

THEME 1
Allocations across jurisdictions

Allocating fish across jurisdictions

Professor Jon Van Dyke

William S. Richardson School of Law

University of Hawaii at Manoa

United States of America

jvandyke@hawaii.edu

ABSTRACT

The world's fisheries are in a time of grave crisis. Most of the fisheries that have produced bountifully in the past are now overfished, with many species facing commercial extinction. To respond to this situation, the world community adopted the 1995 Straddling and Migratory Fish Stocks Agreement, and since then several regions have adopted innovative regional fishery agreements. The most ambitious of these new agreements is the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Central and Western Pacific Ocean, which was adopted in Honolulu on September 5, 2000. This treaty, like the 1995 Agreement, adopts the precautionary principle as its main guideline. It requires countries to engage in data collection and data exchanges to promote transparency. It creates a Commission to allocate fish stocks. The Commission must make some decisions by consensus, but for others will utilize a chambered voting system whereby the distant-water fishing countries and the island countries must each agree by an enhanced majority before a decision can be adopted. To provide further protection for each country, the Convention authorizes countries to seek judicial review of any Commission decision if the decision is thought to violate the Convention, or the 1995 Agreement, or the 1982 Law of the Sea Convention. This Convention is now in force, and its operations will be monitored closely to see if its ambitious and important goals can be met.

One of the central missions of this Convention and other regional fishery management organizations is to allocate fish among its contracting parties. This paper discusses the criteria that should be considered when making such allocation decisions.

1. WORLDWIDE CRISIS IN FISHERIES

Our generation has awakened to a worldwide crisis in fisheries that demands immediate and urgent attention. The decimation of fish populations around the globe has been well documented,⁵ but a few examples help emphasize the urgency of the present situation:

- Scientists now understand that without “highly precautionary management,” most deep-sea fisheries are unmanageable, because the characteristics of deep-sea

⁵ David E. Pitt, *Despite Gaps, Data Leave Little Doubt that Fish Are in Peril*, N.Y. Times, Aug. 3, 1993, at C4, col. 1 (nat'l ed.). See generally *Freedom for the Seas in the 21st Century: Ocean Governance and Environmental Harmony* 13-22 (Jon M. Van Dyke, Durwood Zaelke, and Grant Hewison, eds., 1993). Among the stocks that are now seriously depleted are Atlantic halibut, New Zealand orange roughy, bluefin tuna, rockfish, herring, shrimp, sturgeon, oysters, shark, Atlantic and some Pacific Northwest salmon, American shad, Newfoundland cod, and haddock and yellowtail flounder off of New England. Associated Press, *Steps Must Be Taken to Counter Overfishing*, United States Panel Warns, Honolulu Star-Bulletin, Oct. 23, 1998, at A-19, col 2 (quoting from a study led by Stanford biologist Harold Mooney and funded by the National Research Council, an arm of the National Academy of Sciences.).

species – “long-life spans, late maturity, slow growth, and low fertility” – make them particularly vulnerable to overfishing⁶

- Recent research has revealed that deep-sea species in the northern Atlantic are on the brink of extinction because of large-scale bottom trawling. “A recent study on the Scotian Shelf cod stocks in the North Atlantic reveals that they are now four percent of their estimated biomass in 1853, with most of the drop occurring since World War II.”⁷ Other cod stocks in the North Atlantic are now at less than ten percent of their original biomass.⁸ After the collapse of the cod stocks in the 1980s and 1990s, bottom trawling became common, causing some stocks to plummet by 98 percent in one generation, putting them into the “critically endangered” category.⁹ Scientists have been trying to bring this problem to the world’s agenda – and in February 2004, more than 1,000 marine scientists issued a statement expressing their “profound concern...regarding the unsustainable nature of many deep-sea bottom trawl fisheries on the high seas, and the physical destruction wrought by bottom trawling, including damage to rare and endemic species and critical habitats.”¹⁰
- Fisheries in the exclusive economic zones of the United States remain dangerously depleted, and members of the United States Ocean Commission and its private counterpart, the Pew Commission, issued a recent report saying that if immediate action is not taken the crisis will become irreversible in five to seven years.¹¹

The international community has developed global and regional treaties, but practical decisions must be made regarding how best to determine how many fish of each species can be harvested each year, how to determine how much of this amount each country should be allowed to harvest, and how to enforce the decisions that are made.

2. THE 1982 UNITED NATIONS LAW OF THE SEA CONVENTION

The acceptance by the negotiators at the United Nations Convention on the Law of the Sea¹² of the simple direct and elegant language of Article 192 marked a turning point in the human stewardship of the ocean: “States have the obligation to protect and preserve the marine environment.”¹³ Each word has importance and power. The operative word “obligation” makes it clear that countries have positive duties and responsibilities and must take action. The verbs “protect” and “preserve” reinforce each other, to emphasize that countries must respect the natural processes of the ocean and must act in a manner that understands these processes and ensures that they continue for future generations. The “marine environment” is a purposively comprehensive concept

⁶ K. M. Gjerde and D. Freestone. 2004. Unfinished Business: Deep-Sea Fisheries and the Conservation of Marine Biodiversity Beyond National Jurisdiction: Editors’ Introduction, 19 *International Journal of Marine and Coastal Law* 209, 210-11 (2004); see generally Lee Kimball, *Deep-Sea Fisheries of the High Seas: The Management Impasse*, 19 *International Journal of Marine and Coastal Law* 259.

⁷ K. M. Gjerde. 2005. Editor’s Introduction: Moving from Words to Action, 20 *International Journal of Marine and Coastal Law* 323, 326.

⁸ *Id.*

⁹ *Earthweek: Deep-Sea Damage*, Honolulu Advertiser, Jan. 8, 2006 (citing an article by Jennifer Devine of Newfoundland’s Memorial University in Nature).

¹⁰ Gjerde & Freestone, *supra* note 2, at 211 (citing *Protecting the World’s Deep-Sea Coral and Sponge Ecosystems*, at <http://www.mcbi.org/DVC_statement/sign.htm>).

¹¹ *United States Gets D+ Grade for Ocean Policies*, Honolulu Advertiser, Feb. 5, 2006.

¹² *United Nations Convention on the Law of the Sea*, Dec. 10, 1982, U.N. Doc. A/CONF.62/122, reprinted in 21 *I.L.M.* 1261 (1982) and *The Law of the Sea: Official Text of the United Nations Convention on the Law of the Sea with Annexes and Index*, UN Sales No. E.83.V.5 (1983). As of the fall of 2005, 149 countries had ratified the Law of the Sea Convention.

¹³ See generally Jon M. Van Dyke, *International Governance and Stewardship of the High Seas and Its Resources*, in *Freedom for the Seas in the 21st Century*, *supra* note 1, at 13-22; Jon M. Van Dyke, *Sharing Ocean Resources in a Time of Scarcity and Selfishness*, in *The Law of the Sea: Inherited Doctrine and a Regime for the Common Heritage* 3-36 (Harry Scheiber ed. 2000).

covering all aspects of the ocean world – the water itself, its resources, the air above, and the seabed below – and it covers all jurisdictional zones – internal waters, territorial seas, contiguous zones, exclusive economic zone, continental shelves, archipelagic waters, and high seas. Article 192 thus recognizes the profound responsibility that all countries have to govern the oceans in a manner that respects the marine creatures that inhabit them. The marine environment must thus be preserved for the benefit of those who will come later to exploit its resources, to study its mysteries, and to enjoy the many pleasures that the oceans offer us.

The provisions of the 1982 U.N. Law of the Sea Convention regarding fisheries are general in nature but nonetheless clearly articulate an overarching duty to cooperate in all situations involving shared fisheries. Article 56 recognizes coastal state sovereignty over the living resources in the 200-nautical-mile exclusive economic zone (EEZ), but Articles 61, 62, 69, and 70 require the coastal state (a) to cooperate with international organizations to ensure that species are not endangered by overexploitation; (b) to manage species in a manner that protects “associated or dependent species” from overexploitation; (c) to exchange data with international organizations and other nations that fish in its EEZ; and (d) to allow other states (particularly developing, land-locked, and geographically disadvantaged states) to harvest the surplus stocks in its EEZ. Article 63 addresses stocks (or stocks of associated species) that “straddle” adjacent EEZs, or an EEZ and an adjacent high seas area, and requires the states concerned to agree (either directly or through an organization) on the measures necessary to ensure the conservation of such stocks. Article 64 requires coastal states and distant-water fishing states that harvest highly migratory stocks such as tuna to cooperate (either directly or through an organization) to ensure the conservation and optimum utilization of such stocks. Article 65 contains strong language requiring nations to “work through the appropriate international organization” to conserve, manage, and study whales and dolphins. Article 66 gives the states of origin primary responsibility for anadromous stocks (e.g., salmon and sturgeon), but requires the states of origin to cooperate with other states whose nationals have traditionally harvested such stocks and states whose waters these fish migrate through.

On the high seas, Articles 118 and 119 require states to cooperate with other states whose nationals exploit identical or associated species. Article 118 is mandatory in stating that nations “shall enter into negotiations with a view to taking the measures necessary for the conservation of the living resources concerned” (emphasis added), and suggests creating regional fisheries organizations, as appropriate. Article 120 states that the provisions of Article 65 on marine mammals also apply on the high seas.

These provisions thus reinforce the duty to cooperate that has always existed in customary international law. Because they are not specific enough to resolve conflicts that have arisen as species have been overexploited, the 1995 Straddling and Migratory Stocks Agreement was negotiated.

3. THE 1995 STRADDLING AND MIGRATORY FISH STOCKS AGREEMENT¹⁴

On December 4, 1995, the nations of the world settled on the text of an important document with the cumbersome title of “Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks

¹⁴ Some of the material in this section is adapted and updated from J. M. Van Dyke. 1996. The Straddling and Migratory Stocks Agreement and the Pacific, 11 INT’L J. MARINE & COASTAL L. 406.

and Highly Migratory Fish Stocks.”¹⁵ It builds on existing provisions in the 1982 United Nations Law of the Sea Convention described above, but it also introduces a number of new strategies and obligations that have been requiring fishers to alter their operations in a number of significant ways. In addition to strengthening the role of regional organizations, as explained below, it also promotes peaceful dispute resolution by applying the dispute-resolution procedures of the Law of the Sea Convention to disputes involving straddling and migratory stocks. Ratifications of the 1995 Agreement have been steady, but many important countries have not become contracting parties. As of September 2005, 56 countries had ratified the Agreement, including most European countries, the United States, India, and Liberia, but key fishing countries like Japan, Republic of Korea, China, and most of the Latin American and African countries, and many of the countries providing flags of convenience had not yet ratified the Agreement.¹⁶ Professor Rosemary Rayfuse has recently suggested that “even in the absence of...wider ratification, it is arguable that certain principles embodied in the [Straddling and Migratory Fish Stocks Agreement] and the [FAO] Compliance Agreement may not be binding on all states as a matter of customary international law.”¹⁷ Her primary example of a provision that has become obligatory through state practice is “the obligation to co-operate in respect of high seas fisheries through the medium of RFMOs or other co-operative arrangements.”¹⁸

3.1 The duty to cooperate

The guiding principle that governs the 1995 Agreement is the duty to cooperate. This core concept is given specific new meaning, and the coastal nations and distant-water fishing nations of each region are now required to share data and manage the straddling fisheries together. Article 7(2) requires that “[c]onservation and management measures established for the high seas and those adopted for areas under national jurisdiction shall be compatible in order to ensure conservation and management of the straddling fish stocks and highly migratory fish stocks in their entirety” (emphasis added). This duty gives the coastal state a leadership role in determining the allowable catch to be taken from a stock that is found both within and outside its exclusive economic zone, as evidenced by the requirement in Article 7(2)(a) that contracting parties “take into account” the conservation measures established by the coastal state under Article 61 of the Law of the Sea Convention for its EEZ “and ensure that measures established in respect of such stocks for the high seas do not undermine the effectiveness of such measures.” This polite diplomatic language indicates clearly that catch rates outside

¹⁵ Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, U.N. Doc. A/CONF.164/37, 8 September 1995, 34 I.L.M. 1542 (1995). See generally J. E. Colburn. 1995. Comment, Turbot Wars: Straddling Stocks, Regime Theory, and a New U.N. Agreement, 6 J. TRANSNAT'L LAW & POLICY 323; D. M. Kedziora, Gunboat Diplomacy in the Northwest Atlantic: The 1995 Canada-EU Fishing Dispute and the United Nations Agreement on Straddling and Migratory Fish Stocks, 17 *Northwestern J. of Int'l Law and Business* 1132 (1996-97); M. Hayashi. 1996. The 1995 Agreement on the Conservation and Management of Straddling and Highly Migratory Fish Stocks: Significance for the Law of the Sea Convention, 29 *Ocean and Coastal Management* 51; M. Hayashi. 1996. Enforcement by Non-Flag States on the High Seas Under the 1995 Agreement on Straddling and Highly Migratory Fish Stocks, 9 *Georgetown Int'l Environmental Law Review* 1; D. A. Balton. 1996. Strengthening the Law of the Sea: The New Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks, 27 *Ocean Development and Int'l Law* 125; J. R. Mack. 1996. Comment, International Fisheries Management: How the U.S. Conference on Straddling and Highly Migratory Fish Stocks Changes the Law of Fishing on the High Seas, 26 *California Western Int'l Law J.* 313; M. Christopherson. 1996. Note, Toward a Rational Harvest: The United Nations Agreement on Straddling Fish Stocks and Highly Migratory Species, 5 *Minnesota J. of Global Trade* 357.

¹⁶ Website of the United Nations Law of the Sea Convention (visited Feb. 19, 2006).

¹⁷ Rosemary Rayfuse, *To Our Children's Children's Children: From Promoting to Achieving Compliance in High Seas Fisheries*, 20 *International Journal of Marine and Coastal Law* 509, 525 (2005).

¹⁸ *Id.*

a 200-nautical-mile exclusive economic zone cannot differ significantly from those within the EEZ.

3.2 The duty to work through an existing or new fisheries organization

The 1995 Agreement requires coastal and island nations to work together with distant-water fishing nations in an organization or arrangement to manage shared fisheries. Article 8(3) addresses this issue, and it is quoted in full here because its somewhat ambiguous language requires close examination:

Where a subregional or regional fisheries management organization or arrangement has the competence to establish conservation and management measures for particular straddling fish stocks or highly migratory fish stocks, *States fishing for the stocks on the high seas and relevant coastal States shall give effect to their duty to cooperate* by becoming a member of such an organization or a participant in such an arrangement, or by agreeing to apply the conservation and management measures established by such an organization or arrangement. *States having a real interest in the fisheries concerned may become members of such organizations or participants in such arrangement. The terms of participation of such organizations or arrangements shall not preclude such States from membership or participation*; nor shall they be applied in a manner which discriminates against any State or group of States having a real interest in the fisheries concerned. (Emphasis added.)

It is hard to read this language without concluding that the coastal and island nations must cooperate with the distant-water fishing nations fishing in adjacent high seas areas either by allowing them into an existing fishery management organization or by creating a new one that all can join. All states “having a real interest” in the shared fishery stock must be allowed into the organization. Only those states that join a regional organization or agree to observe its management regulations can fish in a regional fishery (Article 8(4); and see Article 17(1)). Article 13 requires existing fisheries management organizations to “improve their effectiveness in establishing and implementing conservation and management measures...”

Article 11 addresses the difficult question whether new distant-water fishing nations must be allowed into such an organization once established. Do the nations that have established fishing activities in the region have to allow new entrants? The language of Article 11 does not give a clear answer to this question, but it seems to indicate that some new entrants could be excluded if the current fishing nations have developed a dependency on the shared fish stock in question. Furthermore, developing nations from the region would appear to have a greater right to enter the fishery than would developed nations from outside the region. “Article 25(1)(b), implies some degree of preference for developing countries that are new members, by requiring states to ‘facilitate access [to high seas fisheries]...subject to articles 5 and 11.’”¹⁹ The 1995 Agreement emphasizes the need to cooperate, and it requires the coastal and island nations to cooperate with the distant-water fishing nations operating in the adjacent high-seas areas to the same extent that the distant-water fishing nations must cooperate with the coastal and island nations.

3.3 The precautionary approach

The “precautionary principle” has gained almost universal acceptance during the past decade as the basic rule that should govern activities that affect the ocean environment.²⁰ This principle requires users of the ocean to exercise caution by undertaking relevant

¹⁹ M. W. Lodge and S. N. Nandan. 2005. Some Suggestions Towards Better Implementation of the United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks of 1995, 20 *International Journal of Marine and Coastal Law* 345, 374.

²⁰ See generally Jon M. Van Dyke, *The Evolution and International Acceptance of the Precautionary Principle*, in *Bringing New Law to Ocean Waters* 357-79 (David D. Caron and Harry N. Scheiber eds. 2004).

research, developing non-polluting technologies, and avoiding activities that present uncertain risks to the marine ecosystem. It requires policy-makers to be alert to risks of environmental damage, and the “greater the possible harm, the more rigorous the requirements of alertness, precaution and effort.”²¹ It rejects the notion that the oceans have an infinite or even a measurable ability to assimilate wastes or support living resources, and it instead recognizes that our knowledge about the ocean’s ecosystems may remain incomplete and that policy-makers must err on the side of protecting the environment. It certainly means at a minimum that a thorough evaluation of the environmental impacts must precede actions that may affect the marine environment. All agree that it requires a vigorous pursuit of a research agenda in order to overcome the uncertainties that exist.

Some commentators have explained the precautionary principle by emphasizing that it shifts the burden of proof: “[W]hen scientific information is in doubt, the party that wishes to develop a new project or change the existing system has the burden of demonstrating that the proposed changes will not produce unacceptable adverse impacts on existing resources and species.”²² Others have suggested that the principle has an even more dynamic element, namely that it requires all users of the ocean commons to develop alternative non-polluting or non-burdensome technologies.

The precautionary principle is given center stage as the primary basis for decision-making in the new Straddling and Migratory Stocks Agreement. Article 5(c) of the Straddling and Migratory Fish Stocks Agreement lists the “precautionary approach” among the principles that govern conservation and management of shared fish stocks, and Article 6 elaborates on this requirement in some detail, focusing on data collection and monitoring. States are required to improve their data collection, and to share their information widely with others. When “information is uncertain, unreliable or inadequate,” states must be “more cautious” (Article 6 (2)) and they must take “uncertainties” into account when establishing management goals (Article 6(3)(c)). Species thought to be under stress shall be subjected to “enhanced monitoring in order to review their status and the efficacy of conservation and management measures” (Article 6(5)). If “new or exploratory fisheries” are opened, precautionary conservation measures must be established “as soon as possible” (Article 6(6)).

Then, in Annex II, the Agreement identifies a specific procedure that must be used to control exploitation and monitor the effects of the management plan. For each harvested species, a “conservation” or “limit” reference point as well as a “management” or “target” reference must be determined. If stock populations go below the agreed-upon conservation/limit reference point, then “conservation and management action should be initiated to facilitate stock recovery” (Annex II(5)). Overfished stocks must be managed to ensure that they can recover to the level at which they can produce the maximum sustainable yield (Annex II(7)). The continued use of the maximum sustainable yield approach indicates that the Agreement has not broken free from the approaches that have led to the rapid decline in the world’s fisheries,²³ but the hope is that the conservation/limit reference points will lead to early warnings of trouble that will be taken more seriously.

3.4 The duty to assess and to collect and share data

Article 5(d) reaffirms the duty to “assess the impacts of fishing, other human activities and environmental factors” of stocks, and Articles 14 and 18(3)(e) explain the data

²¹ David Freestone, *The Precautionary Principle*, in *International Law and Global Climate Change* 21, 36 (Robin Churchill & David Freestone eds. 1991).

²² *Freedom for the Seas in the 21st Century*, supra note 1, at 477.

²³ Fishing to attain the maximum sustainable yield inevitably means reducing the abundance of a stock, sometimes by one-half or two-thirds. This reduction can threaten the stock in unforeseeable ways and also will impact on other species in the ecosystem.

collection requirements necessary to facilitate such assessments. Article 14 requires contracting parties to require fishing vessels flying their flags to collect data “in sufficient detail to facilitate effective stock assessment” (Article 14(1)(b)). Annex I then explains the specific information that must be collected, which includes the amount of fish caught by species, the amount of fish discarded, the types of fishing methods used, and the locations of the fishing vessels (Annex I, art. 3(1)). In order to permit stock assessment, each nation must also provide to the regional fishery organization data on the size, weight, length, age, and distribution of its catch, plus “other relevant research, including surveys of abundance, biomass surveys, hydro-acoustic surveys, research on environmental factors affecting stock abundance, and oceanographic and ecological studies” (Annex I, art. 3(2)). These requirements, if taken seriously, will revolutionize the fishing industry, where the competitive nature of the quest for fish has encouraged each nation to hide its activities from others to the extent possible. The data collected “must be shared with other flag States and relevant coastal States through appropriate subregional or regional fisheries management organizations or arrangements” in a “timely manner,” although the “confidentiality of nonaggregated data” should be maintained (Annex I, art. 7). Decision-making at regional fishery organizations must now be “transparent” under Article 12, and international and nongovernmental organizations must be allowed to participate in meetings and to observe the basis for decisions.

3.5 The methods of enforcement

Article 18 further requires contracting parties to establish “national inspection schemes,” “national observer programmes,” and “vessel monitoring systems, including, as appropriate, satellite transmitter systems” to manage their flag fishing vessels with some rigor. Article 21(1) gives these requirements teeth by authorizing the ships of a nation that is party to a regional fisheries agreement to board and inspect on the high seas any ship flying the flag of any other nation that is a party to the same agreement.²⁴ If the boarded vessel is found to have committed a “serious violation,” it can be brought into the “nearest appropriate port” for further inspection (Article 21(8)). The term “serious violation” is defined in Article 21(11) to include using prohibited fishing gear, having improper markings or identification, fishing without a license or in violation of an established quota, and failing to maintain accurate records or tampering with evidence needed for an investigation.

3.6 Dispute resolution

Part VIII of the Agreement requires contracting parties to settle their disputes peacefully, and extends the dispute-resolution mechanisms of the Law of the Sea Convention to disputes arising under this new Agreement. These procedures are complicated and somewhat untested, but should provide flexible and sophisticated mechanisms to allow nations to resolve their differences in an orderly fashion.

3.7 Recognition of the special needs of developing nations

The 1995 Agreement recognizes in Articles 24-26 that the burden of conservation may affect the coastal fisheries that many communities rely upon for subsistence. These articles state that developing states should not be required to shoulder a “disproportionate burden of the conservation action” (Art. 24(2)(c)), and they call for increased technical and financial aid to developing countries to allow them to meet their duties of data collection and dissemination.

²⁴ Nations already have the power to board, inspect, and arrest vessels violating laws established to “control and manage the living resources in the exclusive economic zone.” Law of the Sea Convention, *supra* note 8, art. 73(1).

4. THE 2000 HONOLULU CONVENTION

The Pacific Island and distant-water fishing nations with an interest in the Pacific met every six months for several years in Honolulu in the late 1990s to draft an important new treaty governing the migratory fish stocks of the Pacific Ocean. Formally called “The Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean”²⁵ and signed in Honolulu in September 2000, this treaty creates the regional organization anticipated by Article 64 of the 1982 Law of the Sea Convention²⁶ and by the 1995 Straddling and Migratory Stocks Agreement.²⁷

The 2000 Honolulu Convention is breathtakingly innovative in a number of significant respects. It is huge in its geographical scope, covering much of the vast Pacific Ocean and governing territorial seas and exclusive economic zones as well as high seas areas. It creates a Commission with authority to set catch limits and allocate catch quotas to fishing nations both within and outside the exclusive economic zones of coastal and island nations. The Commission can also regulate vessel types, fish size and gear, and can establish area and time limitations. Decision-making is by consensus for the central issues – such as allocation of fish to contracting parties – and by chambered voting on others, requiring a majority of support from the two chambers – one consisting of the ten distant-water-fishing nations and the other consisting of the 16 island nations – thus carefully protecting both groups. Decisions of the Commission can be reviewed by an arbitral review panel to ensure consistency and protect against discrimination.

This new treaty requires fishing of migratory species in the high seas to be compatible with the regulations that apply within adjacent exclusive economic zones. It relies on the precautionary approach as its basic foundation throughout. It reinforces the importance of the duty to cooperate. It allows Taiwan Province of China to participate in decision-making (as “Chinese Taipei”), it allows non-self-governing territories to participate (pursuant to rules to be adopted), and nongovernmental organizations can also participate in appropriate ways. Compliance will be through flag-state and port-state enforcement, boarding and inspection rights, obligatory transponders on all high-seas fisheries, and regional observers on the vessels.

The final negotiating session was held in Honolulu from August 30 to September 5, 2000, and a treaty was signed by most of the negotiating parties, but China, France and Tonga abstained²⁸ and Japan and Republic of Korea refused to sign the agreement.²⁹ The FFA members worked hard during the three-year negotiating period to ensure that the convention area was as large as possible, that decisions could be made without unanimous agreement, that developing countries would receive financial assistance to carry out their obligations under the treaty, that the treaty could come into force even if the distant-water fishing nations did not ratify it, and that a vessel monitoring system

²⁵ The Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, Honolulu, Sept. 4, 2000, <<http://www.spc.org.nc/coastfish/Asides/Conventions/>> (26 March 2001); see generally V. Botet. 2001. Filling in One of the Last Pieces of the Ocean: Regulating Tuna in the Western and Central Pacific Ocean, 41 *Virginia Journal of International Law* 787-813.

²⁶ Law of the Sea Convention, *supra* note 8, art. 64; see generally J. Van Dyke and S. Heftel. 1981. Tuna Management in the Pacific: An Analysis of the South Pacific Forum Fisheries Agency, 3 *University of Hawaii La Review* 1, 11-17.

²⁷ 1995 Straddling and Migratory Stocks Agreement, *supra* note 11.

²⁸ China abstained because of its concern about Taiwan Province of China’s classification as a “fishing entity,” with some rights to participate separately in decision-making, and France abstained because it wanted the French islands in the Pacific to have separate status in the Commission that is to be established.

²⁹ Japan and Republic of Korea stated that they view the treaty as too restrictive of their historic fishing practices in the high seas. These countries have, however, been participating in some of the subsequent meetings and are expected eventually to ratify the Convention.

would become mandatory for all vessels. Although not all the FFA positions were achieved to extent desired,³⁰ the final version of the treaty was signed in September 2000 by all the FFA members except Tonga. Since then, the Republic of Korea, Japan and China have ratified the Honolulu Convention, along with all other countries involved in the negotiations except the United States and Indonesia,³¹ and the contracting parties have been meeting regularly to establish the institutions created by the Convention and to start making the difficult decisions required to implement it. The United States is expected to ratify the Convention. President Bush recommended ratification in May 2005,³² and the Senate Foreign Relations Committee held a hearing on it on September 29, 2005.³³ Pending ratification, the United States has attended meetings in recent months as a “cooperating non-member.”

5. ALLOCATION OPTIONS

Everyone who has ventured an opinion about the challenge of allocating fish agrees that such allocations should be both “equitable” and “efficient,” but giving meaning to those terms remains elusive. One typical well-meaning but vague pronouncement on this topic provides the following language:

Equity in the allocation of both rights and obligations. Regimes that balance the competing interests of all participants are likely to be perceived as the most legitimate, which should in turn promote higher levels of compliance with agreed fishing rules. Among the many balances to be found are: those that have historically participated vs. new entrants; coastal States vs. distant water fishing States; developed States vs. developing States.³⁴

5.1 Conservation is paramount

Michael W. Lodge and Satya N. Nandan have made the important point that “allocation rights, both in the EEZ and on the high seas, are subordinate to the obligation to conserve.”³⁵ At the present time, they note, “neither UNFSA, nor the decision rules of many existing RFMOs, provide mechanisms for allocation that balance conservation interests with the economic and social interests of states. In fact, within many RFMOs, negotiated criteria for catch allocations are often based on the notion of historical catch, which is a powerful incentive to indulge in a race to fish.”³⁶ And, they add, the problem of overfishing may be exacerbated by “adding developing state fishing capacity to existing overcapacity, especially where this operates simply as a mechanism to support reflagging and transfer of effort by distant water fishing nations (DWFNs).”³⁷

Professor Ted L. McDorman has noted that “the setting of the total allowable catch (TAC)” and “quota allocation decisions...are inevitably the most controversial”

³⁰ Among the many compromises, for instance, was the decision-making provision, which established “chambers” consisting of the FFA and the non-FFA members of the Commission, and provided that each chamber would need to support a decision by a three-fourths majority, with the proviso that no proposal could be defeated by fewer than three votes in either chamber.

³¹ Status of the Convention on the Conservation and Management of Highly Migratory “Fish Stocks in the Western and Central Pacific Ocean, WCPFC/Comm.2/07 Rev. 1, available at <<http://www.spc.int/OceanFish/Html/WCPFC>> (visited Feb. 20, 2006).

³² Press Release, George W. Bush, Message to the United States Senate Regarding WCPF Convention (May 16, 2005), available at <http://www.whitehouse.gov/news/releases/2005/05/20050516-7.html> (visited Sept. 4, 2005).

³³ 151 Cong. Rec. S D990 (daily ed. Sept. 29, 2005).

³⁴ See D. A. Balton and D. C. Zbicz. 2004. Managing Deep-Sea Fisheries: Some Threshold Questions, 19 International Journal of Marine and Coastal Law 247, 257.

³⁵ Lodge and Nandan, *supra* note 15, at 374.

³⁶ *Id.*

³⁷ *Id.*

for regional fishery management organizations (RFMOs).³⁸ He suggests looking to the considerations listed in Article 11 of the Straddling and Migratory Fish Stocks Agreement governing the participation of new members of fishery organizations for guidance regarding allocation rights within the fishery – “the status of the stocks and existing fishing efforts; existing fishing patterns (historic fishing activity); economic need and coastal state dependence; and contribution to conservation.”³⁹ He stresses that consensus is important to ensure support for the allocation decisions, and suggest that to promote consensus “in years, and for stocks where consensus cannot be reached, that the quotas for each member decline by a pre-set amount (e.g. 20%) for each year non-consensus prevails.”⁴⁰

“Equity” is a complicated and multifaceted concept, with different applications in different contexts. It certainly includes the concept of being “fair,” but just as certainly it does not inevitably mean that everyone should receive an equal amount. In the maritime boundary context, Articles 74 and 83 of the Law of the Sea Convention require opposite and adjacent states to reach an “equitable solution,” language was chosen instead of phrasing that would have stated that boundaries should be drawn along the “median” or “equidistance” line separating the land areas of the countries. The concept of an “equitable solution” in the boundary context has generated a series of specific rules, as discussed below,⁴¹ including, for instance, that the boundary that would exist if the equidistance line were utilized should be adjusted in light of the length of the coastlines of the competing countries, because the coastlines provide some rough indication of the relationship between the country and the adjacent waters.⁴²

5.2 Common but differentiated rights and responsibilities

Both the Law of the Sea Convention and the Straddling and Migratory Fish Stocks Agreement contain provisions recognizing that countries have common but differentiated responsibilities and rights. These treaties recognize that the formal equality of states does not inevitably mean that all states are similarly situated, because some have better means to protect the global environment and to assist other states and some have stronger claims to shared resources than others. This idea was identified in Principle 23 of the 1972 Stockholm Declaration,⁴³ which explained that “it will be essential in all cases to consider ... the extent of applicability of standards which are valid for the most advanced countries but which may be inappropriate and of unwarranted social cost for developing countries.” Principle 7 of the 1992 Rio Declaration⁴⁴ went on to say more directly that: “In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities.” This principle of “common but differentiated responsibility” has two prominent elements – asymmetry of obligations and financial support for developing countries.

The Law of the Sea Convention recognizes these different responsibilities in several articles, including, for instance, Article 207 on land-based pollution, which refers to the economic capabilities of developing states when articulating the responsibility to

³⁸ T. L. McDorman. 2005. Implementing Existing Tools: Turning Words into Actions – Decision-Making Processes of Regional Fisheries Management Organizations (RFMOs), 20 *International Journal of Marine and Coastal Law* 423, 425.

³⁹ *Id.* at 438.

⁴⁰ *Id.* at 440 (noting that the quota reductions “can be justified on the basis of precaution” and that this procedure would provide “an important incentive to agree on allocations”).

⁴¹ See *infra* text at notes.

⁴² See e.g. J. M. Van Dyke. 1996. The Aegean Sea Dispute: Options and Avenues, 20 *Marine Policy* 397, 398-401.

⁴³ Stockholm Declaration of the Human Environment. 1972. Report of the UN Conference on the Human Environment, UN Document A/CONF/48/14/Rev. 1.

⁴⁴ Rio Declaration on Environment and Development. 1992. UN Document A/CONF.151/5/Rev.1.

deal with this problem.⁴⁵ Other provisions in the Law of the Sea Convention providing special preferences for developing and otherwise disadvantaged countries include:

- Article 62(2) and (3) – granting developing countries preferential rights to the surplus stocks in the EEZs of other coastal states in their region.
- Articles 69 and 70 – giving developing landlocked and geographically disadvantaged states preferential rights to the surplus stocks in EEZs of coastal states in their region.
- Article 82 – exempting developing states from making payments from continental shelf resources beyond 200 nautical miles and have preferential rights to payments made by other states.
- Article 119 – apparently giving developing countries some preferential rights to the living resources of the high seas.
- Article 194(1) – stating states must prevent, reduce, and control pollution of the marine environment “using for this purpose the best practicable means at their disposal and *in accordance with their capabilities*” (emphasis added).
- Article 199 – requiring states to develop contingency plans for responding to pollution incidents “*in accordance with their capabilities*” (emphasis added).
- Articles 202–03 – stating that developing states are entitled to training, equipment, and financial assistance from developed states and international organizations with regard to the prevention, reduction, and control of marine pollution.
- Article 206 – explaining that the duty to assess environmental impacts of planned activities extends “*as far as practicable*” (emphasis added).
- Articles 266–69 – stating that developing countries are entitled to receive “marine science and marine technology on fair and reasonable terms and conditions.”
- The 1995 Straddling and Migratory Fish Stocks Agreement⁴⁶ also contains a number of provisions recognizing the special rights of developing countries: The Preamble recognizes “the need for specific assistance, including financial, scientific and technological assistance, in order that developing States can participate effectively in the conservation, management and sustainable use of straddling fish stocks and highly migratory fish stocks...”
- Article 3(3) says that “States shall give due consideration to *the respective capacities of developing States* to apply articles 5, 6 and 7 within areas under national jurisdiction and their need for assistance as provided for in this Agreement” (emphasis added).
- Article 11(f) gives developing states a preference to enter into a fishery and into a fishery organization as a new member.
- Article 24 addresses the financial needs of developing countries:
 1. States shall give full recognition to the *special requirements of developing States* in relation to conservation and management of straddling fish stocks and highly migratory fish stocks and development of fisheries for such stocks. To this end, *States shall*, either directly or through the United Nations Development Programme, the Food and Agriculture Organization of the United Nations and other specialized agencies, the Global Environment Facility, the Commission on Sustainable Development and other appropriate international and regional organizations and bodies, *provide assistance to developing States...* (emphasis added).

⁴⁵ Law of the Sea Convention, supra note 8, art. 207(4) (emphasis added):

States, acting especially through competent international organizations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from land-based sources, *taking into account characteristic regional features, the economic capacity of developing States and their need for economic development...*

⁴⁶ Straddling and Migratory Fish Stocks Agreement, supra note 11.

- Article 25 provides some more specific language regarding these obligations:
 1. States shall cooperate, either directly or through subregional, regional or global organizations:
 - (a) *to enhance the ability of developing States, in particular the least-developed among them and small island developing States, to conserve and manage straddling fish stocks and highly migratory fish stocks and to develop their own fisheries for such stocks;*
 - (b) *to assist developing States, in particular the least-developed among them and small island developing States, to enable them to participate in high seas fisheries for such stocks, including facilitating access to such fisheries subject to articles 5 and 11; and*
 - (c) *to facilitate the participation of developing States in subregional and regional fisheries management organizations and arrangements... (Emphasis added.)*
 - Funding is addressed in Article 26: 1.
 1. States shall cooperate to *establish special funds to assist developing States* in the implementation of this Agreement, including assisting developing States to meet the costs involved in any proceedings for the settlement of disputes to which they may be parties.
 2. States and international organizations *should assist developing States in establishing new subregional or regional fisheries management organizations or arrangements, or in strengthening existing organizations or arrangements, for the conservation and management of straddling fish stocks and highly migratory fish stocks. (Emphasis added.)*

From these many provisions it should be clear that one element of any “equitable” approach to allocation is that developing countries must receive a share linked to their greater needs and must also receive financial assistance so that they can take proper advantage of the fish in their region.

5.3 Should allocation be based on population? Or on a state’s “dependence” on fish for food security?

If the focus remains on “equity,” then obviously some attention to the numbers of mouths that need to be fed is relevant to any allocation decision. Some may argue that a fish-per-capita allocation system, perhaps with some modifications for unique “equitable” considerations, makes sense and offers some elegant simplicity. Others would point out that some communities “depend” on fish or enjoy eating fish more than others, and would argue historical fishing practices should be recognized as the baseline from which allocations should be made. Still others⁴⁷ might suggest that utilizing historical fishing practices will inevitably reward the more developed countries, which have been able to finance large fishing operations, and will once again disadvantage developing countries. Basing allocations on historical fishing activities will tend to reward those countries that have overcapitalized and subsidized their fishing fleets, thus giving benefits for activities that have distorted the market and which would be punished in other economic sectors.

5.4 The importance of “contiguity” or geographical proximity

A system focused on population would allow the populated nations to come into all regions with priorities to harvest the fish, and would ignore the link between the residents of the area and the nearby fish. Any equitable system of allocation will have to recognize the importance of geographical proximity, or contiguity, to the allocation choices that must be made. Especially since regional fishery management organizations

⁴⁷ See supra text at note 32, for the quote on this topic from Lodge and Nandan.

frequently have responsibilities over fish within exclusive economic zones as well as fish on the high seas, the allocation decisions made by the organizations must recognize the “sovereign rights” that states have to the fish in their EEZs, which gives them a substantial priority in any allocation scheme. In the Pacific, the Pacific Island communities must have a priority to the fish in their region because of their geographical proximity and because they are developing nations that are entitled to assistance and priorities under both the Law of the Sea Convention and the Straddling and Migratory Fish Stocks Agreement.

5.5 What other “equitable” criteria are relevant?

Other ideas for equitable criteria to apply to allocation decisions can be gleaned from the criteria developed in maritime boundary delimitation adjudications, from criteria relevant to disputes over sovereignty of remote areas, and from the Rio Principles. In maritime boundary disputes, members of decision-making tribunals usually start with an equidistance or median line, but then adjust it to correspond to “special circumstances” and equitable considerations.⁴⁸ The factor that has been used most consistently to adjust this line has been the proportionality of the length of the coastlines of the disputing states.⁴⁹ This criterion has been preferred over candidates such as coastal population and economic activity in the coastal waters, because it is a stable factor that is unlikely to change over time. Another element of these boundary decisions that has been relatively consistent during the past four decades has been that the decisions tend to reject an “all-or-nothing” approach and to allocate each state at least some maritime space, and thus to find a solution that each country can live with. Decision makers tend to recognize that even geographically disadvantaged countries have rights to maritime resources, and as sovereign states have the right “to participate in international arrangements as an equal.”⁵⁰ Maritime delimitations thus tend to recognize the vital security interests of each nation, and to craft a solution that protects these interests.⁵¹ Food security is certainly a crucial element of any state’s national security interests, and access to food sources is important to every community. The case where this interest was recognized most directly is the *Jan Mayen Case*, where Norway (which had sovereignty over Jan Mayen Island) was allocated a maritime zone sufficient to give it equitable access to the important capelin fishery that lies between Jan Mayen and Greenland.⁵²

If we look at the criteria that have been applied to resolve sovereignty disputes over remote land territory, we find tribunals focusing on links between the claimants and the territory expressed through “discovery” and “effective occupation,” focusing in particular on recent displays of sovereignty. “Contiguity” is sometimes discounted, but has played a role in other situations.

The judicial and arbitral decisions regarding sovereignty disputes over islands since World War II have focused more on which country has exercised actual governmental

⁴⁸ See generally Van Dyke, *Aegean Sea Dispute*, supra note 38, at 398-401.

⁴⁹ This approach has been used particularly in the *Case Concerning Delimitation of the Maritime Boundary in the Gulf of Maine Area (Canada v. United States)*, 1984 I.C.J. 246, *Case Concerning the Continental Shelf (Libya v. Malta)*, 1985 I.C.J. 13, paras. 66 and 75, *Case Concerning Maritime Delimitation in the Area Between Greenland and Jan Mayen (Denmark v. Norway)*, 1993 I.C.J. 38, [hereafter cited as *Jan Mayen Case*], and the *Delimitation of the Maritime Areas Between Canada and France (St. Pierre and Miquelon)*, 31 I.L.M. 1149 (1992). See generally J. I. Charney, 1994. *Progress in International Maritime Boundary Delimitation Law*, 88 *American Journal of International Law* 227, 241-43.

⁵⁰ Charney, supra note 45, at 249.

⁵¹ This principle was also recognized in the *Jan Mayen Case*, supra note 45, where the Court refused to allow the maritime boundary to be too close to Jan Mayen island, and it can be found in the background of all the recent decisions. The refusal of tribunals to adopt an “all-or-nothing” solution in any of these cases illustrates their sensitivity to the need to protect the vital security interests of each nation.

⁵² *Jan Mayen Case*, supra note 45.

control over the feature during the previous century, than on earlier historical records.⁵³ The first major decision by the International Court of Justice regarding ownership of an isolated uninhabited island feature was the decision in the *Minquiers and Ecrehos Case*,⁵⁴ where the Court explained that: “What is of *decisive importance*, in the opinion of the Court, is not indirect presumptions deduced from events in the Middle Ages, but the evidence which relates directly to the possession of the Ecrehos and Minquiers groups.”⁵⁵ This view was followed in the *Gulf of Fonseca Case*,⁵⁶ where the court focused on evidence of actual recent occupation and acquiescence by other countries to determine title to disputed islets, and in the decision in the *Eritrea-Yemen Arbitration*,⁵⁷ where the tribunal relied explicitly on the *Minquiers and Ecrehos* judgment for the proposition that it is the relatively recent history of use and possession of the islets that is most instructive in determining sovereignty and that the historical-title claims offered by each side were not ultimately helpful in resolving the dispute: “The modern international law of acquisition (or attribution) of territory generally requires that there be: an intentional display of power and authority over the territory, by the exercise of jurisdiction and state functions, on a continuous and peaceful basis.”⁵⁸

This very same approach was utilized by the Court in its recent decision resolving a dispute between Malaysia and Indonesia over two tiny islets – Ligitan and Sipadan.⁵⁹ The larger of the islets (Sipadan) is 0.13 square kilometres in size.⁶⁰ Neither has been inhabited historically, but both have lighthouses on them and Sipadan has recently been “developed into a tourist resort for scuba-diving.”⁶¹ The Court first addressed arguments based on earlier treaties, maps, and succession, but found that they did not establish any clear sovereignty.⁶² It then looked at the “*effectivites*” – or actual examples of exercises of sovereignty over the islets, and explained that it would look at exercises of sovereignty even if they did “not co-exist with any legal title.”⁶³ Indonesia claimed title based on various naval exercises in the area conducted by themselves and previously by their colonial power (the Netherlands), but Malaysia prevailed based on the governmental actions of its colonial power (the United Kingdom) exercising control over turtle egg collection and constructing lighthouses on both islets.⁶⁴

Contiguity, or geographical proximity, has not always played a decisive role in adjudications, but it sometimes has been a significant factor. Arbitrator Max Huber

53 See generally M. J. Valencia, J. M. Van Dyke, and N. A. Ludwig, *Sharing the Resources of the South China Sea* 17-19 (1997).

54 *Minquiers and Ecrehos Case (France/United Kingdom)*, 1953 I.C.J. 47.

55 *Id.* at 57 (emphasis added).

56 *Land, Island and Maritime Frontier Dispute (El Salvador/Honduras; Nicaragua intervening)*, 1992 I.C.J. 351 [hereafter cited as *Gulf of Fonseca Case*].

57 *Eritrea-Yemen Arbitration*, <<http://www.pca-cpa.org>> (1998-99).

58 *Id.*, 1998 Award, para. 239.

59 *Sovereignty over Pulau Ligitan and Pulau Sipadan*, 2002 I.C.J. – (Dec. 17, 2002).

60 *Id.* para. 14.

61 *Id.*

62 *Id.* paras. 58, 72, 80, 92, 94, 96, 114, and 124.

63 *Id.* para. 126 (citing *Frontier Dispute (Burkina Faso/Republic of Mali)*, 1986 I.C.J. 587 para. 63; *Territorial Dispute (Libyan Arab Jamahiriya/Chad)*, 1994 I.C.J. 38 paras. 75-76; *Land and Maritime Boundary Between Cameroon and Nigeria (Cameroon v. Nigeria; Equatorial Guinea intervening)*, 2002 I.C.J. –, para. 68).

64 *Id.* para. 132.

rejected contiguity as a basis for a claim of title in the *Palmas Arbitration*,⁶⁵ and a number of countries include land areas quite distant from other parts of the country. Nonetheless a land area closely linked to another land area, and utilized by residents of the adjacent area, may “belong” to that adjacent area as a matter of logic, common sense, and historical practice. Some islets are viewed as “dependent” on other islands, and some groups of islands have historically been viewed as units; in these cases it would not be logical to divide such islands between two different sovereigns. Even Arbitrator Huber acknowledged that “[a]s regards groups of islands, it is possible that a group may under certain circumstances be regarded as in law a unit, and that the fate of the principal part may involve the rest.”⁶⁶ The International Court of Justice viewed, for instance, the Minquiers group as a “dependency” of the Channel islands (Jersey and Guernsey) and thus ruled that they should be subject to the same sovereign authority.⁶⁷ In the *Gulf of Fonseca Case*, the ICJ Chamber concluded that Meanguerita was an “appendage” to or “dependency” of Meanguera, and thus should be awarded to El Salvador along with its larger neighbor.⁶⁸

The recent development of the regimes of the continental shelf and the exclusive economic zone, as well as the extension of the territorial sea from three to 12 nautical miles in the 1982 Law of the Sea Convention, are all to some extent based on a recognition of the importance of “contiguity.”⁶⁹ Another clear example of a tribunal’s reliance upon concepts of contiguity can be found in the 1998-99 *Eritrea-Yemen Arbitration*.⁷⁰ The tribunal awarded to Yemen the lone island of Jabal al-Tayr and the al-Zubayr group, because Yemen’s activities on these barren islands were greater, and because they are located on the Yemen side of the median line between their uncontested land territories.⁷¹ The tribunal recognized the relevance of geographical proximity or contiguity, utilizing the “presumption that any islands off one of the coasts may be thought to belong by appurtenance to that coast unless the State on the opposite coast has been able to demonstrate a clearly better title.”⁷² The Mohabbakahs and the Haycock Islands were thus awarded to Eritrea because they were mostly within 12 nautical miles of the Eritrean coast.

The Rio Principles⁷³ are another important source for ideas regarding relevant equitable principles governing the allocation challenge. Perhaps the most relevant is Principle 4, which says that “In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be

⁶⁵ *The Arbitral Award Rendered in Conformity with the Special Agreement Concluded on January 23, 1925 Between the United States of America and the Netherlands Relating to the Arbitration of Differences Respecting Sovereignty over the Island of Palmas (or Miangas)*, 2 R.I.A.A. 829 (April 4, 1928), reprinted in 22 American Journal of International Law 867, 893-94 (1928) [hereafter cited as *Palmas Arbitration*]. Palmas is an isolated island, but when one looks at a map it seems to be closer to the Philippines than Indonesia because it is 48 miles from the large Philippine island of Mindanao and the Indonesian islands it is near (it is 51 miles from Nanusa) are small and seem isolated themselves. Arbitrator Huber wrote that: “Although states have in certain circumstances maintained that islands relatively close to their shores belonged to them in virtue of their geographical situation, it is impossible to show the existence of a rule of positive international law to the effect that islands situated outside territorial waters should belong to a state from the mere fact that its territory forms the terra firma (nearest continent or island of considerable size).” Id. at 893. Any such rule, he explained, would be “wholly lacking in precision and would in its application lead to arbitrary results.” Id.

⁶⁶ Id., 22 American Journal of International Law at 894; 2 UNRIAA at 855.

⁶⁷ *Minquiers and Ecrehos Case (France/United Kingdom)*, 1953 I.C.J. 47, 71.

⁶⁸ *Gulf of Fonseca Case*, supra note 52, 1992 ICJ 351,579, para. 368.

⁶⁹ See, e.g., H. Lauterpacht, *Sovereignty over Submarine Areas*, 27 British Year Book of International Law 428 (1950).

⁷⁰ *Eritrea-Yemen Arbitration*, <<http://www.pca-cpa.org>> (1998-99).

⁷¹ Id., 1998 Award, paras. 509-24.

⁷² Id., para. 458.

⁷³ Rio Declaration, supra note 40; see generally J. M. Van Dyke, 1996. *The Rio Principles and Our Responsibilities of Ocean Stewardship*, 31 Ocean and Coastal Management 1.

considered in isolation from it.” This confirms the point made recently by Lodge and Nandan⁷⁴ that conservation values must remain paramount in any allocation regime. The oceans and their resources are the common heritage of humankind, and public trust values must be applied to any system dividing these resources.⁷⁵

6. HOW SHOULD STATES BE REWARDED FOR GOOD BEHAVIOUR?

Careful management of fish stocks is expensive and challenging, and countries that make financial sacrifices to monitor and maintain threatened fish stocks should receive some reward for their actions. This principle forms the basis of Article 66 of the Law of the Sea Convention, which says that “[s]tates in whose rivers anadromous stocks originate shall have the primary interest in and responsibility for such stocks.” Because the spawning habitat of salmon and other anadromous species must be maintained carefully to enable them to reproduce successfully, it has been recognized that the countries that maintain their river systems to permit successful spawning should be able to reap the bounty of the salmon harvest. This principle means that even when the salmon are in the high seas, they cannot be caught without explicit permission of the country of origin. If we extrapolate from this principle, we should find ways of rewarding countries that invest in the monitoring and maintenance of fish stocks by giving them allocation bonuses.

7. SHOULD STATES BE PUNISHED FOR MISBEHAVING?

7.1 Selfish and destructive fishing practices

Another aspect of “equity” is that countries must be held accountable for taking more than their share and engaging in destructive fishing practices. The highly destructive high seas bottom trawling, for instance, is an unsustainable practice that does “major damage” to biodiversity and destroys “resources that should be available to all states.”⁷⁶ Other examples of selfish and unacceptable activities include providing a flag to vessels that engage in improper fishing activities and distorting the market by subsidizing fishing vessels.

7.2 Controlling IUU fishing

Obviously, any solution to the overfishing of high seas fisheries must involve true cooperation and transparency, which must include bringing the practice of “illegal, unregulated, and unreported” (IUU) fishing under control. This effort will require revisions to the flag-of-convenience system that allows many fishing vessels to operate with limited regulation. It will also require use of modern satellite-based vessel-monitoring-system (VMS) technology, on-board independent observers, and detailed boarding and inspection programs to increase monitoring and thus permit active enforcement of regulations.⁷⁷

7.3 Flags of convenience

The problem of IUU fishing is directly related to the extensive use of flags of convenience:

there has to be a collective effort to deal with the related and urgent problems of IUU fishing and free riders. The problem is that, despite the advances made by the 1995 Agreement and the various measures adopted through the FAO, not all flag states are able or willing to exercise effectively their responsibilities for fishing vessels flying their flags on the high seas. Urgent action is needed to address this problem. It is a

⁷⁴ See *supra* text at notes 31-33.

⁷⁵ See J. M. Van Dyke, *International Governance and Stewardship of the High Seas and Its Resources*, in *Freedom for the Seas in the 21st Century*, *supra* note 1, at 19.

⁷⁶ Kimball, *supra* note 2, at 273.

⁷⁷ See Balton and Zbicz, *supra* note 30, at 249-50.

matter of great concern that seven out of the 11 cases before the International Tribunal for the Law of the Sea related to the activities of fishing vessels flying so-called flags of convenience, or flags of non-compliance.⁷⁸

Numerous strategies have been proposed to deal with the flag-of-convenience conundrum, such as “co-ordinating global and regional high seas vessel registers, vessel monitoring systems, port state measures, the use of trade measures and so on,” but the essential answer is that states must “take full responsibility for the activities of their nationals, regardless of the flag of the fishing vessel concerned.”⁷⁹

8. EVOLVING INTO A RIGHTS-BASED SYSTEM

The allocation decisions that will be made by regional fishery management organizations in the next few years are extremely important, because it is almost inevitable that the allocation schemes will evolve into something akin to a “rights-based” system, and that countries will view their allocation quotas as a vested property right that they are entitled to maintain in future years. Professor McDorman seemed to recognize this phenomenon, when he proposed that countries’ quotas from last year be automatically cut 20% for the current year if they cannot reach a consensus on the allocation for the current year.⁸⁰ In other words, he appeared to accept the idea that last year’s quota would be the starting point for any discussion about allocation for this year and coming years. Each allocation will thus have importance not just for the current year, but because it will set a baseline for future years, and states will seek to maintain and increase their allocation. States will make investments in reliance on the allocations given to them, and they will insist that they are entitled to continue fishing at the rate that they have fished in previous years.

9. SUMMARY AND CONCLUSION

The decisions made by the regional fishery management organizations allocating fish must be “equitable” and “efficient.” Translating such vague terms into actionable criteria is one of the major challenges of our generation. The analysis presented above suggests that these criteria must include the following elements:

- Conservation values must be paramount and the precautionary approach must be utilized to ensure that fish stocks remain bountiful for future generations. Countries must share data regarding their fishing activities and must support scientific research to understand the life cycle of each species and its relationships with other species in its ecosystem.
- Developing countries must be given priorities in the allocation of stocks and must be given assistance so that they can utilize their allocations effectively.
- Geographical proximity to the fish stocks must be recognized as an important element of any allocation scheme. When the stocks straddle EEZs of states, those states have a particularly strong claim to a substantial share of the allocation quota, but even for stocks outside the EEZ, the countries in the region should have a priority over those outside the region.
- Countries that make expenditures to monitor and maintain the fish stocks should be rewarded with enhanced allocations.
- Those countries that misbehave by abusing the flag-of-convenience system, by permitting IUU fishing, by allowing their vessels to engage in destructive high-seas bottom trawling, and by subsidizing their fishing industry should be punished by having their allocations reduced.

⁷⁸ M. W. Lodge. 2004. Improving International Governance in the Deep Sea, 19 *International Journal of Marine and Coastal Law* 299, 307.

⁷⁹ *Id.* at 308.

⁸⁰ McDorman, *supra* note 34, at 440.

- The population of a country, its historical dependence on the fisheries in question, and its historical consumption of sea food and need for it as “food security” are also relevant considerations, although of less importance than those listed above.

Decisions must, of course, be made through a transparent process, and by consensus whenever possible. The process of allocation will be one of trial-and-error in the early years, and, because we still know so little about many species and many ocean area, precaution must always guide the allocations.

International allocation issues and the high seas: An economist's perspective

Professor Gordon Munro

Department of Economics and Fisheries Centre

University of British Columbia

Canada

gmunro@interchange.ubc.ca

1. INTRODUCTION

This paper is concerned with allocation issues pertaining to fishery resources that are shared internationally. My instructions are to approach the topic from the perspective of an economist. While I shall comment on the legal framework provided by the 1982 UN Convention on the Law of the Sea (UN, 1982) and the 1995 UN Fish Stocks Agreement (UN, 1995)⁸¹, I shall, in keeping with my instructions, rely upon my colleague, Professor Jon Van Dyke, who will precede me in the panel, to review in detail the legal framework surrounding the topic.

In taking the economist's perspective, a key question that I shall attempt to address in this paper, is whether there exist approaches to allocations between and among the States/entities sharing the fishery resources that will ensure the long run sustainability of the fisheries, which the resources support. The answer would seem to be self-evident. If it is possible to identify allocation schemes that are perceived as being fair and equitable, by all those sharing the resources, then all should be well.

While not denying the importance of allocations that are seen to be fair and equitable, it will be argued that the existence of equitable allocation schemes constitutes a necessary, but not sufficient, condition for the long term sustainability of internationally shared fishery resources. This is particularly true in the case of internationally shared fishery resources that are to be found in all, or in part, in the high seas.

In attempting to address this, and related questions, I shall draw heavily upon the results of and papers presented at, the Expert Consultation on the Management of Shared Fish Stocks, mounted jointly by the government of Norway and the FAO in Bergen, in October 2002.⁸² This Expert Consultation, which we shall refer to hereafter as the Bergen Expert Consultation, established several working groups, one of which dealt explicitly with the resolution of allocation issues (FAO, 2002). I should also note, in passing, that two states, which were very active in the Bergen Expert Consultation, were Australia and New Zealand.

I had the privilege of being involved in the Bergen Expert Consultation, both during the preparation phase as a consultant for the FAO, and during the Expert Consultation itself, as a participant. Following the Bergen Expert Consultation, I co-authored a

⁸¹ The full title of the Agreement is Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks.

⁸² Norway-FAO Expert Consultation on the Management of Shared Fish Stocks Bergen, Norway, 7-10 October 2002.

FAO Fisheries Technical Paper No. 465 on the conservation and management of shared fishery resources, with two colleagues from the FAO, Ms Annick Van Houtte, from the FAO Legal Office, and Mr Rolf Willmann, from the Fishery Policy and Planning Division, FAO Department of Fisheries (Munro, Van Houtte and Willmann, 2004). Needless to say, I shall draw heavily upon the Munro, Van Houtte and Willmann paper, as well.

In my attempt to address the aforementioned questions, I shall, of course, point to several real world examples, but I shall, by and in the large, touch only lightly upon cases directly involving Australia and New Zealand. My colleague, Professor Rosemary Rayfuse, who will follow me in the panel, will wish to discuss such cases in detail.

2. CLASSES OF INTERNATIONALLY SHARED FISHERY RESOURCES AND LEVELS OF COOPERATIVE RESOURCE MANAGEMENT

According to FAO estimates, internationally shared fishery resources account for as much as one third of world marine capture fishery harvests (Munro, Van Houtte and Willmann, 2004). It is thus, for good reason, that the FAO has declared that the effective management of these resources stands as one of the great challenges on the way towards achieving long-term sustainable fisheries (FAO 2002).

The FAO categorizes internationally shared fishery resources as follows:

1. Transboundary fish stocks – fishery resources that cross the EEZ boundary of one coastal State into the EEZ(s) of one, or more, neighbouring coastal States.
2. Highly migratory fish stocks – highly migratory species, as set forth in Annex 1 of the 1982 UN Convention (UN, 1982), consisting primarily of the major tuna species. In light of their highly migratory nature, they are to be found both within the coastal State EEZ and the adjacent high seas. In the adjacent high seas the stocks are subject to exploitation by distant water fishing States (DWFSs).
3. Straddling fish stocks – all other fish stocks (with the exception of anadromous/catadromous stocks) that are to be found both within the coastal State EEZ and in the adjacent high seas, where they are subject to exploitation by DWFSs.
4. Discrete high seas fish stocks – fish stocks to be found wholly within the high seas (Munro, Van Houtte and Willmann, 2004).

From an economic standpoint, there is no meaningful distinction between categories 2 and 3 (Munro *et al.*, 2004). Hence, we shall merge 2 and 3 into one category, straddling stocks, broadly defined. Consequently, we are left with: A: Transboundary stocks; B: Straddling stocks (broadly defined); C: Discrete High Seas stocks.

Two passing comments are in order. The first is that Categories A and B are far from being mutually exclusive. There are numerous fish stocks that fall into both categories, the tuna stocks of the Western and Central Pacific being a prominent example. The second comment is that Categories A, B and C are in ascending order, in terms of difficulties to be encountered in achieving effective, sustainable management of the resources.

With respect to management, we shall conclude that, with a few exceptions, all shared fish stocks, regardless of the category into which they may fall, require that States/entities act cooperatively, if the fisheries, which they support, are to be sustainable through time. The Bergen Expert Consultation was reminded that the late John Gulland had, some 20 years earlier, pointed out that there are two levels of such cooperation, the primary level, consisting of scientific cooperation alone, without reference to coordinated management programs, and the secondary level – “active management” – which, almost by definition, requires the establishment of coordinated joint management programs (Munro *et al.*, 2004). The Bergen Expert Consultation concluded that, while the primary level is useful as a precursor to the secondary level, it is seldom sufficient in of and by itself. Cooperation must, with few exceptions, move forward to the secondary level (FAO, 2002).

John Gulland went on to say that the secondary level of cooperation – “active management” – if it is to succeed, requires that the cooperating States/entities deal effectively with the following:

- a. allocation of harvest shares among the participating states (or entities);
- b. determination of an optimal management strategy through time, including inter alia, the determination of optimal global harvests over time; and
- c. implementation and enforcement of coordinated management agreements (cited in Munro *et al.*, 2004).

The implications of the Gulland requirements are straightforward. The allocation issue is indeed a key issue that must be addressed, if cooperative resource management is to succeed. The issue cannot be addressed in isolation, however. Simultaneously, one must address the issues of determining the optimal resource management strategies through time, and of implementing and enforcing the coordinated resource management agreements.

3. TRANSBOUNDARY FISH STOCKS

We commence with the case of Category A fish stocks – transboundary stocks, those crossing the EEZ boundary into the EEZ(s) of one, or more, neighbouring coastal States. We do so for two interrelated reasons. First, the problems to be faced in achieving effective resource management are less formidable than they are in case of Categories B and C stocks. Secondly, transboundary fish stocks were recognized as a major resource management issue well before the other two categories were so recognized. As a consequence, the management of transboundary fish stocks has been extensively studied by economists, legal experts, as well as other. With respect to the economic aspects of management, the economics of the management of transboundary stocks has come to serve as the foundation for the economics of the management of straddling and discrete high seas fish stocks.

The first question to be raised is: what, in fact, is to be allocated between, or among, the coastal States sharing the resource? Is it the agreed upon TAC (or its equivalent) that is to be allocated among the separate coastal States fleets, or is it the net economic benefits that arise from the total harvests (resource rent, to use some economic jargon) that is to be allocated.

The two are not necessarily the same. At a later point in the discussion, reference will be made to a particularly successful cooperative fisheries management arrangement, involving four States, in which the national fleets of two out of the four were allocated annual harvest shares of zero. We shall maintain that, if the sharing of the net economic benefits from the relevant fishery(ies) is to be done only through the sharing of harvests among national fleets, bargaining among the coastal States will be constrained, with consequences that could be severe.

Next, let me comment on the underlying legal framework surrounding the management of these resources, to be found in 1982 UN Convention. While I defer to my colleagues on the panel for a detailed analysis of the framework, I allow myself the following remarks. The 1982 UN Convention contains but one article pertaining to the management of these stocks, namely Article 63(1). The article imposes a duty on relevant coastal States to negotiate over arrangements for the management of these resources. What the article does not do is to impose a duty on the coastal States to reach an agreement. If the States negotiate in good faith, but are unable to reach an agreement, then each State is to manage its share of the resource (i.e. that part occurring within its EEZ), in accordance with the relevant rights and duties laid down by the 1982 UN Convention (Van Houtte, 2003). We can refer to this as the default option.

With the default option in mind, economists find that they have before them two issues, which they must attempt to analyse:

1. The consequences, if any, of the relevant coastal States adopting the default option, and not cooperating in the management of the resource, at least not beyond the primary level of coordinating scientific research.
2. The conditions that must prevail, if a cooperative management regime (at the secondary level) is to be stable over the long run.

If, in investigating the first issue, it is found that non-cooperative management does not carry with it significant negative consequences, then, of course, the second issue ceases to be of interest, and can be safely ignored. It will also mean, needless to say, that we shall have no allocation issues worthy of the name. Examples of shared fish stocks can be found, in which we shall reach just such a conclusion, with respect to the first issue.

If it is discovered that non-cooperation does, in fact, yield results much inferior to cooperation, then the second issue must be addressed head-on. The investigation of the second issue – the conditions that must be met, if cooperative resource management regimes are to be stable through time – will have to take place in the knowledge that any cooperative resource management arrangement must be, as Scott Barrett emphasizes in his recent book *Environment and Statecraft*, self-enforcing (Barrett 2003).

By the term self-enforcing, Barrett means that no participant in an arrangement, or agreement, can turn to a third party to enforce the arrangement/agreement. Those entering into a domestic contract, he points out, can turn to the courts, local or national, to enforce the contract, should a dispute arise. The ICJ notwithstanding, States entering into an international treaty arrangement, or some other form of contractual international agreement, have no such recourse. Hence, the arrangement/agreement must be self-enforcing, and so it is with cooperative fisheries management arrangements (Barrett 2003).⁸³

Consider now the simplest case of a transboundary resource, one that is shared by two neighbouring coastal States. Take as an example the one provided by a rich scallop resource off the Atlantic coast of North America, shared by the United States and Canada. With the advent of Extended Fisheries Jurisdiction, and the resolution of the Atlantic coastal zone boundary delimitation dispute between the two coastal States, it was found, for various biological, seabed terrain and technological reasons, that the harvesting of scallops in the Canadian zone had no significant impact upon American harvesting opportunities, and vice-versa. The default option provided by the 1982 UN Convention, while perhaps not perfect, was deemed to be adequate. There was no strong case to be made for secondary level cooperation (Munro, 1987).

The case of the Atlantic scallop fishery resource, shared by the United States and Canada, is the exception, not the rule. The usual, the normal, situation is one in which the harvesting activity of one coastal State, sharing a fishery resource, will have a significant impact upon the harvesting opportunities of its neighbours. Thus, a strategic interaction will inevitably arise between the two States. The resource management decisions made by the first coastal State will influence the resource management decisions of the second coastal State. The reverse will be equally true.

If, in what we have termed the standard, or normal, transboundary fish stock case, there will inevitably be strategic interaction between or among, the coastal States sharing the resources, then economists have no choice, but to incorporate such strategic interaction into their analysis. The economics of the management of transboundary fish stocks is, as a consequence, a blend of the standard fisheries economic applied to single state fisheries, and the theory of strategic interaction (or interactive decision theory), more commonly known as the theory of games.⁸⁴ Economists studying other

⁸³ Most of Scott Barrett's book is devoted to the problems of international pollution. Nonetheless, his analysis does have direct relevance to international fisheries.

⁸⁴ The name comes from the fact that games, e.g. card games, were often used to illustrate the theory. In some ways, the name is unfortunate, in that it creates the impression that the theory is confined to frivolous issues, which it most definitely is not.

shared resources, e.g. water resources, the atmosphere, also find themselves compelled to incorporate game theory into their analysis.

Game theory is becoming increasingly widely used in many different branches of economics, as well as being used in numerous other fields, such as legal studies, international relations and evolutionary biology. As an indication of the growing importance of game theory, the Nobel Prize in Economic Sciences has now been awarded twice to specialists in game theory. The first was a joint award in 1994, with one of the recipients being John Nash, who laid the foundation for much of the game theory used in economics. The second, also a joint award, was given in 2005. The press release announcing the awarding of the Prize for 2005 to Laureates Thomas Schelling and Robert Aumann, read as follows:

Why do some groups of individuals, organizations and countries succeed in promoting cooperation while others suffer from conflict? The work of Robert Aumann and Thomas Schelling has established game theory – or interactive decision theory – as the dominant approach to this age-old question. (Nobelprize.org, 2005.)

For the purposes of this paper, we need only a broad overview of game theory – theory of strategic interaction – and the insights which the theory can offer us, when dealing with the two central issues before us.⁸⁵ We do, nonetheless, require some basic terminology.

To begin, those engaging in the strategic interaction, e.g. coastal States sharing a transboundary fishery resource, are referred to as “players. The “players” are assumed to be rational and to have various courses of action open to them, which are referred to as “strategies.” The expected return to a player, in following a particular strategy, is then referred to as a “payoff.” The size of the expected return or “payoff” will, needless to say, be dependent upon the known, or expected, reactions of other “players.” The interaction between, or among, the players, as they execute their strategies, is the game. The stable outcome of a game, if it exists, is termed the “solution” to the game. Finally, the game may be a “once only” affair, or it may be repeated.

There are two broad categories of games, these being competitive, or non-cooperative, games, and cooperative games. In a cooperative game, the players are assumed to be motivated entirely by self interest, but have some incentive to attempt to cooperate. Of critical importance is the fact that players are able to communicate with one another effectively. In competitive, non-cooperative games, the lines of communication between and among the players are, more often than not, faulty, or are simply non-existent.

Having said all of this, however, it must be emphasized in passing that open lines of communication, between and among players, do not, in of and by themselves, guarantee a stable solution to a cooperative game. As we shall emphasize, communication among players is a necessary, but not sufficient, condition for a stable outcome (solution) to the cooperative game.

In exploring the first issue – the consequences of non-cooperative resource management – we draw, not surprisingly, upon the theory of non-cooperative games. The key conclusion arising from non-cooperative game theory is that the “players” will be driven inexorably to adopt strategies that they know perfectly well will produce decidedly undesirable results. This outcome is referred to as a “Prisoner’s Dilemma” outcome after a famous non-cooperative game developed to illustrate the point (Tucker, 1950). The “Prisoner’s Dilemma,” and its application to fisheries, is discussed in an accompanying technical appendix, Appendix A.

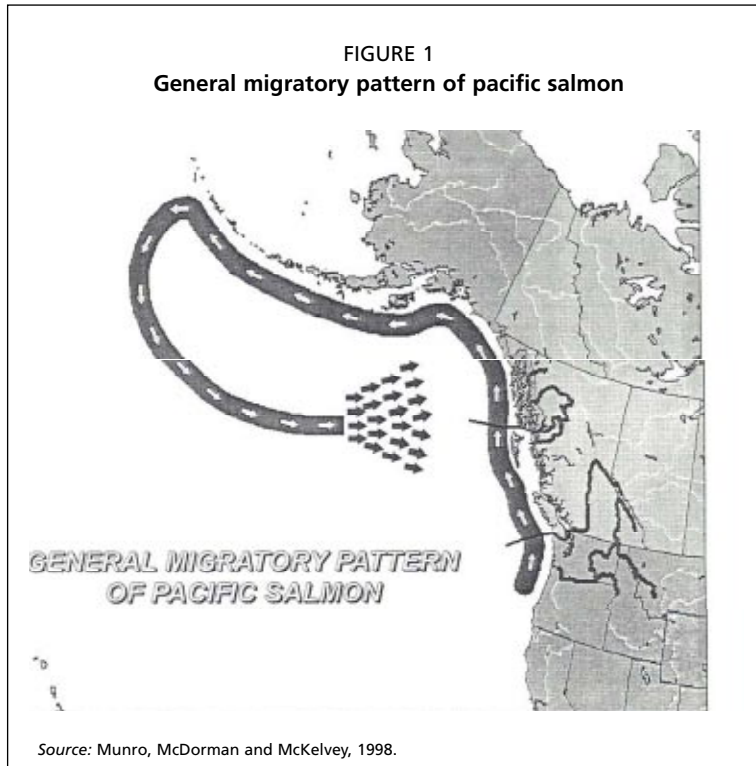
⁸⁵ Having said this, we include two technical appendices, which go into the nature of game theory, and its application to international fisheries, in greater depth.

The basic nature of the “Prisoner’s Dilemma” outcome, in a fisheries context, can be illustrated as follows. Consider a transboundary fishery resource shared by two coastal States A and B. A’s harvesting activities will have an impact upon B, and vice versa. Suppose further that there is no significant resource management cooperation between the two. A and B adopt the default option and manage their respective segments of the resource on their own.

If A undertakes to restrict harvests in order to “invest” in the resource, the benefits from this action will not be enjoyed by A alone, but will be shared with B. What assurance does A have that B will also undertake to conserve the resource? Since there is no cooperation, the answer is none. It is only too possible that B would be content to “free ride” off of A’s resource investment efforts. In these circumstances, it is likely that A will conclude that the return on its resource investment would be less than the cost, and that its best course of action (“strategy”) is to do nothing. B could be expected to come to the same conclusion.

Worse, A has to allow for the possibility that B might deliberately deplete the resource. If A seriously believes this, then it could decide that its best strategy is to strike first. Once again, B could follow the same line of reasoning.

For a real world example, we turn to one of the most complex cooperative fishery management arrangements in the world, namely Pacific salmon shared by the United States and Canada. Historically, Pacific salmon was the single most important fishery resource for the fishing industries of the American states of Washington, Oregon and Alaska, and the Canadian province of British Columbia. The resource is shared, because American fishermen inevitably intercept (i.e. harvest) salmon produced in Canadian rivers and streams, while Canadian fishermen inevitably intercept American produced salmon (Figure 1).



The United States and Canada, two developed coastal States with extensive fisheries management resources and experience, came together in the late 1960s to cooperate in the management of all Pacific salmon fishery resources from northern California to the Gulf of Alaska.⁸⁶ The negotiations were long, arduous and difficult. A successful conclusion was not reached until 1985. What drove the negotiators on was the manifestation of the “Prisoner’s Dilemma.”

It was believed, at the time, that salmon production could be increased substantially through enhancement projects (e.g. fish ladders) on major salmon rivers, such as the Fraser River, which empties south of Vancouver,

⁸⁶ Canada and the United States did have a treaty for the cooperative management of Pacific salmon produced in Canada’s Fraser River system, dating back to the 1930s. In the late 1960s, with the UN Third Conference on the Law of the Sea looming on the horizon, it was decided that the scope for Canada-United States cooperative management of Pacific salmon had to be broadened (Munro, McDorman and McKelvey, 1998).

British Columbia, and the Columbia River, which marks the boundary between the states of Washington and Oregon. If Canada and the United States both engaged in such projects, the mutual benefits could have been impressive. Each country deliberately held back from enhancement projects, however, for fear that the other would “free ride” on its efforts (Munro, McDorman and McKelvey, 1998).

In addition, there were outbreaks between the two countries of Pacific salmon “fish wars,” which the American legal expert, Thomas Jensen, defines as deliberate overexploitation of the fishery resource for the purpose of denying harvest opportunity to the other party or parties (player or players) (Jensen, 1986, p.18). When negotiations finally reached a successful conclusion in 1985, in the form of the Canada-United States Pacific Salmon Treaty, Jensen commented that the Treaty could best be described as a “peace treaty memorializing the end of the Pacific salmon war” (Jensen, 1986, p.372). In the early 1990s, the Treaty seized up for a period of several years. During this period of treaty paralysis, the “Prisoner’s Dilemma” re-emerged with a vengeance (Miller, Munro, McDorman, McKelvey and Tydemers, 2001).

It is, admittedly, possible that coastal States sharing a fishery resource will be fortunate in that, in the absence of formal cooperative resource management arrangements, tacit cooperation will emerge. Tacit cooperation is, however, inherently fragile. This author was a part of a team carrying out an economic study for the Benguela Current Large Marine Ecosystem Programme on the advisability of moving forward to a formal cooperative resource management regime for the three coastal States involved: South Africa, Namibia and Angola (Sumaila, Munro and Keith, 2005). The three States share several fishery resources, the most important of which is hake (Figure 2).

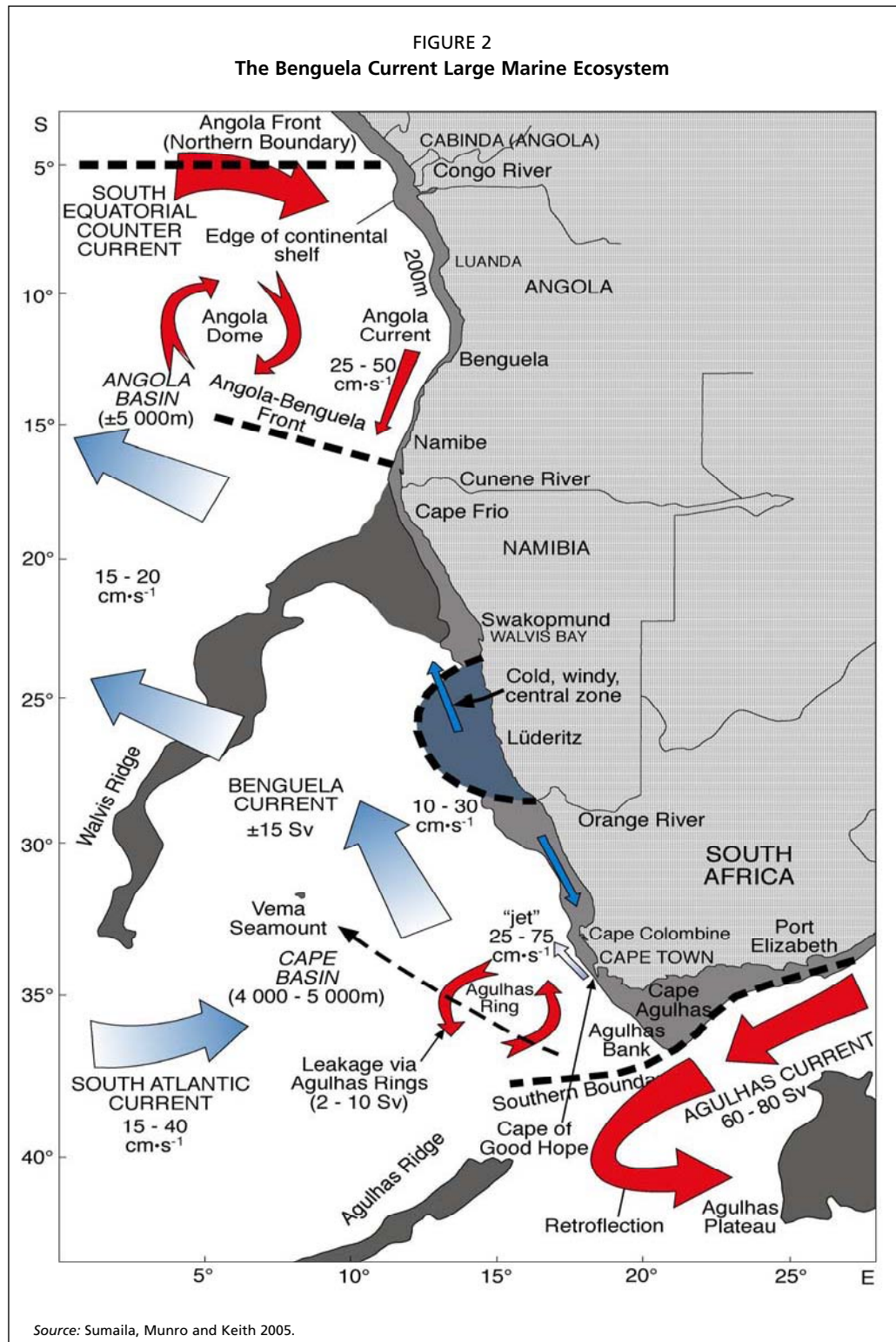
Formal fisheries management cooperation among the three has not advanced beyond the primary level. There is, to this point, no evidence of destructive fisheries practices, no evidence of the “Prisoner’s Dilemma” at work. Thus, there appears to be tacit secondary level cooperative management. While not down playing the costs of establishing a formal secondary level cooperative resource management regime, we urged that the three move towards such a cooperative resource management regime. A key argument, which we made for such a move, rested upon the inherent fragility of tacit cooperation⁸⁷ (Sumaila *et al.*, *ibid.*)

Thus, with few exceptions, cooperation (beyond the primary level) does matter in the management of transboundary stocks. Hence, we have no choice but to examine in detail, the second issue, the conditions that must be met, if the cooperative resource management arrangement is to prove to be stable through time, given that the arrangement must be self-enforcing.

In examining this issue, we draw appropriately upon the second branch of game theory, the theory of cooperative games, which is essentially a theory of bargaining. From the theory arises the first, and one might say, critical, condition for stability, a condition, which on the face of it, is stunningly obvious. It goes under the heading of the “individual rationality” condition. No cooperative arrangement will be stable unless each, and every, “player” is assured a return (payoff) from the cooperative arrangement, at least as great as that which it would enjoy by refusing to cooperate. The Report of the Bergen Expert Consultation noted that, while this proposition should be obvious, it is often ignored in practice (FAO 2002).

An accompanying, one might say overarching, condition for stability is that of perceived fairness and equity. If only one player believes that its share of the overall

⁸⁷ There had previously been uncertainty about the extent to which the resources had been shared, which caused the authors of the report to suspect that the tacit cooperation might have been inadvertent, i.e. the impact of one State’s harvesting activities upon its neighbours might not have been fully recognized.



economic returns from the cooperative arrangement is inequitable, the arrangement will be inherently unstable.⁸⁸

⁸⁸ Fairness and "individual rationality" are not entirely independent. If one player realizes that the payoff to it from cooperation is less than what it would receive from non-cooperation, it will hardly deem the cooperative arrangement to be "fair."

Historically, a "fair" basis for making allocations in the cooperative management of transboundary stocks has been seen to consist primarily of the zonal attachment of the stock, or stocks, and/or historical catch records of the relevant coastal State fleets, within their respective EEZs (see: FAO, 2002).

The problem then is to devise a cooperative arrangement, which is deemed to be fair, and which will deter defection. A cooperative arrangement, in which no participant has an incentive to defect is, by definition, self-enforcing.

Obviously, in order to achieve this goal, the allocation of the economic returns from the cooperatively managed fishery among the participants must be seen as equitable, but there is more to it than this. Return to the Gulland list of three problems that a cooperative regime must address. In addition to allocations, he included implementation and enforcement, and the determination of the optimal resource management program through time.

Consider first implementation and enforcement. If weak monitoring promises that cheating will go largely undetected, then even players with a strong moral sense, may calculate that cheating by other players will reduce their expected payoffs from cooperation below what they could expect to receive under cooperation, regardless of how “fair” their promised allocations may have been. They can be expected to refuse to cooperate – the “individual rationality” condition once again.⁸⁹

With regards to determining the optimal resource management program through time, cooperative game theory uses the term “cooperative surplus.” This refers to the difference between the sum of payoffs to the players under cooperation and the sum of the payoffs to the players under non-cooperation. Achieving optimal resource management through time will maximize the “cooperative surplus.” The larger the “cooperative surplus,” the more the players have to lose through a collapse of the cooperative management arrangement, and the easier it is to ensure that the “individual rationality” condition is met for each “player”.

For an example, we turn to the case of a particularly successful cooperative fisheries management arrangement, which involved the cooperative management of cod, haddock and capelin in the Barents Sea, by Norway and the Soviet Union/Russia. The cooperative resource management arrangement was established in the mid-1970s, when the Cold War was in full sway. The arrangement has been successful, in spite of complications arising from the fact that some of its stocks are straddling, as well as transboundary, in nature. The arrangement has also survived the political transformation in the former Soviet Union. This author will assert that a key factor in the success of the arrangement was, and is, the magnitude of the “cooperative surplus.”

Two Norwegian economists, Claire Armstrong and Ola Flåten, undertook an empirical analysis of the Barents Sea cooperative fisheries management arrangement, focusing on the most important of the three resources, cod. They argued that the cooperative arrangement was far from perfect in terms of maximizing the global economic returns from the fisheries. Nonetheless, the two estimated that the combined economic returns from the cod fishery to the two coastal States under cooperation was more than 50 times greater than what it would have been under non-cooperation (Armstrong and Flåten, 1991). While the study was completed over a decade ago, there is no reason to believe that the returns from cooperation have diminished significantly (Stokke, 2003). Thus both “players” have a great deal to lose from the cooperative management arrangement’s collapse. The arrangement is indeed self-enforcing.

One complication that can arise, in attempting to achieve an optimal management regime, is that there is no guarantee that the players in the cooperative fisheries game will have identical resource management goals. This fact was recognized by the FAO, while the UN Third Conference on the Law of the Sea was under way (FAO, 1979).⁹⁰ It has been argued that, where there are differences in management goals, it is invariably

⁸⁹ See the Report on the Bergen Expert Consultation for a detailed discussion on monitoring and enforcement in cooperative fisheries management arrangements (FAO, 2002).

⁹⁰ The 1979 FAO report pointed out that one State might opt for a MSY policy, while its partner State might opt for a biomass larger than that associated with MSY, and be pleased to accept lower catch rates.

the case that one player (or players) places a higher value on the resource than the other (Munro, 1987). Maximizing the economic returns of the fishery through time obviously calls for the management preference of the player(s) placing the highest value on the resource to predominate. This outcome is unlikely to be achieved, however, if allocations among the players are to be confined to allocations of the TAC(s) among national fleets. In order for what we might call the optimum optimum to be achieved, the player(s) placing the highest value on the resource will have to be prepared to compensate the other players through transfers, which may be monetary, but which can also take many other forms. This has come to be known as the Compensation Principle (Caddy, 1997; Munro, 1987; Munro *et al.*, 2004).

In game theory parlance, these transfers are referred to as “side payments.” The use of such side payments came up for considerable discussion in the Bergen Expert Consultation, where several participants preferred the less provocative term of “negotiation facilitators” (FAO, 2002). An obvious objection to the use of side payments (negotiation facilitators) is that those called to make them will balk at the sacrifice imposed upon them. A second technical appendix, Appendix B, shows that those making the side-payments, as well as those receiving them, can expect to benefit. The use of side payments allows for a superior resource management regime to the benefit of all.

For an example of the use of side payments to the benefit of all, we turn to the case of the North Pacific fur seal fishery. From the late 19th century onwards, the fishery was shared by four states: Canada, Japan, Russia and the United States. When the fishery became significant in the late 19th century, there was no cooperative management. The “Prisoner’s Dilemma” played itself out, and the resource was subject to severe overexploitation. Fearing the outright collapse of the resource, the four states came together and transformed the non-cooperative game into a cooperative one, which took the form of the 1911 Convention for the Preservation and Protection of Fur Seals, which was to last, with one lengthy hiatus, until 1984 (Barrett, 2003).

The four players were not identical. Two, Russia and the United States, were low cost harvesters, harvesting the seals on land (Pribiloff Islands), while the other two, Canada and Japan, were high cost harvesters, harvesting the seals at sea. Moreover, Russia and the United States received higher prices for their seal skins than did the other two countries. Needless to say, Russia and the United States placed a higher value on the resource than did the other two. Under the terms of the Convention, Canada and Japan were each to receive a certain fixed percentage of the TAC. The allocation to the Canadian and the Japanese fleets, however, equalled zero. All harvesting was to be done by Americans and Russians, with the Canadians and Japanese receiving their shares of the TAC in the form of seal skins, each season. The United States and Russia did, of course, determine the resource management regime.

This pure side payments cooperative arrangement proved to be profitable for all four players. Moreover, it also had beneficial conservation consequences. It was estimated that, between 1911 and 1941 (when the hiatus in the Convention, referred to earlier, commenced), the seal herds had increased eighteenfold (FAO, 1992).

A further complication arises from the number of players. As a general rule, the larger the number of “players,” the more difficult it is to achieve a stable cooperative resource management regime – the curse of large numbers. The reasons are reasonably straightforward. The larger the number of “players”, the greater becomes the enforcement problem, and the greater becomes the problem of reconciling conflicting management goals.⁹¹

⁹¹ Confirmation has been provided by a recent empirical study on world fisheries carried out by a New Zealand economist (McWhinnie, 2005). The empirical study reveals that shared fishery resources are more likely to be subject to overexploitation than are fishery resources confined to a single EEZ. Among shared fishery resources, the risk of overexploitation increases with the number of states/entities sharing the resources.

To return to the Barents Sea example, it can be argued that another factor leading to the success of the cooperative management arrangement is that the number of coastal States involved is only two.

Even if enforcement is strong, and a good attempt to maximize the “cooperative surplus” has been made, there remains an additional condition that must be met, if the cooperative resource management regime is to be stable through time. We shall refer to this condition, or requirement, simply as “resilience.”

It can be anticipated that the cooperative resource management regime will be subject to unpredictable shocks through time, due to environmental, economic or political factors. The consequence can be that, what was initially seen as a stable cooperative management regime will cease to be so, unless the cooperative resource management regime has sufficient flexibility to adjust to the shocks.

For an example, we return to the case of the Canada-United States Pacific Salmon Treaty. In the cooperative fisheries game that is the Treaty, it is reasonable to regard Canada as a single player, because, within Canada, jurisdiction over marine fisheries rests wholly with the federal government. In the United States, on the other hand, significant power rests with the individual states. The United States was, and is, therefore, not a single player, but what can be seen as a four player coalition, consisting of Washington plus Oregon, Alaska, the United States federal government, and because of key United States federal court decisions regarding the allocation of salmon harvests off of Washington/Oregon, the 24 Treaty Native American tribes of Washington, Oregon and Idaho.⁹²The cooperative game is a two stage one, in which the players in the American coalition bargain among themselves, and, upon achieving a consensus, proceed to bargain with Canada.

The Alaskans have always had the least to gain from the Treaty, and indeed the Treaty negotiations temporarily ground to a halt in the early 1980s, because of Alaskan dissatisfaction. Through a complex bargaining process, the problem was resolved and the Treaty came in to place in 1985.

At the time of the signing of the Treaty there was a rough balance between Canadian interception of American produced salmon, and the American interception of Canadian produced salmon. It was recognized by all that the cooperative surplus was substantial, and it appeared that the allocation of the economic benefits from the fishery were more or less fair (Munro, McDorman and McKelvey, 1998).

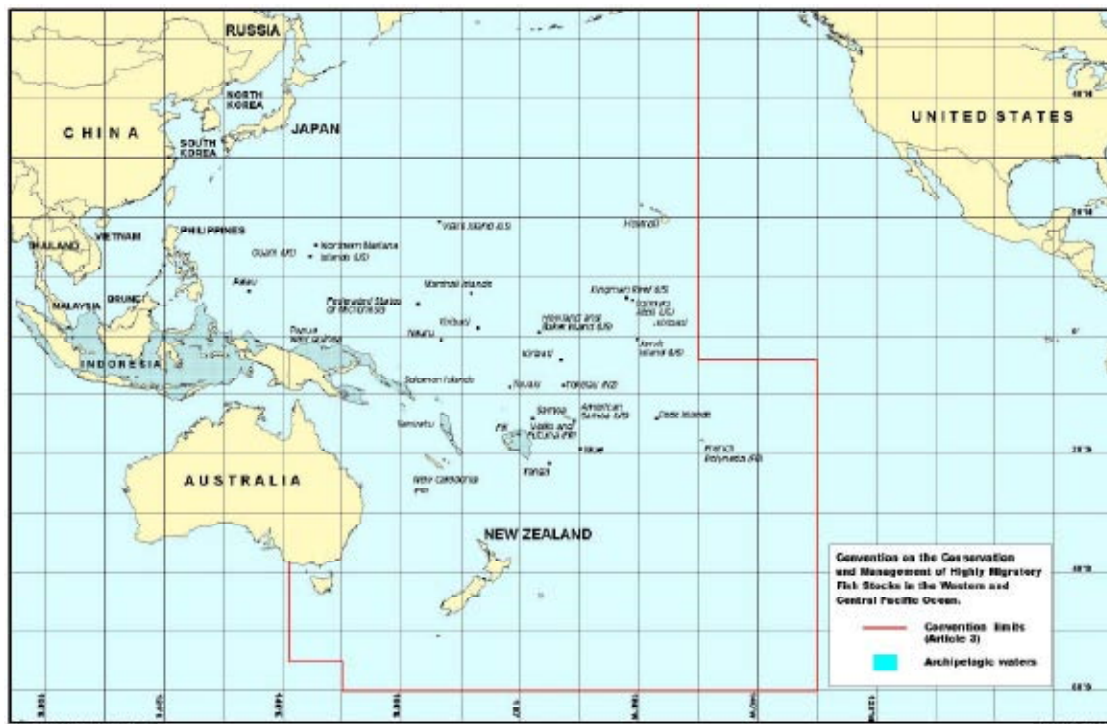
What was not recognized at the time was that there was a climate regime shift under way. The regime shift was to have a decidedly negative impact upon salmon stocks off Washington, Oregon and southern British Columbia, and a decidedly positive impact upon salmon stocks off of Alaska. The equitable division of benefits was upset, and the Treaty was thrown into disarray, with Alaska effectively being pitted against Canada, Washington/Oregon and the American Treaty tribes. To all intents and purposes the “individual rationality” condition, with respect to Alaska, was not being met (Miller *et al.*, 2001; Miller and Munro 2004).

The cooperative resource management arrangement proved to lack the resilience to withstand the major environmental shock in the form of the climate regime shift. One weakness of the Treaty was that bargaining between Canada and the American coalition was constrained by the fact there was no allowance whatsoever for side payments (Miller *et al.*, 2001).

After almost six years of treaty paralysis, Canada and the United States signed the Pacific Salmon Agreement in 1999 (United States Department of State, 1999) designed to “patch up” the Treaty. Interestingly, the Agreement contains (modest) provisions for side payments, although they are certainly not labelled as such (Miller *et al.*, 2001). At

⁹² The American federal government plays a relatively minor role in the American coalition (see: Miller, Munro, McDorman, McKelvey and Tydemers, 2001).

FIGURE 3
Pacific Island States



Source: Munro, Van Houtte and Willmann.

the time of writing, the Treaty, as modified by the Agreement, has worked reasonably well since 1999. Whether the Treaty proves to be sustainable over the long run remains to be seen.

The final example, which I wish to consider in this section, is that of a cooperative resource management regime, which has displayed resilience through time, and which has dealt effectively with the curse of large numbers. It is, moreover, within hailing distance of its 30th anniversary. The cooperative management regime is the one among the Pacific Island States that are fellow members of Australia and New Zealand in the South Pacific Forum Fisheries Agency (FFA) (Figure 3).

It is well known that the Pacific Islands Region encompasses the richest tropical tuna resources in the world, which are, in turn, of high economic importance to the Pacific Island States. It could be argued that this group of states were among the big “winners” of the advent of the EEZ regime.

The Pacific Island States had a powerful incentive to cooperate. Some 80-90 per cent of the tuna harvests in the region were, and are, taken by distant water fishing states (DWFSs) (Aqorau, 2003). In the late 1970s-early 1980s, the Pacific Island States effectively faced only one DWFS, one that was a major power in the Asia Pacific region. As a provider of tuna harvesting services in the region, this powerful nation was in the position of a monopolist. In the absence of cooperation, it would have been inevitable that the single DWFS would have played one Island state against the other, and would have done so successfully (Munro, 1991).

The Pacific Island States did attempt to cooperate through the vehicle of the FFA, established in 1979. Achieving effective cooperation was, however, very difficult. There were some 14 Pacific Island State members of the FFA, varying greatly in size, with many at low levels of development. The distances were (and are) immense. The Pacific Island States are spread over 35 million square kilometres of ocean space, while having a combined land mass of only 500 thousand square millimetres (Aqorau, 2003).

Implementing effective monitoring and surveillance programs, appeared to be an insurmountably difficult task.

The point has already been made that establishing a stable cooperative arrangement with a large number of participants (players) is a demanding undertaking, in the best of circumstances. This author, writing 25 years ago, expressed the then widely shared pessimism about the stability of this seemingly intractable 14 player fisheries game (Munro, 1982).

In cooperative game theory, it is common to talk in terms of coalitions of players when the number of players exceeds two. The total number of players is thought of as the Grand Coalition, in addition to which there can be subcoalitions. One then has to be concerned, not only about the possibility of individual players defecting, but also the possibility of subcoalitions so doing.

The tuna resources in the South Pacific are not evenly spread throughout the region, but tend rather to concentrate around the Equator. The consequence is that there are, in relative terms, “haves” and “have nots” among the Pacific Island Nations. Seven of the fourteen could be regarded as “haves.” Concerned about the lack of progress in the FFA, the seven met on the island of Nauru (one of the seven) and signed a formal agreement, the Nauru Agreement. The seven became known as the Nauru Group thereafter. The Nauru Group made it known that, while the Group had no wish to see the FFA disintegrate, the Group would go it alone unless the others engaged in serious cooperation. The others decided that serious cooperation was indeed in their best interest.

Two subcoalitions were thus formed, the Nauru Group (“haves”), and the “have nots.” It helped that there are two major Pacific Island States, Papua New Guinea (PNG) and Fiji, which were in different subcoalitions. PNG was in the “haves” subcoalition, and became its leader, while Fiji became the leader of the “have nots” subcoalition. The intractable fourteen player game had evolved into what amounted to a game between two stable subcoalitions (Munro, 1991).

Not surprisingly, the management goals of the two subcoalitions were not the same. The Nauru Group was much more concerned about the long-term stability of the resources, than the less well off subcoalition. Clearly, the Nauru Group placed the higher value on the resource. As we have noted, the theory tells us that the optimal outcome would be for the management preferences of the subcoalition placing the higher value on the resource to be made dominant, and for that subcoalition to compensate its fellow subcoalition.

The predictive power of the theory in this instance proved to be strong. The Nauru Group became the cutting edge in terms of formulating management policy. Various forms of side payments emerged, through which the “have not” subcoalition was compensated (Aikman, 1987; Munro, 1991). These compensations continue up to the present day. Moreover, the “have nots” subcoalition has played an increasingly important role in the cooperative management of the resource (D. Doulman, FAO, personal communication), which attests to the growing strength and stability of the cooperative resource management arrangement – the Grand Coalition.

4. STRADDLING FISH STOCKS

It will be recalled that, in this paper, we are defining straddling fish stocks broadly to include all fish stocks to be found within the coastal State EEZ and the adjacent high seas. To repeat an earlier comment, in terms of the economics of resource management, there is no meaningful difference between straddling stocks, as defined by the FAO, and highly migratory stocks (Munro *et al.*, 2004).

Once again, I leave the detailed discussion of the legal framework surrounding such stocks to my colleagues on the panel. I shall content myself with the following observations. First, under the terms of the 1995 UN Fish Stocks Agreement, the resources are to be managed through Regional Fisheries Management Organizations

(RFMOs), as exemplified by the Western and Central Pacific Fisheries Commission, and the North Atlantic Fisheries Organization (NAFO). Under Article 8(4) of the Agreement, “only those States which are members of such an organization or participants in such an arrangement, or which agree to apply the conservation and management measures established by such organization or arrangement, shall have access to the fishery resources to which these measures apply” (United Nations, 1995, Article 8(4)). Whether this provision applies to all States, or only to those that have ratified the Agreement is a question, which I leave to my colleagues learned in international law. The second observation is that fleets of non-participants, which engage in exploitation of the high seas portion of stocks subject to RFMO management in a manner contrary to the management provisions of the RFMO, and do so, because the fleets’ home states believe themselves not to be subject to Article 8(4) of the Agreement, or do so in defiance of the Article, are deemed to be engaging in unregulated, as opposed to illegal, fishing.

Economists, in exploring the economics of the management of straddling stocks, commence with the economics of the management of transboundary stocks, and then ask themselves what additions, or modifications, to the analysis, if any, are now required. With respect to non-cooperative management of straddling stocks, the answer is simple. The economics of non-cooperative management of transboundary stocks applies without modification. Non-cooperative management of straddling type of stocks leads directly to “Prisoner’s Dilemma” type of outcomes.

Munro, Van Houtte and Willmann argue that weaknesses in the 1982 United Nations Convention, pertaining to high seas fishery resources, ensured that straddling type of stocks would be managed non-cooperatively, prior to 1995. The result was discord and overexploitation, as exemplified by the pollock resources of the Bering Sea “Doughnut Hole,” and groundfish resources on the Nose and Tail of the Grand Bank of Newfoundland, which led ultimately to the 1993–1995 UN Fish Stocks Conference (Munro *et al.*, 2004). The three then go on to state that “... the overexploitation of straddling stocks [broadly defined] worldwide, which provided the rationale for the UN Fish Stocks Conference, bears powerful testimony to the predictive power of the economic analysis of the non-cooperative management of such resources” (Munro *et al.*, 2004, p.45).

It is in cooperative resource management that significant differences appear between transboundary and straddling stock management. The first difference is one of degree rather than kind. With respect to cooperative management of transboundary stocks, the FFA based cooperative regime is unusual in terms of its large numbers. Usually, the number of “players” is modest. In the cooperative management of straddling type stocks, a large number of “players” (and hence the curse of large numbers) is commonplace. The two following differences are differences in kind.

The second difference is in terms of the nature and number of participants (players) through time. In the case of transboundary stocks, the identity of those which should be involved in the cooperative management of a resource, or set of resources, is, with few exceptions, obvious. Moreover, the number of participants through time will be constant (again with few exceptions). As far as straddling type stocks are concerned, on the other hand, even the identity of the initial, or “charter,” members of a given RFMO may not be entirely clear. Article 8(3) of the 1995 UN Fish Stocks Agreement maintains that: “... States having a real interest in the fisheries concerned may become members of such organizations,” i.e. RFMOs, (United Nations, 1995, Article 8(3)). Does this imply that the “charter” members of a RFMO should include, for example, DWFSs, which had hitherto never been involved in the relevant fisheries, but now would like to become so involved, and express a “real interest” to this effect? Munro, Van Houtte and Willmann found that experts in international law do not have a uniform view on the issue (Munro *et al.*, 2004, p.50, n.38).

With regards to the number (and nature) of participants of a RFMO over time, this may be anything but constant, since some of the participants are DWFSs, whose fleets are nothing, if not mobile. Possibly, some initial “charter” members of the RFMO may withdraw and abandon the relevant fishery(ies). More importantly, New Members/Participants may appear and demand to be allowed entrance. Articles 8, 10 and 11 of the Agreement make it apparent that “charter” members of a RFMO cannot bar outright prospective New Members which are prepared to adhere to the RFMO management regime (United Nations, 1995; Munro *et al.*, 2004). The question is: under what terms are prospective New Members to be permitted to enter (e.g. what allocations are to be made to New Members)?

The third major difference between cooperative management of transboundary stocks, and that of straddling stocks revolves around the threat of “free riding.” Munro, Van Houtte and Willmann (2004) make a distinction between non-compliance and “free riding,” while conceding that the two are close, and that in some instances the boundary between the two will be fuzzy indeed. In using the term “non-compliance,” they mean essentially cheating by participants in a cooperative arrangement. By “free riding,” on the other hand, they refer to enjoyment of the benefits of, or returns from, a cooperative arrangement by non-participants.

Non-compliance is obviously an issue in the management of transboundary stocks. While the authors agree that “free riding” is conceivable in the case of transboundary stock management, they are hard pressed to come up with any real world examples.

By way of contrast, “free riding” is very much an issue in the cooperative management of straddling stocks, given the possibilities open for unregulated fishing in the high seas adjacent to the EEZs. The consequences of uncontrolled “free riding” are straightforward enough. With the prospect of much of the economic return from cooperative management being bled off by “free riders,” “charter” members of a RFMO may calculate that their expected payoff from participating in, or remaining in, the cooperative arrangement would fall below their payoffs from non-cooperation – the “individual rationality” condition yet again. The stability of the RFMO could collapse.

In the pre-1995 United Nations Fish Stocks era, several efforts to manage straddling type of stocks, through cooperative management arrangements, were severely hindered by the “free riding” of non-participants, which were actively engaged in unregulated fishing. Clear cut examples are provided by NAFO (Bjørndal and Munro, 2003), and by the Commission for the Conservation of Southern Bluefin Tuna (CCSBT, 2006; Cox, Stubbs and Davies, 1999; Kennedy, 1999).

In addition to “free riding” through unregulated fishing, the New Member and “real interest” issues carry with them a more subtle variant of the “free rider” problem, quite separate from unregulated fishing. It arises in the following manner.

An international group of legal experts, T. McDorman, K. Sigurjonsson and P. Örebech maintain that, under the 1995 UN Fish Stocks Agreement, New Members must be allocated just and reasonable shares of the TAC(s), available under the RFMO management plan, (Örebech, Sigurjonsson and McDorman 1998). A number of years ago, Kaitala and Munro (1997) demonstrated the following. If *just and reasonable* implies that New Members/Participants, upon joining a RFMO, should be allocated, at no further cost as it were, shares of the Total Allowable Catch, or the equivalent, on a pro-rata basis, then, when planning is undertaken for the establishment of a RFMO, prospective “charter” members could well calculate that their expected payoffs from cooperation would fall below their respective non-cooperation payoffs. Hence, the RFMO would be stillborn, in essence because of potential New Member “free riding”.

The Kaitala-Munro argument can be explained in terms of the following example. Suppose that a hitherto overexploited straddling type of stock comes under the

management of a RFMO consisting of coastal State V, and three DWFSs, W, X and Y, all of which had a history of involvement in the fishery. The four “charter” members undertake the cost and sacrifice of rebuilding the resource over, let us say, a seven year period. In the eighth year, the four are in a position to enjoy a return on their resource investment, through harvesting. At the beginning of the eighth year, a prospective new member, DWFS Z, appears. It demands access to the RFMO, agrees to abide by the resource management rules, but demands, “free of charge,” a pro-rata share of the harvest, and by implication, a pro-rata share of the net economic returns from the fishery. If DWFS Z’s demands were acceded to, Z would effectively be a “free rider.” Having incurred none of the costs and sacrifices of investment in the resource, it will enjoy, at no cost, a pro-rata share of the return on the investment. A straightforward application of game theory demonstrates that the impact of this new form of “free riding” is no different from the impact of the “free riding” associated with unregulated fishing (Kaitala and Munro *ibid*; Munro *et al.* 2004).

The “real interest” issue raises a similar “free rider” problem. Munro, Van Houtte and Willmann argue that, if “real interest” as expressed in Article 8 of the Agreement, is interpreted to mean that States, not currently engaged in exploiting resources to come under the management of a RFMO, must be invited to become “charter” members of the RFMO, then the same sort of “free rider” problem, threatened by the New Member issue, can readily arise. Return to our New Member problem example, discussed in the previous paragraphs.

Suppose, as before, that States V, W, X, and Y come together to establish a RFMO to oversee the management of a straddling or highly migratory stock, which had, in the past, been overexploited. Suppose, also as before, that the four had been actively involved in the fishery prior to any thought being given to establishing a RFMO. The four plan to rebuild the resource over a seven year period. Let us suppose that DWFS Z is a state, which had never participated in the exploitation of the resource, but which has developed a “real interest” in the resource, now that it may come under effective management. Rather than wait to come in later as a New Member, Z demands full and undiluted “charter” membership. The four feel compelled to accede to Z’s demand. Z incurs no real sacrifice in the re-building of the resource, because it had not hitherto been engaged in harvesting the resource. Z will simply bide its time over the seven year period, and then, when the eighth year arrives, will come to enjoy an allocated share of the return on the resource investment, as the “free rider” that it most certainly is. Once again, the possibility of such “free riding” could undermine the viability of the RFMO.

The Bergen Expert Consultation discussed two examples of attempts of RFMOs (or RFMO-like bodies) to address the New Member issue, namely NAFO and the Northeast Atlantic Fisheries Commission (NEAFC). Relevant to these examples is Article 11(a) of the 1995 UN Fish Stocks Agreement, which admonishes existing members of a RFMO, when preparing to accommodate new entrants, to take into account the status of the relevant stocks and existing fishing effort (UN 1995).

Munro, Van Houtte and Willmann comment that both NAFO and NEAFC are taking Article 11(a) with great seriousness. They conclude that “- to be blunt, a *just and reasonable* [allocated] *share* of the TACs for new entrants is interpreted largely as being what is left over” (Munro *et al.* 2004, p49).

There is, of course, an alternative, which is to allow prospective new entrants to buy quotas from existing RFMO members, similar to prospective new entrants to a domestic ITQ fishery attempting to buy quota from existing ITQ holders. The alternative was discussed at the Bergen Expert Consultation. The report of the Consultation states:

If ... it were possible for prospective New Members to purchase quotas from existing members of RFMOs, this would serve to ease the problem of quota allocation to New Members (FAO, 2002, para. 63).

It was recognized in Bergen that, if this approach were to be adopted, then, by implication, the “charter” members of the RFMO would be granted de facto collective property rights to the fishery resources encompassed by the RFMO (Munro *et al.* 2004, p. 37).

This author is well aware that the New Member problem is of direct relevance to the WCPFC, and to the CCSBT. Information arising from the CCSBT makes it apparent that the Commission is encouraging those, which were hitherto engaged in unregulated fishing, to become New Members (CCSBT 2006). The author will not attempt to go into detail, but will, rather, defer to others on the panel, and at the Conference, whose knowledge of the two bodies far exceeds his own.

Having said all of this, an apparent dilemma now confronts us. If allocations offered to prospective New Members, or hitherto non-participants in the fishery(ies) now claiming a “real interest,” are too generous, then the RFMO may be undermined for reasons discussed. If, however, States/entities found in these two groups deem the offered allocations to be insufficient, they may refuse to join the RFMO, and turn to unregulated fishing in the adjacent high seas, Agreement or no Agreement. How then is the dilemma to be resolved?

A group of European fisheries economists, who are, this author would argue, at the cutting edge of the application of game theory to the management of shared fish stocks, have, in the recent past, addressed this very problem.⁹³ Their conclusion is that, if restrictions on unregulated fishing are weak, there will be instances in which no resolution of the dilemma is possible—regardless of how ingenious the allocation schemes might be.⁹⁴

In a recent study, the analysis developed by these economists was tested empirically by being applied to the case of East Atlantic Bluefin Tuna fisheries, under the management jurisdiction of the International Commission for the Conservation of Atlantic Tuna (ICCAT) (Pintassilgo, 2003). The author of the empirical study concludes that, if restrictions on unregulated fishing are weak, it will not be possible to achieve a stable (self-enforcing) cooperative arrangement for the management of the resource, the 1995 UN Fish Stocks Agreement notwithstanding. The author also concludes, however, that, if unregulated fishing can be eliminated, the prospects for effective cooperative resource management will be much brighter (Pintassilgo, *ibid.*). Another pair of European economists add that, if effective cooperative management measures are not applied to the tuna resource, the sustainability of the fishery will be under severe threat (Bjørndal and Brasão, *forthcoming*).

The implications of the preceding analysis and empirical studies are clear, and unambiguous. In his keynote address to the International Institute of Fisheries Economics and Trade (IIFET) 2004 Japan Conference, Assistant Director General, Ichiro Nomura, FAO, stated that “... if Regional Fisheries Bodies [including RFMOs] are not able to fulfil their mandates because of IUU fishing, the outlook for the sustainable utilization of many of the world’s commercially important fish stocks is bleak.” (Nomura, 2004, p.7). This author can only agree. If the newly emerging RFMO regime is to prosper, it is of utmost importance that unregulated fishing be eliminated,

⁹³ See in particular: Lindroos (2002); and Pintassilgo (2003).

⁹⁴ In the straddling stock cooperative fisheries game, as we have emphasized, large numbers of “players” is the norm. Let it be recalled that, when there are a large number of players, it is not sufficient to worry about individual players going off on their own and playing non-cooperatively. One also has to worry about sub coalitions defecting. One should also point out that it is not just frustrated potential New Members, which might engage in “free riding.” “Charter” member DWFs could announce their withdrawal from the RFMO and proceed to become “free riders.”

with the first such fishing becoming, de facto if not de jure, illegal fishing.⁹⁵ It is difficult to overstate the importance of the FAO International Plan of Action to deal with IUU fishing (IPOA-IUU) (FAO, 2001).

5. DISCRETE HIGH SEAS STOCKS

There is very little that one can say, at this stage, about these stocks. Munro, Van Houtte and Willmann describe them as the “orphan” fish stocks of the ocean (Munro *et al.*, 2004, p. 57). Many of the stocks have been protected to date, by virtue of the fact that it is too costly to exploit them on a commercial basis. The history of world fisheries assures us that, with the ongoing advance of fisheries technology, this protection will disappear over time.

Munro, Van Houtte and Willmann point out that the only legal protection, which the resources have, comes from the 1982 UN Convention, Part VII, High Seas (UN, 1982). States exploiting such stocks are admonished to cooperate for the purpose of conserving the resource. Needless to say, no mechanism for cooperation is suggested.

Part VII of the 1982 Convention did, in of and by itself, prove to be quite inadequate for the conservation of straddling type of stocks. It is questionable whether one has any justification whatsoever for assuming that Part VII articles will prove to be any more adequate for the conservation of discrete high seas stocks. One could look forward, with confidence, to an intractable “free riding” problem.

Without an effective mechanism for cooperation, we can anticipate that the discrete high seas stocks fisheries will play themselves out as competitive fisheries games, with the to be expected destructive consequences. It may be that a solution could be found in extending the mandate of RFMOs to cover these resources. At this point, we can do no more than speculate.

6. CONCLUSIONS

This paper has been concerned with allocation issues, in the context of internationally shared fishery resources, as seen from the perspective of an economist. The key question that has been raised is whether there exist allocation schemes that will ensure the long run stability of the fisheries, which these resources support. The answer is that, while allocation schemes, deemed to be fair and equitable, are clearly important for the long run stability of internationally shared fisheries, they are not sufficient, in of and by themselves.

We commence with two fundamental propositions. The first is that, with few exceptions, there will be a strategic interaction between, and among, the States/entities sharing the fishery resources. The second is that cooperative arrangements, for the management of such resources must be self-enforcing, if they are to be sustainable over the long run.

Given the first proposition, economists, in analyzing the management of internationally shared fishery resources, have been compelled to view the problem through the lens of the theory of strategic interaction, popularly known as game theory. In so doing, we are driven to our first conclusion, namely that, if the cooperative management arrangement breaks down, the consequences can be severe, with there being little left to allocate over the long term.

Self-enforcing cooperative resource management regimes are those in which no participant (“player”), now or in the future, does have, or will have, an incentive to defect, and go it on its own. To achieve this goal, cooperative management regimes for

⁹⁵ The single most important emerging RFMO, where these problems are being played out, is on this Conference’s doorstep, namely the Western and Central Pacific Fisheries Commission (see: Figure 3). Munro, Van Houtte and Willmann maintained that “... the WCPFC represents an immensely ambitious undertaking. If it is successful, one can anticipate that it will serve as a model for emerging RFMOs throughout the world” (Munro *et al.* 2004, p. 55).

both transboundary and straddling stocks must, we have now learned, be “resilient”, in that they can withstand unpredictable shocks. Straddling stock cooperative management regimes face an additional threat in the form of “free riding”. We conclude that, unless the problem of unregulated fishing can be dealt with effectively, the threat posed by “free riding” will be chronic, and could undermine the emerging RFMO regime. There remain discrete high seas stocks, which we referred to as the “orphans” of the sea. At the time of writing, we have little assurance of self-enforcing, stable cooperative regimes being established for their management. The threat posed by “free riding” is, at best, daunting.

APPENDIX A

Non-cooperative management of shared fish stocks and the “Prisoner’s Dilemma”

This appendix draws heavily upon Munro, Van Houtte and Willmann 2004 (see pp. 61-63).

The “Prisoners’ Dilemma” is perhaps the most famous of all non-cooperative games. The name arises from a story introduced by the author (Tucker, 1950) to illustrate the point that, under non-cooperation, the players will be driven to adopt strategies, which they know are less than optimal.

In the story, two men, R and T, are arrested on (justifiable) suspicion of grand larceny. In prison, the men are isolated from one another, so that no cooperation between the two is possible. The state prosecutor then interviews prisoner R. The prosecutor admits that the evidence, which he has, is limited. He concedes that, if both R and T plead not guilty, the most he can do is to convict the two on a lesser charge. They would then each receive 6 months in prison. If both R and T plead guilty, they will each receive a 5-year prison sentence. The prosecutor continues that, if R pleads guilty, while T pleads not guilty, R will be released for having turned state’s evidence, and thus helping to convict T. If, on the other hand, R pleads not guilty, while T pleads guilty, R will be dealt with harshly. He will receive a 10-year prison sentence. The prosecutor then holds exactly the same interview with T.

R and T are the players. Each has two possible strategies: to plead guilty, or to plead not guilty. If R and T could communicate, and were able to enter into a binding agreement, they would cooperate, and each would adopt the strategy of pleading not guilty. The outcome of the cooperative game would be that the two would be released from prison after a short stay of 6 months. They cannot communicate, however, with the result that they cannot cooperate. A non-cooperative game is the only option. In this situation, the best strategy for R will be to plead guilty. What is true for R is also true for T. The two will thus spend 5 years in prison, a most inferior outcome.

To see why we get this seemingly perverse “solution” to the non-cooperative game, we set up a so-called Payoff Matrix. The payoffs in the Matrix are expressed in terms of prison sentences. Consider the following, adapted from Luce and Raiffa (1957):

Prisoner R\Prisoner T	Pleads guilty	Pleads not guilty
Pleads guilty	5 years each	0 years for R, and 10 years for T
Pleads not guilty	10 years for R, and 0 years for T	1/2 year each

Consider the position of R. If Player T were to plead guilty, Player R would clearly be better off pleading guilty. If Player T were to plead not guilty, Player R would, once again, be better off pleading guilty. Regardless of which of the two strategies Player T may adopt, the best strategy for Player R is to plead guilty. Hence, pleading guilty is the dominant strategy for Player R. What holds true for Player R, also hold true for Player T.

Colin Clark, in his book *Bionomic Modelling and Fisheries Management* (Clark, 1985), presents a lucid example of the Prisoner’s Dilemma applied to fisheries. Consider a fishery resource, shared by two countries, in which the costs of harvesting are independent of the size of the biomass, and in which the price for harvested fish and unit fishing effort costs are the same for the two countries, and are both constants. For each country, the net return for each unit of fish harvested is $p-c$, where p is the price of harvested fish and c the unit cost of harvesting. For the sake of simplicity, let $p-c=1$.

Let x denote the biomass, and $G(x)$ the growth of the biomass, and thus the sustainable harvest for any given level of x . Suppose that we commence at the global optimal biomass level, i.e. the biomass level at which the global economic returns from the resource will be maximized. Denote that biomass by x^* . The global economic return from the resource at $x = x^*$ is the present value of the sustainable harvest through time, which can be expressed as: $G(x^*)/\delta$, where δ is the appropriate rate of interest, or discount rate, assumed to be common to the two countries.

One possible harvest policy is simply to deplete the resource. Since harvesting costs are independent of the size of the resource, the resource could be reduced to zero. If, commencing at $x = x^*$, the resource is depleted to zero, the economic return from so doing would be just x^* . We assume that x^* is positive, which implies, in turn, that $x^* < G(x^*)/\delta$.

Country 1 has two possible strategies: deplete the resource, or conserve it. If Country 1 adopts the deplete strategy, while Country 2 follows the conserve strategy, it is assumed that Country 1 can deplete the resource so quickly that Country 2 receives nothing (and thus ends up as the “goat”). What holds true for Country 1, holds true for Country 2, which faces the same set of strategies.

Finally, we assume that the two countries have equal bargaining strength and harvesting power. Hence, if the two follow the same strategies, they will share the economic returns from the fishery equally.

The Payoff Matrix looks as follows:

Country 1/Country 2	Conserve	Deplete
Conserve	$\frac{G(x^*)}{2\delta}, \frac{G(x^*)}{2\delta}$	$0, x^*$
Deplete	$x^*, 0$	$\frac{x^*}{2}, \frac{x^*}{2}$

If both conserve, each will receive one-half of the present value of the sustainable harvest, i.e. $\left(\frac{G(x^*)}{\delta}\right) \times \frac{1}{2}$. If both deplete, each will receive $\frac{x^*}{2}$. Since $\frac{x^*}{2} < \left(\frac{G(x^*)}{2\delta}\right)$, then it follows that, if the two countries could communicate with one another and were prepared to cooperate, and enter into a binding agreement, we would end up with the resource being conserved.

Suppose, on the other hand, that there is no cooperation, no communication, between the two countries. Assume, to begin with, that $x^* > \left(\frac{G(x^*)}{2\delta}\right)$ and consider Country 1. If Country 2 should follow the conserve strategy, Country 1 will receive $\frac{G(x^*)}{2\delta}$, if it conserves, and x^* , if it depletes. If Country 2 should follow the deplete strategy, Country 1 would receive 0, if it follows the conserve strategy, and $\frac{x^*}{2}$ if it follows the deplete strategy. Clearly Country 1 should adopt the deplete strategy. What holds true for Country 1, hold true for Country 2, and we end up with a deplete, deplete outcome. This is a perfect Prisoner’s Dilemma case (Clark, 1985, pp.151-153).

Suppose, on the other hand, that $x^* < \left(\frac{G(x^*)}{2\delta}\right)$. Country 1 would be better off conserving, if Country 2 followed the conserve strategy. It is possible that we would end up with a conserve, conserve outcome (tacit cooperation). But, such an outcome is decidedly unstable. Suppose that Country 1, guessing that Country 2 will conserve, adopts the conserve strategy, but is then proven wrong. Country 2 depletes, with the result that Country 1 is left with 0, and is indeed the “goat.”

There is, in the theory of games, a famous criterion for selecting strategies in non-cooperative games, which is particularly applicable when one’s opponent is both aggressive and unpredictable. It is referred to as the maxmin criterion. The criterion states that one should look at the worst possible outcome from following each strategy, and then compare. Choose the strategy having the least worst outcome. In

the case under discussion, $x^* < \left(\frac{G(x^*)}{2\delta}\right)$, the Payoff Matrix tells us that the worst outcome for Country 1, if it follows the conserve strategy, is that it will receive 0 (the “goat” outcome). The worst outcome for Country 1, if it follows the deplete strategy, is that it will receive $\frac{x^*}{2}$. An application of the maxmin criterion would lead Country 1 to choose the deplete strategy. If Countries 1 and 2 each regard one another as aggressive and unpredictable, we can look forward to a deplete, deplete outcome. We might refer to this as the imperfect Prisoner’s Dilemma case (Clark, 1985, *ibid.*; Bacharach, 1976).

APPENDIX B

A two player cooperative fisheries game and side payments

In this appendix, we attempt to illustrate more fully some of the points made about simple cooperative fisheries games.

In the example to follow, we assume two players - two coastal States sharing a transboundary fishery resource. Call the players simply Player I and Player II. The payoffs to the players are expressed in terms of the present values of the expected net economic returns to the players from the fishery, given a particular harvest program.

We now introduce some economic jargon. The late 19th century-early 20th century Italian economist, Vilfredo Pareto, put forth the proposition that, in trade or in other dealings between and among “individuals,” the outcome was certain to be less than optimal, if it were possible by a rearrangement of the dealings to make one “individual” better off, without making the other “individual” worse off. This gave rise to the expressions “Pareto Improving” and “Pareto Optimality.” “Pareto Optimality” implies a situation, in which it is not possible to make one “individual” better off, except at the expense of the other(s). A formal condition for the stability of a “solution” to a cooperative game is that the “solution” be “Pareto Optimal.” This fits in with our discussion in the text of the necessity of attempting to maximize the global net economic returns from the cooperatively managed fishery.

Now consider the following widely used diagram. We assume that, for whatever reason, Players I and II have different management goals and that Player I places a higher value on the fishery resource than does II. The payoffs to I, θ , are shown on the vertical axis; while the payoffs to II, γ , are shown on the horizontal axis.

The payoff θ_0 represents the payoff I would receive, if there was no cooperation. I cannot receive less from the cooperative game than θ_0 , if there is to be a “solution” to the game. In the case of II, we have two alternative cases, one in which its payoff from non-cooperation is γ_0 , the second case in which its payoff from non-cooperation is γ'_0 .

Now suppose that side payments are barred. The curve $\beta = 1$ to $\beta = 0$ represents the so called Pareto Frontier. It shows all of the pairs of payoffs to all possible solutions to the cooperative game meeting the criterion of Pareto Optimality. If a “solution” to the game exists, it must lie on this frontier.

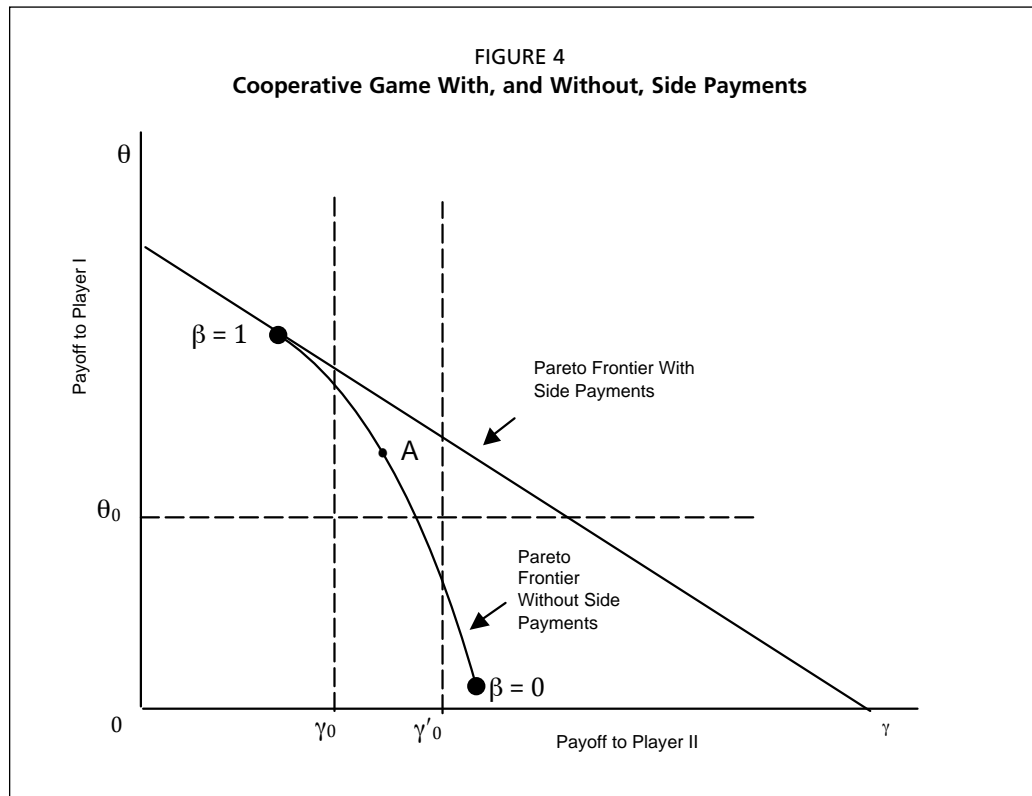
The parameter β is a bargaining parameter. If $\beta = 1$, the resource management preferences of I are completely dominant, while if $\beta = 0$, those of II are completely dominant. If $0 < \beta < 1$, we have a compromise resource management program.

Suppose now that the payoff, which II would receive under non-cooperation is γ_0 . We can see at once that a solution to the cooperative game in which the management preferences of I, the player placing the highest value on the resource, are dominant, is not feasible. Player II would end up being worse off than it would be under non-cooperation. The “individual rationality” condition would not be met.

A “solution” to the game would be achievable; however, say at point such as A. Point A is Pareto Optimal. Furthermore, both players will receive payoffs greater than they would under non-cooperation.

On the other hand, if II's expected payoff from non-cooperation is γ'_0 , there would be no “solution” to the cooperative game. There is no point on the Pareto frontier at which both I and II are assured of being better off than they would be by acting non-cooperatively. Attempts to achieve cooperation would break down. A non-cooperative game would ensue.

Now suppose that side payments are feasible. The Pareto Frontier then becomes a 45° line, implying that the two players attempt to maximize the global returns from the fishery, without worrying about differences in management preferences. This will



be achieved by allowing the management preferences of I to prevail, i.e. we end up at $\beta = 1$. Player I will manage the fishery, and will make transfers to II to ensure II's cooperation.

II will be clearly better off when the side payments are feasible, but so will I. If II's payoff under non-cooperation is γ'_0 , the existence of side payments will make the difference between cooperation and non-cooperation. If II's non-cooperative payoff is γ_0 , the impact of the introduction of side payments is not so dramatic. Nonetheless, I, as well as II, can expect to be better off. By allowing side payments, the global net economic benefits from the fishery can be maximized, which they cannot in the absence of side payments. The introduction of side payments is "Pareto Improving," – both players can expect to win.

Return to the real world example of the North Pacific fur seal fishery. Think of Russia plus the United States as the equivalent of I, and Canada plus Japan as the equivalent of II. The cooperative resource management arrangement, by allowing for superior economic management, meant that Russia and the United States, as well as Canada and Japan, were better off than they would have been had the arrangement called for continued Canadian and Japanese high cost harvesting.

ACKNOWLEDGEMENTS

The author wishes to express his gratitude to the organizers of the Sharing the Fish Conference '06 for their generous support in making it possible for him to participate in the Conference. He would also like to express his gratitude for the generous support of the Sea Around Us Project, of the Fisheries Centre, University of British Columbia, which is, in turn, sponsored by the Pew Charitable Trust of Philadelphia, United States.

REFERENCES

Aikman, C.C. 1987. Island Nations of the South Pacific and Jurisdiction Over Highly Migratory Species, *Victoria University of Wellington Law Review* 17: 101-124.

- Aqorau, T.** 2003. Cooperative Management of Shared Fish Stocks in the South Pacific, in FAO, Papers Presented at the Norway-FAO Expert Consultation on the Management of Shared Fish Stocks Bergen, Norway, 7-10 October 2002, FAO Fisheries Report No. 695 Supplement, Rome: 57-67.
- Armstrong, C. and O. Flåten.** 1991. The Optimal Management of a Transboundary Fishery Resource: The Arcto-Norwegian Cod Stock, in R. Arnason and T. Bjørndal (eds.), *Essays on the Economics of Migratory Fish Stocks*, Berlin, Springer-Verlag: 137-152.
- Bacharach, M.** 1976. *Economics and the Theory of Games*, London, The MacMillan Press
- Barrett, S.** 2003. *Environment and Statecraft: The Strategy of Environmental Treaty-making*, Oxford, Oxford University Press.
- Bjørndal, T. and A. Brasão.** forthcoming. The East Atlantic Bluefin Tuna Fisheries: Stock Collapse or Recovery?, *Marine Resource Economics and Gordon Munro 2003. The Management of High Seas Fisheries Resources and the Implementation of the UN Fish Stocks Agreement of 1995*, in Tom Tietenberg and Henk Folmer (eds.), *The International Yearbook of Environmental and Resource Economics 2003/2004: A Survey of Current Issues*, Cheltenham, Edward Elgar: 1-35.
- Caddy, J. F.** 1997. Establishing a Consultative Mechanism or Arrangement for Managing Shared Stocks Within the Jurisdiction of Contiguous States, in D. Hancock (ed), *Taking Stock: Defining and Managing Shared Resources*, Australian Society for Fish Biology and Aquatic Resource Management Association of Australasia Joint Workshop Proceedings, Darwin, NT, 15-16 June 1997, Sydney, Australian Society for Fish Biology: 81-123.
- Clark, C.** 1985. *Bioeconomic Modelling and Fisheries Management*, New York, Wiley Interscience.
- Commission for the Conservation of Southern Bluefin Tuna.** 2006. <http://www.ccsbt.org/>
- Cox, A., M. Stubbs, and L. Davies.** 1999. Southern Bluefin and CITES: An Economic Perspective, Report for Fisheries Research Fund and Environment Australia, ABARE Research Report 99-2, Canberra: Australian Bureau of Agricultural and Resource Economics.
- FAO.** 1979. Interim Report of the ACMRR Working Party on the Scientific Basis of Determining Management Measures, FAO Fisheries Circular No. 718, Rome.
- FAO.** 1992. *Marine Fisheries and the Law of the Sea: A Decade of Change*, FAO Fisheries Circular No. 853, Rome.
- FAO.** 2001. *International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing*, Rome.
- FAO.** 2002. Report of the Norway-FAO Expert Consultation on the Management of Shared Fish Stocks Bergen, Norway, 7-10 October 2002, FAO Fisheries Report No. 695, Rome.
- Jensen, T. C.** 1986. The United States-Canada Pacific Salmon Interception Treaty: An Historical and Legal Overview, *Environmental Law* 16: 365-422.
- Kaitala, V.o and G. Munro.** 1997. The Conservation and Management of High Seas Fishery Resources Under the New Law of the Sea, *Natural Resource Modeling* 10: 87-108.
- Kennedy, J.** 1999. A Dynamic Model of Cooperative and Non-cooperative Harvesting of Southern Bluefin Tuna With an Open Access Fringe. Presented to the 1999 World Conference on Natural Resource Modeling, Halifax.
- Lindroos, M.** 2002. Coalition in Fisheries. Helsinki School of Economics Working Paper W-321.
- Luce, R.D. and H. Raiffa.** 1957. *Games and Decisions: Introduction and Critical Survey*, New York, John Wiley and Sons.
- McWhinnie, S.** 2005. The Tragedy of the Commons in International Fisheries: An Empirical Estimation, unpublished paper, Department of Economics, University of British Columbia, Vancouver, Canada.

- Miller, K. and G. Munro.** 2004. Climate and Cooperation: A New Perspective on the Management of Shared Fish Stocks, *Marine Resource Economics* 19: 367-393.
- Munro, G., McDorman, T., McKelvey, T. R. and P. Tydemers.** 2001. The 1999 Pacific Salmon Agreement: A Sustainable Solution? *Occasional Papers: Canadian-American Public Policy*, No. 47, Orono, Canadian-American Center, University of Maine.
- Munro, G.** 1982. Cooperative Fisheries Arrangements between Pacific Coastal States and Distant Water Fishing Nations, in H.E. English and A.D. Scott (eds.), *Renewable Resources in the Pacific*, Ottawa, International Development Research Centre: 247-253.
- Munro, G.** 1987. The Management of Shared Fishery Resources Under Extended Jurisdiction, *Marine Resource Economics* 3: 271-296.
- Munro, G.** 1991. The Management of Migratory Fishery Resources in the Pacific: Tropical Tuna and Pacific Salmon, in R. Arnason and T. Bjørndal (eds.), *Essays on Economics of Migratory Fish Stocks*, Berlin, Springer-Verlag: 85-106.
- McDorman, T and T. R. McKelvey.** 1998. Transboundary Fishery Resources and the Canada-United States Pacific Salmon Treaty. *Occasional Papers: Canadian-American Public Policy*, No. 33, Orono, Canadian-American Center, University of Maine.
- Van Houtte, A. and R. Willmann.** 2004. The Conservation and Management of Shared Fish Stocks: Legal and Economic Aspects, *FAO Fisheries Technical Paper*, No. 465, Rome.
- Nobelprize.org** 2005. <http://nobelprize.org/economics/laureates/2005/press.html>.
- Nomura, I.** 2004. State of World Fisheries and Future Sustainability Issues, Proceedings of the Twelfth Biennial Conference of the International Institute of Fisheries Economics and Trade: What are Responsible Fisheries?, Corvallis, Department of Agricultural and Resource Economics, Oregon State University.
- Örebech, P., Sigurjonsson, K. and T.L. McDorman** 1998. The 1995 United Nations Straddling and Highly Migratory Fish Stocks Agreement: Management, Enforcement and Dispute Settlement, *The International Journal of Marine and Coastal Law* 15: 361-378.
- Pintassilgo, P.** 2003. A Coalition Approach to the Management of High Seas Fisheries in the Presence of Externalities, *Natural Resource Modeling* 16: 175 – 197.
- Stokke, O. and E. Schram.** 2003. Management of Shared Fish Stocks in the Barents Sea, in *FAO, Papers Presented at the Norway-FAO Expert Consultation on the Management of Shared Fish Stocks Bergen, Norway, 7-10 October 2002*, *FAO Fisheries Report No. 695 Supplement*, Rome: 180-191.
- Sumaila, U. R., Munro, G. and H. Keith.** 2005. Benguela Current Commission (BCC) Economic Study, prepared for the United Nations Office for Projects Services (UNOPS) and Benguela Current Large Marine Ecosystem (BCLME) Programme, <http://www.earthmind.net/marine/docs/bcc-economic-study.pdf>.
- Tucker, A.W.** 1950. A Two-Person Dilemma, unpublished paper, Stanford University.
- United Nations.** 1982. United Nations Convention on the Law of the Sea. UN Doc. A/Conf.62/122.
- United Nations.** 1995. United Nations Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks. Agreement for the Implementation of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. UN Doc. A/Conf./164/37. United States Department of State 1999. Diplomatic Note No. 0225 from Canada to the United States; reply; attached agreement, June 30. <http://www.state.gov>.
- Van Houtte, A.** 2003. Legal Aspects in the Management of Shared Fish Stocks: A Review, in *FAO, Papers Presented at the Norway-FAO Expert Consultation on the Management of Shared Fish Stocks Bergen, Norway, 7-10 October 2002*, *FAO Fisheries Report No. 695 Supplement*, Rome: 30-42.

Regional allocation issues or Zen and the art of pie cutting

Professor Rosemary Rayfuse

Associate Professor and Director of International Law Programs

Faculty of Law

University of New South Wales

Sydney, Australia

r.rayfuse@unsw.edu.au

1. INTRODUCTION

The discipline of Zen consists in attaining enlightenment. According to the Zen school of thought, freedom is not enlightenment. Rather, freedom is the outcome of enlightenment which is attained through the rigorous application of two approaches. The first approach, that of verbalism, requires one to “examine the living words and not the dead ones”.⁹⁶ Dead words are “those that no longer pass directly and correctly and intimately on to the experience. They are conceptualized, they are cut off from the living roots”.⁹⁷ The second, or ‘actional’ approach, consists in taking action which has as its deeper purpose the “awakening in a disciple’s mind [of] a certain consciousness that is attuned to the pulsation of Reality”.⁹⁸ From an international lawyer’s perspective, the intriguing thing about Zen philosophy is that these two approaches appear to mirror those taken in the development of international law, in particular customary international law, which requires evidence of *opinio juris* and state practice.

If we apply Zen philosophy to the high seas fisheries context, the alleged freedom to fish is not enlightenment. Enlightenment is, instead, to be attained through the implementation of a fisheries regime which ensures, in light of changing experiences and realities, the long-term sustainability of fish stocks. Only when that goal is achieved will enlightenment, and hence true freedom, be achieved. In the context of the topic of allocation, attainment of enlightenment requires devising allocation strategies to divide ever decreasing resources among ever increasing numbers of exploiters in a manner that both ensures the long term sustainability of the resource and is acceptable to all.

This paper examines the search by Regional Fisheries Management Organizations (RFMOs) for enlightenment in the context of the allocation of high seas fish stocks. Although allocation is essentially a political, or negotiated, process, in devising their allocation strategies RFMOs and their member states act within the context of a wide-ranging body of legal principles. This body of law is, however, still developing.

Moreover, as states seek new ways to deal with constantly emerging realities, these principles may come into conflict with each other or their legal status may be controversial. In other words, RFMOs are operating in a changing international legal environment that reflects the ongoing tension between the state sovereignty and international communitarian models. Accordingly, rather than focus on political or economic aspects, or on the practice in one or more RFMOs as will be done in

⁹⁶ D. T. Suzuki. 1959. *Zen and Japanese Culture*. Princeton University Press, Princeton, NJ. p. 7.

⁹⁷ *Ibid.*

⁹⁸ *Ibid.* p9.

other papers, this paper presents a broad overview of the legal principles that apply to the who, what, why, when, where, and how of allocation decisions by RFMOs. It concludes with some suggestions for a reconceptualization of the legal regime which might bring us closer to the elusive goal of enlightenment in the context of regional allocation issues.

2. LEGAL PRINCIPLES APPLICABLE TO ALLOCATIONS WITHIN RFMOS

2.1 Who allocates?

The first set of principles relate to the question of who has the right to allocate high seas fisheries. It seems beyond doubt that RFMOs are now the accepted *modus operandi* through which international cooperation in the conservation and management of high seas fisheries is to be carried out.⁹⁹ Articles 116-118 of the Law of the Sea Convention (LOSC)¹⁰⁰ provide that the duty to cooperate in respect of the conservation and management of high seas fish stocks is to be carried out through the establishment, where applicable, of RFMOs. This is further reinforced by Article 8 of the Fish Stocks Agreement (FSA)¹⁰¹ which institutionalises the duty to cooperate through the medium of RFMOs by providing that only members of RFMOs or non-members which agree to abide by the conservation and management measures adopted by RFMOs can access the fishery concerned.

However, the efficacy of allocations made by RFMOs is affected by the operation of a number of legal principles. First, the freedom to fish on the high seas, while often overstated, nevertheless means that, subject to certain restrictions, the vessels of any state, including states that are not members of an RFMO, may fish on the high seas within the regulatory area of that RFMO. These restrictions include the general limitations of 'due regard'¹⁰² and 'peaceful purposes'¹⁰³ as well as the specific limitations arising from states' treaty obligations, the rights, duties and interests of coastal states in straddling and anadromous fish stocks, highly migratory and catadromous species and marine mammals, and the duties of conservation, cooperation and non-discrimination in respect of the conservation and management of the living resources of the high seas.¹⁰⁴ Arguably this circumscribed 'freedom' is also now exercisable either only by members of RFMOs or by non-member states parties that agree to abide by the conservation and management measures adopted by an RFMO. This restriction, found in the FSA,¹⁰⁵ is however, not yet universally accepted as binding on all states as a matter of customary international law. Thus, its application appears to be limited to parties to the FSA.

Next, the *pacta tertiis* rule, which provides that treaties do not bind third, or non-party, states,¹⁰⁶ operates to exempt non-members and non-parties to the FSA from the application of an RFMO regime. The effect is that allocation decisions can only be made in respect of members. Even assuming RFMO allocations are adhered to by member states, which is often not the case, their efficacy is compromised by the inability of an

⁹⁹ In truth, this is something of an overstatement. Cooperation can be through mechanisms other than formally established RFMOs. The terminology of RFMO is used here as shorthand to encompass all cooperative participatory agreements and arrangements for the management of high seas fisheries resources.

¹⁰⁰ United Nations Convention on the Law of the Sea, 10 December 1982, 21 ILM 1245 (hereinafter LOSC).

¹⁰¹ Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, 8 September 1995 34 ILM 1542 (hereinafter, FSA).

¹⁰² LOSC Art 87(2).

¹⁰³ LOSC Art 88.

¹⁰⁴ LOSC Arts 116 – 120. See Rosemary Rayfuse. 2004. Non-Flag State Enforcement in High Seas Fisheries. Martinus Nijhoff, p.30-34.

¹⁰⁵ FSA Art 8.

¹⁰⁶ Vienna Convention on the Law of Treaties, 23 May 1969, 1155 UNTS 331 Arts 34-38.

RFMO to require submission of catch and effort data from non-members. In other words, allocations will be based on incomplete scientific information and will therefore be unreliable and possibly unachievable or unsustainable.

The principle of exclusivity of flag state jurisdiction further limits the effectiveness of RFMO allocations. As noted above, RFMOs have no legal standing to enforce their allocation regimes, or any other part of their mandate, against non-members. Thus, the phenomenon commonly referred to as Illegal, Unreported and Unregulated (IUU) fishing appears to continue almost unabated. However, IUU fishing is not confined to non-members of RFMOs but is also carried out by nationals of member states. Nevertheless, while progress is being made, RFMOs still lack comprehensive and effective compliance and enforcement regimes in respect of their members¹⁰⁷ who, it is acknowledged, may see little advantage, commercial or otherwise, in compliance with limitations on their fishing effort when non-members are not so bound. Thus IUU fishing is often said to be at the root of the allocation issue.

The question of ‘who can allocate’ also relates to the issue of participation in RFMOs. Not addressed in the LOSC, the FSA provides that “states having a real interest in the fisheries concerned may become a member” of RFMOs.¹⁰⁸ What, precisely, a ‘real interest’ is, however, is still not clear.¹⁰⁹ Argument persists as to whether the category encompasses only states with a pre-existing fishing history and relevant coastal states, or is also open to new entrants or other states with no such attachment but only a general interest in, for example, the conservation of living marine resources or global biodiversity. Molenaar suggests that no rational argument exists to interpret or apply the concept of real interest to bar states in these latter categories from membership in RFMOs.¹¹⁰ Nevertheless, some RFMOs do make membership contingent on fishing interest. Others, while not limiting membership in this way, make membership contingent on allocation, while still others are prepared to offer membership but no allocation.¹¹¹

While any state may accede to the Convention on the Conservation of Antarctic Marine Living Resources, membership in the Commission on the Conservation of Antarctic Marine Living Resources (CCAMLR) is only open to states which are actively engaged in research or harvesting activities within the Convention area.¹¹² Similarly, any state may accede to the Convention on Future Multilateral Cooperation in the North-West Atlantic Fisheries; however, membership of the Fisheries Commission of the Northwest Atlantic Fisheries Organization (NAFO) is limited to states already engaged in fishing in the NAFO Regulatory area or those that provide satisfactory evidence that they intend to do so during the relevant year.¹¹³ However, membership applications will not succeed if the prospective member has no allocation. The apparent circularity of this is overcome by the practice of offering new entrants allocations of fishing opportunities for stocks not currently allocated.¹¹⁴ While the Republic of Korea and Taiwan Province of China successfully negotiated allocations before joining the Commission on the Conservation of Southern Bluefin Tuna (CCSBT) the Commission

¹⁰⁷ See R. Rayfuse. 2005. “To Our Children’s Children’s Children: From Promoting to Achieving Compliance in High Seas Fisheries”, *International Journal of Marine and Coastal Law* 20(3-4):509-532.

¹⁰⁸ FSA Art 8(3).

¹⁰⁹ E. J. Molenaar. 2000. “The Concept of ‘Real Interest’ and Other Aspects of Cooperation through Regional Fisheries Management Mechanisms”, *International Journal of Marine and Coastal Law* 15:475-531.

¹¹⁰ *Ibid.* p496-498.

¹¹¹ E. J. Molenaar. 2003. “Participation, Allocation and Unregulated Fishing: The Practice of Regional Fisheries Management Organisations”, *International Journal of Marine and Coastal Law* 18(4):462-466.

¹¹² Convention on the Conservation of Antarctic Marine Living Resources, Art VII.

¹¹³ NAFO Convention Arts IV(1), XII(4) and XIII(1).

¹¹⁴ See NAFO Resolution to Guide the Expectations of Future New Members with Regard to Fishing Opportunities within the NAFO Regulatory Area, adopted at the 21st Annual Meeting of NAFO, September 1999.

initially refused to grant an allocation to South Africa should it join the Commission. After several years of debate, the Commission has recently agreed to make a 'final' offer of a 45 tonne catch limit to South Africa in return for it becoming a cooperating non-member. This is less than the 60 tonne allocation requested by South Africa.¹¹⁵

None of these approaches encourages new entrants, and each merely encourages unregulated fishing. Moreover, each of these approaches arguably discriminates in fact, if not in form, against new entrants and developing states which have not previously had the capacity, be it legal or practical, to engage in high seas fisheries. As Molenaar points out, the concept of cooperating non-member has been adopted by a number of RFMOs in an attempt to woo compliance from non-members. These states may receive allocations and they may also be exempt from measures designed to deter IUU fishing.¹¹⁶ The status of cooperating non-member is, however, not a permanent one but is subject to annual renewal by the RFMO concerned. While clearly designed to encourage eventual membership, this may, instead, merely result in further discrimination against developing state non-members which may be held to higher levels of compliance with the RFMO regime than the members themselves.

2.2 What is being allocated?

The next set of principles relates to the question of what is being allocated. International law does not currently recognise any property rights in high seas fisheries. In other words, no one owns the fish.¹¹⁷ RFMOs can therefore not allocate fish. They can, however, allocate fishing opportunities as between their members. This is recognized in Article 10 of the FSA which refers to participatory rights such as allocations of allowable catch or levels of fishing effort. Nevertheless, as all states have the freedom to fish on the high seas, any participatory rights allocated by an RFMO will only ever be relative at best, and hence, imperfect.

RFMO members may distribute these imperfect rights among their nationals as, for example, in the provision of individual quotas, the sum total of which do not exceed the internationally agreed national allocation. Member states operating in this manner are responsible for their nationals and, to that end, must ensure, through adequate compliance and enforcement mechanisms, that the overall national allocation is not exceeded. If it is, the member state will be internationally responsible to other RFMO members for its breach of its allocation. The consequences of such a breach are, however, unclear. Acts of retorsion¹¹⁸ or countermeasures¹¹⁹ may be adopted by other individual members of the RFMO. Alternately, the RFMO may take steps against recalcitrant members. Traditionally, these steps have involved the development of reporting procedures aimed at 'naming and shaming' in compliance committees or similar RFMO bodies. A more interesting concept has been adopted in the International Commission on the Conservation of Atlantic Tunas (ICCAT) by which overages in one year must be deducted from allocated amounts in future years. More recently, ICCAT has gone further and drastically reduced the Taiwanese allocation in response to Taiwan Province of China's continued involvement in IUU fishing.

RFMO members may wish to transfer all or part of their national allocation to other members. Although an imperfect right, this right can be transferred to other

¹¹⁵ CCSBT. Report of the Extended Commission for the Twelfth Annual Meeting of the Commission, Report of the Twelfth Annual Meeting of the Commission, 15 October 2005, paras. 72-74.

¹¹⁶ Ibid. p466.

¹¹⁷ This is subject to the exception of coastal state interests in anadromous stocks, catadromous species and sedentary species on the extended continental shelf as per LOSC Arts 66-68.

¹¹⁸ These are acts that although perfectly lawful are regarded as 'unfriendly'.

¹¹⁹ Countermeasures are unlawful acts the unlawfulness of which is excused because they are taken in response to a prior unlawful act and meet certain criteria relating to proportionality, necessity and temporal limitations. See R. Rayfuse. 2004. "Countermeasures in High Seas Fisheries". *Netherlands International Law Review* 51(2):41-76.

members by agreement if the RFMO regime allows or does not otherwise prohibit it. Where allocation is transferred the receiving member state will become responsible internationally for adherence to it. However, where effort – as opposed to allocation – is transferred, as through the chartering out of vessels flagged in one member state to another member state the attribution of responsibility becomes less clear. While the flag state will *prima facie* be responsible under the principle of exclusive flag state jurisdiction, the chartering state may also be responsible as a member of the RFMO and questions of joint and several responsibility will arise. Moreover, questions may arise as to whose allocation the vessel is fishing against. ICCAT regulates chartering arrangements for its members pursuant to Recommendation 02-21 on Vessel Chartering. Vessels may only be chartered from other ICCAT members or cooperating non-members and both states are responsible to ensure compliance by the vessel with ICCAT measures. Both states are obliged to record the catch and to do so separately from catches taken by other vessels. However, catches taken count against the allocation of the member who charters the vessel. Similarly, Article 15 of the NAFO¹²⁰ Conservation and Enforcement Measures dealing with chartering arrangements allows charters as between NAFO members with the flag state being responsible to ensure compliance with NAFO measures and the chartering member, which is the member state to whom the allocation was originally made, being responsible for compliance with its own allocation limits.

RFMO members may also wish to transfer all or part of their allocation to non-members. Such transfers may serve three purposes: (1) they may act as an incentive for procuring non-member membership in the RFMO; (2) they may be used to allow new entrants to establish a fishing history to allow them to meet membership criteria; and (3) they may provide a revenue source for the transferring state. Referred to as ‘quota trading’ in the CCSBT, in 2003 the Republic of Korea proposed to sell its national quota to non-member South Africa which had been refused an allocation by the Commission in return for membership. However, the suggestion that a state should have to purchase an imperfect right to fish for a species on the high seas flies in the face of the traditional rules of freedom of fishing, and even more so where that state is a coastal state through whose waters the species passes and which has the right to fish for that species within its exclusive economic zone in any event. Nevertheless, it is always open to states to agree to fetters on their sovereign rights, including the freedom of fishing on the high seas. In doing so, however, the issue becomes one of enforcement and responsibility for breaches by the non-member state of the purchased allocation. By virtue of the *pacta tertiis* rule the RFMO cannot enforce against the non-member (unless that non-member is a party to the FSA). Thus, by effecting transfers of this sort the member state may be open to the charge that it is undermining the RFMO regime contrary to the basic principles of good faith.

2.3 When to allocate?

The third set of principles relates to the question of when RFMOs should engage in an allocation exercise. Traditionally RFMOs have only sought to regulate allocation of stocks or species once decline in biomass has been noted, in other words, once overfishing has already occurred. Allocation exercises then become a race to the bottom with member states reluctant to accept any lower than their historically highest catch as their allocation, even despite sound scientific advice that such allocations will drive the stock or species concerned into commercial or biological extinction. Perceived or genuine lack of scientific knowledge, ponderous decision-making processes, and

¹²⁰ Northwest Atlantic Fisheries Organization.

objection procedures¹²¹ often render nugatory regulatory efforts to reach scientifically meaningful allocation decisions. Moreover, many stocks and species currently subject to exploitation are not regulated in any way and these are the fisheries into which new entrants are often pushed.

Arguably allocations should be set on any fishery from its inception. This strategy is followed in the Commission on Conservation of Antarctic Marine Living Resources (CCAMLR) which sets precautionary catch limits on all new and exploratory fisheries in the Convention area. This is not to suggest that the limits set are necessarily biologically astute. However, catch limits can be amended over time as more data on stock status becomes available. In this respect it is worth noting that initial limits should be, but often are not, set at both a precautionary and conservative level, as once a fishery is established reducing allocations is notoriously difficult. To give but one example, despite accepted scientific advice of the need to reduce allocations in the CCSBT members have consistently deferred taking and actioning the hard decision which, in 2005 was put off yet again until 2007. In short, as the human propensity is to overexploit and protect their right to do so, allocations should be set, and be set carefully, from the start of, and in respect of all fisheries.

2.4 Why allocate?

The purpose of allocating high seas fishing opportunities is simple; to avoid overfishing and the inevitable tragedy of the commons that comes from overexploitation of an open access resource. As Molenaar notes, this is one of the core objectives and principle functions of an RFMO.¹²² As a matter of basic treaty law, RFMOs play this role in respect of their members only. Increasingly, however, RFMOs have been institutionalized as custodians of the resources under their mandate for the entire international community with all states being required either to comply with the measures adopted by RFMOs or refrain from fishing.¹²³ The role of RFMOs should therefore now be to ensure that as an open access resource, the resource continues in a long-term and sustainable manner to be available to all states on an equitable and non-discriminatory basis.

2.5 Where to allocate?

An important, and controversial, set of principles relate to the area over which RFMOs may exercise their allocational jurisdiction, or the issue of where allocations are to be made. The difficulty here arises from the conflict of interests between coastal states and high seas fishing states over straddling and highly migratory fish stocks, most famously highlighted by the Canadian arrest of the Spanish vessel the *Estai* in 1995 when Canada alleged that the high seas fishing activities of the *Estai* were undermining its own fisheries within its EEZ. While coastal states may, and do, arrest vessels for illegally fishing within their EEZ, as in Australian and French arrests of foreign flagged vessels fishing for Patagonian toothfish within their waters, the international community has been less than enthusiastic about following Canada's example.

The crux of the matter lies in the possible differences between the management regimes. A coastal state may strictly regulate access to a stock. However, its conservatory actions may be nullified by un-, or insufficiently, regulated fishing for the same stock in the high seas part of its range. This seems to have been at the heart of the dispute between Chile and the EU over swordfish fishing in the Eastern Pacific

¹²¹ T. McDorman.2005. "Decision Making Processes in RFMOs". *International Journal of Marine and Coastal Law*. 20(3-4).

¹²² Molenaar, *supra* note 17 p466.

¹²³ FSA Art 8.

Ocean.¹²⁴ Alternately, an RFMO may strictly regulate access to a stock but a coastal state in whose waters the stock is also found may not. In a strange turn of events at NAFO, it will be recalled that while the NAFO moratorium on high seas fishing for cod was in place Canada reopened its domestic cod fishery, thereby raising the ire of its NAFO partners.¹²⁵ Admittedly the opening was short-lived. After four years it was obvious that there were simply no cod to be had and the fishery was closed permanently. Coastal states seeking membership in RFMOs who have been denied allocations may similarly engage in heavy exploitation of a stock while it is within their EEZ thereby undermining the RFMO regime and possibly creating a situation of overexploitation. South Africa has repeatedly expressed its desire to join the CCSBT but to do so in return for an allocation of the overall SBT catch. The Commission has repeatedly refused to give South Africa an allocation. South Africa can, of course, fish for SBT within its own EEZ without any allocation from the Commission - a situation of no benefit to the stock (or the Commission).

One view, traditionally held by high seas fishing nations has been that RFMOs should have the power to regulate, and allocate, in respect of a stock throughout its range. The contrary view, held by coastal states is that coastal states should have that power. Chile's claim to a Presential Sea¹²⁶ and the Canadian concept of 'custodial management' of the straddling stocks on the high seas portion of the Grand Banks¹²⁷ are two manifestations of this view. However, article 7 of the FSA establishes the principle of compatibility whereby neither group of states takes precedence. Rather, measures established by RFMOs for the high seas and by coastal states for within their EEZs are to be compatible. Unfortunately, although article 7 does list a number of factors that are to be taken into account in determining compatibility, no guidance exists on precisely whose measures are to be compatible with whose.¹²⁸ Resolution of the issue of compatibility is left to be dealt with by the dispute settlement provisions of the FSA an approach which has not yet been tested. In any event, it is clear that while RFMOs may consider coastal state catches when reaching decision on allocation, they cannot, without the agreement of the relevant state, fetter coastal states' sovereign rights to exploit the living resources within their EEZs.

2.6 How to allocate?

A final set of principles relate to the question of how, or in what manner, RFMOs should allocate fishing opportunities. Neither the LOSC nor the FSA provide any specific principle to guide allocation processes. Rather, the FSA merely calls upon members of RFMOs "to agree, as appropriate, on participatory rights such as allocations of allowable catch or level of fishing effort".¹²⁹ The FSA does set out a number of criteria that are relevant to the allocation issue although no indication is given of the relative weight of these criteria. Nevertheless, these criteria reflect a number of underlying legal principles including the precautionary principle, the ecosystem approach, the principles of non-discrimination and fairness, and the principle of recognition of the

¹²⁴ See M. A. Orellana. 2002. "The Swordfish Dispute between the EU and Chile at the ITLOS and the WTO". *Nordic Journal of International Law*. 71:55-81.

¹²⁵ R. Rayfuse. 2003. "Canada and Regional Fisheries Organisation: Implementing the UN Fish Stocks Agreement". *Ocean Development and International Law*.34:216.

¹²⁶ F. O. Vicuña. 1992. "'The Presential Sea': Defining Coastal States' Special Interests in High Seas Fisheries and Other Activities". *German Yearbook of International Law*. 35:264-331.

¹²⁷ Canada, Department of Fisheries and Oceans Canada, Report of the Roundtable on Improving the Management of Straddling Fish Stocks, 11 April 2003, available at http://www.dfo-mpo.gc.ca/media/backgrou/2003/hq-ac18a_e.htm.

¹²⁸ A. O. Elferink. 2001. "The Determination of Compatible Conservation and Management Measures for Straddling and Highly Migratory Fish Stocks". *Max Plank Yearbook of United Nations Law*. 5:551-607.

¹²⁹ FSA Art 10(b).

special requirements of developing states.

While argument persists over whether the precautionary principle is a principle or an approach, the precautionary approach is one of the 'general principles' enunciated in article 5 of the FSA. The details of the application of the precautionary approach is set out in article 6 which, at the risk of oversimplification, requires RFMOs to be more careful or cautious in their allocation decisions where information is uncertain, unreliable or inadequate. A number of RFMOs have been working to introduce the concept of precaution into their management decisions. However, particularly where considerable IUU fishing activity is occurring, this may require RFMOs to revisit and revise downward existing allocations. As experience in the CCSBT and other RFMOs has demonstrated, however, members are extremely loathe to reduce their allocations, even in the face of conclusive scientific evidence of the need to do so.

Article 5 of the FSA also requires the adoption of an ecosystem approach which protects not only the targeted stocks, but non-target associated and dependent species as well as the biodiversity of the marine environment as a whole. However, as experience in CCAMLR has shown, implementing an ecosystem approach is a difficult and complex matter. Moreover, in implementing an ecosystem approach RFMOs may again need either to revise downward allocations of targeted stocks or otherwise restrict the manner in which fishing activities are carried out.

The fundamental principles of non-discrimination and fairness also apply in the allocation context, although their successful implementation may be far from assured. In the quest for compatibility or high seas and EEZ measures, Article 7(2)(d) of the FSA requires states to consider the biological unity and other biological characteristics of stocks and the relationships between the distribution of the stocks, the fisheries and the geographical particularities of the region concerned including the extent to which the stocks occur and are fished in areas under national jurisdiction. Sub-paragraph (e) requires states to take into account the dependence of coastal states and high seas fishing states on the stocks concerned. Allocations which fail to consider any of these aspects will result in unfairness either to the coastal or the fishing states which in turn will be evidence of discrimination against one or the other.

The FSA is particularly concerned with how RFMOs should allocate participatory rights to new members. Article 11 sets out a non-exhaustive list of criteria to be considered including: the status of stocks and level of current fishing effort; the respective interests, fishing patterns and fishing practices of new and existing members; the respective contribution of new and existing members to the collection and provision of data and conduct of scientific research on the stocks; the needs of coastal communities which are dependant mainly on fishing for the stocks; the needs of coastal states whose economies are overwhelmingly dependent on the exploitation of living marine resources; and the interests of developing states in the region in whose areas of national jurisdiction the stocks also occur. Nevertheless, even a cursory glance at these criteria seems to indicate that they are weighted in favour of existing fishing effort and existing compliance with RFMO regimes to which states may not even be party. Moreover, as Molenaar notes, these criteria relate not only to situations where fishing opportunities are to be allocated but may also encompass situations where no allocations are made at all.¹³⁰ In this case there will be little incentive for new entrants to join RFMOs. Thus, these criteria neither necessarily discourage unregulated fishing, nor compel fairness and non-discrimination in the allocation of fishing opportunities.

This may be somewhat ameliorated in the case of developing states by the operation of articles 24 and 25 of the FSA which call for recognition of the special requirements of developing states and set out the forms of cooperation by which assistance to meet those special requirements is to be provided. However, while FSA parties are to assist

¹³⁰ Molenaar, supra note 17, p468.

developing states to develop their own fisheries for straddling and highly migratory fish stocks, to enable them to participate in high seas fisheries, and to facilitate their participation in RFMOs, cooperation for these purposes is to take the form of financial assistance, human resources development, technical assistance, transfer of technology through joint venture arrangements, and advisory and consultative services. Nothing in the FSA gives developing states a prima facie right to an allocation of high seas fishing opportunities. Yet it will be recalled that all states have the right for their vessels to fish on the high seas.

In an undersubscribed or unregulated fishery new entrant developing states will likely have little difficulty obtaining an allocation. However, in many RFMOs the most lucrative fisheries are already fully or over-subscribed. Thus, the only way developing states or other new entrants might receive an allocation is if existing members of an RFMO either willingly reduce their own allocations, a level of altruism not yet evidenced by members of RFMOs, or agree to possibly unsustainable capacity increases. One alternative, which has been adopted in NAFO, is to provide new entrants with allocations in respect of new and unallocated fisheries only.¹³¹ Other RFMOs provide allocations to new entrants from ‘others quotas’ or that portion of the allocation that is set aside to account for fishing by cooperating non-members. Another approach is found in the Fleet Capacity Resolution¹³² adopted by the Inter-American Tropical Tuna Commission (IATTC) which only allows for allocation of fishing opportunities to new entrants where they make arrangements to replace a vessel already listed on the IATTC Vessel Register. The overall effect of all this is, however, that neither articles 24 and 25, nor these allocation approaches, necessarily discourage unregulated fishing or encourage developing countries to join RFMOs. Instead, they lead to the perception that the ‘haves’ will continue to have (albeit it often in continually decreasing amounts) and the ‘have nots’ will continue to be left to settle for the leftovers.¹³³

Of course the issues of allocation criteria and new entrants are not co-extensive. Allocating fishing opportunities as between members is an important – and almost always contentious – aspect of RFMO activity. Despite continuing scientific advice of the need to limit catches of bigeye tuna, the IOTC has not yet been able to adopt any system of allocation of fishing effort. Rather it has merely called on members to limit their catches to “recent level of catch reported by the Scientific Committee” and has determined that at its next meeting in 2006 it will establish interim catch levels for cooperating non-members.¹³⁴ The IATTC has taken a different approach by attempting to limit fleet capacity.¹³⁵

Some RFMOs are now moving to adopt detailed allocation criteria. The ICCAT Criteria for the Allocation of Fishing Possibilities,¹³⁶ adopted in 2001, are the most comprehensive example to date and apply to all stocks when allocated by ICCAT. Included are criteria relating to: past/present fishing activity; the status of the stocks; the status of the qualifying participant states; and the record of compliance or cooperation by participant states. Also included is a list of nine conditions for applying the criteria including the requirement that they be applied in a fair and equitable manner with the goal of ensuring opportunities for all qualifying participants and that they should be applied in a manner that encourages cooperating non-members to become members where they are eligible to do so. Interestingly, however, no qualifying participant

¹³¹ NAFO Resolution to Guide the Expectations of Future New Members with Regard to Fishing Opportunities within the NAFO Regulatory Area, supra note 20.

¹³² Resolution on Capacity of the Tuna Fleet Operating in the Eastern Pacific Ocean, June 2002.

¹³³ R. Rayfuse. 2004. “The Challenge of Sustainable Fisheries” in Nico Schrijver and Friedl Weiss (eds) *International Law and Sustainable Development, Principles and Practice* (Brill). p487.

¹³⁴ IOTC Resolution 05/01 on Conservation and Management Measures for Bigeye Tuna.

¹³⁵ IATTC Resolution on Fleet Capacity of the Tuna Fleet Operating in the Eastern Pacific Ocean, June 2002.

¹³⁶ ICCAT Recommendation 01-25.

shall trade or sell its quota allocation or any part thereof. The approach proposed by Republic of Korea in the CCSBT would not work in ICCAT. After a rather rocky start to its implementation, which resulted in the Commission failing to reach agreement on any allocations in 2001, the allocation process appears to have improved to the point that in 2005 Taiwan Province of China's allocation was significantly reduced due to its continuing failure to comply with Commission measures and its involvement in IUU fishing, both conditions to be considered in applying the allocation criteria.

In contrast, the NAFO Draft Guidelines for the future allocation of fishing opportunities for the stocks not currently allocated¹³⁷ set out four criteria only: historical fishing in accordance with NAFO rules during a representative reference period; contribution to research and data collection on the stock concerned; needs of coastal communities which are dependent on fishing for the stocks concerned; and/or contribution to the NAFO Conservation and Enforcement Measures. Disputes over allocation in NAFO are legend and it is not clear how these criteria will assist in resolving them, or the problem of unregulated fishing in general. Similarly, while the CCAMLR approach of 'olympic' style fisheries overcomes the problem of disputes over allocations between members it does not entirely, at least in the absence of an effective enforcement regime, resolve the problem of IUU fishing.

3. RECONCEPTUALIZING THE LEGAL PRINCIPLES RELEVANT TO REGIONAL ALLOCATION ISSUES

The challenge of allocation has elsewhere been stated to be to ensure that "each and every participant anticipates receiving long-term benefits from the cooperatively managed fishery that are at least equal to the long-term benefits it would expect to receive in the absence of collaboration".¹³⁸ The question is what legal principles might better assist RFMOs to meet this goal?

First, the principle of freedom of fishing could be retired from the pantheon of fundamental principles. Indeed, the continued articulation of the principle is both inaccurate and misleading, if not downright disingenuous. As noted above, the 'freedom' has long been subject to a developing range of limitations and exceptions including the obligation to cooperate in respect of the conservation and management of high seas fish stocks, through the establishment, where appropriate, of RFMOs. The corollary of this is that where a state fails in its duty to cooperate it forfeits the right for its nationals to participate in the 'freedom' of fishing. While the content of the obligation to cooperate is still developing it arguably now involves, at a minimum, the obligation to either agree to abide by the measures adopted by RFMOs or refrain from fishing. States who authorise or otherwise permit their vessels to fish in contravention of RFMO measures, or who fail to restrain their vessels from engaging in IUU fishing, or to take effective action against any of their vessels that have engaged in IUU fishing are in breach of their duty and forfeit the right for their nationals to fish. Other states may then take countermeasures against the breaching state which might even include the arrest of the vessels concerned.

Next, the principle of exclusivity of flag state jurisdiction could also be retired. Like the freedom of fishing, flag state jurisdiction is not, in fact, exclusive. Rather, it is only primary, and is conditioned by reference to a number of exceptions. Where a flag state fails to meet its responsibilities a secondary jurisdiction over its vessels may be vested in non-flag states¹³⁹ which might then take enforcement action against recalcitrant vessels. Moreover, the principle of flag state jurisdiction itself could be rejected or

¹³⁷ NAFO: Meeting Proceedings of the General Council and the Fisheries Commission for 2002/2003, Annex 11 at 172-173.

¹³⁸ FAO. 2002. Report of the Norway-FAO Expert Consultation on the Management of Shared Fish Stocks, FAO Fisheries Report No. 695. Rome, FAO. p8.

¹³⁹ For a comprehensive analysis of this issue see Rayfuse, *supra* note 9.

modified with the power to flag residing in the RFMO. A less drastic approach would be to require ‘dual-flagging’ on high seas fishing vessels. In either case, only vessels authorized by the RFMO and flying its flag would be entitled to engage in a high seas fishery. All other vessels would be *prima facie* IUU vessels and subject to arrest or other measures either by the enforcement services of the RFMO or by any other state.

Next, the institutionalization of RFMOs could be further strengthened by acceptance that RFMOs act as the custodians of all high seas fisheries on behalf of the international community as a whole. To that end RFMOs could be given the power not only of binding regulation and allocation in consultation with coastal states in whose waters the relevant stocks are also found, but could also possess the machinery necessary to enforce that regulation. A fair, equitable, and non-discriminatory allocation strategy along these lines might then involve an RFMO setting overall catch limits for species and auctioning off quotas to commercial operators – as opposed to states. The proceeds of the auction would then go to fund the operation of the RFMO, its scientific research and its enforcement services which could also be utilized by coastal states seeking to ensure that high seas operators are not operating illegally in their waters. In other words, the solution to both the allocation and IUU fishing issues might lie in the development of individual property rights in high seas fisheries which are allocated, overseen and enforced by RFMOs.

4. CONCLUSION

It is acknowledged that the above suggestions are controversial and not fully developed. However, it is often said that the question of allocation cannot be dealt with until the issue of IUU fishing is resolved. Yet, perhaps what is needed is a reconceptualization of the problem. In other words, perhaps the solution to IUU fishing lies in finding a new legal paradigm in which ‘allocation’ takes place. Radical, lateral and controversial thinking may be what is needed to awake in our minds a “consciousness that is attuned to the pulsation of Reality”. A metaphorical Zen-like ‘slap in the face’ may be what is needed to hasten the attainment of enlightenment in the context of regional allocation issues.

Allocation issues in fisheries management

Dr Wendy Craik

Chief Executive

Murray-Darling Basin Commission

Australia

Thanks very much, Peter, I'm gathering it's Peter from your voice, and thank you for the welcome. Firstly, my apologies that I can't be with you today, I was actually really looking forward to catching up with my fisheries colleagues, and the program that you've managed to put together looks really interesting, so I really apologize that I can't be there in person, but last week I was struck down by a virus, and I thought it was probably important to actually try to get rid of it, so I hope this presentation works¹⁴⁰ with the slides being controlled by someone over there and I just provide the voice-over.

Now, when Peter first asked me to talk, he reflected on the fact that I'd worked in both fisheries and water, and asked me to make some remarks on sharing publicly-owned resources from my experience in both those areas. I'd just have to say, my experience in the water area is a bit less than my experience in fisheries, but it's certainly been a steep learning curve in the last 18 months or so.

1. INTRODUCTION

So, if we can move on from the first slide on to – which I assume is on the screen now – on to the second slide, “Sharing the Resource”, I thought it was worth starting with this quote which is attributed to Winston Churchill, which indicates that in the very early days of water management, there were some very interesting views in place:

“...every last drop of water which drains into the whole valley of the Nile shall be equally and amicably divided among the river people, and the Nile itself shall perish gloriously and never reach the sea”.

It's pretty clear looking at this quote from Churchill that he didn't think much of freshwater environments, or freshwater fish, or anything about the fish that had to move up or down stream, or prawns to breed. But, in a sense, I suppose, it shows that the early views of water were nearly as optimistic as the early views of fish.

If we can move on to the next slide, I found a quote from T. H. Huxley¹⁴¹ which really suggests that fisheries management was a waste of time:

“I believe, then, that the cod fishery, the herring fishery, the pilchard fishery, the mackerel fishery, and probably all the great sea fisheries, are inexhaustible; that is to say, that nothing we do seriously affects the number of the fish. And any attempt to regulate these fisheries seems consequently, from the nature of the case, to be useless.”

Now, I suppose there are some who still agree with that quote – the fact that it's a waste of time – but I think in the last hundred years in both the areas of fisheries and water we've certainly made significant progress. I think we'd all agree – those of us

¹⁴⁰ Presentation can be found at: <http://www.fishallocation.com/>.

¹⁴¹ T. H. Huxley. International Fisheries Exhibition. 1883.

who have been involved in the management of fisheries and water – that that progress has not been without some stumbling along the way.

If we could go to the next slide, headed “Publicly owned resources”, I’m not going to give you a long talk about the tragedy of the commons, but I guess that’s the underlying issue that we’re dealing with in terms of managing publicly-owned resources, when no one actually owns the fish, and no one has the responsibility to look after it. And because they’re large and sometimes fall into finite resources, and monitoring the impacts on them is costly and difficult, our responsiveness perhaps is not what it should be. And certainly, I think we’re generally slow to act, and I think history has shown us that we’re generally slow to react even when a problem is first perceived.

If we can move on to the next slide, headed “Fish and water”. As I mentioned, I’m going to compare fish and water today, but I’m actually going to do that using specific examples: the first one being in terms of fisheries, Commonwealth fisheries; and; in terms of water, the Murray-Darling Basin Commission approach to water. I’ve limited it to those two, simply because I know most about them, and I’m certain there will be differences in other fisheries and other water environments. But I think they really illustrate the main points that I want to make well enough. I want to cover today the evolution of management, the features of management, parallels and differences, and try to suggest what we might have learned, and make some remarks about the future.

2. FISHERIES

We move on to “Fisheries”. Much of what I say now will be familiar to many of you, and a quick run-through of pre-1991 Commonwealth fisheries management, and this came from the DAFF¹⁴² website, so it’s not my view of history. There was a ‘command and control’ approach to Commonwealth fisheries management, the Australian Fisheries Service was located in the Federal Department of Primary Industries; there was little consultation with the industry or with other players, like NGOs. Fisheries management was based on some conservation input controls, and I think everyone would agree there was excess capacity, there was full exploitation of fisheries or overexploitation in many fisheries, and as a result, poor economic performance. And in 1988, the brave new world came into being, with the *New Directions* policy statement.

Now, after 1991, the institutions that shape Commonwealth fisheries management: you obviously had the Offshore Constitutional Settlement that had been negotiated over a number of years, and distinguished Commonwealth and state fisheries, although there are still some areas unresolved many years later, and some areas, I guess, that people would wish had been resolved in different ways. You have the federal department, the Department of Primary Industry, the federal portfolio department determining policy; you have the Australian Fisheries Management Authority (AFMA) responsible for implementing management; the Fisheries Research and Development Corporation (FRDC), responsible for a large part of fisheries research and development in Commonwealth fisheries; and, in more recent times, you have the Federal Department of Environment and non-government conservation bodies involved as well, in management of these fisheries. The objectives of fisheries management: ecological sustainability and economic efficiency.

Now, in fisheries management, there are fisheries management plans in place, statutory fishing rights are or will be in place in all Commonwealth fisheries, total allowable catches are set in each fishery, generally for a single species, and they’re set on an annual basis; you have management and budget committees in place in each fishery, and they’re comprised of government, industry, and environmental people, and AFMA

¹⁴² Department of Agriculture, Fisheries and Forestry, Government of Australia.

has a statutory authority, a board which has government, industry, science, and various other people that reports to the federal minister of fisheries, who I believe, is, or has been, with you today.

Each fishery management plan has an objective and covers things like areas, gears and timing. As I mentioned, the total allowable catch generally is set on an annual basis for each species, and based on catch history, stock status, stock interactions and market factors. All the things you'd expect, and anything else that's relevant. And in the setting of these total allowable catch each year, scientists are involved, fishers are involved, there are conservation groups involved, management advisory committees have a major role in the setting of those total allowable catches.

Moving on to the next slide, number 11 "Fisheries: management". There are statutory access entitlements, as I've mentioned, and they provide each owner with a share, a predetermined share, of whatever the total allowable catch is, so, while the share doesn't change, the annual number of kilos that's in that share may well change. The entitlements are tradable within the fishery; there are limited carryover arrangements in place; and as well, of course, there are bycatch arrangements in place for fisheries, which is all about dealing with the impact of the fisheries on the environment, beyond the target stocks – that'll deal with things like gear and timing.

Moving on to the next slide, which is headed, "Fisheries: issues". These are the issues, as I understand it, that fisheries, Commonwealth fisheries, are facing today, and these aren't either unique to Commonwealth fisheries, or they're not unique to the current time. The increasing efficiency of users, of fishers, is obviously an issue that is a challenge how to deal with in any kind of a reasonable way. Overfishing of stocks, a recent Bureau of Rural Sciences (BRS) report that suggested 29 stocks were overfished or fully exploited, but I should point out, that the northern prawn fishery, the brown tiger prawn, has improved its status from being overfished, which is great news.

The cost of management and monitoring sometimes exceeds the gross value of production of a fishery and, of course, one of the difficulties is, you're out at sea, and as everybody knows, the cost of being out at sea go up in getting independently verified data, always costly. Illegal fishing in the Australian fishing zone is a real issue for this country. I read that 39 vessels have been seized in the northern area this year, and of course there's the overfishing, or the illegal fishing, sorry, in the Antarctic, and how we can deal with that in a complete way is a real challenge. Now, how the strategy frameworks have been put in a place, as a couple fisheries have had them in, but this is all about having agreed targets and limit reference points and agreed decision rules, and all fisheries will have this by 2008, or at least a proposal.

And, of course, recently, last year, the federal minister of fisheries at the time amassed a \$220 million dollar adjustment program, about two-thirds the annual value of the gross total production of the fishery. So, notwithstanding the fishery management arrangements that are in place, the minister commented that we had too many boats chasing too few fish in our fisheries. Now, these adjustment plans were accompanied by significant reductions in the total allowable catch, so, even though we have all these management arrangements in place, we still find the need for adjustment packages.

3. WATER

Moving on to the next slide, which is headed, "Water", and then the next slide giving you a comparison between fisheries and water.

Before 1992, and obviously after, it's really important to understand the role of the Constitution, Clause 100 of the Constitution in relation to water management in this country. And Clause 100 says that the Commonwealth shall not, by any law or regulation of trade or commerce, abridge the right of the state or of the residence they're in to the reasonable use of the river for conservation or irrigation. In other words,

water is the responsibility of the states, and that the only way that the Commonwealth can influence that is generally by funding.

Now in 1915, you wouldn't quite be right about here, but you're close. The first idea for some kind of agreement came into being in 1893, so it actually took 22 years to actually come to fruition in the River Murray Water Agreement, in 1915, signed by those four jurisdictions. In it, it had some major provisions. It had some agreed water-sharing principles, where, under which the upper states, Victoria and New South Wales, agreed to share the water equally at Albury - all water above Albury they share equally - and South Australia gets a predetermined share every year. There's an agreed minimum monthly share, and an agreed annual share that South Australia gets, and all the rest of the water is generally available for the taking or not, and goes down the river.

So, as well as water-sharing principles, there was agreement about infrastructure – so, building dams and locks and gears, the focus was very much on the river itself, not the surrounds, but the river itself and the water in the river. In 1987, after being in place for a fair period of the time, amendments were made to the agreement which really broadened the coverage of the agreement to include more about the basin and impacts on shared water resources.

Next slide, please: “Water: history post-1992”. The 1992 Murray-Darling Basin Agreement was signed, which actually reflected the 1987 agreements, was still very River Murray water focused with broader based add-ons. It's worth pointing out that the agreement is reflected in the legislation of each participating jurisdiction in the commission, so that when you have things going through numbers of parliaments, it takes a while to get changes in place. Now the original water sharing rules were agreed, and the objective of the agreement is to promote and coordinate planning and management of equitable and sustainable use of land, water, and other resources. By 1998, Queensland and the ACT had also signed, so all the jurisdictions that could have an interest in the Commission are now signed up to the agreement.

Next slide, please, headed “Water: management” listing the institutions that determine water management within the Murray-Darling basin. Firstly, you've got the Constitution. Then you've got the Murray-Darling Basin Agreement that determines what the Murray-Darling Basin Commission does in terms of provision of water to the states: they give shares of water to the states, notify the states when shares of water are available, and it's the states that make the allocations to the irrigation organizations or irrigators, or irrigation organizations do it then to irrigators.

Of course in more recent times, we've had the COAG water reform agenda, the National Competition Policy (brought in 1994), and the National Water Initiative agreed in 2004. Both of those are really about having a more efficient and effective and environmentally sustainable water industry in this country.

Next slide, please. Just to give you an idea of the nature of the sort of complexity that we're dealing with in this single basin. Now, I know it's a large basin, but it's still a single basin. At the top of the next slide (headed “State management”), you can see that the top lines give you the nature of the water organizations in each of the main jurisdictions. From there you go from statutory authorities to private irrigation companies, to trusts, to government owned corporations.

So, you can see there's a real difference. In some cases you get individual irrigated water rights; elsewhere, the irrigated shareholders of the companies don't actually get the entitlement like a statutory right, but they get a share in the company which, of course, then relates to their water rights, but it's a slightly different instrument. So there is a lot of variation. Of course, most of the states are going through legislative change because of the National Water Initiative, and most of them – all of them – have some kind of regional plan or are putting regional water plans in place.

3.1 Water management

Next slide, please, headed “Water: management”. How is the water actually managed? Well, you have the water sharing principles that are managed, and in 1995, a major initiative was the cap on surface, on valley surface water diversions - in other words, on how much water is taken out of the river.

The cap puts a maximum limit that applies in perpetuity on diversions, and that maximum limit is set at 1993-1994 levels of development of that valley. And those caps are put on the Kiewa River Valley. Queensland and ACT have yet to determine their caps. The cap is climate adjusted each year. It relates only to river water (and that’s important to know - it doesn’t relate to ground water or what’s in farm dams, generally). It’s also independently ordered each year. And at the time it was put in place it was not determined whether the levels of diversions, those cap levels, are actually environmentally sustainable.

Moving on to the next slide, also headed “Water: management”. We have the annually agreed share provided to the states under the water-sharing principles. Now, the states get a sort of progressive advice as to what water is going to be available as more water becomes available in dams, and we, the Commission, advise states as to the availability of water, and that depends to an extent on rainfall and outlook.

In the states, the allocations to irrigators, again, depend, of course, on what’s available - rain fall and outlook - and it’s all limited by the cap. Again, these allocations to irrigators and how much irrigators actually get are limited by the kind of entitlement that they hold. Because whereas there might be one kind of statutory entitlement in fisheries, each state generally has different kinds of entitlements: in New South Wales you have high security entitlements and you have general security entitlements; in Victoria you have high security and sales water; and in South Australia you have high security, and within those, you have a range different products depending on which river you’re in and things. So, the kind of entitlement you have depends on the amount of water you’re going to get at any one time, but it’s always within the cap. And of course in recent years with the drought, the amount, the volume that the irrigators have been getting has been low. For instance, New South Wales general security irrigators have had some of their lowest allocations in 100 years of record.

Moving on, next slide, headed “Water: management”, the statutory property rights that are being legislated in each state – as I mentioned, there’s a range of products given the nature of the entitlement, - relate to a share of the state’s allocation in some way, or the shareholder in the company, but again it varies a bit with the states and this is a generalization. Nonetheless, they’re river valley dependent.

One of the processes that has to be gone through at the moment is separating the water rights from the land, and one of the other issues that is also being resolved at the moment is one of the issues in relation to water trading use: a lot of water moves out of one area and ends up in another area for use, and, of course, most people are going to want that water at the same time, but the capacity of the river channel is limited. During the very hot weather at the beginning of this year, we had some challenges and irrigators’ demands; we had some challenges in providing the volume of water that was required. There’s carryover for New South Wales general security, but no other kind of water entitlement that I’m aware of.

Tradability of water is a bit limited at the moment. Temporary trading, especially with in valleys, has been going on for some considerable time and now adds up to about 10% of total diversions. We had a pilot study going in the late 1990s looking at permanent water trading in high security entitlements below Swan Hill to the Murray Mouth, and of course, the National Water Initiative is focusing very much on broadening trading in permanent water entitlements. You will have seen a fair amount of press on that in recent days, as the date in the National Water Initiative has been

passed, but South Australia and Victoria have agreed to a deal at the moment, and we are busily negotiating arrangements for the basin, the Murray as a whole.

3.2 Water issues

Next slide, “Water issues”. Again, one of the issues is the Murray-Darling Basin Agreement, as I’ve mentioned, is that this is largely a river focused agreement about delivering water with some add-ons. Under the National Water Initiative it has to be amended to make consistent with the National Water Initiative, and probably to bring it up to being a contemporary planning document.

The water-sharing rules that are in the agreement were generally developed for irrigation and communities, and clearly there are some current challenges there that aren’t dealt with in the agreement on a long-term basis. One of those is the general capacity issue that I mentioned before, how do we actually deal with that -Who gets what share? Overallocation is an issue a bit like overfishing, and that’s what led to things like The Living Murray which is recovering 500 gigaliters of water for the Murray, for the environment, and the National Water Initiative.

Next slide, please, another one headed “Water issues”. There are still a lot of issues to sort out in water trade. This is not an easy one given the number of products, the number of states, and the number of areas, and different environments and given the issues that are still being resolved: the rules around temporary versus permanent trade; whether you use an exchange rate (it’s a bit like currency exchanges) and is that the sort of message you use? Or, do you, does the water entitlement retain the original attributes of its initial location and do those attributes stay with it wherever it ends up going (“tagging”)? There’s a bit of a debate on about an exchange rate basis or tagging. Obviously, to move water around because of things like salinity and water logging, environmental clearances are necessary before any trading takes place. Developing all those for the appropriate areas is important, and a bit like when fisheries shut down, all the efforts that have been developed up around that fishery tend to be stranded. What do you do about them, if water moves out of a valley? You’ve got all the irrigation infrastructure, and who’s going to pay for its upkeep? All these issues are still being resolved.

Next slide. A major issue we’re starting to deal with now is what are the risks of the shared water resources? In other words, what’s going to affect the quality and quantity available in the future?

Clearly one distinct possibility is climate change, with the estimates being quite broad as to what impacts are likely on water availability – some go to 20% less in the next 20 years, the on average is available now. Groundwater extractions have increased in recent years - the number of bores has increased as has what’s been taken out of the ground, particularly with the imposition of the cap and the drought in recent years. And there are those who say that a gigaliter of groundwater is equivalent to taking out a gigaliter of river water at some time over the next 50 to 100 years. Farm dams, and how much water is held in farm dams that doesn’t actually get into rivers is another issue, and I think the answer is that we don’t really have much of an idea.

In terms of bush fires, if the foliage, the vegetation burns down, the water yield generally increases to start because there’s nothing sucking up the water in the ground as it runs down the hill. But, over time, you may get a significant drop in water yields as the trees start growing back. And another one is that as irrigators become more efficient, this water sinks back into the ground and returns, or runs off, into the environment. So, while we’re encouraging efficiency, on the other hand, it may have what you might regard as a downside in terms of the spill going back into the environment.

Other major issues, again like fisheries, include the cost of monitoring and measurement, the cost and the precision in those areas: cost of monitoring is increasing,

and how do we do it in a cost-effective way; the difficulties of measurements (and some of them generally, historically haven't been as accurate as they might be); and, we're moving now to electronic measurement to get much greater precision.

3.3 Parallels and differences

Next slide, having done a quick canter through fisheries and water and how they're approached – their management is approached – what are the parallels and differences between the two? Well, the parallels as I see them, and that's the next slide, headed "Parallels: fish and water" are: firstly, that both of them have management plans in place, or being put in place; there are some kind of access or property rights in place, or being put in place; they generally relate in some way, direct or indirect, to shares of the resource available in any year; the entitlements are tradable to a certain extent; and, in some cases although you might question the sustainability of extraction, it's based on some information (but perhaps not on as good information as we would like).

Next slide, again more parallels. There are overallocated resources in both water and fish; both of them have associated strategies like the bycatch strategies in fisheries, and in water we have things like the salinity strategy, which is all about dealing with the salt and how we can deal with it as a result of irrigation largely mobilizing salt.

Both of them, both fish and water, have recovery programs in place. There's the adjustment package announced last year for Commonwealth fisheries, and things like The Living Murray recovering 500 gigaliters of environment is in place for the Murray-Darling Basin.

Monitoring and measurement: the cost of monitoring, as I mentioned, is high in both, and there is the issue of how do you do it cost-effectively. The precision of measurement, again, has its challenges in both areas. Increasing user efficiency, of course, is an issue in both resources, and finding ways to deal with it in a way that assists, is helpful for the industries themselves, is a challenge, but much more so in fisheries, in that if users become more efficient in irrigation, generally they expand their area under entitlement under irrigation.

On to the next slide, the differences between fish and water. I think the approach to the extraction limit is slightly different, I think diversions – water diversions – are generally, they're not at 1994 levels, or set at a point in time, then you have an annual level which is at that, or below that level. The TAC is really set annually, there's really no upper limit on it, and it's based on a range of factors. Now, the water diversions are based on a range of factors, too, but I think it's a slightly different approach. There's a total limit on extractions in water, which is the cap, whereas there is none in fisheries, there's no upward total allowable catch, other than what was set each year.

The nature of the entitlements: in water, I think the entitlements are more complex in the sense that you have a much greater variety of entitlements than you do in Commonwealth fisheries.

The kind, and level, of end user involvement, I think, is a bit different in both areas. In fisheries, you have the management advisory committees who are very involved in setting the total allowable catches, for instance, while in water, the end users are involved in developing water sharing plans, a bit like fisheries management plans. They're not involved, in any way, in setting the annual diversions and the annual allocations for water.

The complexity of entitlement differs a bit, and I mentioned that. I think conservation interests are generally a bit more active in or, historically have been more active in, fisheries than in water. I think we're stepping up the conservation interests in waters, these days, but I think the almost institutional involvement in fisheries isn't matched in water yet. I think the view of environment, I think fisheries now, at least their approach is almost entrenched in management arrangements. I think we're moving that way in water, but I think we've got a bit of a way to go.

I think, in terms of risk assignment in water, some of that is spelled out quite clearly in the National Water Initiative – who actually bears the cost if the government change a policy, who bears the cost if it's a national phenomenon – so those things are actually quite clearly spelled out. Whereas in fisheries, while you might get the end result being similar, it's not spelled out anywhere that I'm aware of in terms of policy.

4. WHAT HAVE WE LEARNED?

I think there's no doubt that we're overoptimistic managers for these natural resources. We tend to believe that if we take this action, it's going to work out. We do tend to overallocate our natural resources, and our history would underline that on the other side of the coin, we're not cautious enough. I think, though we're improving. And, I think often we don't have a very good understanding for the reasons for our resource variability or what the scope of it can be, or what the range of that variability can be.

Moving on to the next slide, more of what have we learned, well, clearly, we've managed on history, I think that's inevitable. I think water's a bit luckier, because I can see how much it's rained in any one year, and that helps determine allocations. That makes it a bit easier than fisheries. I think we have a good understanding of sustainable resource requirements: what's precisely required to sustain a fishery, and what's precisely required to sustain a river. I think there's plenty of scope for work there. Independent monitoring programs found necessary, but they're incredibly costly, and we really do need to find better ways to handle how we deal with that issue. And I think there's no doubt that statistically proving cause and effect is very difficult and often there's a reluctance to act, and this is understandable, too, until you can actually demonstrate that link – but the danger is that we keep monitoring precisely until we get irrevocable information or irrefutable information on usually, what turns out to be the decline of a particular resource, but it's very nicely measured.

Moving on to the next slide, "What have we learned". Now, this slide might be controversial, but I thought it was food for thought. This came from a Canadian paper¹⁴³ relating to Regional Fisheries Management Councils in the United States, which suggested that there are a lot of reasons for modern fisheries management failing, if you accept that it's failed. The author proffered up this reason, that "the most fundamental reason might be the overwhelming dominance of extractive interests in participatory decision-making venues", and I'm just putting it up as food for thought.

Moving on to the next slide, "What have we learned", I don't think we test our management assumptions often much before we implement them, we make an assumption that it's going to work, that it'll be better than the other management option in place, but often we don't monitor those assumptions very well. Inevitably, we have inertia in our institutional arrangements, and, again, understandably there's often political caution to act in any major way, because people's livelihoods are going to be affected, so that's not at all surprising.

Moving on to the next slides about "The future". We've got all those management challenges to deal with in the future, but I think the other challenge we're going to have to find a way to deal with is climate change, because inevitably that's going to affect not only water, but fisheries as well. We need to make sure that we have budgets that actually pick up the whole system. Fisheries is further along the way in dealing with that than water is, I think, in terms of taking a holistic approach. We don't include and we don't prepare water budgets with farm dams, ground water, all those sorts of things, and we don't have a good idea, say, of total water taken out of the system each year.

In terms of interactions between different fisheries, different fishes, and different parts of the environment, I think getting a handle on those is difficult both in fisheries

¹⁴³ Okey, T.A. 2002. Membership of the eight Regional Fishery Management Councils in the United States: are special interests over-represented? Fisheries Centre, University of British Columbia.

and in water. We're trying to look at the interactions between the various risks to available water resources, because they're known to interact, but that's a challenge.

Community views are something that's really going to guide the development of where both fisheries and water go in the future and where that's going to be. I'm not sure that we can always predict that.

And, on to the last slide, increasing user efficiency is clearly something that we do need to deal with, along with how we find some way of managing that so that it's actually an autonomous adjustment.

Illegal extractions clearly are a big issue, particularly in fisheries. And when you ask people about it in water they say, "I'm not sure if anyone's actually measured it" but I think we're seeing more of that with some of this more electronic measurement occurring.

And institutional arrangements: do we need to do anything about them? I don't have a fixed view on it, but do we need to make them more rigid or more flexible? Do we need some kind of national capacity to address fisheries issues like we have in the National Water Commission? I don't know, but I just raise these for thoughts.

So there you have it, my view on a bit of comparison in a nutshell fisheries and water and the issues related to allocations and sharing. Thank you very much for listening.