

## DWFNs and Coastal States

### ■ Economic and Social Aspects of their Interactions

The relations between coastal states and DWFNs have been profoundly affected by the extended fisheries jurisdiction (EFJ) arising from the UN Third Conference on the Law of the Sea. As a consequence of the conference, and the resultant UN Convention on the Law of the Sea (UN, 1982), coastal states have been given the power to establish 200-mile EEZs. From this it follows that, when discussing coastal state-DWFN relations, a clear distinction must be made between those fishery resources which lie wholly within the coastal state EEZ, and those stocks which lie both within the EEZ and the adjacent high seas. It also follows that, as a preliminary to discussing coastal state-DWFN relations under the EEZ regime, we should comment on the state of affairs which existed prior to the UN Third Conference on the Law of the Sea and the advent of EFJ.

### ■ The Pre-EFJ Era

Prior to the advent of the EFJ and the EEZ regime, coastal states typically had jurisdiction over fishery resources off their shores out to no more than 3 miles. Fisheries jurisdiction out to 12 miles was deemed to be unusual. Hence, the bulk of marine fishery resources were high seas fishery resources.

The high seas fishery resources were subject to control by international commissions, or were subject to no control whatsoever. Where the stocks were subject to management by international commissions, the management was, more often than not, weak. The ICNAF, discussed in the Newfoundland case study, provides an example. In any event, the high seas fisheries were characterized by open access, in which DWFs could fish at will.

The economics of open access fisheries, in which property rights to the resources are non-existent, are well known (e.g. Munro and Scott, 1985). Overexploitation of the stocks is all but guaranteed. The fishers, be they coastal state fishers or DWFNs, have no incentive to conserve the resource. Hence, we should not be surprised to find that the pre-EFJ history of DWF activity was one of chronic overexploitation of the stocks. The cases of Iceland, Namibia, Newfoundland, and Mauritania and Senegal all provide examples of pre-EFJ overexploitation of fishery resources by DWFs.

It was, in fact, the decidedly unsatisfactory state of affairs in high seas fisheries management which provided the motivation for EFJ. To cite but one example, Canada became a strong advocate of EFJ in large part because of its dissatisfaction with ICNAF resource management off Canada's Atlantic coast.

With these preliminary comments completed, let us now turn to coastal state-DWFN relations under EFJ – the EEZ regime.

## Fishery Resources Wholly within the EEZ

Fishery resources which lie wholly within the EEZ can be said to constitute, to all intents and purposes, the property of the coastal state (McRae and Munro, 1989). It is true that, in the years immediately following the UN Third Conference on the Law of the Sea, there was considerable dispute over whether tuna, and other highly migratory species, found within the coastal state EEZ, could be said to constitute coastal state property. The United States insisted that they were not. The United States was to reverse its position in the early 1990s, and the issue appeared to be settled (UN, 1992). Thus, all fishery resources within the EEZ could now be said to constitute coastal state property.

Nonetheless, it did appear, at first glance, that the UN Convention on the Law of the Sea circumscribed these coastal state property rights in a manner which is of key importance to the issue of coastal state-DWFN relations. While Article 56 of the convention grants the coastal state "sovereign rights for the purpose of exploring, exploiting and conserving the...living resources within the EEZ", and while Article 61 explicitly grants the coastal state the right to set the TACs for fisheries within the EEZ (UN, 1982), Article 62 lays down the so called "surplus principle". In essence, the principle states that the coastal state is to assess its fishing capacity in relation to each of the aforementioned TACs. In those instances in which the coastal state fishing capacity falls short of the TAC, a "surplus" is deemed to exist. Article 62 then calls upon the coastal state to grant "other" states (e.g. DWFs) access to the "surplus" (UN, 1982).

The "surplus principle" is, however, something of an illusion, at least from an economic perspective. First, Article 61 grants the coastal state what amounts to a free hand in setting the relevant TACs. Hence, the coastal state could go a long way towards eliminating surpluses through judicious setting of the TACs. More importantly, Article 62 grants the coastal state very broad powers in imposing terms and conditions of access (e.g. imposition of fees) upon DWFs seeking access to any "surplus" (UN, 1982). In no sense whatsoever is the coastal state expected to grant DWFs free access to the "surpluses" (Munro, 1985 and 1989). With a modest amount of imagination a coastal state could, in fact, devise sets of terms and conditions of access which would serve to discourage all DWFs seeking access (Munro, 1985 and 1989).

Given that the fishery resources within the EEZ constitute coastal state property, and given that the so called "surplus principle" is largely empty in economic terms, then the decision as to whether or not DWFs are, or are not, to be granted access to the EEZ can be seen to rest with the coastal state. Of course, DWFs may attempt to enter an EEZ, and catch the stocks contained therein, without obtaining access agreements from the coastal state, as is exemplified by the case of the Galapagos Islands. Such action constitutes poaching, pure and simple. In principle, such action is no different from say, the stealing of livestock from a farmer or rancher.

The question then becomes why a coastal state, which is capable of defending its marine property rights, should contemplate establishing access arrangements for one or more DWFs, as opposed to phasing out DWF activities within its EEZ with all possible speed. The economic answer is that the coastal state may find that it can increase its

economic returns from its fishery resources by establishing the arrangements. The coastal state can be thought of as "importing" the fishing, and/or processing, services of the DWFs. Alternatively, the coastal state can be thought of as "hiring" the services of the DWFs (Munro, 1985 and 1989).

If we think of the coastal state as "importing" the services of the DWFs, then the question as to whether or not it is in the economic interest of the coastal state to grant access to DWFs can be cast as an international trade question. A *prima facie* case can be made for "importing" such services if the DWF has a comparative advantage in fishing a particular resource within the EEZ, and/or processing the catch.

Suppose, for the sake of argument, that the DWF can both fish the relevant resource and process the catch at costs much lower than those which would be incurred by domestic fishers and processors. Then the coastal state might well find that the net economic benefit which it can obtain from the resource would be maximized by granting access to the DWF, with the granting of access being accompanied by a set of fees designed to capture a portion of the net economic benefits, or economic resource rent, from the fishery. The Pacific island nations of the western and central Pacific, which have seen up to 80 per cent of their offshore tuna catches taken by DWFs under access arrangements involving fees, could be thought of as one example (Munro, 1990).

Alternatively, the DWF might have a comparative advantage in fishing the resource, but not in processing the catch. In such circumstances, it could be to the coastal state's economic advantage to enter into a joint-venture arrangement with the DWF, in which the fleet fished the resource and delivered the catches to onshore processors. Namibia provides an illustration of a coastal state which has adopted the joint-venture approach.

If the DWFs have a comparative advantage in neither fishing nor processing, then the coastal state's decision will be straightforward. No access arrangements should be contemplated.

The argument for not granting access arrangements, even when the DWFs possess a comparative advantage, is really an argument for granting protection to the domestic fleets and/or processors (Munro, 1989). Economists maintain that many arguments for protection, when judged from a national perspective, are specious. Not all such arguments are invalid, however. A prominent "legitimate" argument is the so called "infant" industry argument: a country may have a comparative advantage in the production of a particular good or service. The domestic industry producing the good or service is newly established, an "infant". Until the industry has gone through a learning period its costs will appear to be higher than those of its foreign competitors. Thus the country's comparative advantage is latent. Hence, unless the "infant" industry is granted temporary protection, it will not survive, and the country's latent comparative advantage will remain unrevealed.

Hence, one could argue that a coastal state implementing an EEZ regime should provide protection for the domestic industries taking advantage of the new opportunities created thereby, until such time as the "infants" achieve maturity. The infant industry argument has validity, but it has to be handled with great care. The

problem in applying the argument is that it is very difficult to determine a priori which “infants” do in fact have a real chance of achieving maturity. Those that remain in permanent childhood risk becoming a permanent drain upon the economy.

New Zealand is an example of a developed coastal state that has explicitly followed a policy of “importing” foreign fishing/processing services. When New Zealand established its EEZ (the fourth largest in the world), it established a quota regime for its domestic fishing companies exploiting the offshore stocks now encompassed by its EEZ. The companies were enabled, within limits, to fish the stocks, and process the catches, with their own vessels and processing facilities, or to engage foreign vessels under charter to do the fishing/processing for them. Extensive chartering of foreign vessels did in fact take place (Munro, 1989). In an address, given a few years ago, the then New Zealand Minister of Fisheries, stated that his country followed a policy of “free trade in fishing services”, and noted that 100 foreign vessels were under charter from DWFNs such as Japan, the Republic of Korea, Poland, Russia, and Ukraine (Kidd, 1994).

Two key points must be made in passing. The first is that the use of domestic fishing/processing services, as against the “importation” of foreign services, is not an either/or situation. It is quite possible that it will be optimal for the coastal state to have a mix of domestic and foreign services. The foreign comparative advantage may prove to be limited and specific. New Zealand does, for example, have a definite mix of foreign and domestic services.

The second point is that comparative advantage is not static, but rather can be expected to vary over time. Thus, a coastal state may initially find that it is in its economic interest to import DWF services, but may find that this ceases to be the case, because of shifting comparative advantage. In other words, the initial comparative advantage of DWF over domestic fishing/processing services may be transformed into a comparative disadvantage.

What we might term the “trade in services” argument for establishing access arrangements with DWFs will, if positive, provide a prima facie case for establishing the access arrangements. It does not, however, settle the matter. It is naive to suppose that a coastal state, even if developed, can exert absolute control over DWFs granted access to the EEZ. Consequently, the full benefits of the DWF comparative advantage are unlikely to be enjoyed by the coastal state. For example, the coastal state is likely to find it costly to ensure that the DWFs comply fully and precisely with the terms and conditions laid down by the coastal state.

This type of problem is not unique to the coastal state-DWFN case. Indeed, it is a commonplace in economics, and is referred to by economists as the “principal-agent” problem. It arises when the principal, say an employer, “hires” the agent to perform certain tasks, but cannot control the agent’s actions with precision. The principal must remain content with establishing an incentive scheme to motivate the agent. A textbook example is that of a landlord and a sharecropper. The landlord, the principal, cannot exercise absolute control over the sharecropper, the agent, but must rather rely upon a set of incentives.

At an earlier point, we said that one might, as well as thinking of the coastal state "importing" the services of DWFs, think of the coastal state "hiring" the services of DWFs. Thought of in this way, the coastal state can be seen as the principal and the DWF(s) as the agent(s). The terms and conditions of access then can be viewed as the incentive scheme. Principal-agent analysis has in fact been applied to the coastal state-DWF problem (see, for example, Clarke and Munro, 1987 and 1991; Munro, 1994).

In principal-agent analysis, one talks about "first best situations" and "second best situations" faced by the principal. In a first best situation, the agent is no more than the principal's slave. In the second best situation, the agent is imperfectly controlled by the principal through a set of incentives. The difference between the benefits which the principal receives under the realistic second best situation, and what it would receive under the utopian first best situation, is referred to as the "incentive gap" (Munro, 1994). The typical coastal state, in granting access to one or more DWFs, is very much confronted with a second best situation. In terms of benefits, the coastal state must recognize that there will be some "slippage" – an incentive gap – and realistically assess the benefits to be derived from DWF participation, in comparison with those to be derived by relying solely on domestic fishing and processing services.

One aspect of incentives and "slippage" involves monitoring and surveillance of DWFs, in ensuring that they comply with the terms and conditions of access (e.g. not exceeding their allowed catches). Few coastal states have sufficient surveillance capacity to police the DWFs with absolute effectiveness. Indeed, most would find the costs prohibitive, and thus must rely upon incentive schemes of some sort to achieve a reasonable degree of compliance.

One of the best examples is provided by the aforementioned Pacific island nations. The combined EEZs of the Pacific island nations equal the area of Africa. Most of the island nations are at relatively low levels of development, and cannot afford extensive fleets of patrol vessels and aircraft to monitor DWFs operating in the EEZs. The island nations cooperatively have developed an effective incentive scheme, involving a Regional Register of Foreign Fishing Vessels. One aspect of the scheme is that a foreign vessel found in violation of its access terms and conditions in the EEZ of one island nation faces the threat of banishment from the EEZs of all of the island nations (Munro, 1990).

Among the case studies, Mauritania probably provides the best example of "slippage". Mauritania has the potential to enjoy significant economic benefits from the granting of access to DWFs. Due to the coastal state's limited monitoring and surveillance capabilities, however, these benefits have certainly been below the maximum. "Slippage" has been apparent.

### Fishery Resources Found both within the EEZ and the Adjacent High Seas

Over the last decade and a half, managing fishery resources that are to be found both within the EEZ and the adjacent high seas has emerged as a serious problem. Such

resources, referred to as straddling stocks and highly migratory stocks, were the focus of a major UN intergovernmental conference (UN Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks) from 1993 to 1995. The agreement to which the conference gave rise (UN, 1995), which was designed to supplement, or buttress, the Convention on the Law of the Sea, is now up for ratification. The process of implementation is only just beginning.

With such resources, the coastal state-DWFN relations become quite different. The sovereign rights to the intra-EEZ portions of the stocks, granted by Article 56 of the Convention on the Law of the Sea to the coastal state, remain unchanged. What the coastal state does not have, however, are full property rights to the high seas portions of such stocks. In fact, the nature of the property rights to the high seas portions of these stocks is not entirely clear at the time of writing.

The aforementioned UN agreement calls for straddling stock type of resources to be managed on a region by region basis through regional fisheries management organizations (RFMOs), in which membership will be open to relevant DWFs. The coastal state will have no choice but to deal with the relevant DWFs, although the coastal state will still be left with the power of determining whether the DWFs in question should or should not be granted access to the EEZ.

It should be emphasized, in passing, that the consequences of ineffective cooperation between coastal states and DWFNs in the management of straddling/highly migratory stocks can be severe. Evidence is provided by the case study on the “donut hole” in the Bering Sea. The Alaska pollock stocks in this high seas enclave clearly constitute a straddling stock. The stocks were subject to massive overexploitation by DWFs, as a result of non-cooperation between the DWFs and the relevant coastal states – Russia and the United States. There was cooperation in the end, but only after the damage had been done. It was examples, such as the “donut hole”, that provided the motivation for the aforementioned 1993-1995 UN conference.

It has been argued that, if the RFMOs are to be successful, the relevant adjacent high seas will become high seas in name only (Munro, 1998). It is further argued that, on a de facto, if not de jure, basis, the coastal state and DWF members of an RFMO will share joint property rights to the high seas portions of the stocks (Munro, 1998).

It should also be noted that the 1993-1995 UN conference recognized at a very early stage that it is nonsensical to think of the high seas portion and EEZ portion of a straddling type of stock being subject to separate management regimes. If a DWFN member of a RFMO becomes a de facto joint owner of the high seas portion of the stock in question then it can be expected to exert influence over the management of the stock within, as well as without, the EEZ.

Given that the nature of the management of straddling and highly migratory stocks is still being determined, and will continue to be determined for some time to come, there is little more that can be said about coastal state-DWFN relations with regards to these resources at the present time.

## Social Considerations\*

Social impacts can be analysed at three different levels, global, hemispheric or international, and national. Global impacts include those of industrial fishing on the common heritage of humankind, primarily the reduction in abundance and diversity of marine fish stocks and the consequent foreclosing of options for future generations. At a hemispheric level, DWFs transfer protein and wealth from underdeveloped to developed nations. At a national level, and certainly prior to EEZs, DWFs impacted on indigenous and artisanal fishers. While the creation of EEZs was widely expected to improve conservation and management, this has not always proved to be the case. Nor have EEZs in themselves alleviated the situation of indigenous and artisanal fishers as each country is free to decide how resources are allocated between coastal and offshore fisheries.

The two key points are that first, for most of human history, fishing communities were located close to the fish. Second, fish populations were more than adequate for local needs. There was little or no population pressure, no global markets. Fish were thus protected by the limited needs of the dependent community, by limitations of vessels and gear, and above all, by weather and sea conditions. Newfoundlanders fished cod from June to September (see the Newfoundland case study above). Similarly, DWFs fishing off Iceland up to the beginning of this century were restricted to the summer months. After that, the cod were safe enough. In fact, merchants who supplied the necessities of life in exchange for salt cod often complained that people commonly stopped fishing while there were still plenty of fish to be caught (Ommer, 1994).

### GLOBAL ISSUES

Vessel technology severed the ancient link between fishing and communities anchored by geography. Fishing communities, whether Newfoundland outports, BC Aboriginals, or Senegalese pirogues came to be looked on as relics of the past, or at best, quaint. Big government and big industry became the key players. As local stocks became depleted, various nations took to the high seas in search of new stocks.

The evolution of fisheries management lags very shortly behind the growth of industrial fleets. As the realization dawned that fisheries were finite, government stepped in with successive control measures. The commercial industry is thus the parent of modern fisheries management. It is little wonder that traditional systems received short shrift. The marginalization of traditional management systems and the criminalizing of traditional fishing practices are significant social issues that remain to be addressed (Thoms, 1996).

Pauly et al. (1998) show that, as large, commercially valuable species are depleted, modern industrial fishing is moving steadily down the marine food web. If this continues unchecked, the end result will be a world ocean full of krill, lanternfish, and squid. Areas like the South China Sea are already dominated by fast-turnover pelagic species. This reduces the options for future generations. The most popular remedy, very large no-take marine protected areas, also has significant social implications for indigenous and longstanding coastal fishing communities who might wake up one day

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to find most or all of their traditional fishing grounds declared a “no-take” area in the interest of conservation.

Subsidies are another major issue. Garcia and Newton (1997), estimate the annual global cost of fishing at around US\$116 billion, with corresponding revenues of US\$70 billion. The difference, US\$46 billion per year, consists of direct and indirect subsidies. Subsidies are also a national and indeed domestic issue. The northern cod study shows that Canada’s response to international fishing pressure was to invest heavily in advanced catching and processing technology. The former Soviet bloc invested enormous amounts in distant water vessels. In the Newfoundland case, the inshore trap fishers ate into their savings and home equity to buy more traps and gear – running ever faster to stand still. There is a real reluctance to abandon this level of investment.

### **INTERNATIONAL AND HEMISPHERIC ISSUES**

The realization that catching power has outstripped the productive capacity of world oceans led inexorably to the creation of EEZs. Iceland led the way by extending its EEZ to 4 miles in 1952, 12 miles in 1958, 50 miles in 1972, and finally 200 miles in 1975 (see the Icelandic case study above). Well and good, but the new national domains had no effect on the behaviour of walleye pollock in the Bering Sea. Atlantic herring were equally indifferent to the new ocean frontiers.

The social implication is that nations with little or no history of dialogue, cooperation, or indeed war have, all of a sudden, to start to deal with each other. This requires a rapid maturation. Some achieve it, for example the parties to the Bering Sea “donut hole” and Norwegian spring-spawning herring agreements. Others do not, as witnessed by the annual tomfoolery and posturing between Canada and the United States over Pacific salmon and the 1996 Turbot War between Canada and Spain, where the question of whether Canada was within its rights to seize a vessel on the high seas is still being debated in court.

Mauritania, and to a lesser extent Senegal, exemplify the problem of transfer of protein and wealth from poor “southern” nations to the relatively rich DWFNs. The case study shows that for a 45-year period (1950-1994), DWFNs took over 80 per cent of the catch. In recent years, the Mauritanian catch has remained at around 10 per cent while Senegal, with an aggressive artisanal fishery, has increased its catch significantly. Namibia has made a commitment to rebuild stocks depleted prior to independence and appears well placed to maximize economic and social benefits as stocks rebuild.

The need for “internationalization” of fisheries management and responsible behaviour by developed nations identified at the end of the Mauritania/Senegal case study is apparent. The role of Norway, the United States, and Iceland in aiding Namibia to build “respectable capabilities for controlling and monitoring foreign fishing... [and] ... for training Namibian personnel and reducing the dependency on expatriates” is encouraging. The need for international bodies which can exert more than moral suasion and the unequivocal political backing of powerful nations for measures such as the FAO Code of Conduct for Responsible Fishing remains to be met.

## **NATIONAL ISSUES**

While the allocation of stocks within the EEZ is at the sole discretion of the coastal nation, there are nonetheless significant social and equity considerations involved in how these stocks are fished. Both Mauritania and Iceland recognized this in setting out regulations to restrict large vessels from inshore areas to protect the small boat fleet. In the case of Mauritania, these measures have not been entirely successful. The economic impacts of offshore fisheries can also be significant. Canada's failure to protect the inshore cod fishery has, so far, cost Can\$4.2 billion to mitigate community impact. This raises a number of important social questions, not least of which is whether longstanding communities such as Newfoundland outports have a "right" to continue to exist after their original economic bases have been eroded. When management by big government played a role in eroding the economic base, what is the nature and extent of government's responsibility? Is Can\$4.2 billion enough?

### **■ Concluding Remarks**

Extended fisheries jurisdiction has radically altered the relationship between coastal states and DWFNs. DWFs no longer have unimpeded freedom to operate as they please. With regards to fishery resources wholly within the EEZ, the decision as to whether DWFs should be allowed access to these resources lies with the coastal state. The coastal state, if it is acting rationally, will, or will not, decide to grant such access in light of the expected impact that this decision will have upon the state's long-term economic and social interests.

Fishery resources that lie both within the EEZ and the adjacent high seas present a far more difficult problem. In the case of these resources, the coastal state has little option but to seek the cooperation of the DWFNs.

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## References

- AED (1993) Namibia: fishing for growth. *African Economic Digest*. 17 May: 4.
- Angelsen A, Fjeldstad OH, and Sumaila UR (1994) *Project Appraisal and Sustainability in Less Developed Countries*. Chr. Michelsen Institute Report R: 1.
- Anon. (1994a) Arguments rage as "flag fleet" grows. *Fish. News Int.* 33(6): 14-15.
- Anon. (1994b) *Focus on Fisheries and Research*. Namibia Brief 18. 115 pp.
- Anon. (1996a) Illegal fishing "doubles Arab catch". *Fish. News Int.* 35(10).
- Anon. (1996b) Iceland show heralds industry up-turn – as difficult decade ends. *Fish. News Int.* supplement 35(9): 1.
- Anon. (1996c) Russia "breaks redfish quota" – Iceland port ban follows. *Fish. News Int.* supplement 35(9): 32.
- Anon. (1996d) *Agreed Record of Fisheries Consultations on the Management of the Norwegian Spring Spawning Herring (Atlanto-Scandian Herring) Stock in the Northeast Atlantic for 1997*.
- Anon. (1997a) Fjölstofnarannsóknir 1992-1995 (Multispecies research 1992-1995). *Hafrannsóknastofnun Fjölrit* 57: 413.
- Anon. (1997b) *Útvegur 1996 (Fishery statistics 1996)*. Fiskifélag Íslands. 548 pp.
- Anon. (1997c) Bluefin hooked off Iceland. *Fish. News Int.* 36(1): 5.
- Anon. (1997d) Nýttjastofnar sjávar 1996/97. Aflahorfur fiskveiðiárið 1997/98 (State of marine stocks in Icelandic waters 1996/97. Prospects for the quota year 1997/98). *Hafrannsóknastofnun Fjölrit* 56: 167.
- Anon. (1997e) *Agreed Record of Fisheries Consultations on the Management of the Norwegian Spring Spawning Herring (Atlanto-Scandian Herring) Stock in the Northeast Atlantic for 1998*.
- Anon. (1998a) *Focus on Fisheries and Research*. Namibia Brief 20. 172 pp.
- Anon. (1998b) Interview with the Minister of Fisheries and Marine Resources: 4-7, in *Focus on Fisheries and Research*. Namibia Brief 20. 172 pp.
- Arnason R (1994) *The Icelandic Fisheries, Evolution and Management of a Fishing Industry*. Fishing News Books.
- Arnason R (1996) On the ITQ fisheries management system in Iceland. *Fish Biology and Fisheries* 6: 63-90.
- Ástthósson ÓS and Gíslason Á (1995) Long term changes in zooplankton biomass in Icelandic waters in spring. *ICES J. Mar. Sci.* 52: 657-668.
- Bakkala RG (1993) Structure and historical changes in the groundfish complex of the Eastern Bering Sea. *NOAA Tech. Rep. NMF*. 114. 91pp.
- Bates Q (1996) Deep waters saves (Iceland's) fleet. *Fish. News Int.* supplement 35(9): 20-21.
- Beaudry FH, Folsom WB, and Rovinsky DJ (1993) *World Fishing Fleets: An Analysis of Distant-Water Fleet Operations Past – Present – Future. Volume II. Africa and the Middle East*. National Marine Fisheries Service, National Oceanic and Atmospheric Administration. Silver Spring, Maryland. 51 pp.
- Bjørndal T, Hole AD, Slinde WM, and Asche F (1997) *Norwegian Spring Spawning Herring – some Biological and Economical Issues*. Foundation for Research in Economics and Business Administration, Bergen. Working paper No. 29/1997. 45 pp.
- Blatt C (1998) Hake industry on threshold of world markets: 29-36, in *Focus on Fisheries and Research*. Namibia Brief 20. 172 pp.
- Brulhet J (1976) Etat actuel des pêches maritimes à Nouadhibou. *La Pêche Maritime* 55(1183): 582-487.
- Cadigan S (1995) *Marine Resource Exploitation and Development: Historical Antecedents in the Debate over Technology and Ecology in the Newfoundland Fishery, 1815-1855*. Eco-Research Programme Occasional Paper, Memorial University of Newfoundland.

- Cadigan S (1996) *The Sea Was Common, and Every Man Had a Right to Fish in it: Failed Proposals for Fisheries Management and Conservation in Newfoundland, 1855-1880*. Eco-Research Programme Occasional Paper, Memorial University of Newfoundland.
- Camhi M (1995) Industrial fisheries threaten ecological integrity of the Galapagos Islands. *Cons. Biol.* 9(4): 715-724.
- Canfield JL (1993) Recent developments in Bering Sea fisheries conservation and management. *Ocean Dev. Int. Law.* 24(3): 257-289.
- Caveriviere A (1994) Le poulpe (*Octopus vulgaris*) au Senegal: une nouvelle ressource, in Barry-Gerard M, Diouf T, and Fonteneau A (eds.) *L'évaluation de ressources exploitables par la pêche artisanale Sénégalaise, Tome 2*. ORSTOM Paris. 423 pp.
- Christensen V and Pauly D (1992): ECOPATH 11 – a system for balancing steady-state ecosystem models and calculating network characteristics. *Ecol. Modelling* 61: 169-185.
- Chuksin Yu V and Kuderskaya RA (1991) Biology, fishery and stock management of Cape horse mackerel. *State of the Fishing Industry's Biological Resources in the Central and South Atlantic and East Pacific Oceans*. Okeana: 54-85 (in Russian).
- CIA (1997) *The 1997 World Factbook*. [www.odci.gov/cia/publications/nsolo/wfb-all.htm](http://www.odci.gov/cia/publications/nsolo/wfb-all.htm).
- Clarke FH and Munro GR (1987) Coastal states, distant water. Fishing nations and extended jurisdiction: a principal-agent analysis. *Natural Resource Modeling* 2: 81-107.
- Clarke FH and Munro GR (1991) Coastal states and distant water fishing nations: conflicting views of the future. *Natural Resource Modeling* 5: 345-370.
- Coull JR (1972) *The Fisheries of Europe, an Economic Geography*. G Bell and Sons, Ltd., London.
- Cunningham S, N'-Guer A, and Thiam I (1995) Monopsonistic fisheries management: the case of Mauritania: 305-317, in Liao DS (ed.) *International Cooperation for Fisheries and Aquaculture Development: Proceedings of the 7th Biennial Conference of the International Institute of Fisheries Economics and Trade, Vol. I*. Keelung, Taiwan, National Taiwan Ocean University.
- de Young B and Rose GA (1993) On recruitment and distribution of atlantic cod (*Gadus morhua*) off Newfoundland. *Canadian Journal of Fisheries and Aquatic Sciences* 50: 2729-2741.
- di Soncino R (1983) Letter to Duke of Milan, 18 December 1497, in *Task Force on Atlantic Fisheries. Navigating Troubled Waters*. Supply and Services, Ottawa.
- Diallo M (1994) Quelques éléments sur la compétition des pêcheries artisanales et industrielles pour l'accès à la ressource au Senegal, in Barry-Gerard M, Diouf T, and Fonteneau A (eds.) *L'évaluation de ressources exploitables par la pêche artisanale Sénégalaise, Tome 2*. ORSTOM Paris. 423 pp.
- Dow Jones News Reuters (1998) Russia seizes North Korean trawlers.
- Dunlap WV (1995) Current legal developments: Bering Sea. *Int. J. Mar. Coast. Law.* 10(1): 114-135.
- Economist Intelligence Unit (1998a) Namibia fishing. *Country Profiles* 1 December.
- Economist Intelligence Unit (1998b) Namibia production: fishing. *Country Profiles* 19 December.
- Estrada M and Marrase C (1987) Phytoplankton biomass and productivity of the Namibian coast: 347-356, in Payne AIL, Gulland, and Brink KH (eds.) *The Benguela and comparable frontal systems*. S. Afr. J. Mar. Sci. S. Afr. Tydskr. Seewet. (5).
- Fadayomi NO (1987) Investment prospects in marine capture fisheries, in Ita EO, Ajayi TO, Ezenwa B, Olaniawo AA, Udolisa RE, and Taggart PA (eds.) *Proceedings of the 5th Annual Conference of the Fisheries Society of Nigeria, Fison, Ilorin, Sept. 22-25 1986* (5).
- Ferraris JB, Samb, and Thiam M (1994) Les statistiques de pêche au CRODT: description des systèmes de collecte et de traitement des données: 73-94, in Barry-Gerard M, Diouf T, and Fonteneau A (eds.) *L'évaluation de ressources exploitables par la pêche artisanale Sénégalaise, Tome 2*. ORSTOM Paris. 423 pp.

- Finlayson AC (1994) *Fishing for Truth: A Sociological Analysis of Northern Cod Stock Assessment from 1977-1990*. St. John's Institute of Social and Economic Research.
- Fredin RA (1987) *History of Regulation of Alaskan Groundfish Fisheries*. National Marine Fisheries Service. NWAFC Processed Report 87-07.
- Garcia S and Newton C (1997) Current situation trend and prospects in world capture fisheries: 3-27, in Pikitch E, Huppert DD, and Sissenwine M (eds.) *Global Trends: Fisheries Management*. American Fisheries Society Symposium 20, Bethesda.
- Gerlotto F, Stequert B and Brugge WJ (1979) La pêche maritime artisanale en Afrique de l'Ouest: la pêche au Sénégal. *La Pêche Maritime* 1211: 98-109.
- Gíslason Á and Ástthórsson ÓS (1997) Árstíðabreytingar dyrasvífs fyrir norðan Ísland (Seasonal changes in zooplankton in the waters north of Iceland), in Fjölstofnarannsóknir 1992-1995 (Multispecies research 1992-1995). *Hafrannsóknastofnun fjölrit* 57: 11-23.
- Gjøvsætter H (1994) Pelagic fish and the ecological impacts of the modern fishing industry in the Barent Sea. *Arctic* 48(3): 267-278.
- Goffinet T (1992) Development and fisheries management: the case of northwest Africa. *Ocean and Coastal Management* 17:105-136.
- Guthmundsson G (1981) *Togaraöldin, 1. Bindi, Stórveldismenn og kotkarlar (The Trawler Age 1)*. Örn og Örlygur, Reykjavík, Iceland.
- Halliday RG and Pinhorn AT (1996) North Atlantic fishery management systems: a comparison of management methods and resource trends. *Journal of Northwest Atlantic Fishery Science* 20. 117 pp.
- Hamre J (1990) Life history and exploitation of the Norwegian spring spawning herring: 5-39, in Monstad T (ed.) *Biology and Fisheries of the Norwegian Spring Spawning Herring and Blue Whiting in the Northeast Atlantic. Proceedings of the Fourth Soviet-Norwegian Symposium, Bergen, 12-16 June 1989*.
- Hewitson JD (1988) Catch trends in the multispecies pelagic fishery off Namibia in 1987. *Collect. Sci. Pap. ICSEAF* 15: 7-17.
- Hewitson JD, Melo YC, and Cooper RM (1989) The Namibian pelagic fishing resource during 1988. *Collect. Sci. Pap. ICSEAF* 16(1): 119-131.
- Hjörleifsson E (1997) *A Brief Overview on the Natural History, Fisheries, and Management of Greenland Halibut in E-Greenland, Icelandic and Faeroe Waters*. Working paper for a West Nordic meeting on fisheries in Qaqortoq 6-8 August 1997. 18 pp.
- Hjörleifsson E, Pálsson J, and Valtýsson HT (1998) Landathur flatfiskafla á Íslandsmithum 1950-96 (Catches of flatfish in Icelandic waters 1905-96). *Hafrannsóknastofnun. Flatfiskanefnd, vinnuskýrsla*, 9801. 23 pp.
- Hutchings JA (1995) Spatial and temporal variation in the exploitation of northern cod, *Gadus morhua*: a historical perspective from 1500 to the present, in Daniel Vickers (ed.) papers presented at the conference entitled *Marine Resources and Human Societies in the North Atlantic Since 1500*. ISER Conference Papers (5). Memorial University of Newfoundland, St. John's.
- Hutchings JA and Myers RA (1994) What can be learned from the collapse of a renewable resource? Atlantic cod, *Gadus morhua*, of Newfoundland and Labrador. *Canadian Journal of Fisheries and Aquatic Sciences* 51: 2126-2146.
- Hutchings JA and Myers RA (1995) The biological collapse of atlantic cod off Newfoundland and Labrador: an exploration of historical changes in exploitation, harvesting and management, in Arnason R and Felt L (eds.) *The North Atlantic Fishery: Successes, Failures and Challenges*. Institute of Island Studies, Charlottetown, PEI.
- INPFC (1987) *Statistical Yearbook 1984*. International North Pacific Fisheries Commission, Vancouver, BC. 125 pp.

- INPFC (1996) *Statistical Yearbook 1992*. International North Pacific Fisheries Commission, Vancouver, BC. 115 pp.
- IPS (1995) Namibia – fishing: easing troubled waters. *Inter Press Service* 5 September.
- International Commission for Northwest Atlantic Fisheries 1953-1978. Statistical bulletin, Dartmouth, NS.
- International Commission for Northwest Atlantic Fisheries (1964) *List of Vessels over 50 Gross Tons Fishing in the ICNAF Convention Area in 1962*. Dartmouth, NS.
- Jakobsson J (1985) Síldarstofnar og stjórn síldveitha í norðaustanverthu Atlantshafi (Herring stocks and management of herring fisheries in the north-eastern Atlantic). *Ægir, rit Fiskifélags Íslands* 78(1): 2-9.
- Jakobsson J (1992) Recent variability in the fisheries of the North Atlantic. *ICES Mar. Sci. Symp.* 195: 291-315.
- Jarre-Teichmann A and Christensen V (1998a) (in press) Comparative modelling of trophic flows in four large upwelling ecosystems: global vs. local effects, in Durand M, Cury P, Mendelsohn R, Roy C, Bakun A, and Pauly D (eds.) *Global vs. Local Changes in Upwelling System*.
- Jarre-Teichmann A and Christensen V (1998b) (in press) Modelling trophic flows in large upwelling ecosystems: temporal and spatial comparisons. *ICLARM Studies and Reviews* 24.
- Jónsson G and Magnússon MS (eds.) (1997) Sjávarútvegur (Fisheries), in *Hagskinna Sögulegar hagtölur um Ísland (Hagskinna Icelandic Historical Statistics)*. Hagstofa Íslands (Statistics Iceland) Reykjavík: 299-357.
- Jónsson J (1992) *Íslenskir fiskar (Icelandic Fishes)*. Fjölvi, Reykjavík, Iceland. 568 pp.
- Jónsson J (1994) Fisheries of Iceland, 1600-1900. *ICES Mar. Sci. Symp.* 198: 3-16.
- Jurgens JD (1991) The fishery industry in Namibia: 39-46, in *Conference Proceedings, Abidjan '91, 1st World Conference on Small Pelagics, Mackerel, Sardine, Herring*. Abidjan, Côte d'Ivoire, 10-12 June.
- Kaczynski V (1989) Foreign fishing fleets in the subSaharan west African EEZ. *Mar. Policy* Jan. 2: 15.
- Kebe M (1994) Principales mutations de la pêche artisanale maritime sénégalaise, in Barry-Gerard M, Diouf T, and Fonteneau A (eds.) *L'évaluation de ressources exploitables par la pêche artisanale Sénégalaise, Tome 2*. ORSTOM Paris. 423 pp.
- Kidd, Honourable LD, Minister of Fisheries (1994) Opening address to fourth APEC fisheries working group meeting, in Ministry of Fisheries, *Report of the Fourth Asia-Pacific Working Group Meeting on Fisheries*. Annex 3. Wellington, New Zealand.
- Konchina Yu V (1986) Distribution and feeding of south African horse mackerel and hake in the Namibian shelf waters. *Collect. Sci. Pap. ICSEAF* 13(1): 7-18.
- Kurlansky M *Cod. A Biography of the Fish that Changed the World*. Alfred A Knopf, Canada. 294 pp.
- Lasch R (1994) Structure, constraints and development options of fish processing and marketing in Namibia: 1325-1335, in Antona J, Catanzano J, and Sutinen JG (eds.) *Proceedings of the Sixth Conference on the International Institute of Fisheries Economics and Trade Issy les Moulineaux, France*. IFREMER, Paris.
- Lear WH and Parsons LS (1993) History and management of the fishery for northern cod in NAFO divisions 2J3K and L, in Parsons LS and Lear WH (eds.) *Perspectives on Canadian Marine Fisheries Management*. National Research Council of Canada and Department of Fisheries and Oceans, Ottawa.
- Lutjeharms, JRE, Webb DJ, de Cuevas BA, and Thompson SR (1995) Large-scale modelling of the south-east Atlantic upwelling system. *S. Afr. J. Mar. Sci.* 16: 205-225.
- MacPherson E and Gordo A (1992) Trends in the demersal fish community off Namibia from 1983 to 1990: 635-649, in Payne ALL, Brink KH, Mann KH, and Hilborn R (eds.) *Benguela trophic functioning*. *S. Afr. J. Mar. Sci. S. Afr. Tydskr. Seewet.* 12.
- Magnússon J and Magnússon JV (1995) Oceanic redfish (*Sebastes mentella*) in the Irminger sea and adjacent waters. *Scientia Marina* 59(3-4): 241-254.

- Mann KH and Lazier JRN (1991) *Dynamics of Marine Ecosystems. Biological-Physical Interactions in the Ocean*. Blackwell Scientific Publications, Boston. 466 pp.
- Maus J (1997) Sustainable fisheries information management in Mauritania. Implications of institutional linkages and the use of remote sensing for improving the quality and interpretation of fisheries and biophysical data. PhD Thesis. University of Warwick. Coventry, England. 269 pp.
- McDorman TL (1991) Canada and the North Pacific ocean: recent issues. *Ocean Dev. Int. Law* 22(4): 365-379.
- McRae D and Munro G (1989) Coastal state rights in the 200-mile exclusive economic zone, in Neher P, Arnason R, and Mollat N (eds.) *Rights Based Fishing*. Kluwer Academic Publishers, Dordrecht: 97-112.
- Merlen G (1995) Use and misuse of the seas around the Galapagos Archipelago. *ORYX* 29(2): 99-106.
- Munro GR (1985) Coastal states, distant water fleets and EFJ: some long run considerations. *Marine Policy* 9: 2-15.
- Munro GR (1989) Coastal states and distant water fishing nation relations: an economist's perspective. *Marine Fisheries Review* 5: 3-10.
- Munro GR (1990) Extended jurisdiction and the management of Pacific highly migratory species. *Ocean Development and International Law* 21: 289-307.
- Munro GR (1994) Coastal states and distant water fleets under extended jurisdiction: the search for optimal incentive schemes, in Basar T and Haurie A (eds.) *Advances in Dynamic Games and Applications*. Birkhauser, Boston: 301-317.
- Munro GR (1998) The management of high seas fisheries and the United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks: a review. Unpublished paper prepared for Project on The Management of High Seas Fisheries. Bergen, Norway.
- Munro GR and Scott AD (1985) The economics of fisheries management, in Kneese AV and Sweeney JL (eds.) *Handbook of Natural Resource and Energy Economics*. Amsterdam, North Holland, II: 623-676.
- Myers RA and Cadigan NG (1995) Was an increase in natural mortality responsible for the collapse of northern cod? *Canadian Journal of Fisheries and Aquatic Sciences* 52: 1274-1285.
- Namibia Foundation (1994) Focus on fisheries and research. *Namibia Brief* 18. 116 pp.
- Neis et al. (1996) *Northern Cod Stock Assessment: What Can be Learned from Interviewing Resource Users?* DFO Atlantic fisheries research document 96/45.
- Northwest Atlantic Fisheries Organization (1979-1995) *Statistical Bulletin*. Dartmouth, NS.
- Northwest Atlantic Fisheries Organization (1992) *List of Vessels 1989*. Dartmouth, NS.
- Northwest Atlantic Fisheries Organization (1995) *Statistical Bulletin Supplementary Issue, Fishery Statistics for 1960-1990*. Dartmouth, NS.
- OECD (1997) *Towards Sustainable Fisheries. Economic Aspects of the Management of Living Marine Resources*.
- Ommen R (1994) One hundred years of fishery crisis in Newfoundland. *Acadiensis* XXIII (2) (Spring): 5-20.
- Omori H (1998) Personal communication, June.
- Orebeck P, Sigurjonsson K, and McDorman TL (1997) The 1995 United Nations Straddling and Highly Migratory Fish Stocks Agreement: Management, enforcement and dispute settlement. Unpublished.
- Óskarsson, Th (1991) *Íslensk togaraúterth 1945-1970 (Icelandic Trawler Fishing 1945-1970)*. Sagnfræðirannsóknir, Bindi 11. Bókaútgáfa Menningarsjóths, Iceland. 272 pp.
- Painting SJ, Lucas MI, Peterson WT, Brown PC, Hutchings L, and Mitchell-Innes BA (1993) Dynamics of bacterioplankton, phytoplankton and mesozooplankton communities during the development of an upwelling plume in the southern Benguela. *Mar. Ecol. Prog. Ser.* 100(1-2): 35-53.
- Pálsson ÓK (1983) The feeding habits of demersal fish species in Icelandic waters. *Rit Fiskdeildar* 7(1): 1-60.
- Pálsson Th (1996) *Close to the Sea* (2nd edition). Ministry of Fisheries, Iceland. 32 pp.

- Pauly D et al. (1998) Fishing down marine food webs. *Science* 279 (Feb.).
- Pitcher TJ and Preikshot DB (1998) RAPFISH: A rapid appraisal technique to evaluate the sustainability status of fisheries (submitted).
- Pitcher TJ, Mackinson S, Vasconcellos M, Nøttestad L, and Preikshot DB (1998a) Rapid appraisal of the status of fisheries for small pelagics using multivariate, multidisciplinary ordination, in Baxter B (ed.) *Proceedings of the 15th Lowell Wakefield Fisheries Symposium, Oct. 8-11, Anchorage, AK*. Fairbanks, Alaska Sea Grant (in press).
- Pitcher TJ, Bundy A, Preikshot DB, Hutton T and Pauly D (1998b) Measuring the unmeasurable: a multivariate interdisciplinary method for rapid appraisal of health of fisheries: 31-54, in Pitcher TJ, Hart PJB, and Pauly D (eds.) *Reinventing Fisheries Management*. Chapman and Hall, London.
- Preikshot DB and Pauly D (1998) A multivariate interdisciplinary assessment of small-scale tropical fisheries, in Baxter B (ed.) *Proceedings of the 15th Lowell Wakefield Fisheries Symposium, Oct. 8-11, Anchorage, AK*. Fairbanks, Alaska Sea Grant (in press).
- PANL (1962) *Fisheries Conference, St. John's, 24 September*. Provincial archives of Newfoundland and Labrador MG 644, file 287: 1-40.
- PANL (1964) The inshore cod fishery of Newfoundland and Labrador (by Alister Fleming) in *Summary of Proceedings of Industrial Development Section, 22-23 June*. Provincial archives of Newfoundland and Labrador GN 34/2, file 11/80/6 v3.
- Sæmundsson B (1926) *Íslensk dyr I. Fiskarnir (Pisces Islandae) (Icelandic Animals I. The Fishes (Pisces Islandae))*. Bókaverslun Sigfúsar Eymundssonar, Reykjavík, Iceland.
- Samba A (1994a) Présentation sommaire des différentes pêcheries sénégalaises, in Barry-Gerard M, Diouf T, and Fonteneau A (eds.) *L'évaluation de ressources exploitables par la pêche artisanale Sénégalaise, Tome 2*. ORSTOM, Paris. 423 pp.
- Samba A (1994b) Evaluation des ressources exploitables par la pêche artisanale au Sénégal: bilan des recherches effectuées, in Barry-Gerard M, Diouf T, and Fonteneau A (eds.) *L'évaluation de ressources exploitables par la pêche artisanale Sénégalaise, Tome 2*. ORSTOM, Paris. 423 pp.
- Schopka SA (1994) Fluctuations in the cod stock off Iceland during the twentieth century in relation to changes in the fisheries and environment. *ICES Mar. Sci. Symp.* 198: 175-193.
- Sedletskaia VA (1995) Effect of hydro-meteorological factors on the formation of spawning concentrations of the horse mackerel *Trachurus trachurus* L. at the northwestern coast of Africa: 29-36, in *Biology and Population Dynamics of Fishes and Invertebrates in the Atlantic Ocean (Biologiya i Dinamika Chislennosti Ryb i Bespozvonochnykh Atlanticheskogo Okeana)*. ATLANTNIRO, Kaliningrad Russia.
- Shelton PA (1992) Detecting and incorporating multispecies effects into fisheries management in the North-West and South-East Atlantic: 723-737, in Payne, ALL, Brink KH, Mann KH, and Hilborn R (eds.) *Benguela trophic functioning*. S. Afr. J. Mar. Sci. S. Afr. Tydskr. Seewet. 12.
- Stefánsson U (1962) North Icelandic waters. *Rit Fiskdeildar* 3: 1-269.
- Stefánsson U and Ólafsson J (1991) Nutrients and fertility of Icelandic waters. *Rit fiskdeildar* 12 (3): 1-56.
- Templeman, Wilfred (1966) *Marine Resources of Newfoundland*, Bulletin No. 154. Fisheries Research Board of Canada, Ottawa.
- The Vancouver Sun* (1998) Russians kill two Chinese on poaching ship. 27 May.
- Thiam M and Gascuel D (1994) L'évolution de la pêche chalutière demersale du plateau continental sénégalais, in Barry-Gerard M, Diouf T, and Fonteneau A (eds.) *L'évaluation de ressources exploitables par la pêche artisanale Sénégalaise, Tome 2*. ORSTOM Paris. 423 pp.
- Thoms MJ (1996) *Illegal conservation: two case studies of conflict between indigenous and state natural resource management paradigms*. MSc., Trent University, Peterborough, England.
- Thór JTh (1982) *Breskir togarar og Íslandsmíth 1889-1916 (British Trawlers in Icelandic Waters. History of British*

- Steam Trawling off Iceland 1889-1916 and the Anglo-Icelandic Fisheries Dispute 1896-1897*. Hith Íslenska Bókmenntafélag, Iceland. 237 pp.
- Thór JTh (1995) *British Trawlers and Iceland 1919-1976*. Fiskeri-og Søfartsmuseets Studieriserie 6, University of Göteborg. 269 pp.
- Thórthardóttir Th (1995) Plöntusvifith og frumframleithni í sjónum við Ísland (The phytoplankton and primary production in Icelandic waters), in Stefánsson U (ed.) *Íslendingar, hafith og auðhlindir thess (Icelanders, the Ocean and its Resources)*. Vísindafélag Íslendinga, Reykjavík: 65-88.
- Thorleifsson H (1974) *Saga íslenskrar togaraúgerthar fram til 1917 (History of the Icelandic Trawl Fisheries until 1917)*. Sagnfræthirannsóknir 3. Bindi. Bókaútgáfa Menningarsjóths, Reykjavík, Iceland. 212 pp.
- Traynor JJ, Karp WA, Sample TM, Furusawa M, Sasaki T, Teshima K, Williamson NJ, and Yoshimura T (1990) Methodology and biological results from surveys of walleye pollock (*Theragra chalcogramma*) in the eastern Bering Sea and Aleutian Basin in 1988: 69-99, in Low L (ed.) *Proceedings of the Symposium on Application of Stock Assessment Techniques to Gadids*. INPFC Bull. no. 50.
- United Nations (1982) *United Nations Convention on the Law of the Sea*. UN Doc. A/Conf. 62/122.
- United Nations (1992) *The Law of the Sea: The Regime for High Seas Fisheries, Status and Prospects*. UN Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, New York.
- United Nations (1995) United Nations Conference on Straddling Fish Stocks. *Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks*. UN Doc. A/Conf./164/37.
- Walters C, Christensen V, and Pauly D (1997) Structuring dynamic models from trophic mass-balance assessment, reviews in *Fish Biology and Fisheries* 7(2): 139-172.
- Wespstad VG (1993) The status of Bering Sea pollock and the effect of the "donut hole" fishery. *Fisheries* 18(3): 18-27.
- Wright M (1997) Frozen fish companies, the state, and fisheries development in Newfoundland, 1940-1966. *Business and Economic History* 26(2) (Winter).
- Wright M (1997a) Fishing in the Cold War: the international politics of the twelve-mile fishing limit, 1958-1969. *Journal of the Canadian Historical Association*.
- Wysokinski A and Czykieta H (1989) Stocks of major fish species off Namibian coast. *Biul. Morsk. Inst. Ryback. Gdynia (Bull. Sea Fish. Inst. Gdynia)* 20(1-2): 18-28 (in Polish).

# Appendix 1

## DWFNs and the cumulative catches 1950-1994 outside of their own FAO Statistical Areas

DWFN	Cummulative (t x 10 <sup>3</sup> ) 1950-1994	DWFN	Cummulative (t x 10 <sup>3</sup> ) 1950-1994
USSR	74,372	Ecuador	87
Japan	49,569	Samoa	58
Spain	22,860	Iraq	57
Korea Rep.	11,086	Chile	57
Russian Fed.	10,453	Denmark	55
Poland	8,201	Greenland	48
Taiwan	7,370	Peru	48
Portugal	7,095	Netherlands	39
Germany	6,847	Bermuda	32
France	6,044	Libya	31
Ukraine	4,209	Sri Lanka	30
Norway	2,819	St Vincent	26
Romania	2,530	Ireland	19
Cuba	2,323	Nigeria	16
United States	2,254	Malta	14
Bulgaria	2,140	Brazil	14
Latvia	1,886	Cayman Is.	14
Italy	1,808	Costa Rica	9
Lithuania	1,790	Australia	8
Estonia	1,455	Argentina	4
Faeroe Is.	1,439	El Salvador	4
UK	696	Vanuatu	3
Greece	660	Cape Verde	2
Iceland	513	Sierra Leone	1
Georgia	425	Bahamas	1
Panama	369	Sweden	0.353
China	302	New Zealand	0.176
Ghana	261	Philippines	0.146
Israel	182	South Africa	0.132
Venezuela	168	Tonga	0.026
Egypt	152	St Helena	0.010
Canada	101	Somalia	0.007
Honduras	92	Colombia	0.001
Mexico	89		

