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Achieving Fisheries Sustainability in the United States

by Richard Hildreth

Editors' Summary: The 1996 Sustainable Fisheries Act is arguably the most significant federal environmental legislation enacted in the last two decades. The Act applies sustainability principles and approaches such as biodiversity protection, externality internalization, and precaution to advance fisheries sustainability within the U.S. EEZ. In this Article, Prof. Richard Hildreth details the U.S. attempt at moving toward more sustainable fisheries management. He outlines the global legal framework governing ocean resources, and then focuses on the multilateral and bilateral fisheries agreements to which the United States is a party. Finally, he describes how the SFA incorporates the sustainability principles embodied in these international agreements.

I. Introduction

Fisheries management is an important sector of ocean governance in the United States, with both the federal and state levels of government playing important management roles. Sustainability is an explicit goal of the relevant legislation. Sustainability is defined consistent with international norms of responsible environmental conduct emphasizing biodiversity protection, externality internalization, and a precautionary approach to resource use.

Fishery management plans (FMPs), marine protected area (MPA) designations, implementing regulations, and court interpretations indicate that four key problems in achieving fisheries sustainability are being addressed: overfishing of target species; incidental bycatch of nontarget species; altered predator-prey relationships due to removal of target and nontarget species; and habitat changes caused by fishing and other ocean activities. Experience is accumulating with a range of tools beyond input controls in single species fisheries, including capacity reductions through vessel and license buyback schemes, limits on entry through dedicated access privileges, and multiple-species and ecosystem-based management plans.

Further steps toward sustainability are supported by the recent reports of the Pew and U.S. Ocean Policy Commissions, the Presidential Action Plan and Joint Ocean Commission Initiative following up on those reports, President George W. Bush's June 2006 designation of the Northwest Hawaiian Islands National Monument, and Senate Bill 2012 which passed the U.S. Senate in June 2006 and would improve both domestic and international fisheries management.

II. Global Legal Framework

The principal international guidance for nations with extensive ocean resources like the United States comes from the 1982 United Nations (U.N.) Convention on the Law of the Sea (UNCLOS).[1] While covering a broad array of marine issues, the older procedure- and jurisdiction-oriented UNCLOS is drafted in the more traditional, comprehensive "hard law" treaty form rather than as a framework convention like the 1992 biodiversity[2] and climate change conventions,[3] or as a nonlegally binding "soft law" document.[4]

President William J. Clinton presented UNCLOS, as modified, to the Senate for accession in October 1994, but the Senate has yet to act. Pending Senate action, most if not all of UNCLOS' fisheries provisions discussed in this Article are binding on the United States as customary international law and thus are part of U.S. domestic law enforce-

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1. Stuart B. Kaye, International Fisheries Management (2001); Rosemary Rayfuse, *The Interrelationship Between the Global Instruments of International Fisheries Law*, *in* Developments in International Fisheries Law 107 (Ellen Hey ed., 1999); U.N. Convention on the Law of the Sea, *opened for signature* Dec. 10, 1982, 1833 U.N.T.S. 3, 397 (English) [hereinafter UNCLOS].
2. Convention on Biological Diversity, June 5, 1992, S. Treaty Doc. No. 103-20 (1993), 1760 U.N.T.S. 79 [hereinafter CBD].
3. U.N. Framework Convention on Climate Change, May 9, 1992, S. Treaty Doc. No. 102-38 (1992), 1771 U.N.T.S. 107, 165 (English).
4. Donald R. Rothwell, *Building on the Strengths and Addressing the Challenges: The Role of Law of the Sea Institutions*, 35 Ocean Dev. & Int'l L. 131 (2004).

able in U.S. courts.[5] However, UNCLOS' extensive dispute resolution provisions, including the International Tribunal for the Law of the Sea that recently has rendered important decisions in some international fisheries management disputes,[6] are not customary international law and thus are not available to the United States.[7]

The United States has ratified the 1995 U.N. Fish Stocks Agreement,[8] which has gone into force and mandates a precautionary approach that protects biodiversity and minimizes bycatch based on the best scientific information available,[9] and has adopted the U.N. Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries.[10] The United States has ratified the 1993 FAO Agreement to Promote Compliance With International Conservation and Management Measures by Fishing Vessels on the High Seas,[11] which has gone into force, and which the United States has implemented through the Fisheries Act of 1995.[12] The FAO also has adopted a voluntary International Plan of Action for the Management of Fishing Capacity,[13] which calls on countries to develop national plans to manage and, as necessary, reduce fishing capacity by 2005, and to develop indicators of sustainable fisheries development.[14]

As defined in Article 2 of the 1992 U.N. Convention on Biological Diversity (signed but not yet ratified by the United States), which entered into force for ratifying nations December 29, 1993, "'[s]ustainable use' means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations."[15] Pending ratification, the United States is obligated not to undercut the convention by Article 18 of the 1969 Vienna Convention on the Law of Treaties,[16] which entered into force in 1988 without U.S. ratification, but which is binding on the United States as customary international law.[17]

A few fish species threatened with biological extinction, most not of commercial significance, are listed under the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora,[18] to which the United States is a party. International trade in listed species generally is prohibited by the convention.[19] Agenda 21, adopted by all nations attending the 1992 United Nations Conference on Environment and Development (UNCED), views oceans and adjacent coastal areas as "a positive asset that presents opportunities for sustainable development."[20] It also points out that, given increasing problems of environmental loss and degradation, new approaches to marine and coastal area management and development are needed (at the national, subregional, regional, and global levels)—approaches that are integrated in content and are precautionary and anticipatory in ambit.[21] However, Agenda 21 also reflects how difficult achieving sustainability will be, especially in areas like high seas fishing[22] and marine mammal management.[23]

In addition to biodiversity and sustainability, two other themes of international environmental policy relevant to sustainable fisheries—the precautionary approach and the polluter pays principle—should be noted. The precautionary approach[24] is reflected in Principle 15 of the UNCED Rio Declaration on Environment and Development, which provides: "In order to protect the environment, the precautionary approach shall be widely applied by States accord-

5. 68 Fed. Reg. 42595 (July 18, 2003); United States v. Royal Caribbean Cruises, 30 F. Supp. 3d 114 (D.P.R. 1997).

6. Barbara Kwiatkowska, International Decision, *Southern Bluefin Tuna (New Zealand v. Japan; Australia v. Japan), Order on Provisional Measures (ITLOS Cases Nos. 3 and 4)*, 94 Am. J. Int'l L. 150 (2000); Bernard H. Oxman & Vincent Bantz, International Decision, *The M/V "Saiga" (No. 2) (Saint Vincent and the Grenadines v. Guinea), Judgment (ITLOS Case No. 2)*, 94 Am. J. Int'l L. 140 (2000).

7. John E. Noyes, *The United States, the Law of the Sea Convention, and Freedom of Navigation*, 29 Suffolk Transnat'l L. Rev. 1 (2005).

8. 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, *opened for signature* Dec. 4, 1995, S. Treaty Doc. No. 104-24 (1996), 2167 U.N.T.S. 3, 88 (English) [hereinafter U.N. Fish Stocks Agreement].

9. David A. Balton, *Strengthening the Law of the Sea: The New Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks*, 27 Ocean Dev. & Int'l L. 125 (1996).

10. Serge M. Garcia et al., *The FAO Guidelines for the Development and Use of Indicators for Sustainable Development of Marine Capture Fisheries and an Australian Example of Their Application*, 43 Ocean & Coastal Mgmt. 537 (2000).

11. Agreement to Promote Compliance With International Conservation and Management Measures by Fishing Vessels on the High Seas, *adopted* Nov. 24, 1993, S. Treaty Doc. No. 103-24 (1994), 2221 U.N.T.S. 91, 120 (English).

12. Pub. L. No. 104-43, §§101-111, 109 Stat. 366, 367-376 (1995) (codified at 16 U.S.C.A. §§5501-5509 (West)).

13. U.N. FAO, International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries; International Plan of Action for the Conservation and Management of Sharks; International Plan of Action for the Management of Fishing Capacity 19-26 (1999), *available at* ftp://ftp.fao.org/docrep/fao/006/x3170e/X3170E00.pdf.

14. *Id.*; Tavis Potts & Marcus Haward, *Sustainability Indicator Systems and Australian Fisheries Management*, Mar. Stud., Mar./Apr. 2001, at 1.

15. CBD, art. 2, *supra* note 2, 1760 U.N.T.S. at 147.

16. Vienna Convention on the Law of Treaties, May 23, 1969, 1155 U.N.T.S. 331, 8 I.L.M. 679.

17. Sims G. Weymuller, *Phoenix From the Ashes—the 1999 Pacific Salmon Agreement*, 10 Pac. Rim L. & Pol'y J. 815 (2001).

18. Convention on International Trade in Endangered Species of Wild Fauna and Flora, Mar. 3, 1973, 27 U.S.T. 1087, 993 U.N.T.S. 243.

19. Mahmood S. Shivji et al., *Genetic Profiling Reveals Illegal International Trade in Fins of the Great White Shark*, Carcharodon Carcharias, 6 Conservation Genetics 1035 (2005).

20. Agenda 21: Programme of Action for Sustainable Development; Rio Declaration on Environment and Development; Statement of Forest Principles: The Final Text of Agreements Negotiated by Governments at the United Nations Conference on Environment and Development (UNCED), 3-14 June, 1992, Rio De Janeiro, Brazil, ch. 17.1, U.N. Sales No. E.93.I.11 (1993).

21. Biliana Cicin-Sain, *Earth Summit Implementation: Progress Since Rio*, 20 Marine Pol'y 123 (1996); Robert W. Knecht & Biliana Cicin-Sain, *Implications of the Earth Summit for Ocean Governance*, *in* Ocean Governance: Issues and Challenges 17 (David D. Caron et al. eds., 1993); Lawrence Juda, *Changing National Approaches to Ocean Governance: The United States, Canada, and Australia*, 34 Ocean Dev. & Int'l L. 161 (2003).

22. William T. Burke, *UNCED and the Oceans*, 17 Marine Pol'y 519 (1993).

23. Patricia Birnie, *UNCED and Marine Mammals*, 17 Marine Pol'y 501 (1993).

24. Ellen Hey, *The Precautionary Approach: Implications of the Revision of the Oslo and Paris Conventions*, 15 Marine Pol'y 244 (1991); Richard G. Hildreth et al., *Roles for a Precautionary Approach in Marine Resources Management*, *in* Ocean Yearbook 19, at 33 (Aldo Chircop & Moira McConnell eds., 2005).

ing to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."[25] The 1995 U.N. Fish Stocks Agreement quoted below defines a precautionary approach to managing straddling and highly migratory fish stocks in a similar way.[26]

Under the polluter pays principle, development activities which are approved must pay the full cost of their impacts on the environment, "internalizing externalities" as the economists say. Except in fisheries management, this principle is the most entrenched of the four in the natural resources management laws and practices of most developed nations.[27] Through implementation of the polluter pays principle, incentives can be provided for the taking of a sustainable approach to resource use, including domestic and high seas fisheries.

A principal effect of UNCLOS is the allocation of ocean resources, including fish, seaward 200 miles to coastal nations such as the United States.[28] However, along with recognition of national rights to exploit resources, the convention also imposes duties to control pollution from both ocean- and land-based sources and to protect the habitat of depleted, threatened, or endangered species and other forms of marine life.[29] Also recognized is the concept that certain clearly defined fragile or exceedingly valuable areas should be provided special protection through implementation of more stringent environmental protection laws.[30]

UNCLOS Articles 61 and 119 require that the best scientific evidence be used to achieve maximum sustainable yield as qualified by relevant environmental and economic factors; in a nation's 200-mile exclusive economic zone (EEZ), that evidence must be taken into account, and, on the high seas, management measures must be based on it. Article 62 requires the sharing of surplus EEZ fish with other nations, but other articles grant coastal nations wide discretion in administering that obligation. Prof. William Burke points out that if ecosystem conservation requires fisheries measures, nations will have to strike a balance between the environmental and fisheries provisions of UNCLOS in order to ensure sustainable exploitation.[31] To achieve that balance in the management of straddling and highly migratory fish stocks, Article 6 of the 1995 U.N. Fish Stocks Agreement, which implements UNCLOS provisions relating to such fish stocks, utilizes a precautionary approach: "States shall be more cautious when information is uncertain, unreliable or inadequate. The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures."[32]

Unfortunately, both on the high seas and within the EEZs of many nations, including Australia and the United States, many fisheries have ecologically or economically collapsed: "Management failure results essentially from the common property nature of fisheries and the lack of effective will to control fishing effort levels directly in the absence of an explicit allocation of resources."[33] In addition to overfished target species, many high seas and EEZ fisheries also involve unsustainable levels of bycatch of nontarget fish and other species.[34] To achieve sustainability in some previously open-access domestic fisheries, some nations, including the United States, have to some extent privatized them. These nations have awarded individual transferable quotas (ITQs) to a limited number of individual participants in the fisheries[35] or created communal fishing rights.[36]

As discussed further below, the United States manages fisheries under principles related to sustainability,[37] but in practice many important fisheries have been overfished in unsustainable ways.[38] The causes of overfishing include illegal fishing, management decisions not in line with scientific evidence, scientific standards that are beyond the management system's capacity to administer, poorly designed regulatory frameworks that promote overfishing, failure to account for bycatch as fish landings, and poor enforcement. Furthermore, from a polluter pays perspective, some important external costs of fishing, such as bycatch of nontarget species, are only beginning to be internalized. For most fish-

25. UNCED, June 3-14, 1992, *Report of the United Nations Conference on Environment and Development (Rio de Janeiro, 3-14 June 1992), Annex I, Rio Declaration on Environment and Development*, U.N. Doc. A/CONF.151/26 (Vol. I) (Aug. 12, 1992), *available at* http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm.

26. Tom Polacheck, *Experimental Catches and the Precautionary Approach: The Southern Bluefin Tuna Dispute*, 26 Marine Pol'y 283 (2002).

27. Sanford E. Gaines, *The Polluter-Pays Principle: From Economic Equity to Environmental Ethos*, 26 Tex. Int'l L.J. 463 (1991); Tracy M. Price, *Negotiating WTO Fisheries Subsidy Disciplines: Can Subsidy Transparency and Classification Provide the Means Towards an End to the Race for Fish?*, 13 Tul. J. Int'l & Comp. L. 141 (2005).

28. UNCLOS, arts. 56-57, *supra* note 1, 1833 U.N.T.S. at 418-19.

29. *Id.* arts. 192-96, 1833 U.N.T.S. at 477-79.

30. *Id.* arts. 194(5), 211(6)(a), 1833 U.N.T.S. at 479, 484.

31. William T. Burke, *The Law of the Sea Concerning Coastal State Authority Over Driftnets on the High Seas*, *in* The Regulation of Driftnet Fishing on the High Seas: Legal Issues 13 (FAO Legislative Study 47, 1991).

32. U.N. Fish Stocks Agreement, art. 6(2), *supra* note 8, 2167 U.N.T.S. at 93.

33. Serge M. Garcia, *The Precautionary Principle: Its Implications in Capture Fisheries Management*, 22 Ocean & Coastal Mgmt. 99, 109 (1994).

34. Edward L. Miles, The Need to Identify and Clarify National Goals and Management Objectives Concerning Bycatch, Paper Presented to the National Industry Bycatch Workshop, Newport, Or. (Feb. 4-6, 1992).

35. David Campbell et al., *Individual Transferable Catch Quotas: Australian Experience in the Southern Bluefin Tuna Fishery*, 24 Marine Pol'y 109 (2000); R. Quentin Grafton, *Comment on "What Restoration Schemes Can Do. Or, Getting It Right Without Fisheries Transferable Quotas,"* 36 Ocean Dev. & Int'l L. 375 (2005); Robert E. Kearney, *Fisheries Property Rights and Recreational/Commercial Conflict: Implications of Policy Developments in Australia and New Zealand*, 25 Marine Pol'y 49 (2001); Bonnie J. McCay, *Privatization in Fisheries: Lessons From Experiences in the U.S. and Canada*, *in* Moving Ahead on Ocean Governance 65 (Biliana Cicin-Sain and Lori L. Denno eds., 1994); Bonnie S. McCay et al., *Individual Transferable Quotas (ITQs) in Canadian and U.S. Fisheries*, 28 Ocean & Coastal Mgmt. 85 (1995); Comm. on Ecosystem Mgmt. for Sustainable Fisheries, Nat'l Res. Council, Sustaining Marine Fisheries (1999); Peter Orebech, *What Restoration Schemes Can Do. Or, Getting It Right Without Fisheries Transferable Quotas*, 36 Ocean Dev. & Int'l L. 159 (2005); Michael D. Young, *The Design of Fishing-Right Systems—the New South Wales Experience*, 28 Ocean & Coastal Mgmt. 45 (1995).

36. Daniel S. Holland & Jay J.C. Ginter, *Common Property Institutions in the Alaskan Groundfish Fisheries*, 25 Marine Pol'y 33 (2001).

37. Josh Eagle & Barton H. Thompson Jr., *Answering Lord Perry's Question: Dissecting Regulatory Overfishing*, 46 Ocean & Coastal Mgmt. 649 (2003); Carl Safina, *U.S. Ocean Fish Recovery: Staying the Course*, 309 Science 707 (2005).

38. Shi-Ling Hsu, *What Is a Tragedy of the Commons? Overfishing and the Campaign Spending Problem*, 69 Alb. L. Rev. 75 (2005).

eries, no attempt is made by governments to capture a portion of the economic rent through royalties or fees, and this may be a contributing factor to both the overfishing and the externalities problems. National implementation of more precautionary approaches to setting domestic fisheries catch quotas is helping to reduce overfishing in both domestic open-access and domestic limited entry fisheries.[39]

In some fisheries, bycatch of nonfish species threatens biodiversity.[40] In the United States, major legal pressures to reduce such threats are generated under endangered species and marine mammal protection laws. However, without improved protection for habitat important to both commercially valuable fish species and nontarget bycatch species, both overfishing and bycatch problems may be expected to continue. In the United States, Endangered Species Act (ESA)[41] listings for endangered and threatened coastal and marine species create potentially significant legal protection for the habitat of these species—on a regionwide scale in the case of the more than 20 species of anadromous fish listed as endangered or threatened on the West Coast.[42]

III. United States Fisheries Management

A. U.S. Multilateral Fisheries Agreements

In addition to the global agreements discussed above, the United States is a party to several important regional fisheries management agreements, many of them implemented domestically through legislation enacted by the U.S. Congress.[43] Examples include the convention for the management of western and central Pacific tuna and other highly migratory fish stocks, signed in September 2000 by Australia, the United States, and 12 Pacific Island nations and ratified by the Senate in November 2005.[44] The convention incorporates many of the management principles contained in the U.N. Fish Stocks Agreement discussed above.

Agreements recently ratified by the United States include the 1998 Agreement on the International Dolphin Conservation Program,[45] designed to limit the incidental take of dolphins in the eastern Pacific tuna fishery[46] and implemented by the International Dolphin Conservation Program Act.[47] It went into force in February 1999. The United States has signed the 1996 Inter-American Convention for the Protection and Conservation of Sea Turtles,[48] designed to minimize the incidental take of sea turtles in shrimp fisheries with the use of turtle excluder devices.[49] The turtle convention is especially notable for the specific commitments to protect sea turtle habitat contained in Annex II and to comply with World Trade Organization (WTO) agreements contained in Article XV.

Both these conventions are multilateral responses to fisheries incidental take issues which the United States had pursued unilaterally through congressionally authorized trade sanctions until the well-known adverse WTO decisions in the tuna-dolphin and shrimp-turtle cases.[50] Those WTO panel and appellate body opinions also raised questions about unilateral U.S. trade sanctions against nations violating other international and U.S. policies intended to promote sustainable fishing, such as driftnet prohibitions.[51] A principal message of the WTO cases is that trade sanctions based on multilateral agreements are more likely to be upheld when challenged before the WTO. The dolphin and sea turtle conventions could also serve as models for the negotiation of international agreements to utilize U.S. standards for reducing the bycatch of nontargeted fish, as authorized by the U.S. Sustainable Fisheries Act (SFA) of 1996.[52]

Several of the regional regimes to which the United States is a party are confronting enforcement challenges, especially against nonmembers.[53] Included in this group is the Convention on the Conservation of Antarctic Marine Living Resources[54] (implemented by the Antarctic Marine Living

39. Grant J. Hewison, *The Precautionary Approach to Fisheries Management: An Environmental Perspective*, 11 Int'l J. Marine & Coastal L. 301 (1996); Geoffrey P. Kirkwood & A.D.M. Smith, *Assessing the Precautionary Nature of Fishery Management Strategies*, *in* Precautionary Approach to Fisheries. Part 2, Scientific Papers 141 (FAO Fisheries Technical Paper 350/2, 1996); Adam K. Smith & David A. Pollard, *The Best Available Information—Some Case Studies From NSW, Australia, of Conservation-Related Management Responses Which Impact on Recreational Fishers*, 20 Marine Pol'y 261 (1996).

40. Susan Hanna, Tradition and Globalization: Common Property in Theory and Practice: The Example of Biodiversity Protection in Fisheries, Paper Presented at the First Pacific Regional Meeting of the International Association for the Study of Common Property (IASCP), Brisbane, Australia (Sept. 2-4, 2001), http://dlc.dlib.indiana.edu/archive/00000711/00/hanna.pdf.

41. 16 U.S.C. §§1531-1544, ELR Stat. ESA §§2-18.

42. 71 Fed. Reg. 14683 (Mar. 23, 2006).

43. Nat'l Oceanic & Atmospheric Admin., U.S. Dep't of Commerce, Year of the Ocean Discussion Papers, at C-37 to C-47, J-9 to J-16 (1998).

44. Harry F. Campbell, *Managing Tuna Fisheries: A New Strategy for the Western and Central Pacific Ocean*, 24 Marine Pol'y 159 (2000); Peter Ward et al., *Science Arrangements for the Regional Management of Tuna Fisheries*, 24 Marine Pol'y 93 (2000).

45. Agreement on the International Dolphin Conservation Program, with Annexes, May 21, 1998, Temp. State Dep't No. 99-42, 1999 WL 230818.

46. Chris Hedley, *The 1998 Agreement on the International Dolphin Conservation Program: Recent Developments in the Tuna-Dolphin Controversy in the Eastern Pacific Ocean*, 32 Ocean Dev. & Int'l L. 71 (2001); Denis A. O'Connell, *Tuna, Dolphins, and Purse Seine Fishing in the Eastern Tropical Pacific: The Controversy Continues*, 23 UCLA J. Envtl. L. & Pol'y 77 (2005).

47. Pub. L. No. 105-42, 111 Stat. 1122 (1997) (codified at 15 U.S.C.A. §§1412-1416 (West)); Defenders of Wildlife v. Dalton, 97 F. Supp. 2d 1197 (Ct. Int'l Trade 2000).

48. Inter-American Convention for the Protection and Conservation of Sea Turtles, with Annexes, Dec. 1, 1996, S. Treaty Doc. No. 105-48 (1998), *available at* http://frwebgate.access.gpo.gov/cgibin/getdoc.cgi?dbname=105_cong_documents&docid=f:td048.pdf.

49. Eugénia Naro-Maciel, Current Development, *The Inter-American Convention for the Protection and Conservation of Sea Turtles: An Historical Overview*, 1 J. Int'l Wildlife L. & Pol'y 69 (1998).

50. Richard J. McLaughlin, *The Recent WTO Decision on Sea Turtles and Its Impact on International Environmental Law, in* Emerging Issues in National Ocean and Coastal Policy 25 (Harry N. Scheiber ed., 1999).

51. Humane Soc'y of U.S. v. Clinton, 236 F.3d 1320, 31 ELR 20394 (Fed. Cir. 2001).

52. 16 U.S.C.A. §1822(h) (West).

53. David J. Bederman, *CCAMLR in Crisis: A Case Study of Marine Management in the Southern Ocean*, *in* Law of the Sea: The Common Heritage and Emerging Challenges 169 (Harry N. Scheiber ed., 2000); Liza D. Fallon & Lorne K. Kriwoken, *International Influence of an Australian Nongovernment Organization in the Protection of Patagonian Toothfish*, 35 Ocean Dev. & Int'l L. 221 (2004); Jean-Pierre Plé, *Responding to Non-Member Fishing in the Atlantic: The ICCAT and NAFO Experiences*, *in* Law of the Sea: The Common Heritage and Emerging Challenges 197 (Harry N. Scheiber ed., 2000).

54. Convention on the Conservation of Antarctic Marine Living Resources, May 20, 1980, 33 U.S.T. 3476, 1329 U.N.T.S. 48.

Resources Convention Act of 1984[55]), which takes an ecosystem-based approach to managing southern ocean living resources and utilizes a precautionary approach to fisheries management.[56] Judicial support for aggressive U.S. regulatory actions to close enforcement gaps with respect to U.S. flag vessels, such as mandatory vessel monitoring systems,[57] has been mixed.[58]

A more controversial regional agreement to which the United States is a party is the South Pacific convention prohibiting driftnet fishing, implemented by the U.S. High Seas Driftnet Fisheries Enforcement Act and Driftnet Impact Monitoring, Assessment, and Control Act.[59] Rather than regulating the use of driftnets, the parties proceeded to absolutely prohibit their use based on fragmentary information about their impacts.[60]

B. Bilateral Agreements

The United States is a party to over 20 bilateral fisheries agreements in addition to the regional and global agreements discussed above. However, with the phaseout of foreign fishing in the U.S. EEZ, most of these bilateral agreements, known as governing international fisheries agreements, are not currently of great significance. The remaining bilateral agreements of significance are U.S. agreements with Canada, such as the 1985 Pacific Salmon Treaty,[61] which is implemented by the U.S. Pacific Salmon Treaty Act of 1985,[62] and with Russia, such as the 1996 Agreement on the Conservation of Straddling Fish Stocks in the Central Part of the Sea of Okhotsk,[63] implemented by the Central Bering Sea Fisheries Enforcement Act[64] (as amended by the Sea of Okhotsk Fisheries Enforcement Act of 1995).[65] Despite some implementation difficulties, especially under the Pacific Salmon Treaty with Canada, several fisheries governed by these agreements appear to be managed more sustainably now than in the past. Preventing overfishing is a principal goal of both the 1985 salmon treaty and the 1999 agreement implementing it; the 1999 agreement includes specific commitments to restore salmon habitat.[66] Compared to the 1996 SFA,[67] discussed next, the other bilateral agreements are not particularly innovative with respect to implementing the international norms of biodiversity protection and internalization of externalities with a precautionary approach.

C. Precaution, Internalization of Externalities, and Biodiversity Protection in the SFA

The SFA's amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)[68] authorize the use of a precautionary approach to overfishing but do not allow the collection of economic rent.[69] They do contain provisions aimed at reducing the bycatch and bycatch mortality of nontarget fish; henceforth, all federal FMPs and their implementing regulations must prevent bycatch and minimize bycatch mortality to the extent practicable. The SFA also requires the rebuilding of overfished stocks by, e.g., reduction in harvesting effort and capacity, regulation of new fishing gear types, and some protection of fish habitat.[70] Wasteful practices such as shark finning and the stripping of roe from pollock while discarding the carcass are prohibited. Moreover, a congressional moratorium on individual fishing quotas to limit entry in overfished fisheries[71] was allowed to expire after a National Research Council report endorsing the use of such quotas in appropriate circumstances.[72]

The SFA has been supported with National Marine Fisheries Service (NMFS) regulatory guidance and is beginning to have significant impacts on the design of FMPs by the regional fishery management councils, the review of FMPs by the NMFS, the U.S. Department of Commerce's (Commerce Department's) review and approval of FMPs, and the federal courts asked to review the validity of regulations implementing FMPs.[73] Recent judicial decisions support

55. Pub. L. No. 98-623, tit. III, 98 Stat. 3398 (1984) (codified at 16 U.S.C.A. §§2431-2444 (West)).
56. 71 Fed. Reg. 13353 (Mar. 15, 2006); Graeme Parkes, *Precautionary Fisheries Management: The CCAMLR Approach*, 24 Marine Pol'y 83 (2000); Rosemary Rayfuse & Martin Wilder, *International Fisheries and Sustainability: Dealing With Uncertainty*, *in* Ocean Yearbook 14, at 114 (Elisabeth Mann Borgese et al. eds., 2000).
57. Christopher J. Carr, *Vessel Monitoring Systems: A New Technology for the Transition to Sustainable Fisheries*, *in* Emerging Issues in National Ocean and Coastal Policy, *supra* note 50, at 31.
58. Blue Water Fisherman's Ass'n v. Mineta, 122 F. Supp. 2d 150 (D.D.C. 2000).
59. Convention for the Prohibition of Fishing With Long Driftnets in the South Pacific, Nov. 24, 1989, S. Treaty Doc. No. 102-7 (1991), 1899 U.N.T.S. 3; implemented by the High Seas Driftnet Fisheries Enforcement Act, Pub. L. No. 102-582, 106 Stat. 4900 (1992) (codified at 16 U.S.C.A. §1826 (West)), and by the Driftnet Impact Monitoring, Assessment, and Control Act of 1987, Pub. L. No. 100-220, tit. IV, Dec. 29, 1987, 101 Stat. 1477 (1987) (no currently effective sections in U.S.C.A. (West)).
60. William T. Burke, *Compatibility and Precaution in the 1995 Straddling Stock Agreement*, *in* Law of the Sea, *supra* note 53, at 105; Douglas M. Johnston & David L. VanderZwaag, *The Ocean and International Environmental Law: Swimming, Sinking, and Treading Water at the Millennium*, 43 Ocean & Coastal Mgmt. 141 (2000).
61. Pacific Salmon Treaty, U.S.-Can., Jan. 28, 1985, T.I.A.S. No. 11091.
62. Pub. L. No. 99-5, 99 Stat. 7 (1985) (codified at 16 U.S.C.A. §§3631-3644 (West)).
63. Agreement on the Conservation of Straddling Fish Stocks in the Central Part of the Sea of Okhotsk, U.S.-Russ., June 13, 1996, Temp. State Dep't No. 04-438, 1996 WL 33663685.
64. Pub. L. No. 102-582, tit. III, 106 Stat. 4906 (1992) (no currently effective sections in U.S.C.A. (West)).
65. Pub. L. No. 104-43, tit. V, 109 Stat. 391 (1995) (no currently effective sections in U.S.C.A. (West)).
66. Weymuller, *supra* note 17.
67. Pub. L. No. 104-297, 110 Stat. 3559 (1996) (codified in scattered sections of 16 U.S.C.A. (West)).
68. Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. §§1801-1883.
69. Richard G. Hildreth, *U.S. and International Fisheries Law: The Role of Sustainability, Biodiversity Protection, Externality Internalization, and Precaution*, *in* Managing Marine Fisheries in the United States: Proceedings of the Pew Oceans Commission Workshop on Marine Fishery Management 6 (2002).
70. Richard K. Wallace & Kristen M. Fletcher, Understanding Fisheries Management (2d ed. 2000).
71. Yakutat, Inc. v. Gutierrez, 407 F.3d 1054, 35 ELR 20103 (9th Cir. 2005).
72. Comm. to Review Individual Fishing Quotas, Nat'l Res. Council, Sharing the Fish: Toward a National Policy on Individual Fishing Quotas (1999).
73. Kristen M. Fletcher, *When Economics and Conservation Clash: Challenges to Economic Analysis in Fisheries Management*, 31 ELR 11168 (Oct. 2001); Susan Hanna, *More Than Meets the Eye: The Transaction Costs of Litigation*, 7 Ocean & Coastal L.J. 13 (2001); Marian Macpherson & Mariam McCall, *Judicial Remedies in Fisheries Litigation: Pros, Cons, and Prestidigitation?*, 9 Ocean & Coastal L.J. 1 (2003).

avoiding commercial[74] and recreational[75] overfishing and rebuilding overfished stocks as well as rigorous council, NMFS, and Commerce Department implementation of the SFA's bycatch reduction,[76] essential fish habitat,[77] and new fishing gear management mandates. Some councils are implementing these mandates by including marine reserves or "no-take zones" in FMPs.[78] These techniques are the foundation for FMPs under which future fishing will be more sustainable with respect not only to the target species but also the habitat and ecosystems of which they are a part, including predator and prey species.[79] With adequate budget and personnel, some of the regional councils may now be encouraged to prepare regional marine ecosystem-based management plans[80] as an extension of the multispecies FMPs, some with marine reserves or no-take zones,[81] which they currently prepare. Such ecosystem plans could pose special challenges in the judicial review process.[82]

Reauthorization of the SFA is before the 109th Congress.[83] Amendments contained in Senate Bill 2012[84] would strengthen the SFA's mandates against overfishing. Three additional amendments are worth considering: (1) explicit legislative authorization for the use of MPA techniques such as marine reserves or no-take zones in FMPs; (2) authorization of the collection of economic rent; and (3) inclusion of a citizen suit provision like that of the ESA and most other major federal environmental statutes. The latter would authorize "any person" with a broadly defined interest in SFA compliance to bring suit in federal court where there has been demonstrated noncompliance with an important SFA mandate.

In addition, congressional adjustment of current federal-state fisheries management roles should be studied. The states' traditional prominence is reflected in their substantial representation on the regional councils, MSFCMA §306(a)'s preservation of state fisheries jurisdiction beyond state boundaries, MSFCMA §306(b)'s limitation on preemptive federal management within state boundaries, and the dominant state fisheries role within three miles confirmed by the Submerged Lands Act.[85] Unfortunately, the current arrangements largely ignore the fact that approximately 90% of the fisheries resources found off U.S. coasts are interjurisdictional, i.e., they migrate across state lateral boundaries, other nations' maritime boundaries, or the federal-state boundary. The current MSFCMA regional council scheme reduces but does not eliminate the significance of state lateral boundaries and the federal-state boundary three miles offshore. As suggested by the Australian[86] and Canadian[87] experiences,[88] more unified management on both sides of the three-mile line seems called for and could be accomplished by extending the MSFCMA regional council system landward, coupled with increased federal regulation of recreational fishing. Logic might suggest including coastal internal waters under the MSFCMA scheme, but federal support for state management of U.S. internal waters, which have been broadened in accordance with international law, would lessen probable state resistance to extending the MSFCMA scheme landward to the territorial sea baseline. For specific situations where interjurisdictional considerations dictated the need for regional rather than state fisheries management within internal waters, a preemption process similar to that established by MSFCMA §306(b) could be utilized.

Less preferable from a fisheries resource management perspective would be amendments to the Submerged Lands Act moving coastal state boundaries to the seaward edge of the 12-mile U.S. territorial sea and granting those states resource management authority over fish and other resources within their widened offshore zones. Regardless, the MSFCMA's landward limit on foreign fishing in the U.S. EEZ could be moved seaward from coastal state boundaries to the seaward edge of the U.S. 12-mile territorial sea in accordance with UNCLOS.[89] Finally, MSFCMA §10l(b)(l)'s claim to U.S-origin anadromous fish beyond the U.S. EEZ (except when they are in another nation's EEZ or territorial sea) conflicts with UNCLOS Article 66's mandates for cooperation with other nations and thus needs to be amended.

All changes to U.S. fisheries statutes and implementing regulations must be continuously monitored for their consistency with customary international law and treaties to which the United States is a party because of the U.S. doctrine that later statutes and regulations which conflict with earlier treaties are effective for purposes of domestic U.S. law.[90]

74. Natural Resources Defense Council v. Daley, 209 F.3d 747, 30 ELR 20532 (D.C. Cir. 2000).

75. Coastal Conservation Ass'n v. Gutierrez, Nos. 2:05CV400-FTM-29DNF, 2:05CV419-FTM-29DNF, 2005 WL 2850325 (M.D. Fla. Oct. 31, 2005).

76. A.M.L. Int'l v. Daley, 107 F. Supp. 2d 90 (D. Mass. 2000); Oceana v. Evans, No. Civ. A.04-0811(ESH), 2005 WL 555416 (D.D.C. Mar. 9, 2005), *appeals pending* (D.C. Cir. 2005).

77. American Oceans Campaign v. Commerce Dep't, 52 Env't Rep. Cas. (BNA) 1087 (D.D.C. 2000).

78. Greenpeace v. Nat'l Marine Fisheries Serv., 106 F. Supp. 2d 1066 (W.D. Wash. 2000).

79. Large Marine Ecosystems (Timothy M. Hennessey & Jon G. Sutinen eds., 2005); M. Casey Jarman et al., *The MFCMA-MMPA-ESA Reauthorizations: Incremental Fine Tuning Versus Holistic Solutions*, *in* Ocean Yearbook 11, at 256 (Elisabeth Mann Borgese et al. eds., 1994); Marian Macpherson, *Integrating Ecosystem Management Approaches Into Federal Fisheries Management Through the Magnuson-Stevens Fishery Conservation and Management Act*, 6 Ocean & Coastal L.J. 1 (2001); Comm. on Ecosystem Mgmt. for Sustainable Fisheries, Nat'l Res. Council, *supra* note 35.

80. Donna R. Christie, *Living Resources Management: A Proposal for Integration of United States Management Regimes*, 34 Envtl. L. 107 (2004); Scott Parsons, *Ecosystem Considerations in Fisheries Management: Theory and Practice*, 20 Int'l J. Marine & Coastal L. 381 (2005).

81. Greenpeace v. Nat'l Marine Fisheries Serv., 106 F. Supp. 2d 1066 (W.D. Wash. 2000).

82. In re the Water Use Permit Applications, 9 P.3d 409 (Haw. 2000).

83. Richard J. Lazarus, *Congressional Descent: The Demise of Deliberative Democracy in Environmental Law*, 94 Geo. L.J. 619 (2006).

84. Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006, S. 2012, 109th Cong. (2006).

85. 43 U.S.C.A. §§1301-1315 (West).

86. Garcia et al., *supra* note 10; Richard G. Hildreth, *Managing Ocean Resources: New Zealand and Australia*, 6 Int'l J. Estuarine & Coastal L. 89 (1991); Potts & Haward, *supra* note 14.

87. Richard G. Hildreth, *Managing Ocean Resources: Canada*, 6 Int'l J. Estuarine & Coastal L. 199 (1991).

88. Anthony Bergin et al., *Marine Living Resources*, *in* Oceans Law and Policy in the Post-UNCED Era: Australian and Canadian Perspectives 173 (Lorne K. Kriwoken et al. eds., 1996).

89. Jeffrey A. Ballweber & Richard G. Hildreth, *Fishery Management Implications of the U.S. Territorial Sea Extension*, *in* 2 Coastal Zone '91, at 1389 (Orville T. Magoon et al. eds., 1991).

90. United States v. MYS Prokofyeva, 536 F. Supp. 793 (D. Alaska 1982).

D. Science and U.S. Marine Resources Law

In reviewing the scientific underpinnings of recent U.S. marine resource management treaties and legislation, several trends are discernible: (1) the introduction of precautionary and adaptive approaches to decisionmaking; (2) greater internalization of the externalities of marine resource exploitation; and (3) increasing respect for biodiversity preservation. Marine resource management decisions have become more holistic and sensitive to ecosystem context through recognition of the habitat and food web impacts of human marine resource use.[91] Nowhere are these trends more apparent than in the design of the SFA, discussed above, and its implementation together with the Marine Mammal Protection Act (MMPA), ESA, and National Environmental Policy Act (NEPA).[92] These trends are less obvious but still discernible in the administration of other U.S. laws relevant to marine resource use such as the Clean Water Act,[93] Ocean Dumping Act,[94] Coastal Zone Management Act,[95] and National Marine Sanctuaries Act.[96] The above trends are not so discernible in the U.S. management regimes for outer continental shelf (OCS) oil, gas, and minerals and for deep seabed minerals.

As discussed above, the SFA requires the U.S. regional fishery management councils to prohibit fishing above a species' maximum sustainable yield, to develop plans to rebuild the species that are below their long-term sustainable yield, to minimize fisheries bycatch, to identify essential fish habitats (EFHs) and take measures to protect them, and to determine the effects of fishing on the environment.[97] In addition, the SFA mandated a study of the extent to which ecosystem principles are used in U.S. fisheries management and how such principles could be further implemented.[98] To achieve these management policies, §1851(a)(2) of the SFA requires that "best scientific information available" be used, words that are not otherwise defined in the Act.[99] Regulations implementing the SFA state that such information includes the "peer-reviewed literature, data reports and 'gray' literature, data files of government resource agencies, and any other sources of quality information."[100] Similar information mandates are included with specific management policies throughout the Act and its implementing regulations.

Other SFA information mandates are more subtle, such as §1853(a)(11)'s mandate that fish bycatch be minimized "to the extent practicable," and §1851's mandate that fisheries management goals such as efficiency, safety, and minimized adverse community impacts[101] be achieved where "practicable." The information produced by council and agency staff and advisory committees pursuant to these mandates are examples of "regulatory science" and "agency research science." Given the relatively modest personnel and research budgets of the regional councils and the NMFS, the vast majority of fisheries management decisions reflected in council FMPs approved and implemented by the Commerce Department are based on this kind of science.[102] Periodically, specific questions of management policy may be mandated by Congress for investigation with timetables and budget support that result in scientific analyses which meet standards closer to those used in traditional peer review processes. Examples would be the National Research Council report on the use of individual fishing quotas as a fisheries management technique[103] and the National Academy of Sciences review of an NMFS endangered Steller sea lion biological opinion requested in 2000 under Public Law No. 106-554 as part of a $43 million study of the impacts of commercial fishing on Steller sea lions.[104]

Beyond the above requirements, data and analyses predominantly environmental, social, and economic are also required in support of fisheries management decisions under the Small Business Act,[105] the Regulatory Flexibility Act,[106] NEPA,[107] and Executive Order No. 12866: Regulatory Planning and Review.[108]

The NMFS' obligation to carry out regulatory science to meet its responsibilities for protected marine species under the MMPA and the ESA further illustrates the challenges facing marine resource agencies in integrating science into policymaking. Under the ESA, federal agencies must consult with the NMFS to ensure that any actions authorized, funded, or carried out by them are "not likely to jeopardize the continued existence" of any endangered or threatened marine species.[109] In approving the otherwise illegal unintentional takings of listed species by nonfederal parties, the NMFS must determine that "the taking will not appreciably reduce the likelihood of the survival and the recovery of the species in the wild."[110] These mandates apply to significant injuries to habitat as well as to the species themselves. The fisheries management challenges created by these mandates are illustrated by the impacts of ground fishing off Alaska

91. Greenpeace v. Nat'l Marine Fisheries Serv., 106 F. Supp. 2d 1066 (W.D. Wash. 2000); Greenpeace Found. v. Daley, 122 F. Supp. 2d 1110 (D. Haw. 2000); Greenpeace Found. v. Mineta, 122 F. Supp. 2d 1123 (D. Haw. 2000).

92. 71 Fed. Reg. 15384 (Mar. 28, 2006); National Environmental Policy Act of 1969, 42 U.S.C. §§4321-4370d, ELR Stat. NEPA §§2-209.

93. 33 U.S.C. §§1251-1387, ELR Stat. FWPCA §§101-607.

94. 33 U.S.C.A. §§1401-1445 (West).

95. 16 U.S.C. §§1451-1465, ELR Stat. CZMA §§302-319.

96. 16 U.S.C.A. §§1431-1445c (West).

97. Wallace & Fletcher, *supra* note 70.

98. Macpherson, *supra* note 79; Ecosystem Principles Advisory Panel, NMFS, Ecosystem-Based Fishery Management (1999).

99. Sustainable Fisheries Act, 16 U.S.C.A. §1851(a)(2) (West).

100. 50 C.F.R. §600.815(a)(2)(i)(B).

101. Blue Water Fisherman's Ass'n v. Mineta, 122 F. Supp. 2d 150, 31 ELR 20202 (D.D.C. 2000).

102. Shepherd R. Grimes, *The Federal Regional Fishery Management Councils: A Negotiated Rulemaking Approach to Fisheries Management*, 6 Ocean & Coastal L.J. 187 (2001).

103. Comm. to Review Individual Fishing Quotas, Nat'l Res. Council, *supra* note 72.

104. Comm. on the Alaska Groundfish Fishery and Steller Sea Lions, Nat'l Res. Council, Decline of the Steller Sea Lion in Alaskan Waters: Untangling Food Webs and Fishing Nets (2003).

105. *Blue Water Fisherman's Ass'n*, 122 F. Supp. 2d at 150.

106. *Id.*

107. American Oceans Campaign v. Commerce Dep't, 52 Env't Rep. Cas. (BNA) 1087 (D.D.C. 2000); Conservation Law Found. v. Mineta, 131 F. Supp. 2d 19 (D.D.C. 2001).

108. Exec. Order No. 12866, 58 Fed. Reg. 51735 (Oct. 4, 1993), *amended by* Exec. Order No. 13258, 67 Fed. Reg. 9385 (Feb. 28, 2002), *reprinted as amended in* 5 U.S.C.A. §601 (West).

109. Endangered Species Act, 16 U.S.C. §1536(a)(2).

110. *Id.* §1539.

and Hawaii on endangered Steller sea lions[111] and monk seals—both also are protected by the MMPA—and the impacts of longline fishing in the Pacific[112] and shrimp fishing in the Gulf of Mexico on endangered and threatened sea turtles. Federal courts have issued injunctions restricting those fishing activities when the NMFS has been judged not to have met those statutory responsibilities adequately.[113] Congress has responded with revised fisheries management directives and significant funding for both compensation to affected communities and regulatory and peer-reviewed research science focused on those disputes. A critique of U.S. fisheries management found that those forms of congressional intervention sometimes unnecessarily consume scarce research funds in disputes where the adequacy and accuracy of research are not the primary bone of contention.[114]

Administration of the MMPA is centered on restoration and maintenance of all marine mammal species at their optimum sustainable population (OSP), which is defined as "the number of animals which will result in the maximum productivity of the . . . species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem . . . ."[115] When data are insufficient to determine a species' OSP or the potential impacts of ocean uses such as fishing on a marine mammal species, federal courts again have restricted fishing to avoid possible risks to protected marine mammals.[116] In response, Congress has revised the standards applicable to the unintended taking of marine mammals in fishing operations. Significant regulatory and agency research science has been necessary to implement those standards[117] and prepare the marine mammal take reduction plans required by §1387 of the Act.[118] Difficult regulatory science issues also have arisen in connection with the potential impacts on marine mammals of undersea acoustic research,[119] coastal rocket and missile launches,[120] and the Makah Tribe's hunting of gray whales.[121]

Reauthorizations of the MMPA and the ESA are pending before the 109th Congress along with reauthorization of the SFA. While no major changes in the MMPA have been proposed, pending amendments to the ESA would significantly weaken its protections of listed species and their habitat. It appears that major statutory steps toward a more ecosystem-based approach to U.S. living marine resources management must await a future Congress.[122]

Marine pollution and nonliving marine resources are managed under statutes that also emphasize regulatory rather than peer-reviewed research science. The information mandates of the Outer Continental Shelf Lands Act (OCSLA)[123] could be the subject of renewed attention under President Bush's energy supply initiatives. Mismanagement of the OCSLA's information processes in connection with possible offshore oil and gas development near North Carolina's Outer Banks and central California resulted in court decisions entitling various oil companies to the return of millions of dollars that they had bid for seabed leases.[124]

Generally under the OCSLA, assessment and management of the impacts of OCS oil and gas development on living marine resources incorporate the MMPA[125] and ESA processes described above, with potential conflicts with fishing handled on a relatively loose and ad hoc basis by the Secretary of the U.S. Department of the Interior under the OCSLA and NEPA.[126] Here and elsewhere under the OCSLA, the precautionary approaches to scientific uncertainty being built into U.S. living marine resources management could be expected to play a much greater role than they have in the past.

As discussed above, most uses of U.S. ocean waters are managed under single sector statutes such as the SFA and the OCSLA. Less than 1% of U.S. ocean waters are managed on an integrated, comprehensive multiple-use basis as MPAs under the Marine Sanctuaries Act. Under that Act, a regulatory science approach is used to carry out multiple-use management within the 13 sanctuaries currently designated.[127] There seems to be a consensus among marine scientists that the MPA concept including no-take zones can be used to prevent overfishing, prevent damage to sensitive habitat areas from certain types of fishing gear, and support ecosystem-based approaches to marine resource management.[128] To implement adaptive management, MPA managers can organize data gathering, analysis, and monitoring on a consistent basis over time.

According to a recent report of the Pew Oceans Commission, adaptive management involves periodic reevaluation and adjustment of the management response based on care-

111. Michael Bhargava, *Of Otters and Orcas: Marine Mammals and Legal Regimes in the North Pacific*, 32 Ecology L.Q. 939 (2005).

112. Turtle Island Restoration Network v. United States, 36 ELR 20044 (9th Cir. Feb. 21, 2006).

113. Greenpeace v. Nat'l Marine Fisheries Serv., 106 F. Supp. 2d 1066 (W.D. Wash. 2000); Greenpeace Found. v. Daley, 122 F. Supp. 2d 1110 (D. Haw. 2000); Greenpeace Found. v. Mineta, 122 F. Supp. 2d 1123 (D. Haw. 2000); Louisiana ex rel. Guste v. Verity, 853 F.2d 322, 18 ELR 21351 (5th Cir. 1988).

114. Susan Hanna et al., H. John Heinz III Center for Science, Economics, and the Environment, Fishing Grounds: Defining a New Era for American Fisheries Management (2000).

115. 16 U.S.C. §1362(9).

116. Kokechik Fishermen's Ass'n v. Secretary of Commerce, 839 F.2d 795, 18 ELR 20622 (D.C. Cir. 1988), *cert. denied*, Verity v. Ctr. for Envtl. Education, 488 U.S. 1004 (1989).

117. 71 Fed. Reg. 13966 (Mar. 20, 2006).

118. Sali J. Bache, *A Primer on Take Reduction Planning Under the Marine Mammal Protection Act*, 44 Ocean & Coastal Mgmt. 221 (2001).

119. Emily A. Gardner, *The Precautionary Principle as Applied to Marine Acoustic Activities*, *in* Emerging Issues in National Ocean and Coastal Policy, *supra* note 50, at 9.

120. 71 Fed. Reg. 14853 (Mar. 24, 2006).

121. Anderson v. Evans, 371 F.3d 475 (9th Cir. 2004).

122. Jarman et al., *supra* note 79.

123. 43 U.S.C.A. §§1331-1356a (West).

124. Mobil Oil Exploration & Producing Southeast, Inc. v. United States, 120 S. Ct. 2423, 30 ELR 20716 (2000); Amber Resources Co. v. United States, Nos. 02-30C, 04-1822C, 05-249C, 2005 WL 3112417 (Fed. Cl. Nov. 17, 2005).

125. 71 Fed. Reg. 11314 (Mar. 7, 2006).

126. Tribal Village of Akutan v. Hodel, 869 F.2d 1185 (9th Cir. 1988), *cert. denied*, Cowper v. Secretary of Interior, 493 U.S. 873 (1989); Massachusetts v. Andrus, 594 F.2d 872, 9 ELR 20162 (1st Cir. 1979).

127. Joanna Burger & Justin Leonard, *Conflict Resolution in Coastal Waters: The Case of Personal Watercraft*, 24 Marine Pol'y 61 (2000); Personal Watercraft Indus. Ass'n v. Dep't of Commerce, 48 F.3d 540, 25 ELR 20681 (D.C. Cir. 1995).

128. James N. Sanchirica et al., *Socioeconomic Implications of Siting Marine Reserves in United States Waters*, *in* Ocean Yearbook 19, *supra* note 24, at 208; Comm. on Evaluation, Design, and Monitoring of Marine Reserves and Protected Areas in the United States, Nat'l Res. Council, Marine Protected Areas: Tools for Sustaining Ocean Ecosystems (2000).

ful observation of outcomes.[129] An example is in-season fisheries quota reductions and closures based on accumulating catch statistics.[130] Monitoring outcomes should be linked legally to adaptive management responses by statute, agency regulation, or permit conditions as appropriate. Adaptive management also depends heavily on careful comparison of monitoring outcomes to scientific predictions. But ecosystem science is both relatively new and complex:

> The goal of sustainability is obviously desirable. . . . That it may more easily be applied to renewable rather than stock resources such as minerals is self-evident. Management for sustained yields of single renewable resources such as fisheries or forestry, as opposed to a more general notion of sustainable development, found its way into the practice of renewable resource use much earlier. If sustainability is extended from a single resource to the ecosystem(s) on which that resource relies, great difficulties are introduced. Ecosystem functions and components may change at different rates and in different directions while they are also influenced by forces outside the system. Simultaneous control or mastery over all of them is usually not attainable for physical, social, or economic reasons.[131]

Due to these scientific uncertainties, ecosystem-based management poses special challenges for the judicial review process discussed in the next section.[132] Many MPA management decisions will most likely use the precautionary approach mentioned above and discussed further below.

With all of these considerations in mind, the Western Pacific,[133] North Pacific,[134] South Atlantic,[135] and Pacific[136] fishery management councils developed proposals for incorporating MPAs into FMPs. In 2000, the Gulf of Mexico council designated two such areas to prevent overfishing, and the North Pacific council for several years has designated relatively small six-mile to 20-mile-diameter MPAs surrounding endangered Steller sea lion rookeries. Similarly, in 2001, the NMFS closed federal waters off the mouth of Delaware Bay to horseshoe crab fishing in order to prevent overfishing and provide declining migratory shorebirds with sufficient crab eggs to feed on. Much larger MPAs have been included in the Northwestern Hawaiian Islands National Monument created by President Bush on June 15, 2006,[137] in the Palmyra Atoll National Wildlife Refuge, and in the Oculina Bank Coral Habitat area off Florida's east coast. These federal initiatives represent the most significant use of the MPA concept outside the sanctuary system. Within the Channel Islands and Florida Keys national marine sanctuaries, special protected areas to control fishing have been designated. These uses of MPAs are consistent with a precautionary approach to scientific uncertainty in the management of fisheries.

E. Judicial Review of Regulatory Science

Marine resource management decisions with potentially significant economic or environmental consequences are frequently challenged in court under the U.S. laws mentioned in previous sections. In reviewing such agency decisions, a court bases its decision on the record that was developed by the agency in making that decision. Under U.S. administrative law, courts will typically defer to agency decisions that have a scientific basis unless they find the agency interpretation to be arbitrary and capricious.[138] Under the arbitrary and capricious standard, courts generally require agencies to be comprehensive in their choice of scientific studies used to reach a decision.[139] In developing its record, an agency might rely on research science, regulatory science, and/or agency research science. It might also choose to ignore scientific studies that might otherwise be relevant to the decisionmaking. For example, an agency that has available preliminary results of agency research study might refuse to consider the data because of the preliminary nature of the conclusions.[140] It may also overlook studies that are repetitive of ones already relied upon or studies the agency believes are outdated. An agency might refuse to act because of its belief that it lacks sufficient information to make an informed judgment.[141] Because of a judicial preference for comprehensiveness, an agency that ignores relevant research must put into the record its reasons for doing so or risk having its decision overturned by the court.[142] Even if the agency justifies its decision, the court could choose to reject the explanation and require the agency to reconsider, taking the ignored research into account.[143]

Thus, careful attention to judicial interpretation of statutory mandates is important in an agency's handling of science. For example, in an important interpretation of the SFA's restrictions on overfishing, a federal appeals court invalidated an NMFS summer flounder quota.[144] The court found that the quota was insufficiently protective of the species' viability, despite evidence of significant economic effects of further reductions in the quota.[145] Although the SFA requires the agency to minimize adverse economic effects, the court held that the Act's provision directed at overfishing took priority. Similarly, an FMP which utilizes regulatory science to justify significant economic impacts in order to reduce bycatch is likely to receive judicial support.[146]

Litigation in Hawaii over the impact of the lobster and bottomfish fisheries on the endangered Hawaiian monk seal

129. Pew Oceans Comm'n, Marine Pollution in the United States (2001).

130. Safina, *supra* note 37.

131. John E. Bardach, *Sustainable Development of Fisheries*, *in* Ocean Yearbook 9, at 57, 71 (Elisabeth Mann Borgese et al. eds., 1991).

132. In re the Water Use Permit Applications, 9 P.3d 409 (Haw. 2000).

133. 64 Fed. Reg. 32210 (June 16, 1999).

134. 65 Fed. Reg. 39342 (June 26, 2000).

135. 69 Fed. Reg. 309 (Jan. 5, 2004), 71 Fed. Reg. 46450 (Aug. 14, 2006).

136. Pacific Fishery Management Council, Information Sheet: Marine Reserves (2005), *available at* http://www.pcouncil.org/facts/mr.pdf.

137. *See* Proclamation No. 8031, 71 Fed. Reg. 36443 (June 15, 2006).

138. Administrative Procedures Act, 5 U.S.C.A. §706 (West); Massachusetts ex rel. Div. of Marine Fisheries v. Daley, 170 F.3d 23 (1st Cir. 1999).

139. Scenic Hudson Preservation Conference v. Federal Power Comm'n, 354 F.2d 608 (2d Cir. 1965).

140. Greenpeace Found. v. Mineta, 122 F. Supp. 2d 1123 (D. Haw. 2000).

141. *Id.*

142. Motor Vehicle Mfrs. Ass'n of the United States v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 13 ELR 20672 (1983).

143. *Mineta*, 122 F. Supp. 2d at 1123.

144. Natural Resources Defense Council v. Daley, 209 F.3d 747, 30 ELR 20532 (D.C. Cir. 2000).

145. *Id.*

146. A.M.L. Int'l v. Daley, 107 F. Supp. 2d 90 (D. Mass. 2000).

demonstrates that science that is sufficient in one context may not be in another.[147] In that case, the court ruled that the NMFS violated §7 of the ESA when it, among other things, failed to evaluate the impact of the Crustacean Fishery Management Plan on prey availability for the monk seals. The NMFS had declined to use preliminary data on the importance of lobsters in the diet of the seals: "[The] NMFS cannot speculate that no jeopardy to monk seals or adverse modification of their critical habitat will occur because it lacks enough information regarding the impact of the fishery on seals. . . . Such a conclusion is arbitrary and capricious."[148] However, the court found that the preliminary nature of the data did not support a claim for an illegal taking of monk seals by the lobster fishery under §9 of the ESA.[149]

The scientific information challenges faced in U.S. fisheries management are perhaps best illustrated by the SFA's mandate that all FMPs designate as EFH "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" as defined in §1802(10). Given the limitations of existing habitat data and the relatively short statutory timetable for making EFH designations, the regional fishery management councils, with the approval of the NMFS and the Commerce Department, have tended to rely on broad generic habitat designations, which have been challenged both successfully[150] and unsuccessfully[151] by environmental groups for their environmental inadequacy, and by commercial fishing groups fearing adverse habitat impacts.[152] So far, in these EFH cases, the courts have accepted the use of quite primitive regulatory sciences to meet tight statutory deadlines. The overfishing cases discussed in the next section suggest that the courts are less likely to be as deferential as council, the NMFS, and the Commerce Department as implementation of the SFA's EFH provisions expands.

Because U.S. marine resource agencies simultaneously implement a number of laws and, as illustrated above, the legal burdens under each law can differ, agencies must continually be aware of the statutory context in which their decisions to use or reject science are being made. To deal with situations of lack of adequate scientific data and to curb the chances that their decisions will be overturned by a court, some agencies are adopting the precautionary approach discussed in the next section.

F. The Precautionary Approach as a Response to Scientific Uncertainty in Marine Resources Management

As formulated in the 1995 Fish Stocks Agreement, the precautionary approach instructs nations to "be more cautious when information is uncertain, unreliable or inadequate. The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures."[153] The precautionary approach is included in other important international agreements regarding marine resource management that the United States has signed, including the 1995 FAO Code of Conduct for Responsible Fisheries[154] and the 1996 Protocol to the London Dumping Convention.[155] The precautionary approach switches the burden of scientific proof for initiating policy responses from those who want to restrict a potentially harmful activity to those who want to initiate or continue the activity. In the many resource management situations where the best available scientific information includes significant uncertainties, the precautionary approach steers decisions toward regulatory disapproval pending resolution of important uncertainties. Thus, whether to adopt a precautionary approach to decisionmaking is in itself a key policy decision for legislators and agency policymaking staff.

NMFS regulations and guidelines implementing the SFA tend to authorize a precautionary approach without mandating it. Specific NMFS and fishery management council decisions utilizing a precautionary approach to avoid overfishing are receiving judicial support,[156] while those that pose significant risks of overfishing are being judicially invalidated.[157] Supported by most[158] but not all recent studies and academic commentary on U.S. fisheries management as well as NMFS guidance documents, the precautionary approach can be expected to spread from overfishing[159] to bycatch reduction,[160] EFH, and management of the impacts of new fishing gear. Eventually, the precautionary approach may become a relatively routine part of council,[161] NMFS,[162] and Commerce Department decisionmaking pursuant to the statutory national standards for fisheries management in MSFCMA §1851.[163]

As reviewed above, the statutory frameworks and judicial decisions involving marine mammal and endangered species protection also incorporate a precautionary approach

147. *Mineta*, 122 F. Supp. 2d at 1123.

148. *Id.* at 1133.

149. *Id.* at 1134.

150. American Oceans Campaign v. Commerce Dep't, 52 Env't Rep. Cas. (BNA) 1087 (D.D.C. 2000).

151. Conservation Law Found. v. Mineta, 131 F. Supp. 2d 19 (D.D.C. 2001); Oceana v. Evans, 384 F. Supp. 2d 203 (D.D.C. 2005).

152. Cape Cod Commercial Hook Fishermen's Ass'n v. Daley, 30 F. Supp. 2d 111 (D. Mass. 1998).

153. U.N. Fish Stocks Agreement, art. 6(2), *supra* note 8, 2167 U.N.T.S. at 93.

154. Code of Conduct for Responsible Fisheries, Oct. 31, 1995, U.N. FAO, Code of Conduct for Responsible Fisheries (1995).

155. 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, Nov. 7, 1996, 36 I.L.M. 1.

156. Southeastern Fisheries Ass'n v. Mosbacher, 773 F. Supp. 435 (D.D.C. 1991).

157. A.M.L. Int'l v. Daley, 107 F. Supp. 2d 90 (D. Mass. 2000); Natural Resources Defense Council v. Daley, 209 F.3d 747, 30 ELR 20532 (D.C. Cir. 2000).

158. Ecosystem Principles Advisory Panel, NMFS, *supra* note 98; Comm. on Ecosystem Mgmt. for Sustainable Fisheries, Nat'l Res. Council, *supra* note 35; Hanna et al., *supra* note 114; *Stanford Fisheries Policy Project Studies Use of Science in Management Decision Making*, The Natural Resource (Envtl. & Natural Resources Law & Policy Program, Stanford Law Sch., Stanford, Cal.), Summer 2001, at 1, 6.

159. NMFS, Technical Guidance on the Use of Precautionary Approaches to Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act (NOAA Technical Memorandum NMFS-F/SPO-31, 1998).

160. 50 C.F.R. §600.350(d).

161. Pacific States Marine Fisheries Comm'n, 52nd Annual Report of the Pacific States Marine Fisheries Commission for the Year 1999 (1999).

162. NMFS, NOAA Fisheries Strategic Plan (1997).

163. 50 C.F.R. ch. 600, subpt. D; 63 Fed. Reg. 24212 (May 1, 1998).

favoring decisions protecting those species and their habitat where scientific uncertainty exists about possible adverse impacts on them.[164] And over time, due in part to the influence of international marine resource agreements to which the United States is a party, U.S. legislation governing marine pollution, navigation,[165] and the management of nonliving marine resources will become increasingly precautionary in approach.

While some resource user groups may be slow to embrace precautionary approaches, given the increased likelihood of delays in access to resources and decreased rates of exploitation when access is allowed, there may be offsetting benefits in the form of greater predictability and transparency[166] in marine resource management decisionmaking:

> The precautionary principle (or approach) is grounded in science and is not an ill defined concept with an arbitrary definition. There is sometimes a perceived lack of scientific integrity in the precautionary principle and critics site [sic] an absence of objectivity and a political nature that lies outside the bounds of good science. However, such criticism is based on a poor understanding of the purpose of the precautionary principle, which is to provide a holistic decision making process and not to pretend to provide a scientific "answer." Science is not rejected, and the need for as much sound scientific information as possible is recognized. In fact, the precautionary approach to environmental protection begins with science, but it also takes into account the limitations of that science and provides guidance for making decisions on the basis of both what is and what is not known, and what are the desired long-term results (environmental, human health, economic and social) of those decisions.[167]

Furthermore, once implemented, precautionary approaches are not immune from political and judicial review. The U.S. Constitution does not mandate that public sector marine resource management decisions favor either environmental protection or resource exploitation. Irrational claims of scientific uncertainty will be judicially invalidated,[168] and the switching of the burden of proof built into the precautionary approach can be changed either by a majority legislative vote or by agency formal or informal rulemaking processes where precautionary approaches have been instituted as a matter of agency policy.

At this time, the decidedly mixed track record of the United States in managing marine resources on a sustainable basis justifies the switch in the burden of proof inherent in the precautionary approaches to scientific uncertainty. Coupled with the related international environmental norms of fully internalizing the externalities of resource utilization while protecting biodiversity, further implementation of precautionary approaches will put U.S. marine resource management on more sustainable paths supportable by the scientific, legal, policymaking, and marine resource user communities. Furthermore, implementation of precautionary approaches may encourage user group contribution to the cost of resolving or at least narrowing scientific uncertainty in particular management decisions, consistent with the "user-pays" philosophy inherent in the norm of fully internalizing the externalities of resource use. Finally, the precautionary approach can give agency personnel a zone of comfort in dealing with scientific uncertainties involved in their marine resource management decisions.

G. Ocean Commission Recommendations and Pending Legislation

Further steps toward U.S. fisheries sustainability are supported by the recent reports of the Pew Oceans Commission[169] and U.S. Ocean Policy Commission,[170] the Presidential Action Plan[171] and Joint Ocean Commission Initiative[172] following up on those reports, and pending legislation to amend the SFA.[173] Both the Pew and U.S. Ocean Policy Commissions called on Congress to strengthen the role of science in fisheries management decisions by having independent scientists set the allowable catch rates. Both commissions supported a transition toward ecosystem-based management of fisheries and the use of greater precaution in dealing with scientific uncertainties. In addition, the U.S. commission urged Congress to broaden public representation on regional fishery management councils and to increase collaborative research between fishermen and scientists to reduce fishing impacts on ocean ecosystems. The chairs of the two commissions, Leon Panetta and Admiral James Watkins, have formed the Joint Ocean Commission Initiative to follow up on the recommendations of their respective commissions. Both commission reports, the Presidential Action Plan, and the Joint Oceans Commission Initiative support U.S. accession to UNCLOS.

Pending Senate Bill 2012[174] would also authorize the regional fishery management councils to consider a variety of ecological factors affecting fish populations, require a study on the state of ecosystem science, and authorize the NMFS to support regional ecosystem pilot projects. Proposed amendments to NEPA would reduce the role of the federal environmental impact statement process as a tool supporting integrated management of multiple ocean uses in the U.S. EEZ. With regard to marine protected species, proposed amendments to the ESA would significantly reduce its role in achieving integrated management of living re-

164. Brower v. Daley, 93 F. Supp. 2d 1071 (N.D. Cal. 2000).

165. Richard G. Hildreth et al., *Evaluation of the* New Carissa *Incident for Improvements to State, Federal, and International Law*, 16 J. Envtl. L. & Litig. 81 (2001).

166. Bache, *supra* note 118.

167. Boyce Thorne-Miller, *The Precautionary Approach in International Agreements on the Marine Environment*, *in* Moving Ahead on Ocean Governance, *supra* note 35, at 25, 26.

168. Symposium, *The Daubert Gate: Managing and Measuring Expertise in an Age of Science, Specialization, and Speculation*, 57 Wash. & Lee L. Rev. 661 (2000).

169. The reports of the Pew Oceans Commission can be accessed by going to the Commission's website, http://www.pewoceans.org/, and following the link to the Pew Charitable Trusts website (last visited Sept. 18, 2006).

170. The reports of the U.S. Commission on Ocean Policy are available on the Commission's website, http://www.oceancommission.gov (last visited Sept. 18, 2006).

171. U.S. Ocean Action Plan: The Bush Administration's Response to the U.S. Commission on Ocean Policy (Dec. 17, 2004), http://ocean.ceq.gov/actionplan.pdf (last visited Sept. 18, 2006).

172. Joint Ocean Commission Initiative, http://www.jointoceancommission.org/ (last visited Sept. 18, 2006).

173. Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006, S. 2012, 109th Cong. (2006).

174. *Id.*

sources and their habitat. An administration-supported marine aquaculture bill, S. 1195, does not integrate the management of marine aquaculture with other ocean uses including commercial and recreational fishing.[175] Such integration might be performed by the executive branch Committee on Ocean Policy established by Executive Order No. 13366.[176] However, proposed amendments to the MMPA would not significantly weaken that Act's protection of marine mammals from incidental takes occurring as part of fishing activities. Pending further congressional and presidential action on these and other legislative proposals, the most thorough and up-to-date assessment of current U.S. ocean laws and programs is contained in Appendix 6 to the U.S. Commission on Ocean Policy's final report.[177]

IV. Conclusion

Pursuant to the SFA, fishing in the U.S. EEZ is being carried out more sustainably than in the past. Thus the SFA legitimately can be regarded as the most significant federal environmental legislation enacted in the last two decades. It is a model for how to operationalize international environmental principles emphasizing biodiversity protection, externality internalization, and a precautionary approach to resource use.

175. National Offshore Aquaculture Act of 2005, S. 1195, 109th Cong. (2005).

176. Exec. Order No. 13366, 69 Fed. Reg. 76591 (Dec. 17, 2004), *reprinted in* 33 U.S.C.A. §857-19 (West).

177. U.S. Comm'n on Ocean Policy, Review of U.S. Ocean and Coastal Law: The Evolution of Ocean Governance Over Three Decades: Appendix 6 to the Final Report (2005), *available at* http://www.oceancommission.gov/documents/full_color_rpt/append_6.pdf.