commerce for the West Coast salmon fisheries on May 26, 1994,¹¹ following closure of many fisheries and large declines in catches of those that remained open. Initial aid of \$15.7 million was made available, with an additional \$13 million being provided after the disaster was extended on August 2, 1995.¹² The disaster was declared due to a collapse in the salmon stocks, thought to be caused by a combination of an “El Niño” event, which brought warmer water northward along the coast, and of very irregular rainfall patterns.¹³

Economic aid has been split among habitat restoration, data collection, and vessel license retirement. Details of the vessel license retirement program are discussed later in this report. Additional aid of as much as \$14 million, in the form of unemployment assistance for affected fishermen, has been made available by the

¹⁰53 Federal Register No. 9 (Jan. 14, 1988): 982.

¹¹59 Federal Register No. 106 (June 3, 1994): 28838.

¹²61 Federal Register No. 79 (Apr. 23, 1996): 17879-17881.

¹³For an example of how an El Niño event might affect fish stocks, see “Climate Change and It’s Effects on Salmon in the Pacific Ocean” on the World Wide Web at: [Http://gladstone.uoregon.edu/~joolee/](http://gladstone.uoregon.edu/~joolee/)

U.S. Department of Labor, and the Small Business Administration has made low-interest loans and debt-restructuring programs available to vessel owners.

Approximately 8,000 salmon fishermen were affected by the disaster, many of them in areas where the only other major employment was in logging, which has also declined substantially in the past decade. Some fishermen were able to move to other fisheries; the habitat restoration and data collection programs aimed to provide employment for some of those unable to move. It is hoped that these programs will enhance the fishery in the long term, enabling salmon populations and catches to recover and increasing understanding of many aspects of salmon population biology.

Phase I of the program created jobs lasting between 5 weeks and 2 months for 477 fishermen. Most of the disaster relief money appears to have helped those who want to continue fishing commercially. However, those who needed the most help — part-time trollers, retired persons, and those who shift between commercial fishing and recreational angling — apparently received very little. Programs designed to provide new employment opportunities yielded very few jobs.¹⁴ Phase II runs until January 1998; to date, 140 jobs have been created in data collection. Further employment in both data collection and habitat restoration are anticipated as the program progresses.¹⁵

New England Groundfish. Although some New England groundfish stocks are still considered to be healthy, others have been depleted to the extent that the Secretary of Commerce declared a fishery disaster on August 2, 1995. The traditional fishery for mixed groundfish species was the focus of greatest concern, and the local impacts of the stock collapse have been severe.

Funding was obtained, primarily from existing federal aid programs, totalling \$90 million for FY1994-FY1996. These funds are financing a comprehensive package of measures, designed both to alleviate short-term hardship within affected communities and to allow stock recovery. Planned restructuring of the industry aims to sustain this recovery indefinitely. Loan guarantees from the National Oceanic and Atmospheric Administration (NOAA, U.S. Dept. of Commerce) and technical assistance and loans from the Environmental Protection Agency (EPA) have contributed to efforts by the industry to diversify into under-exploited fisheries and aquaculture. A NOAA-funded retraining program has provided employment for 149 fishermen and trained 589 others, and the Fishing Family Assistance Centers, established by NOAA and now run by the Department of Labor, provide practical support. The aid package totals \$63

¹⁴Gilden, Jennifer, and Courtland Smith. Survey of Gillnetters in Oregon and Washington: Summary of Results. Adapting to Change: Fishing Families, Businesses, Communities and Regions. Oregon Sea Grant ORESU-T-96-001, 1996, 12 p.; Gilden, Jennifer, and Courtland Smith. Survey of Oregon Troll Permit Owners: Summary of Results. Adapting to Change: Fishing Families, Businesses, Communities and Regions. Oregon Sea Grant ORESU-T-96-002, 1996, 15 p.

¹⁵Personal communication, Stephen Freese, National Marine Fisheries Service, Seattle, WA, October 1996.

million; the remaining \$27 million is being used for a vessel buyback program.¹⁶ (Details of the vessel buyback program are discussed later in this report.)

Gulf of Mexico. A fishery disaster was declared by the Secretary of Commerce for the Gulf of Mexico on August 3, 1995. A total of \$5 million was made available to fishermen in the area for uninsured losses sustained between August 22, 1992, and December 31, 1995, as a direct result of hurricanes or floods, or through direct contact with resulting underwater hazards.¹⁷ It was primarily fishermen in the stone crab and shrimp fisheries that were affected.

To be eligible, vessel owners or operators must have derived at least 50% of their income through fishing, and have annual revenues of less than \$2 million from commercial fishing. Compensation for uninsured loss of as much as \$7,500 per individual vessel is allowed, with a cap of \$22,500 on aggregate applications. Charter vessels are also eligible for compensation. Not all the money available was claimed by the October 1996 deadline. Critics assert that the unexpended funding indicated that this “disaster” was not as severe as it had been portrayed.

Canadian Atlantic Groundfish Strategy. The largest fishery disaster relief program ever was put into place by the Canadian federal government in response to successive closures of Atlantic groundfish fisheries between 1992 and 1994. The collapse of these fisheries has been blamed on overfishing, resulting from such factors as poor implementation and enforcement of total allowable catch quotas and minimum fish size regulations. Most cod fisheries as well as fisheries for redfish in the Gulf of St. Lawrence and on a few flatfish stocks are still closed, and the economic aid was planned to last until May 1999. Economic aid was predicted to take the largest portion of the C\$1.9 billion government aid package, which was also intended to fund a capacity reduction program.

Funds were provided for retraining schemes, early retirement, relocation to other areas, support schemes for non-fishing employers to increase their workforce, and community service. By far the largest share of funds went to income support for fishermen and affected families without income due to the fishing moratoria. Claims for aid were far greater than expected — 40,000 applications were received compared to a prediction of 27,000. As a result, funding is expected to be depleted sometime in 1998. More than C\$200 million of the C\$270 million allocated for a license retirement program has been diverted to the aid program.

Magnuson-Stevens Act Provisions. Late in 1996, §116(a) of the Sustainable Fisheries Act (P.L. 104-297) amended the Magnuson-Stevens Fishery Conservation and Management Act to provide additional fisheries disaster relief in §312(a). In response to a request from a State Governor or a fishing community, or unilaterally, the Secretary of Commerce determines whether a commercial fishery failure is due to a fishery resource disaster of natural or uncontrollable human cause. Following an

¹⁶For further details, see the testimony of John K. Bullard, Director of Sustainable Development and Intergovernmental Affairs, NOAA, U.S. Dept. Of Commerce, before the House Resources Subcommittee on Fisheries, Wildlife, and Oceans, August 1, 1996.

¹⁷61 Federal Register No. 63 (Apr. 1, 1996): 14293-14296.

affirmative determination on cause and an additional determination that assistance will not expand the size or scope of the failure, the Secretary is authorized to provide as much as 75% of the cost of any assistance, with federal appropriations authorized through FY1999.

Capacity Reduction

Vessel Buyback. *United Kingdom.* As a member of the European Community (EC), the United Kingdom (UK) is obliged to meet capacity reduction targets set by the EC Multi-Annual Guidance Program (MAGP). All member states have capacity reduction targets that, once met, allow access to funds for restructuring national fleets. Each nation has responded to the MAGP in a different way, and there is considerable disagreement among member states about different measures of vessel capacity. Full integration of capacity measurement is not due until 2003.¹⁸

In the UK, fishery access has been restricted for more than 20 years. In 1975, safety regulations were applied to vessels longer than 12 meters, removing many vessels from the British Register.¹⁹ Licenses for different “pressure stocks” — stocks most at risk from overfishing — were issued in 1985 to vessels exceeding 10 meters and with a previous track record. The growth in “rule beater” vessels of just less than this length followed as a result, and issuing of licenses for any length of vessel was frozen in 1992.

A vessel buyback scheme was initiated by the UK government in 1993. Vessel owners seeking to have their vessels purchased in the buyback scheme must submit a tender for the value of their vessel capacity units (VCUs). A VCU is defined as:

$$[\text{vessel length} \times \text{vessel width}] + [0.45 \times \text{engine power (in kilowatts)}]$$

Certain fleets were ineligible for vessel purchase in the initial years of the buyback scheme but, since many vessels were able to switch sectors, this approach was dropped. All vessels on the Register that 1) exceed 10 meters in length, 2) are at least 10 years old, and 3) have fished for 75 days in EC waters the previous year are now considered eligible for the buyback scheme.²⁰

Until the UK meets its capacity reduction targets (and qualifies for EC assistance), funding is provided entirely by the UK central government. The first 2 years of the scheme were over-subscribed, with all the allocated money (approximately \$14 million a year) spent and 297 vessels (4.6% of those eligible)

¹⁸For example, see “Tonnage Fiasco,” *Fishing News*, July 1996.

¹⁹Entering the British Register is a prerequisite for any boat wishing to fish under the UK flag, but does not in itself confer any right to fish stocks for which quotas are set. Further licenses must be purchased, relating to the particular area and species targeted.

²⁰For full details, see MAFF News Releases, Nos. 381/94 (Oct. 21, 1994; 2 p.), 227/94 (June 15, 1994; 3 p.), 268/95 (July 14, 1995; 3 p.), and 279/95 (July 25, 1995; 1 p.). Ministry of Agriculture, Fisheries, and Food, London, UK.

bought back. Vessels bought in the scheme must be destroyed, although all equipment may be removed prior to destruction.

New vessels may enter the Register, but must purchase the appropriate number of VCUs from others leaving it. If licenses from a number of smaller vessels are combined to qualify for one larger new entrant, 10% of the combined units are forfeited.

Vessel reduction under the buyback scheme is obviously being achieved, although the MAGP target of a 19% reduction from 1992 levels will not be quickly attained. However, considerable criticism has been forthcoming from both fishermen's and environmental groups,²¹ who claim that only the oldest and least-efficient vessels are being destroyed, and that the reduction in vessel numbers and employment is not reflected by a similar reduction in the overall fishing capacity of the fleet.

Norwegian Purse Seine.²² In contrast to many vessel buyback schemes, this Norwegian program was intended to restore profitability to a fleet where effort had been fairly successfully limited by a system of quotas and seasons. A base fee plus a flat rate per gross registered ton was paid for each vessel bought back. Between 1979 and 1984, 67 vessels (25% of the total) were removed from the fleet, representing 18% of the total capacity, measured as tonnage. Although license prices rose in expectation of increased profitability after implementation of the buyback scheme, the buyback program was considered a success. Depletion of fish stocks was also reversed, and less pressure was exerted upon the government to raise quotas above sustainable limits.

The buyback scheme was funded entirely by the Norwegian government. An analysis in 1986 showed that the increased revenues of those remaining in the fishery were already greater than the costs of the scheme, and that the industry could have financed the buyback program.

Washington Salmon, 1976-1979.²³ A need to reduce capacity in Washington state salmon fisheries was first recognized in the early 1960s. However, the Boldt Decision

²¹Great Britain. Parliament. House of Lords. Select Committee on the Common Fisheries Policy of the European Union. Report. Her Majesties Stationary Office, 1994.

²²For a more detailed review, see Hannesson, Rognvaldur. "The Regulation of Fleet Capacity in Norwegian Purse Seining." Fishery Access Control Programs Worldwide, Proceedings of the Workshop on Management Options for the North Pacific Longline Fisheries, Orcas Island, WA, Apr. 21-25, 1986. Nina Mollett, ed. Alaska Sea Grant Report 86-4 (December 1986): 65-83.

²³For further details, see Schelle, K., and B. Muse. Buyback of Fishing Rights in the US and Canada: Implications for Alaska, 114th Annual Meeting of the American Fisheries Society, 1986, New York; and Jelvik, Mary L. 1986 Annual Report, Washington Dept of Fisheries Commercial Fishing Fleet Adjustment Program, Washington Dept. Of Fisheries, Olympia, WA. 1987.

of 1975, transferring 50% of the salmon catch to Native American Treaty tribe fishermen,²⁴ precipitated the first attempts at capacity reduction.

Funded by the federal government but managed by Washington state, the aim of this vessel buyback program was to mitigate the hardship of non-Native fishermen caused by their catch reduction. A vessel buyback scheme was initiated in 1976, along with additional measures, such as retraining affected fishermen. Licensing for this fishery was restricted in 1974, prior to which access was attained by purchasing an annual state license.

Vessels were purchased at an agreed price after 2 appraisals by independent appraisers. License prices were fixed, and gear was valued at a fixed rate of depreciation from original cost. Vessels had to be delivered to storage yards prior to resale by public auction, and were not allowed to return to the fishery. Total return from resales was \$2.25 million, 42% of the state's total buyback purchase price. Reasons suggested for the decline in value were deterioration of the vessels while in storage, separation of gear and electronics from vessels, and market saturation caused by auctioning off as many as 60 vessels at a time. The state's total purchase price does not include vessel storage costs.

Of a total of more than 7,500 vessels in the fishery, 253 (nearly all gillnetters) were removed. Most buyouts were of marginal fishermen, and very little reduction in effort was attributed to the scheme; 40% of those selling vessels to the buyback program remained in the fishery, either by purchasing new vessels or by retaining a second licensed vessel.

A second round of the scheme gave owners the choice of selecting either vessel buyback or license retirement. Eleven vessels and 238 licenses were purchased in the second round, and vessel buyback was subsequently eliminated as an option.²⁵ The license retirement scheme is discussed below, beginning on page 18.

British Columbia Salmon, 1972 and 1981.²⁶ Entry to British Columbia salmon fisheries was limited in 1969, but licenses had been issued to many vessels that fished only sporadically, in years of peak abundance. Following many years of capacity increases by increasing vessel size, rules against increasing or upgrading vessel capacity were introduced, with limited success.

²⁴Federal court decisions found that treaties signed with the tribes in the 19th Century granted them equal access to fish stocks. For more information, see CRS Report 81-204 GOV, Indian Treaty Fishing Rights: Resource Issues, Legal Developments, Legislative Initiatives.

²⁵Program officials were investigated for dereliction of duty associated with the deterioration of vessels held in storage. Personal hard feelings from these circumstances contributed to creating a bitter attitude toward vessel buyback, and may explain why subsequent Washington state programs shifted to license retirement. These lingering attitudes may complicate future action on vessel reduction components of the Snake River Salmon Recovery Plan, wherein vessel purchases are required for the non-Indian gillnet fishery on the Lower Columbia River and half of the capacity of the troll fleet from Cape Falcon, north to the Canadian border.

²⁶For further details, see footnote 15, and Rettig, R.B., and J.C. Ginter, Limited Entry as a Fisheries Management Tool, University of Washington Press, Seattle, 1978.

In 1970, license fees for the fisheries were doubled to fund a proposed vessel buyback. Although 362 vessels (4.5% of those licensed) were purchased in 1972 for a total cost of about C\$6 million, most were below-average producers, representing just 3.9% of the previous year's catch. Vessels were purchased after valuation by an independent appraiser and were purchased on a first-come, first-served basis. No attempt was made to target the buyback to any particular sector of the fleet. The program retired the least efficient vessels and probably had little long-term impact on capacity.

The cost of the 1972 buyback, after deducting revenues from resale of the vessels, was C\$3.4 million. Vessel sales recouped 43% of the purchase price, before expenses. This was thought to be due to a combination of poor vessel maintenance and the requirement that vessels not return to any British Columbia fishery.

A second buyback in 1981 was funded by a C\$2.9 million grant from the federal government. This scheme was over-subscribed, and 36 vessels were purchased, with the stated aim of "purchasing the maximum capacity at the lowest cost;" \$660,000 was received through resale of the vessels.

A report commissioned after the buyback was completed made several recommendations for changes to any future scheme.²⁷ It suggested that, to be effective, any attempt at capacity reduction would need to require permits to be both area- and gear-specific, and that further schemes should be funded by a royalty on catches and by auctioning 10-year permits to those wishing to remain in the fishery. A rough estimate of a 50% reduction in vessel numbers was projected as necessary to ensure a stable and healthy fishery.

New England Groundfish. A pilot vessel buyback scheme, the Fishing Capacity Reduction Initiative (FCRI), modelled in large part on the United Kingdom's decommissioning scheme, was instituted following the declaration of a fishery disaster in August 1995. Access to new entrants was limited in 1994,²⁸ making a capacity reduction program possible. However, only 412 of 1,663 vessels with limited access groundfish permits (25%) were deemed to be active in the fishery.²⁹ Thus, latent capacity of the inactive vessels in this fishery poses a challenge to meaningful capacity reduction.

The pilot scheme solicited buyback bids for vessels working in the fishery and all attached licenses, not just those for groundfish. To be eligible, vessels must have earned at least 65% of their total gross income from the groundfish fishery in 3 of the previous 4 years. Bids were divided by the average annual groundfish revenues for

²⁷Pearse, P.H. (Commissioner). *Turning the Tide: A New Policy for Canada's Pacific Fisheries*. Vancouver, Canada: Commission on Pacific Fisheries Policy, 1982.

²⁸Amendment 5 of the New England Multispecies Groundfish Plan. Other amendments closed access to several other New England fisheries at the same time.

²⁹Defined as vessels earning at least 65% of their gross income from the fishery. Of the 1,663 vessels with limited access groundfish permits, about 65% of these vessels are catching some quantity of the 10 regulated groundfish species.

3 of the previous 4 years, and the vessels with the lowest resultant scores (*i.e.*, the lowest bid per unit revenue) were purchased. Vessels originally had to be destroyed, although a subsequent change in the scheme now means that vessels may be sold for such purposes as research or training, as long as vessels do not return to any other U.S. fishery.

Bids were submitted by 114 vessels, 28% of those active in the fishery. Eventually, 11 vessels (fewer than 3% of active vessels) were purchased for a total of \$1.9 million. In addition to their groundfish licenses, owners of these vessels surrendered 15 other limited access licenses. These owners retained the right to remain in, or re-enter the fishery, by purchasing another licensed vessel.

The successful completion of the pilot scheme has meant that an additional \$25 million of federal funds has been made available for a greatly enlarged buyback. This is believed to be sufficient to purchase approximately 80 vessels (19% of the active vessels), equivalent to removing capacity responsible for 23% of the historic annual groundfish revenue, but only about 5% of the vessels having groundfish limited access permits.³⁰ The large number of bids in the pilot scheme and the National Marine Fisheries Service's intent to purchase only vessels that it deems "good value for the money" suggests that expanding the scheme would not inflate vessel prices significantly.

The problem of latent capacity in the fishery (the inactive 75% of the vessels) is also being addressed. The U.S. Fish and Wildlife Service has made \$400,000 available, in conjunction with \$600,000 from private funds through the National Fish and Wildlife Foundation, to buyback licenses from vessels not active in the fishery.³¹ Bids will be sought that relate to the vessels' effort capacity, with the lowest bids accepted until the funds are exhausted. At this stage, no projection is available for the number of licenses expected to be surrendered. However, if you consider that about 5,000 vessels have either federal limited or state open access permits for the groundfish fishery, a large latent capacity remains.

The FCRI appears to have the support of the fishing industry. However, the economic state of the fishery is thought to be too poor to self-finance any capacity reduction scheme. The problem of latent capacity, that has caused difficulty in other capacity reduction schemes, may become more apparent as stocks of the principal groundfish species recover. If it becomes economically attractive for vessels to return to the fishery, active capacity could increase enough to seriously deplete stocks a second time. Other management measures, such as gear and quota restrictions, may help to reduce the possibility of a second disaster. The ultimate success or failure of the FCRI will not be known for some years to come.

³⁰For details of all the above, see 61 Federal Register No. 168 (Aug. 28, 1996): 44300-44305.

³¹For further details, see the testimony of John K. Bullard, Director of Sustainable Development and Intergovernmental Affairs, NOAA, U.S. Dept. Of Commerce, before the House Resources Subcommittee on Fisheries, Wildlife, and Oceans, August 1, 1996.

License Retirement. *Australian Northern Prawn.*³² A license retirement scheme for the Australian northern prawn fishery was introduced in 1986, primarily because of concerns about stock depletion. Initially capacity reduction from 116,000 units³³ to 70,000 units over a 6-year period was planned. Increased effort by those remaining in the fishery caused this target to be lowered to 50,000 units, with a new deadline of 1994.

A tendering process was used initially, but bids were considered to be too high. As the scheme progressed, a fixed rate per unit was agreed with the industry, comprising a fixed value for the units purchased and partial compensation for the reduced value of a vessel that no longer had a license. Capacity reduction still failed to reach the levels sought and, in 1993, all vessels remaining in the fishery were forced to surrender 30% of their units. Those choosing to continue in the fishery were obliged to purchase units from vessels wishing to retire. However, substantial displeasure resulted when fishermen retiring from the northern prawn fishery relocated into Queensland's prawn and other fisheries.

Initial finance for the scheme came from A\$5 million in government funds. A further A\$35 million came from within the fishery, paid through an annual levy on the remaining vessels. Over the 7 1/2 years that the scheme ran, vessel numbers within the fishery fell from 302 to 137.

A decline in prawn prices and increased effort and costs (from purchasing new units and paying the levy) for those remaining in the fishery reduced the long-term biological and economic benefits of the scheme. An announcement of compulsory unit purchase price, prior to the request for bids, might have considerably reduced the overall cost of the scheme, although those choosing to surrender licenses would argue that the prices paid reflected a fair value for their retirement from the fishery.

North Atlantic Salmon.³⁴ A fishery for maturing Atlantic salmon developed around the Faroe Islands during the 1980s. Following numerous complaints about a decline in salmon returning to rivers in northern Europe, the North Atlantic Salmon Fund, an independent, non-profit organization supported by the sport angling industry, bought all the licenses of the Faroese fishermen in 1991. These licenses are no longer used. Subsequently, the Fund also concluded an agreement with Greenland fishermen to purchase their 1993-1994 Atlantic salmon quotas.

Initial research appears to show that the economic impacts of the retirement program were positive.³⁵ The economic benefits of salmon caught by sport anglers

³²For further details, see Australian Fisheries, July 1992, p. 5-6 and November 1993, p. 24-26; and Dunn, T., and S. Pascoe. A Bioeconomic Model of the NPF. Australian Bureau of Agricultural and Resource Economics Research Report 94.13, Canberra, 1994.

³³Units are defined as underdeck volume (in cubic meters) plus engine power (in kilowatts).

³⁴For example, see "The North Atlantic Salmon Fund" at: <http://www.gamefishing.co.uk/NASF/>

³⁵However, Atlantic salmon recovery may be less attributable to license retirement than to the (continued...)

is high (each salmon caught by anglers on the River Spey, Scotland, contributes an estimated \$700 to the local economy) and the total cost of the license retirement has been outweighed by the value of salmon returning to rivers that would otherwise have been caught at sea. Similarly, a number of river boards in Scotland and England have purchased the netting rights of local estuarine fishermen. In a number of cases, it has proven economically beneficial, as well as less controversial, to offer retired fishermen jobs in license enforcement.

South Australia Rock Lobster. The South Australia rock lobster fishery is a pot fishery, and license holders have strictly defined limits on the number of pots they may use, with no limitation on pot size. In 1987, a two-year license retirement scheme was initiated, mainly in a bid to increase economic efficiency, with the objective of retiring 40 licenses or 2,400 pots. The state government borrowed A\$6.5 million to initiate the program, which was repaid by the industry through an annual levy on remaining license holders. Licenses were not transferable during the two-year program. The scheme was over-subscribed, and 41 license holders of a total of 238 were bought out before the scheme was closed in 1989, 3 months ahead of schedule. Retirement prices were paid on a fixed “per-pot” basis, and thus one’s total retirement payment was related to the number pots the license holder was entitled to use.

Subsequent analysis of the fishery³⁶ showed that although catches for those remaining within the fishery rose, economic efficiency did not. Increased costs associated with the levy and an increase in effort were cited as the main reasons, although a decline in the real price of rock lobsters compounded the problem. Effort increases among vessels continuing to fish were such that overall effort within the fishery was reduced only marginally, despite a 17% reduction in vessel numbers. License values rose significantly following the retirement, but were thought to reflect the perception of future, rather than immediate, returns. Subsequently, management of this fishery was modified by introducing an individual transferrable quota program, since license retirement was believed to have achieved little in terms of controlling effort.

Oregon Salmon, 1983-86.³⁷ Although signs of stock depletion were already becoming apparent, the implementation of a July 1969 court decision³⁸ reduced the amount of salmon available to non-Native fishermen. This eventually led to a license retirement scheme targeted at Oregon’s Columbia River salmon gillnet fishery.

³⁵(...continued)

advent of extensive aquaculture for this species, which caused the market price for Atlantic salmon to drop sufficiently such that commercial harvest became less desirable and more fish became available for recreational anglers.

³⁶Staniford, A. An Economic Evaluation of the 1987 Buyback in the Southern Zone Rock Lobster Fishery. REARK Research Consortium, Perth, Western Australia, 1993.

³⁷For further details, see footnote 16, and Final Summary Report, Oregon Columbia River Gillnet Salmon Fleet Reduction Program, 1983-86. Portland, OR: Oregon Dept. Of Fish and Wildlife, 1987.

³⁸Sohappy v. Smith, 302 F.Supp. 899, D. Oregon.

Access to the fishery was restricted in 1980, when 572 permits were issued. In 1983, 510 licenses were renewed, the rest having been retired through natural attrition. Four rounds of retirements took place between 1983 and 1986.³⁹ In each case, bids for retirement of the licenses were sought, and in each round the bids were over-subscribed. Altogether, 133 licenses were bought back.

Federal funding of \$715,000 was provided, and average successful bids rose from \$3,600 in the first round to \$6,186 in the final one. The retirement scheme likely caused license prices to rise but, as not all were eligible for retirement and an individual could only sell one license under the scheme, this rise was not great.

About 26% of the valid licenses held in the early 1980s were retired. For unknown reasons and despite an obvious market for licenses, a further 4% were not renewed by holders. However, 25% of the vessels that surrendered licenses remained in the fishery as they also held Washington state licenses. The buyout was judged a success as aggregate fleet harvest costs were reduced by more than the cost of the scheme, and the scheme also brought extra money into the affected local communities. License prices continued to rise after closure of the scheme. However, subsequent developments, discussed later, indicate that the capacity reduction achieved was not sufficient to prevent further problems in the fishery.

Washington Salmon, 1981-1986.⁴⁰ A license retirement followed the vessel buyback scheme outlined earlier. Funded at \$2.5 million annually from 1981-85 and \$1 million in 1986, the retirement targeted specific funds at each of the sectors (seine, troll, gillnet, and charter) within the Washington state salmon fleet. In the first years of the scheme, funding was also provided to purchase commitments that vessels leave the fishery and not return for at least 10 years. Compensation was set at 30% of the value of each vessel, as decided by an independent surveyor.

Between 1981 and 1986, 32% of the Washington licenses were removed,⁴¹ dropping the total number of licenses from 5,681 to 3,857. The proportion lost from each sector varied, from 13% for seine vessels to 43% for trollers. Many vessels involved in the buyout and compensation schemes had a history of fishing in southeast Alaska for part of the year, and it is thought that they chose to concentrate efforts there after surrendering their Washington state licenses.

³⁹Although many in Oregon have consistently opposed compensation schemes such as vessel buyout and license retirement, Oregon chose to participate since federal funding was available and Washington state residents were benefitting from the program. This opposition to compensation schemes may explain why Oregon later opted to fund research and habitat rehabilitation in its participation in the Northwest Emergency Assistance Plan, rather than a compensation program such as Washington state implemented.

⁴⁰For further details, see Schelle, K., and B. Muse. *Buyback of Fishing Rights in the US and Canada: Implications for Alaska*, 114th Annual Meeting of the American Fisheries Society, 1986, New York; and Jelvik, Mary L. 1986 Annual Report, Washington Dept of Fisheries Commercial Fishing Fleet Adjustment Program, Washington Dept. Of Fisheries, Olympia, WA. 1987.

⁴¹Although it appears that some of these were removed by natural attrition.

License holders applying for retirement were ranked in order, depending on the length of their history in the fishery and the date of their application. Licenses were purchased strictly according to this rank and, as a result, a separate market developed within the fishery for those licenses least eligible for retirement. It is thought that this prevented the license retirement from having much effect on values.

Northwest Emergency Assistance Plan. As part of the Northwest Emergency Assistance Plan, discussed earlier, \$4 million in federal money was made available for a license retirement program, administered by the Washington Department of Fish and Game. Three sectors of the salmon fishery in Washington — troll, gillnet, and charterboat — were allocated separate funds, and licenses were chosen after individual bids were received.

To be eligible, vessels had to have fished for at least 1 year between 1986 and 1991 and been able to demonstrate an uninsured loss in the fishery.⁴² The program was heavily over-subscribed, with more than 460 applications. It had been hoped to withdraw as much as 50% of the troll and gillnet capacity. However, only 190 of 666 eligible troll licenses (28%) were bought, 83 of 506 gillnet licenses (16%), and 23 of 206 charter licenses (11%), with modest administrative costs (3% of total expenditures).⁴³ The number of vessels remaining in the fishery is significantly higher than the number defined as “optimum” (1,084 compared to 600) by the Washington Department of Fish and Game in 1991.

Part II of the program was announced on October 31, 1996.⁴⁴ An additional \$5.2 million has been allocated for additional retirements, to be implemented over the next 2 years. Bids for license retirement are to be ranked according to a ratio of the offering price divided by a “salmon disaster impact” which incorporates a fisherman’s recent gross salmon fishery income. The lowest ratios are to be purchased first.

British Columbia Pacific Salmon Revitalization Strategy (Mifflin Plan). The British Columbia (BC) salmon fishery is similar in many respects to those in Washington and Oregon. In 1995, approximately 10,600 fishermen were directly dependent on the BC salmon fishery for their livelihoods, often residing in small communities disproportionately dependent on fishing. Despite earlier capacity reduction schemes, overcapacity is still a major problem. It was estimated that a 50% reduction in vessel numbers would still leave sufficient capacity to harvest the catch in years of peak salmon abundance.⁴⁵ This overcapacity has caused severe economic problems — between 1991 and 1994, the mean value of BC salmon landings was C\$211 million, compared to mean costs (including capital and depreciation) of C\$240

⁴²As defined in 59 Federal Register No. 172 (Sept. 7, 1994): 46224-46232.

⁴³Washington Dept. Of Fish and Wildlife. Northwest Emergency Assistance Plan: Vessel Permit Buy Out Program. Final Report. Financial Assistance Award #NA57F10164. Seattle, WA: August 1995.

⁴⁴61 Federal Register No. 212 (Oct. 31, 1996): 56217-56221.

⁴⁵Gislason, Gordon. Fishing for Answers: Coastal Communities and the BC Salmon Fishery. Initial report prepared for the British Columbia Job Protection Commission by the ARA Consulting Group, Inc., Vancouver, BC, July 8, 1996. 25 p.

million. The problem worsened in 1995 due to declining salmon abundance, and the 1996 fishery was expected to record the lowest landings in 50 years.

The Revitalization Strategy was implemented to help deal with this problem, and included both short- and long-term measures. An \$80 million voluntary retirement was proposed. The scheme paid market prices for licenses surrendered, and it was forecast that the funding, which came from federal government, would be sufficient to remove 20% of the licenses from the fishery. The introduction of landing charges in 1997 is expected to provide sufficient funds for retirement of a further 10% of salmon licenses.

Area licensing was also established. Vessels would have to choose one of two areas for seine vessels, or one of three areas for trollers and gillnetters. Any vessel wishing to fish in more than one area would be required to purchase additional licenses. It was thought that “stacking” licenses in this manner would reduce vessel numbers by a further 20%.

In view of the disastrous season forecast for 1996, vessels were also given the option of not paying the 1996 license fee, and of returning to the fishery in 1997.

Preliminary reports⁴⁶ indicate that the level of retirement was correctly forecast: 48 seine licenses (9% of the total), 451 gillnet licenses (18%), and 309 troll licenses (24%) were bought — 19% of the combined total for all salmon gear. In addition, 205 vessels chose not to fish in 1996, and 246 licenses were stacked, although this is a preliminary total and may ultimately be higher. The increased market for licenses caused license prices to rise by between 50% and 100%.

The scheme has, however, drawn considerable criticism from certain sectors of the industry. Small-vessel fishermen from ports close to the border between adjacent new areas complain that they are being forced to choose between purchasing a second license or abandoning areas they have traditionally fished. Critics of the license stacking proposal suggest that it favors the larger firms within the industry. The seiner fleet, which takes a disproportionately large amount of the catch, is already dominated by a few large companies that have the economic strength to increase their stake by stacking licenses at the expense of the smaller fishermen. Although licenses have also become “gear-specific,” critics point out that, as licenses may be transferred to vessels as much as 30% larger, the reduction in vessel numbers will not be matched by a similar reduction in capacity.

Canadian Atlantic Groundfish Strategy. The closure of the Canadian Atlantic cod fisheries, starting with the northern cod fishery in July 1992, and subsequently also encompassing some redfish, flatfish, and white hake fisheries by 1994, made worldwide news. As part of a C\$1.9 billion government aid package, C\$270 million was earmarked for a capacity reduction program, designed to reduce capacity within the fleet to that sustainable by the fishery when it recovers.

⁴⁶The ARA Consulting Group, Inc. Fishing for Answers: Coastal Communities and the BC Salmon Fishery — Report Addendum. Prepared for the British Columbia Job Protection Commission, Vancouver, BC, August 12, 1996. 4 p.

Newfoundland was by far the most affected province, with 85% of license holders affected — 7,000 in all. Of these, 4,500 met strict eligibility criteria concerning reliance on the fishery and were classed as “core” fishermen. Core fishermen wishing to surrender groundfish licenses had, additionally, to surrender all other fishing licenses and would be ineligible for income support provided by the relief package or to participate in any Canadian fishery in the future.

Reverse bids were sought, with bids then ranked according to vessel size and landings records. Four rounds of retirement were initially planned, the first of which received 1,250 bids. However, many of the bids were exploratory, and were considered to be too high; only 177 licenses were bought back, at a cost of C\$19 million. Bids in the second round were considered to be much more realistic, and 207 licenses were bought at a cost of C\$26 million from 1,050 bids that were received. It was estimated that another C\$25 million could have been spent in Newfoundland alone, while still obtaining the same value for money. Altogether, a total of C\$60 million was spent on the purchase of licenses, C\$50 million of it in Newfoundland. The initial intent, at the time of the first round, had been to remove as much capacity as possible. However, a subsequent cabinet directive required that retirement be balanced across different gear types. Understanding that fishing capacity is the product of technology expressed among the units fishing and not merely the number of fishermen, critics viewed the elimination of fixed gear as resulting in almost no reduction in fishing capacity, while a greater reduction of the mobile sector would have been more effective.

Further retirement rounds were canceled after the money earmarked for retirement was transferred to the aid program. Reduction has not been sufficient to achieve the initial objective of matching capacity to the resource, despite introduction of additional license restrictions and transfer rules. Estimates of capacity removed by the scheme are around 10%, considerably less than the target 50% reduction discussed initially by politicians. Based on scientific assessment, fishing mortality exceeded the optimum target of 20% by 4 or 5 times. Thus, an even larger reduction in fishing capacity would have been necessary, since this high fishing mortality was achieved when only a fraction of the fishing capacity was being used.

Gear Retirement. *Florida Net Ban.* A ban on several types of nets in waters under Florida jurisdiction (waters within 3 nautical miles of the shoreline in the Atlantic and within 8 nautical miles in the Gulf) was implemented on July 1 1995, following a successful referendum and amendment to the state constitution. Gillnets were banned entirely, while seine and trawl nets were restricted to not larger than 500 square feet. Reasons for the ban included alleged stock depletion of mullet, damage done by shrimp trawlers to fish stocks and the seabed, and increasing pressure from the growing number of recreational fishermen for a greater share of the resource.

The Florida Marine Fisheries Commission estimated that approximately 2,500 of the state’s 8,000 commercial fishermen would be adversely affected by the net ban, many of them in small communities with little alternative employment. In an attempt to minimize the impact of the ban, a gear retirement scheme was implemented, along with a package of other measures such as increased entitlement to unemployment compensation for affected individuals. Fixed prices for four categories of nets were paid, and fishermen were allowed to surrender a maximum amount of netting

determined by their catch history over the previous 3 years. A total of \$20 million was spent for net retirement, and nets purchased were recycled.

The gear ban and retirement have caused considerable controversy within the state. A significant portion of the retirement money (alleged to be as much as half) was spent on nets modified in some way to artificially increase their value according to the retirement rule. Difficulties in interpreting and defining the amendment have led to numerous court cases.⁴⁷

Despite apparent flouting of the law, mullet stocks appear to be recovering. The net ban appears to have had little adverse effect on the value of total state landings, as increased offshore fishing and shrimp has increased landings in this sector. However, inshore fishermen unable to upgrade their vessels have been adversely affected, and the few alternative fisheries available to them, such as crabs, are now under significant threat of overfishing. Values of inshore vessels have also fallen dramatically. The effects of the ban appear, at this early stage, to be a decline in overall employment in commercial fisheries (mainly within smaller communities), increased landings in the offshore sector, and recovery of a small number of depleted stocks.

Magnuson-Stevens Act Provisions. Future fishing capacity reduction programs (FCRPs) within the United States can be implemented under the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act detailed in sections 116(a) and 303 of P.L. 104-297, signed into law by President Clinton on October 11, 1996. This measure provides that the Secretary of Commerce, at the request of either a regional fishery management council or state Governor, may introduce a FCRP if it is deemed necessary to address overfishing, provided access to the fishery is restricted and catch limitation measures are in place. Vessels must be permanently withdrawn from the fishery. Industry-funded programs will be allowed, provided that a two-thirds vote of eligible license holders favors such a program. Fees will not be allowed to exceed 5% of the total value of fish landed in fishery whose capacity is to be reduced.

Discussion

Economic Aid

Many argue that apparent need for economic aid indicates underlying problems within a fishery, that an economically healthy fishery is able to cope with periodic natural disasters without outside help. Nonetheless, aid has been used to counter economic devastation of some communities from both human-made and natural disasters. However, it is also argued that, while disaster relief may be necessary in the short-term, it will become a regular and significant drain on public resources if the

⁴⁷For example, cases have been filed concerning whether or not the ban is constitutional, how to measure shrimp trawl size, whether certain counties should be exempt from the ban, the legality of using small trawls to catch baitfish and jellyfish, whether use of nets constructed from tarpaulin material is legal, and fraudulent net sewing to qualify for compensation.

underlying problems within the fisheries are not tackled. In such case, the aid would become little more than a subsidy for a fundamentally unprofitable industry. The Interjurisdictional Fisheries Act (Title III of P.L. 99-659) recognizes this; by requiring economic aid to be given only “after the Secretary of Commerce determines that adequate conservation and management measures are in place,” it aims to remove many of the factors causing the need for this aid, the most pressing of which is overcapitalization. Critics of economic aid argue that healthy industries are inherently resilient, and that, rather than subsidizing and promoting permanent dependency by a faltering industry, the federal government should compassionately assist a reorganization of ailing elements of the fishing industry that is led by people from fishing communities and from within the fishing industry.

Capacity Reduction

Capacity reduction, either through vessel buyback or license retirement, is becoming an increasingly common response to the problems caused by overcapitalization. To have significant success, access to the fishery in question must be limited or restricted; buybacks/retirements are not a realistic option in fisheries that are open to new entrants. Such limited entry may cause resentment after a depleted fishery has recovered and is once more economically profitable. If a controlled fishery expansion is possible subsequent to recovery of a depleted fishery, priority on new entrants could be given to those fishermen displaced by the reduction program. However, care must be taken to limit the expansion of sustainable capacity since allowing new entrants can defeat the purpose of a buyback/retirement program, not to mention waste money.

Capacity reduction might also be viewed as part of a transition from a structure that permitted unsustainable harvests to a more sustainable structure. This new structure implies smaller fishing fleets, less peak employment, and possibly changes in the location and nature of fishing communities. A major question is what role, if any, Congress might take, particularly with respect to anticipated transition costs including temporary economic assistance. It should be kept in mind that market processes — including lack of harvest opportunities as well as price pressures due to competition with aquaculture and commercial catch from other regions — can and may exert a more substantial impact on fishing capacity than a formal capacity reduction program might.⁴⁸

The differences between capacity and effort have been mentioned earlier, but are of great importance and can be easily confused since both are hard to define. Ultimately what is often referred to as effort — the combined effect of the number of days fished, nets hauled, hooks set, etc. — finds expression in the mortality rate of a fish stock due to fishing. Capacity reduction schemes, unless they remove a substantial percentage of effort, will not reduce the fishing mortality rate and may have little measurable effect on the biological state of a fish stock, since vessels remaining might fish harder or longer. Capacity reduction is an inefficient way to manage fishing effort. Reduction in capacity may increase economic profitability for

⁴⁸This has been particularly evident with salmon fisheries in California, Oregon, and Washington.

those remaining within a fishery, by concentrating harvest among fewer vessels, but capacity reduction does not assure recovery of a depleted stock because it does not necessarily reduce the total harvest.

Although reduction in capacity from vessel buyback or license retirement may be identical, the localized effects on the fishing industry could be different. License retirement, unless it removes a substantial portion of the fishermen in a fishery, will not result in capacity reduction if the remaining vessels can be upgraded or replaced by larger vessels to fish harder and longer. Mandatory destruction of vessels purchased in a buyback scheme may prevent prices of vessels in nearby open access fisheries from dropping substantially, (*i.e.*, maintain current values of past investments). If vessels are not destroyed, low vessel prices could promote entry into other marginal fisheries where access is not limited, or put less-expensive equipment on the market for use in upgrading vessels within a limited access fishery, effectively increasing capacity. Conversely, if destruction of vessels should increase the price paid for vessels in a buyback, fewer vessels may be purchased and sellers may acquire sufficient capital to purchase more efficient vessels for use in other fisheries.

Since resale of purchased vessels into other fisheries has been shown to be expensive to administer, it has largely been abandoned as an option. Resale prices are generally very low,⁴⁹ and resale merely relocates or exports the problem of overcapacity to other fisheries. This problem has been highlighted by developmental and environmental non-governmental organizations, who especially seek to prevent overcapacity problems from being relocated to less-developed nations, where managers may have even less expertise to deal with overcapacity concerns.

Mandatory destruction of purchased vessels is not popular among suppliers of fishing equipment, as experience has demonstrated development of a substantial market for secondhand deck and wheelhouse equipment. However, the value of such sales will be taken into consideration by prospective sellers when furnishing bids, giving those paying for the buyback greater value for money. The regulated sale of vessels for non-fishing purposes, such as research, may allow purchase by non-profit organizations that could not otherwise have been afforded. However, care must be taken to assure that such vessels do not inadvertently find their way back into some fishery, either in the United States or abroad. Experience shows that direct sales between vendor and purchaser are much more cost effective than via the buyback authority.

The mandatory destruction of vessels raises strong emotion in many, but also presents a feeling of *fait accompli* among those remaining in the fishery. The perception that problems caused by overcapacity are being addressed directly may help in securing support for additional recovery measures, such as quota or gear restrictions, or seasonal closures. Although by no means unanimous, support from the fishing industry for mandatory destruction, or permanent withdrawal from the fishing register, is widespread.

⁴⁹Due to specialized equipment or unique vessel configuration that may not be easily convertible for use in another fishery, or simply the advanced age of the vessel.

While potentially offering greater capacity reduction per dollar (*i.e.*, a license generally costs less than a vessel), license retirement is more likely to export the problems of overcapacity to other fisheries since the ability to fish is less damaged by surrendering one's license than one's vessel. Indeed, buybacks, without a wide application of limited access, are unlikely to be successful in reducing, rather than merely relocating, overcapacity problems. As alternative open-access fisheries become more scarce, this will become less of a problem, but the ultimate extension will likely be that vessels without licenses will become progressively less valuable, and vendors will seek to be paid more for their licenses, eventually approaching vessel buyback prices.

Success and Failures

Schemes that have achieved their aims of restoring profitability or allowing stock recovery have one common thread — the relatively high proportion of the capacity removed (whether active or not) from the fishery. The successful buyback of 25% of the Norwegian seine fleet and 57% of the Australian northern prawn fishery capacity units are in marked contrast to reductions achieved in some of the earlier North American schemes. Although apparently high percentages of licenses were removed in many of these, multiple license holdings and latent capacity meant that little effort reduction was achieved. As active capacity was withdrawn, many fishermen that had accepted buyback finance re-entered the fishery through purchase of licenses from inactive vessels. In some cases, the premium paid for buyback vessels even helped their replacement by more efficient vessels, increasing the problems of overcapacity rather than reducing it.

Some have recognized latent capacity as a serious problem. Speculative participation in a fishery escalates when limited access management is first acknowledged as possible.⁵⁰ On the other hand, latent capacity may provide the alternatives and flexibility that fishermen need to succeed in a very volatile and uncertain industry. The dual buyback of both active and inactive capacity, as intended by the FCRI in New England, is one approach to solving this. An annual renewal fee may be sufficient to deter some individuals from maintaining their eligibility, but as access to fisheries becomes progressively more difficult, licenses will be seen as being more and more desirable and the fees may need to be quite high to cause significant attrition.

Requiring license use (*i.e.*, verified catch history) for its renewal or a sizeable annual license renewal fee could reduce latent capacity. However, if the license is viewed as being of potential value, such a requirement might actually increase effort

⁵⁰In addition to speculative buying of licenses, those already in a fishery may engage in strategic behavior to establish a significant catch history within the likely qualifying period. Such behavior may be engaged in by former, but recently inactive, participants as a way to capture a share of the anticipated windfall profits associated with many limited access programs. Such behaviors have been justified as providing compensation for individuals who participated in pioneering such a fishery. Speculative investors typically see themselves as savvy capitalists who seized upon an opportunity.

within the fishery, as vessels enter it for the minimum time period required to maintain license eligibility or cover the fee.

An understanding of the forces within a particular fishery is needed to formulate a capacity reduction scheme where significant latent capacity exists. Experience indicates that any scheme which does not address the latent capacity problem will either fail or require a great deal of financing over a long enough period to mobilize all of the latent capacity.

Another well-documented aspect of the latent capacity problem that reduces the success of capacity reduction schemes is a subsequent increase in effort or capacity of those vessels remaining in the fishery (*i.e.*, capital stuffing, or mobilizing underutilized capacity). Such an increase has been the aim of certain schemes, in fisheries where economic issues were of primary concern, and where stock depletion has been prevented or minimized by other management measures. However, in other cases, increases in effort or capacity of individual vessels have canceled any of the perceived benefits of the buyback. The experiences of British Columbia in the 1970s and 1980s show the difficulties in preventing upgrading of vessel capacity within a fishery. The use of some sort of capacity units is an attempt to resolve this problem. The United Kingdom's scheme, going a step further and imposing a 10% unit penalty when licenses are "stacked," responds to the generally greater efficiency of newer vessels.

Technological improvements are such that even in fisheries with no latent capacity and where license transfer to larger or more powerful vessels is forbidden, catching power of individual vessels will increase over time. A detailed study in the Oregon bottom trawl fishery estimated a 2% annual increase,⁵¹ close to the estimate of 2% to 4% by a fishermen's federation in the United Kingdom with respect to the North Sea trawl fleet.⁵²

Figures such as these suggest that current buyback schemes within the United States will not be sufficient in themselves to correct the problems caused by years of overcapitalization. While lessons from the past have been learned, capacity reduction schemes will probably not succeed if they are not of sufficient magnitude. It may be easier during times of fiscal restraint to suggest schemes of limited scope, but underfunded capacity reduction programs have been shown repeatedly to act as little more than subsidies that encourage further overcapitalization. Latent capacity and/or capital stuffing can easily negate the achievements of a modest capacity reduction program.

⁵¹Smith, C., and S. Hanna. "Measuring Fleet Capacity and Capacity Utilization." *Can. J. Fish. Aquat. Sci.*, 47 (1990): 2085-2091.

⁵²Great Britain. Parliament. House of Lords. Select Committee on the Common Fisheries Policy of the European Union. Report. Her Majesties Stationary Office, 1994.

A review of Canadian experiences,⁵³ extending as far back as 1969, has shown how short-term political reasons prevented sufficient reduction in the Canadian Atlantic fleets to sustain profitability as well as any reduction in total allowable catch to achieve sustainable harvests, even though this was recognized at the time. The short-term effect was to maintain employment in the fisheries at unsustainably high levels, at substantial cost to the taxpayers. The long-term effects are now known the world over: complete closure of several once-prolific fisheries and C\$1.9 billion of government money to prevent economic collapse of the affected coastal regions. A valuable natural resource has, in effect, been a considerable drain on government funds for the last 20 years, instead of a productive asset. Even now, despite these lessons, funds for license retirement continue to be diverted, and it is widely accepted that capacity will still be greater than the fully recovered resource can profitably sustain.

Admitting that jobs may be lost, often in areas that can ill afford it and in communities where fishing is a way of life, is painful and has been repeatedly avoided. Alternative fisheries in which to deploy vessels retiring from overcapitalized fleets are becoming increasingly rare. However, fishery managers do have a choice in how to affect the spectrum of vessels within a fishery. What appears to have been lacking are clear objectives or priorities for managers for influencing the size and structure of the fishing fleet. The formulation of such objectives or priorities could seek to incorporate the views of all stakeholders in the fishery, involving them in sharing the responsibility for managing this resource. Alternative decisions on how to distribute capacity reduction among different gear types within a fishery could result in very different effects on local employment in the fishing industry and fishing community economies.

Regulations within a fishery may be used to optimize whatever asset of that particular fishery is valued most. In areas where numerous small communities depend on traditional fisheries, a buyback scheme and subsequent management measures could be tailored to remove the most highly capitalized vessels (those that provide the smallest number of jobs for the amount of fish they land). In other areas, where economic returns from the resource are viewed as being of chief importance, buyback and license-stacking regulations could encourage rationalization in favor of a few highly capitalized and efficient factory ships. However, defining objectives for individual fisheries that managers can then strive to achieve is a political decision that affects a wide array of interested parties (*e.g.*, fishermen, coastal community businesses, large fishing companies, processors, scientists, managers).

The closure of fisheries that have a tradition of open access is bound to cause some controversy and ill feeling among those who are excluded, especially when (or if) there are significant economic returns for those holding licenses. Some argue that vessels with the privilege of access should compensate those denied this privilege. In places where closure of fisheries to new entrants is particularly controversial, license fees of some sort might not only pay for enforcement costs within the fishery but

⁵³Shrank, William. "Extended Fisheries Jurisdiction: Origins of the Current Crisis in Atlantic Canada's Fisheries." *Marine Policy*, v. 19 (1995): 285-299.

could also be used in retraining or job creation schemes within the communities traditionally supported by the fishery.

The economic difficulties faced by many fishing fleets within the United States are such that few could currently afford to finance a capacity reduction scheme from within. However, subsequent economic recovery of the fleet may be sufficient to allow annual license fees that could repay at least some of the cost of the capacity reduction scheme. Whether such fees would be politically acceptable is another matter.

Gear Retirement

Gear retirement has been infrequently discussed and little used, but does offer the potential to stabilize employment within some fisheries, while reducing incidental bycatch within the fishery and damage to the environment. Critics, however, see any restrictions on gear choice to be regulation by inefficiency, forcing the fishing industry to operate with less profitability and in a fashion that is less than economically optimal.

Many labor-intensive methods of fishing (*e.g.*, targeting larger individuals within a species) have lost favor as technology has improved. Gear retirement and subsequent banning of certain types of gear may allow (or force) a fishery to change to more sustainable methods, that in the long term may prove to use the fishery resource more efficiently.⁵⁴ The recent move to ban dragging for lobsters in New England is an example of restrictions on efficient gear for the individual in favor of greater societal efficiency. Such restrictions may, however, impose costs and inefficiencies that will be distributed among various segments of society, and should, therefore, be identified and assessed prior to their implementation.

A harpoon fishery for swordfish on the Atlantic coast, that targeted only older, larger individuals, has existed for many years. It appeared to be sustainable as it was relatively labor-intensive, required little capital, and allowed individual swordfish to spawn several times before they were susceptible to capture. The development of a longline fishery, that captured not only the larger fish but many juveniles that had not reached sexual maturity, caused the harpoon fishery to become uneconomic, and it has almost died out. Some argue that this experience indicates a need for greater use of social and economic studies in decision-making, and that managers exert reasoned control over what types of gear might be legally fished.

In another example, scallop dredges have been shown to kill a large number of juvenile scallops as well as causing considerable damage to other seabed fauna. Shallow waters, however, make possible a dive fishery in which juvenile mortality and seabed damage is non-existent. The larger individuals targeted have not only had a chance to spawn, but also command higher prices due to their perceived higher

⁵⁴“Efficient” can mean different things to different people. For an individual skipper, gear that allows maximum capture of a resource in the shortest time is most efficient. For society, however, gear that maximizes sustainable returns in the long-term may be more socially efficient.

quality. Buying scallop dredges and subsequently banning dredging from certain areas could increase long-term revenues and employment in the fishery. A full accounting of the relative costs of such gear decisions would also include the differential risk to the fishermen's health and safety, effects on total market supply of the product, effects on the per-unit costs of harvesting, resulting market price to the consumer, and other factors.

Fishermen are adept at circumventing regulations designed to limit their catches, and are often loath to change fishing methods that they have developed and practiced over a number of years. Unilateral implementation of gear restrictions may cause both resentment and economic difficulties in what are often already hard-pressed fisheries. The 1995 gillnet buyback in Florida is an example of some of the problems that may be encountered, and policing of unpopular gear restrictions can be expensive and time consuming. Gear retirement may be a way of reducing these problems, and allowing fishermen to finance more sustainable methods of fishing they could not otherwise have afforded to turn to. Thus, gear retirement could play a beneficial role in helping fisheries return to profitability and sustainability.

Appendix

Restricted Access Fisheries in the United States

The following fisheries are considered to be currently under some form of limited entry or controlled access. Fisheries for which there is a complete closure or moratorium in federal waters (*e.g.*, weakfish, Atlantic striped bass, Atlantic salmon) are not considered to be under limited entry or controlled access, since there is essentially no access at all. While a few of these fisheries have structured systems of limited access (*e.g.*, individual transferable quota systems), others have minimal restrictions, such as income qualification for permits. Note also that, while the following list generally equates to fishery management plans (FMPs), some fisheries have been broken out (*e.g.*, Atlantic surf clams and ocean quahogs) to highlight separate fisheries contained in a single FMP.

- American lobster
- Northeast multispecies
- Atlantic sea scallops
- Summer flounder
- Atlantic surf clams
- Atlantic ocean quahogs
- South Atlantic wreckfish
- South Atlantic snapper/grouper
- South Atlantic/Gulf of Mexico coastal migratory pelagics
- South Atlantic live rock (corals)
- Gulf of Mexico reef fish
- Gulf of Mexico red snapper
- South Atlantic/Gulf of Mexico spiny lobster
- Gulf of Mexico stone crab
- Pacific halibut (fixed gear off Alaska)
- Pacific sablefish (fixed gear off Alaska)
- West Coast groundfish
- Western Pacific bottomfish and seamount groundfish
- Western Pacific pelagics
- Western Pacific crustaceans
- Gulf of Alaska groundfish
- Bering Sea/Aleutian Island groundfish
- Alaska high seas salmon
- Alaska sea scallops
- Bering Sea/Aleutian Islands king and Tanner crabs
- Atlantic bluefin tuna (purse seine only)