

Whales, Submarines, and Active Sonar

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Elisabeth Mann Borgese devoted her professional life to promoting awareness about the ocean and building regimes to protect fragile marine ecosystems. This article examines a new acoustic military use of the ocean, which potentially threatens all ocean creatures, and explains how existing principles of international law and treaty regimes apply to this activity.

Professor Van Dyke worked with Elisabeth at the Center for the Study of Democratic Institutions in Santa Barbara, California in 1969–1970, where she introduced him to the emerging efforts to develop a global regime to govern ocean resources and stimulated his early interest in this topic by inviting him to the 1970 *Pacem in Maribus* meeting in Malta. Dr. Morgan worked closely with Elisabeth as co-editor of the *Ocean Yearbook* for Volumes 7–14, and Ms. Gardner was assistant editor of the *Yearbook* for Volume 12. Research support for this paper was provided by the Ocean Mammal Institute.

INTRODUCTION

On 15 July 2002, the U.S. National Marine Fisheries Service (NMFS) exempted the U.S. Navy's Low Frequency Active Sonar (LFAS) program from the requirements of the Marine Mammal Protection Act after determining that its operation would have a "negligible impact" on any species.¹ NMFS thus authorized the Navy to use two ships to transmit low frequency active sonar in about 75 percent of the world's oceans (exempting the polar ex-

1. K. R. Weiss, "Sonar Approved Despite Possible Risks to Whales," *Honolulu Advertiser*, 16 July 2002; M. Kaufman, "Navy Cleared to Use a Sonar Despite Fears of Injuring Whales," *Washington Post*, 16 July 2002, <http://www.commondreams.org/headlines02/0716-06.htm> (accessed 19 July 2002).

tremes). Ten weeks later, in late September 2002, 15 Cuvier's beaked whales beached on the Canary Islands at the same time the U.S. destroyer *Mahan* was maneuvering in the area with ships from nine other members of the North Atlantic Treaty Organization.² Autopsies of the whales revealed brain damage consistent with an acoustic impact.³ This mass stranding followed similar incidents near the Bahamas in March 2000 and Greece in 1996, and in the Canaries between 1985 and 1989, which are described later and which were followed by another incident in the Haro Strait near Vancouver Island.⁴

The NMFS approval of the Navy's use of LFAS was challenged by the Natural Resources Defense Council and other organizations in 2002, leading to a determination by Federal Magistrate Judge Elizabeth D. LaPorte that NMFS had violated federal law in a number of respects, but that the Navy should be permitted to continue with some limited testing because of the strong national security interest involved.⁵ On August 26, 2003, Judge

2. Nine Cuvier's beaked whales were found dead on 24–25 September 2002 on the Canary Islands of Fuerteventura and Lanzarote. Six beached whales were pushed back into the sea, and another two were seen floating lifeless in coastal waters. Ships from Belgium, Canada, France, Germany, Greece, Norway, Portugal, Turkey, the United Kingdom, and the United States were conducting a multinational exercise known as Neo Tapon 2002 designed to practice securing the Strait of Gibraltar. The Cuvier's beaked whale is a toothed cetacean that ranges from 5 to 8 meters in length. J. Socolovsky, "Investigation Points to NATO Exercise in Mass Whale Beaching," *Associated Press*, 10 October 2002, posted at the Web site of the Environmental News Network, http://www.enn.com/news/wire-stories/2002/10/10102002/ap_4866.

3. *Ibid.* (quoting a researcher as saying that the "the only cause which we cannot rule out . . . is acoustic impact").

4. See text at (n. 18, 21 and 24–7 below). On 5 May 2003, the U.S. Navy's guided-missile destroyer *USS Shoup* tested mid-range sonar for five hours in the Haro Strait near Vancouver Island, sending out pings louder than 200 dB, which caused a pod of 22 killer whales and a minke whale to stop their feeding and form into a tight group as far from the sound as possible and then flee the region. The dead carcasses of eight harbor porpoises washed ashore in the days after this test, and subsequent investigations indicated that they had suffered severe trauma to their brains. Tracy Vedder, "This Is Another Smoking Gun," KOMO TV, 8 August 2003, <http://www.komotv.com/news/printstory.asp?id=26542> (accessed 28 August 2003); Robert McClure, "Tests on Marine Mammals to Look for Sonar Link to Injuries," *Seattle Post-Intelligencer*, 12 July 2003, http://www.seattlepi.nwsourc.com/local/130609_sonar12.html (accessed 28 August 2003); Peggy Anderson, "Did Navy Tests Kill Porpoises?" CBSNEWS.com, 23 July 2003, <http://www.cbsnews.com/stories/2003/07/23/tech/main564700.shtml> (accessed 28 August 2003).

5. Natural Resources Defense Council, Inc. v. Evans, No. C-02-3805-EDL (N.D.Cal., Opinion and Order on Cross-Motions for Summary Judgement, 26 August 2003); Judge LaPorte's earlier Opinion and Order Granting Plaintiff's Motion for a Preliminary Injunction was issued 31 October 2002 and published at 232 F.Supp.2d 1003 (N.D.Cal. 2002). Judge LaPorte ruled that NMFS had violated the Marine Mammal Protection Act of 1972, 16 USC Chapter 31, the National Environmental Policy Act of 1969, 42 USC secs. 4321 et seq., and the Endangered Species

LaPorte issued a permanent injunction blocking the broad permit issued by NMFS, holding that it had violated several federal statutes and explaining that “the extremely loud and far traveling naval sonar system” maintains its “sound pressure level of approximately 140 dB more than 400 miles from the [transmitting] vessel” and covers broad areas because it “bounces from the ocean bottom to the surface and back again.”⁶ She stressed that NMFS and the Navy had ignored relevant studies, such as one prepared by Great Britain’s Defense Research Agency, which reported that fish exposed to LFAS “suffered internal injuries at 160 dB, eye damage at 170 dB, auditory damage at 180 dB, and transient stunning at 190 dB.”⁷ The injunction requires the Navy to extend its coastal buffer zone from 12 to at least 43 nautical miles offshore (except in certain limited areas where coastal training is required), to use aerial surveys or observational vessels to monitor for nearby species when operating close to shore, and also to avoid areas of the deep ocean where marine mammals and other endangered species such as sea turtles are migrating, breeding, feeding or clustering. The court’s opinion instructs the parties to meet together to agree on limited areas where the Navy’s testing can continue.⁸

Act of 1973, 16 USC Chapter 35.

In her October 2002 opinion, Magistrate Judge LaPorte had explained that: “It is undisputed that marine mammals, many of whom depend on sensitive hearing for essential activities like finding food and mates and avoiding predators, and some of whom are endangered species, will at a minimum be harassed by the extremely loud and far traveling LFA sonar.” 232 F.Supp.2d at 1053. Although Magistrate Judge LaPorte found that the Navy’s activities violated three federal statutes designed to protect the marine environment, she accepted the testimony of the NMFS experts regarding the impact of LFAS on marine mammals over the sharply conflicting testimony presented by the plaintiff’s experts. Judge LaPorte wrote that: “The law is clear . . . that when qualified experts on both sides reach carefully reasoned but different conclusions, the Court must defer to the agency’s experts. . . .” Order of 26 August 2003, slip op. at 49; also at 232 F.Supp.2d at 1017. Other courts dealing with ocean environmental issues have taken a more skeptical view of the scientific opinions offered by federal agencies. See, for example, *Natural Resources Defense Counsel v. Daley*, 209 F.3d 747, 755, 754 (D.C. Cir. 2000) (explaining that courts “do not hear cases merely to rubber stamp agency actions” and criticizing the agency’s scientific conclusions as ones that could only be correct in “*Superman Comics’ Bizarro world, where reality is turned upside down*”); *Greenpeace v. National Marine Fisheries Service*, 106 F.Supp.2d 1066 (W.D.Wash. 2000) (where the court treated the views of the two sides’ experts as having equal credibility and issued the injunction sought by plaintiffs despite the contrary testimony of the agency’s experts).

6. *Ibid.*, Order of 26 August 2003, slip op. at 3, 11.

7. *Ibid.*, slip op. at 40 (citing a 1994 study by Dr. Turnpenny entitled “The Effects on Fish and Other Marine Mammals of High-Level Underwater Sound”).

8. After the court’s October 2002 order issuing a preliminary injunction, 232 F.Supp.2d 1003 (N.D.Cal. 2002), the parties reached an agreement allowing the Navy to test its sonar in an area of the Western Pacific extending from Saipan in the Commonwealth of the Northern Mariana Islands, to Japan’s Bonin Islands, south of Tokyo. D. Kravets, “U.S. Navy Agrees to Temporarily Limit Testing of New Sonar

About the same time, U.S. Magistrate Judge James Larson, also in Northern California, issued a temporary restraining order blocking geographers from the National Science Foundation, Columbia University, and the Georgia Institute of Technology from “using an array of twenty airguns to fire extremely high energy acoustic bursts into the ocean to generate geophysical data in the Gulf of California” with sound blasts “as high as 263 decibels (dB) at the source,” which had apparently killed “[a]t least two Cuvier beaked whales (*Ziphius cavirostris*), a species particularly susceptible to acoustic trauma.”⁹ Judge Larson noted that: “These levels are significantly higher than 180 dB, which is acknowledged by the Government to cause significant injury to marine mammals.”¹⁰

In January 2003, U.S. District Judge Samuel Conti of the Northern District of California made an additional ruling against sonar use, blocking experiments (authorized by NMFS) that were to be conducted by Woods Hole Oceanographic Institution scientist Dr. Peter Tyack to determine the effect of the sound on the gray whales migrating along the West Coast of California to their winter grounds along the coast of Mexico.¹¹ Judge Conti ruled that because the permits involved “major amendments” to the original project, which had generated “public controversy,” it was necessary to conduct a proper environmental impact assessment under the National Environmental Policy Act before undertaking the experiments. In the process of “balancing” the “harms” to determine whether to issue an injunction, Judge Conti noted that the population of gray whales had been dropping since 1984 (from 21,942 individuals to 17,414) and that “Dr. Tyack’s proposed experiments might inflict unacceptable levels of harm on the gray whales.”¹²

Because of the new acoustic technologies created by the Navy and other researchers, the creatures living in the world’s oceans are now facing a new form of pollution, justified by the Navy as militarily necessary, but with enormous and untested destructive potential. The controversy surrounding the use of sonar and other acoustic devices in the oceans is certain to continue into the future, and will trigger challenges by other nations and nongovernmental organizations. The three cases described earlier indicate that proper enforcement of U.S. environmental laws may protect the marine environment from the dangers posed by LFAS. But if these laws should prove to be inadequate, or if Congress should exempt LFAS from U.S. environmental

System Amid Marine Life Concerns,” *Associated Press* (18 November 2002), <http://www.planetsave.com/ViewStory.asp?ID=3299> (accessed 2 March 2003).

9. Center for Biological Diversity v. National Science Foundation, No. C02-5065 JL, 2002 WL 31548073 (N.D. Cal., Temporary Restraining Order, 30 October 2002), slip op. at 2–3.

10. *Ibid.*, p. 3.

11. Hawaii County Green Party v. Evans, No. C-03-0078-SC (N.D. Cal., Order Granting Permanent Injunction, 24 January 2003).

12. *Ibid.*, slip op. at 24.

laws that would otherwise govern,¹³ other countries and groups concerned about the impact of this technology on their marine resources, and the ocean environment generally, will be obliged to utilize international law principles and tribunals to limit the use of low frequency active sonar by the navies and scientists of the United States and other countries. The sections that follow examine the scientific information now available about the impact of LFAS on the marine environment, address the military and scientific arguments in favor of its use, and analyze possible international strategies that might be pursued to challenge it.

THE EFFECTS OF LOW FREQUENCY ACTIVE SONAR ON MARINE BIOTA

The ocean has always been a noisy place. For billions of years, natural sounds produced by wind, waves, precipitation, ice, seismic events, and marine organisms defined the ocean's acoustic milieu. The auditory sensitivities of marine organisms surely evolved in the presence of these sounds and over time species became specially adapted to deal with the ambient sounds of the ocean environment.¹⁴

During the last 2 centuries, humans have significantly added to the ocean's array of sounds with the introduction of machine-driven commercial and military ships and the active exploitation of the hydrocarbons in the ocean floor. Only recently has much consideration been given to the impacts these sounds could be having on the life forms that inhabit the sea. A particular concern has arisen for marine mammals, many of which use sound as their primary sense, to communicate, to navigate, and to detect predators and prey.

The U.S. Navy's Surveillance Towed Array Sensor System (SURTASS) Low Frequency Active Sonar (LFAS) will employ very loud low-frequency sounds (less than 500 Hz with intensity levels as great as 230 dB re 1 μ Pa at 1 m¹⁵), posing a significant threat to the safety and welfare of marine mam-

13. The U.S. Navy received, for instance, a congressional exemption from the requirements of the Migratory Bird Treaty Act of 1918 to permit it to continue live-fire military training exercises on the island of Farallon de Medinilla, near Saipan, in the Commonwealth of the Northern Mariana Islands. D. DePledge, "Navy Freed from Bird Protection Act," *Honolulu Advertiser*, 14 November 2002, at A11, col. 4. See also J. McQuaid, "Fight Brews Over Environmental Law; Bush Officials Consider Policy to Exempt Oceans," *Times-Picayune* (New Orleans), 16 August 2002, p. 5.

14. National Research Council, Committee on Low-Frequency Sound and Marine Mammals, *Low-Frequency Sound and Marine Mammals: Current Knowledge and Research Needs* (Washington, D.C.: National Academy Press, 1994), p. 2.

15. Although the Navy refuses to release the maximum source level of SURTASS LFAS, claiming it to be classified information, reports indicate the maximum source level to be 230 dB re 1 μ Pa. See "Quiet please. Whales navigating," *The*

mals, and possibly to other forms of marine life as well. The transmitted sound will be about 215 dB at its source, arrayed in a manner to have “an effective source level” of 230–240 dB. According to the Navy’s environmental impact statement (EIS), the sound dispersion would vary somewhat according to the geography and environment but would generally be at the 180 dB level 1 km from the source, at 173 dB 2 km from the source, about 165 dB 40 nautical miles (M) from the source, at the 150–160 dB level up to 100 M from the source, and some 140 dB 400 M from the source vessel.¹⁶ (Decibel levels are logarithmic in nature, so that a sound of 180 dB is 10 times as intense as one of 170 dB.) The sounds are not transmitted uniformly in all directions from the source, but travel in a beam that is a few hundred feet in width, which tends to expand as it leaves its source.¹⁷ These sounds are the loudest ever put into the world’s oceans by humans, with the possible exception of underground explosions. They are designed to travel great distances and are audible by humans in the water 1000 km away without any signal processing.

The threat of this active sonar to marine mammals first became evident in 1996 when an unusual stranding event took place involving 12 Cuvier’s beaked whales in the Mediterranean Sea near Greece that coincided temporally and geographically with “sound detecting system trials” of LFAS by the NATO research vessel *Alliance*. The whales were exposed to sound transmitted from at least 25 km away, which was determined to have reached them at the 150–160 dB re 1 μ Pa at 1 m level after 238 short four-second pings of sound were released, and which caused severe tissue damage to their ear cavities.¹⁸ Cuvier’s beaked whales are a deep-diving pelagic species that rarely strands. Only seven cases of more than four individuals stranding have been recorded since 1963.¹⁹ One commentator concluded that the probability that the mass stranding was not related to LFAS testing was less than 0.07 percent.²⁰ Moreover, three mass strandings involving similar species were also associated with military maneuvers in the Canary Islands between 1985 and 1989, and in 1983²¹ sperm whales in the southeast Caribbean became

Economist (7 March 1998): 85 and A. Frantiz, “Does military testing strand whales?” *Nature* 352 (5 March 1998): 29.

16. See *Natural Resources Defense Council v. Evans*, No. C-02-3805 EDL, 2002 WL 31445165 (N.D.Cal., Opinion and Order Granting Plaintiffs’ Motion for a Preliminary Injunction, 31 October, 2002), slip op. at 12, 28.

17. *Ibid.*, at 28.

18. See generally, Joint Interim Report Bahamas Marine Mammal Stranding Event of 15–16 March 2000. U.S. Dept. of Commerce and Secretary of the Navy. December 2001, http://www.nmfs.noaa.gov/prot_res/overview/Interim_Bahamas_Report.pdf (accessed 28 August 2003).

19. Frantiz (n. 15 above).

20. *Ibid.*

21. M. P. Simmonds and L. F. Lopez-Jurado, “Whales and the military,” *Nature* 351 (6 June 1991): 448.

“unusually silent and dispersed” when exposed to intense military sonar from submarines operating in the area.²²

Because of the way sound is measured and the different speed that sound travels through water, as compared to land, it is estimated that “underwater sound pressure levels numerically are about 61.5 dB greater than sound pressure levels in air for an equal intensity.”²³ In other words, sound measured at 131 dB in water would have the same pressure impact as sound measured at 70 dB on land (60 dB on land is the sound generated by freeway traffic). Continuous exposure above 85 dB (on land) is likely to degrade the hearing of most humans. “Deafening” noise (on land) begins at 110 dB, with 120 dB measuring a hard rock band, 130 dB being the point at which pain is registered, and 140 dB being the point adjacent to a jet engine. The 180 dB (in water) figure said by the Navy to be “safe” for cetaceans would thus affect them at about the same extent as human hearing would be affected by standing next to a hard rock band at a rock concert, if we can assume that the hearing system of cetaceans is roughly comparable to ours.

Following the 1996 experience of the atypical mass stranding of beaked whales in the Mediterranean, efforts have been made to collect the ears of stranded animals that coincided with the nearby use of LFAS and other sonar devices. In March 2000, 17 whales of four different species, including Cuvier’s beaked whales, two minke whales, and a dolphin stranded in the Bahamas in March 2000 as a result of tactical mid-frequency sonar transmitted from U.S. Navy vessels. The whales were exposed to sounds transmitted at the 223–235 dB re 1 μ Pa at 1 m level, with pings transmitted every 24 seconds over a 16-hour period, which were thought to have reached the whales at the 165 dB level.²⁴ (LFAS transmissions will be of longer duration and have more energy; its pings will last between 6 and 100 seconds and will be repeated every 6 to 15 minutes). Scientists found hemorrhaging around the brain and ear bones of the beached cetaceans, injuries consistent with exposure to extremely loud sounds. Eight of the stranded whales died, and other whales probably sank to the sea floor before they had a chance to strand.²⁵ The Navy has admitted that the Bahamas stranding and related

22. W. A. Watkins, K. E. Moore, and P. Tyack, “Sperm whale acoustic behaviors in the Southeast Caribbean,” *Cetology* 49 (1985): 6.

23. R. C. Gisiner, “Proceedings, Workshop on the Effects of Anthropogenic Noise in the Marine Environment, 10–12 February 1998” (Marine Mammal Science Program, Office of Naval Research, 1988), p. 24.

24. *Natural Resources Defense Council v. Evans*, No. C-02-3805 EDL, 2002 WL 31445165 (N.D.Cal., Opinion and Order Granting Plaintiffs’ Motion for a Preliminary Injunction, 31 October 2002), slip op. at 5 (citing the Navy task force’s analysis of the incident).

25. Those whales whose ability to navigate was most severely damaged by the sonar would have died before they were able to make it to the nearest beach.

deaths “were most likely caused by its [mid-range] sonar transmissions,”²⁶ but contends that LFA sonar will affect whales differently. The Navy claims that mid-range sonar can be heard over shorter distances by many marine mammals, while LFA sonar can travel several hundred miles but is audible to fewer species.²⁷

Because the Navy intends to deploy SURTASS LFAS globally, an Overseas Environmental Impact Statement and an Environmental Impact Statement (OEIS/EIS) was required under the authority of the National Environmental Policy Act, prior to the Navy’s use of the technology. As part of the process of preparing the OEIS/EIS, the Navy sponsored a three-phase marine mammal research program (MMRP) to determine how representative marine mammals responded to LFAS transmissions. Phase I of the program focused on blue and fin whales and was conducted off San Nicolas Island in southern California from 5 September through 21 October 1997. Phase II focused on migrating gray whales off central California and was conducted from 8 through 27 January 1998. Phase III was conducted off the northwest coast of the Big Island of Hawaii from 26 February through 31 March 1998 and focused on male humpback whales. An environmental assessment was prepared prior to each phase of this research.

Results from each of the three phases of the LFAS MMRP indicated that the technology did have an effect on each of the representative marine mammal groups tested. The results of Phase I, in which fin and blue whales were exposed to less than full-scale LFAS sound transmissions, indicated a decrease in vocal behavior by approximately 50 percent in blue whales and approximately 30 percent in fin whales.²⁸ The findings from Phase II, in which gray whales migrating nearshore were exposed to LFAS source levels of 185 dB re 1 μ Pa at 1 m, and 170 dB re 1 μ Pa at 1 m (both substantially lower than the actual source level that will be utilized by the Navy), demonstrated an obvious avoidance response to the LFAS signal, particularly at the higher source level of 185 dB where whales deviated 1 km from the source.²⁹ The extent of deviation from the source was less at the lower

26. Center for Biological Diversity v. National Science Foundation, No. C02-5065, 2002 WL 31548073 (N.D.Cal., Temporary Restraining Order, 30 October 2002), slip op. at 8.

27. “Navy Deployment of Sonar Protested,” *Honolulu Advertiser*, 6 September 2001, p. A6.

28. C. W. Clark, P. Tyack, and W. T. Ellison, “Quicklook, Low-Frequency Sound Scientific Research Program, Phase I: Responses of Blue and Fin Whales to SURTASS LFA, Southern California Bight, 5 September B 21 October, 1997” (27 February 1998), pp. 30–1, Figure 28.

29. P. Tyack and C. Clark, “Quicklook Phase II, Playback of Low-Frequency Sound to Gray Whales Migrating Past the Central California Coast, January 1998” (23 June 1998), pp. 22–5, Figures 7–9. Gray whales migrating further offshore did not display the same response.

source levels tested, but apparent nonetheless.³⁰ In addition, observations of sea otters near the LFAS Phase II playback site suggested a reduction in the rate of foraging success of about 11 percent and an increase in dive times by about 11 percent when all dives during acoustic playback were pooled.³¹ Similar to Phase I, the results of Phase III indicated a reduction of vocal activity in male humpback whales exposed to less than full-scale LFAS signals.³² Of 17 male humpback whales tested, 10 individuals stopped singing when exposed to received levels of the LFAS signal ranging from 121 to 151 dB re 1 μ Pa.³³ Four of the whales that stopped singing joined other whales during the transmissions, suggesting they may be trying to maintain normal social interactions or bonding for protection.³⁴ The evidence suggested that the humpback whales avoided the LFAS sound source in addition to stopping their singing.³⁵

The biological significance of these changes in behavior and distribution in response to the LFAS signal cannot be summarily dismissed. Singing and migration are linked to courtship and mating activities. Disruption of these behaviors could potentially impact the reproductive success of individuals, and ultimately the size of a population. Thus, the possibility that the LFAS signal could have long-term adverse effects on marine mammal populations cannot be ruled out, particularly in the case of small populations. A U.S. Navy press release following Phases I and II of LFAS MMRP stated that although "behavioral responses were observed, none raised concern about the potential harm to animals during the playback experiments."³⁶ This statement is insensitive to the potential long-term impacts the disruption of courtship and migratory activities could have on a marine mammal population. If such disruptions were widespread throughout a particular habitat, they could have a greater impact on a population overall than that of a few individuals being harmed as a result of exposure to the full-scale sound source.

It is also important to emphasize that none of the three phases of the LFAS MMRP exposed animals to the sound source at the level the Navy actually plans to utilize. Scientists leading the MMRP explained that less-than-full-scale sound signals were used because it was critical to evaluate how animals thought to be particularly sensitive would respond to sonar at

30. *Ibid.*

31. *Ibid.*

32. C. Clark and P. Tyack, "Quicklook, Low-Frequency Sound Scientific Research Program, Phase III: Responses of Humpback Whales to SURTASS LFA off the Kona Coast, Big Island, Hawaii" (31 August, 1998), p. 24, figure 15.

33. *Ibid.*

34. *Ibid.*

35. *Ibid.*

36.. "Navy and Scientific Community Conduct Low Frequency Sound Research," United States Navy Pacific Fleet Public Affairs Office (March 4, 1998).

received levels potentially well below those thought to pose a risk of harm, and that the best way to evaluate the risk of behavioral disruption is by experiments that carefully control the sound level.³⁷ Given that all three groups of marine mammals tested displayed behavioral and/or distributional changes upon exposure to less-than-full-scale LFAS, it is highly probable that they will have additional and more dramatic responses to the full-scale sound source, and that other species will be affected as well. In fact, the Navy has assumed that 95 percent of the whales would be at risk of experiencing a biologically significant behavioural reaction if exposed to the LFAS at 180 dB, that 70 percent to 75 percent would be at risk of being “taken” if exposed to 173 dB, and that 50 percent would be at risk if exposed to 165 dB.³⁸

The mass strandings in the Bahamas, the Canaries, and the Mediterranean coupled with the results of the MMRP establish that LFAS and other forms of active sonar are harmful to marine mammals. Because the MMRP focused on such a small sampling of species it is not possible to rule out indirect effects on marine mammal populations resulting from adverse effects of LFAS on their species of prey. Laboratory evidence strongly suggests that high intensity sounds may affect the egg viability and growth rates of fish and invertebrates.³⁹ It is important to recognize that adverse effects experienced at one level of the marine food chain may have repercussions throughout the chain as the delicate balance of predators and prey becomes disrupted. The LFAS MMRP, which involved three separate studies, lasted only 6 to 8 weeks in duration, and examined the effects on five species to less than full-scale LFAS signals, was insufficient to rule out adverse impacts from exposure to full-scale transmissions to the species tested or to other components of the ecosystem. It has been suggested, because the MMRP exposed whales to sounds that were much lower intensity than full-scale LFAS transmissions, that the research was designed to yield results indicating that the technology had no significant impact on marine mammals.

In any event, the National Marine Fisheries Service did exempt the LFAS system from the Marine Mammal Protection Act in July 2002, after determining it would have a “negligible impact” on any species.⁴⁰ This conclusion is directly contrary to the results of the MMRP, which showed that

37. P. Tyack, “Comments on Low-Frequency Playback Experiments to Singing Humpback Whales in Hawaiian Waters in Phase III of the LFA Marine Mammal Research Program” (MARMAM, 9 June 1998).

38. Natural Resources Defense Council v. Evans, No. C-02-3805 EDL, 2002 WL 31445165 (N.D.Cal., Opinion and Order Granting Plaintiffs’ Motion for a Preliminary Injunction, 31 October 2002), slip op. at 4, 49–50 (quoting from Declaration of Dr. Kurt Fristrup).

39. National Research Council, Committee on Low-Frequency Sound and Marine Mammals (n. 14 above), pp. 53–4.

40. Dept. of Commerce, NOAA, NMFS Letter of Authorization, <http://www.surtass-lfa-eis.com/Home/Dept> (accessed 8 September 2002).

LFAS brought about behavioral and distributional changes in all species tested, and the 2000 incident in the Bahamas in which the Navy acknowledged that mid-range sonar caused the death of at least eight whales.

As a condition of receiving its exemption, the Navy agreed not to transmit LFAS from immediate coastal areas, but the sound will undoubtedly reach these areas and will be very loud in some locations. In its Environmental Impact Statement, the Navy stated that its transmissions would be limited to “below 180 dB within 22 km (12 M) of any coastlines and offshore biologically important areas.” On its Web site, the Navy says that “The HF/M3 sonar [which is designed to be used as a preventative measure] will provide a very high probability that no marine mammal will be exposed to high sound levels in the LFA mitigation zone (at or above 180 dB).”⁴¹ The effects of received sound levels above 151 dB on marine life have not been studied at all, by the LFAS MMRP or in any other test, and many scientists contend that transmissions above the 120 dB level are likely to cause negative effects on marine mammals and other creatures. The October 2002 federal court ruling required the Navy, in particular, to expand the areas that would be protected from its sonar.⁴² Available evidence suggests that the NMFS decision to exempt the LFAS system from the Marine Mammal Protection Act should be revisited and that international legal mechanisms should be explored to better protect marine mammals and their environment from the use of LFAS and other forms of military sonar.

THE NAVY’S JUSTIFICATIONS

One of the U.S. Navy’s principal missions is to detect and, when necessary, destroy enemy submarines. During the Cold War, the enemy submarines of concern were primarily nuclear powered and nuclear armed. Now, they are chiefly diesel-electric craft. Nuclear submarines can be detected by passive sonar, because of their relatively noisy propulsion machinery. The United States established a system of hydrophones placed on the sea floor connected to cables that terminated at shore stations. In the Pacific, this listening system was called Oceanographic System Pacific and for many years the “cover story,” that the stations, Naval Facilities (NAVFACS), were engaged in scientific research based on oceanography, was effective. When the true nature of the system became known—the secret simply could not be maintained—the specific locations of the hydrophone arrays still remained secret.

41. See <http://www.surtass-lfa-eis.com/Highlights/stage.htm> (accessed 8 September, 2002).

42. *Natural Resources Defense Council v. Evans*, No. C-02-3805 EDL, 2002 WL 31445165 (N.D.Cal., Opinion and Order Granting Plaintiffs’ Motion for a Preliminary Injunction, 31 October 2002), slip op. at 54.

The virtues of this passive sonar system were that long-range detections became possible whenever the Soviet submarines were too noisy for their own safety. Sound ranges are influenced by absorption of the sound in seawater, refraction or bending of the sound caused by changes in seawater temperature, and spreading of the sound as it proceeds from its source to the detecting hydrophones. The system of passive bottom-laid hydrophone arrays could determine bearings or directions, but not ranges. Two or more arrays detecting the target were needed to get an approximate location or fix. Even then, the location as determined was not exact and was effectively an area rather than a point. Follow-up activity by long-range surveillance aircraft was needed to “localize” the enemy submarine, and finally surface ships—destroyers or frigates—were vectored to the site to deliver what might be the final blow. The use of this system was practiced frequently by the combined passive sonar system, and a command or headquarters center was needed to put the information together. The Commander Oceanographic System Pacific was located initially at San Francisco, California (later moved to Pearl Harbor, Hawai’i) and the NAVFACS were on the U.S. west coast, at Barbers Point, Hawai’i, and in Adak, Alaska.

Commander Oceanographic System Pacific was disestablished in 1995 for reasons not disclosed. The Cold War, of course, had been over for half a decade and the threat of a nuclear attack from submarines had been greatly diminished. In addition, the Russian submarines had become quieter and detection ranges determined by the passive sonar were diminished.

What is the submarine threat today? Diesel-electric submarines are now much quieter than they were previously. The need to spend long periods of time on the surface to charge batteries, a procedure that makes the sub susceptible to visual detection, has changed. Even by the end of World War II, efforts were made by German subs to reduce or even eliminate time on the surface by means of a snorkel.⁴³ At present, snorkeling time is on the order of a few minutes, and can be carried out at night. Modern “enemy” boats⁴⁴ can thus escape detection from passive sonar used by the “black boxes” on the ocean floor, and the U.S. Navy decided that long-range, very high-powered, low-frequency active sonar is needed. As explained earlier, this active sonar requires the generation of a powerful sound source that bounces off the enemy ship and is returned to the source vehicle. Surface ships operating as part of the modern SURTASS LFAS can carry and

43. The snorkel is a tube that is extended vertically from a submerged submarine, enabling the submarine to obtain sufficient air to operate its diesel engines while remaining submerged at a relatively shallow depth to avoid visual detection. Use of the term snorkel as a verb, that is, to snorkel or snorkeling is common with submarine personnel.

44. Submariners refer to their craft as “boats.” This is an exception to common nautical terminology, which would classify them as “ships” because of their size and importance.

monitor hydrophone arrays and generate the active sound source, and thereby increase the capability to detect enemy vessels.

Diesel-electric (conventional) submarines are operated by many countries bordering the Atlantic, Pacific, and Indian Oceans, and important smaller bodies of water such as the South China Sea and the Sea of Japan/East Sea. These submarines are particularly effective in straits where numerous sea-lanes converge and surface ships are in transit. Many carry torpedoes and long-range cruise missiles and are of the ex-Soviet Kilo class or have similarly effective designs. Some of the important sea-lanes the United States relies upon for its national security lie near or along important straits, which have become potential “choke points.” Many of these choke points such as the Suez and Panama Canals, the Malacca-Singapore Straits, and the Straits of Florida are vulnerable to disruption by surface ships and submarines.

The U.S. Navy has reported that “there are 224 submarines operated by non-allied nations, and the submarines prowling the world’s oceans today are much quieter and more deadly than ever before.”⁴⁵ To assess numerically the danger to U.S. and allied navies now that the Cold War is over, we have consulted the authoritative *Jane’s Fighting Ships*.⁴⁶ Midget subs are omitted from our list because of their obvious inability to attack U.S. ships, but all others are listed—whether operated by potential enemies or by countries presumed to be friendly. To provide a general assessment of the capabilities of the subs, the following classification is used: SS is the general classification for submarines and the other designations are in effect modifiers: N stands for nuclear; B stands for ballistic missile; G stands for guided missile; K stands for killer (i.e., subs configured for hunter-killer operations).

Australia—6 SSK

Canada—4 SSK

Chile—5 SSK

China—121 with 8 more under construction. The numbers include 1 SSBN, 1 SSB, 7 SSN, 6 SSG, and 106 SS

Colombia—2 patrol subs (SS that are not modernized or improved)

Cuba—1 Foxtrot class (SSK)

Denmark—5 coastal subs with an additional 4 under construction (SS)

Ecuador—2 type 209 class subs (SSK)

Egypt—4 patrol subs with an additional 2 under construction

45. See <http://www.surtass-lfa-eis.com/WhyNeed/stage.htm> (accessed 9 June 2002); see also Department of Navy Office of Legislative Affairs, Memorandum for Interested Members of Congress—Record of Decision for the Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar, 17 July 2002.

46. *Jane’s Fighting Ships, 2002–2003* (Coulsdon, Surrey, U.K.: Jane’s Information Group, Sentinel House, 2002).

- France—2 SSBN with an additional 4 either under construction or planned, 6 SS
- Germany—14 patrol subs with an additional 4 under construction (SS)
- Greece—8 patrol subs with an additional 3 under construction (SS)
- India—1 SSN under construction, 17 patrol subs (SS)
- Indonesia—2 SSK
- Iran—3 Kilo class (SSK)
- Japan—23 SSK
- Malaysia—3 SS
- Netherlands—4 SSK
- North Korea—22 SS and 22 classified as “Coastal” and presumed to be unimproved models with limited capability
- Norway—10 SSK with an additional 4 under construction
- Pakistan—7 SSK with an additional 2 under construction
- Poland—3 SSK
- Portugal—3 SSK
- Russia—17 SSBN with an additional 1 under construction, 7 SSGN with an additional 1 under construction, 17 SSN with an additional 3 under construction, 14 SSK with an additional 2 SSK under construction.
- Singapore—4 SSK
- Taiwan—10 (4SS, 6 SSK)
- United Kingdom—4 SSBN, 12 conventional attack submarines with five more SSK under construction
- Venezuela—2 SSK

Simple quantitative data cannot, of course, completely assess the threat. We are at present unable to judge the skills of the submarine crews, the state of maintenance of the boats, or, most importantly, whether the countries can be considered to be potential enemies or allies. North Korea would certainly be in the potential enemy category. In view of our current relations with China, we cannot be certain about the danger of Chinese subs, but it would be foolish to discount it. Malaysia, Indonesia, and Singapore are certainly not enemies, but their important location guarding the Strait of Malacca puts them in the category of countries of interest.

The Navy has a responsibility to try to detect potential enemy submarines, but in view of the recognized threat to marine life posed by its low frequency active sonar, passive sonar alternatives should continue to be developed and utilized wherever possible.⁴⁷ The use of active sonar, espe-

47. The Executive Summary of the Navy EIS for SURTASS LFA Sonar at ES-6 states this idea generally as “(Restricted Operation—the Navy’s preferred alternative) the use of this system would include geographic restrictions and monitoring to prevent injury to potentially affected species.”

cially in light of the documented damage it causes, can be justified only where the threat from a potential enemy submarine is clearly demonstrated, immediate, and severe.

DOES THE USE OF LOW FREQUENCY ACTIVE SONAR VIOLATE INTERNATIONAL LAW?

The U.S. Navy's current and projected plans to use LFAS do appear to violate international law, particularly the duty of all states to protect the marine environment from pollution, the duty to act with precaution (and to undertake environmental assessments before starting new activities), and the duty to cooperate with other affected countries.

International law is relevant because LFAS will impact areas outside the areas under the jurisdiction of the United States and the NATO countries using this technology, and also because it will impact migratory and straddling species that are in waters under U.S./NATO jurisdiction for part of their life-cycle and outside these waters for other phases of their lives.

RELEVANT TREATY REGIMES

The 1982 United Nations Law of the Sea Convention⁴⁸

Under Article 192 of the Law of the Sea Convention, all countries have "the obligation to protect and preserve the marine environment." This principle is obligatory even for countries that have not ratified the Convention, like the United States, because it has become a binding norm of customary international law.⁴⁹ Article 65 of the Convention has particular relevance to the threats posed to marine mammals, because it requires countries to "co-

48. United Nations Convention on the Law of the Sea, 10 December 1982, entered into force 16 November 1994, UN Doc. A/CONF.62/122 (1982), *International Legal Materials* 21 (1982) at 1261.

49. As of 24 February 2003, 142 countries had ratified the Law of the Sea Convention. UN Division for Ocean Affairs and the Law of the Sea, Chronological List of Ratifications, http://www.un.org/Depts/los/reference_files/chronological_lists_of... (accessed 1 March 2003). A few important countries like the United States and Canada had not ratified the Convention as of that date, but they both have been giving serious consideration to ratification. The United States has frequently acknowledged that the provisions in the Law of the Sea Convention, except those governing exploitation of deep seabed minerals, reflect existing norms of customary international law. See, for example, Ocean Policy Statement by the President, 10 March 1983, accompanying Proclamation No. 5030, 48 Fed. Reg. 10,605 (1983) ("the Convention . . . contains provisions with respect to traditional uses of the oceans which generally confirm existing maritime law and practice and fairly balance the interests of all States").

operate with a view to the conservation of marine mammals and in the case of cetaceans . . . in particular [to] work through the appropriate international organizations for their conservation, management and study.”

The unusually loud sounds emitted in the LFAS process would certainly be considered “pollution,” which is defined in Article I(1)(4) of the Convention as:

the introduction by man, directly or indirectly, of substances or *energy* into the marine environment, including estuaries, which *results or is likely to result* in such *deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.* (Emphasis added).

Sound is a “form of energy manifested by small pressure and/or particle velocity variations in a continuous medium.”⁵⁰ “While the definition [of “pollution” in the Law of the Sea Convention] was . . . not drafted with acoustic pollution in mind, the inclusion of ‘energy’ implies that noise can be a form of pollution under the terms of the LOS Convention.”⁵¹

Article 194(1) is quite clear that countries must do everything possible “to prevent, reduce and control pollution of the marine environment from any source.” “States are required, therefore, to take preventive measures based on existing knowledge to avoid pollution, rather than to take remedial measures once it has occurred, and to apply a precautionary approach when scientific certainty about the harmful effects is not (yet) available.”⁵² Article 194(5) makes it clear that these duties, in particular, require countries to adopt measures “to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.”

Article 196 requires countries to “take all measures necessary to prevent, reduce and control pollution of the marine environment resulting from the use of technologies under their jurisdiction or control.” Articles 204–206 require the preparation and dissemination of environmental impact assessments.⁵³ Although the U.S. Navy did prepare an EIS, the scientific tests it relied upon, as explained earlier, were woefully inadequate and, even so,

50. W. J. Richardson et al., *Marine Mammals and Noise* (San Diego: Academic Press, 1995), p. 544.

51. H. M. Dotinga and A. G. Oude Elferink, “Acoustic pollution in the oceans: The search for legal standards,” *Ocean Development and International Law* 31 (2000): 151, 158.

52. *Ibid.*, at 161.

53. See also Law of the Sea Convention (n. 48 above), Article 165(2)(d) (also requiring environmental impact assessments for activities exploiting the resources of the deep seabed).

demonstrated that LFAS will have negative impacts on marine mammals. In addition, the Navy's EIS was not made available to other countries during its preparation for their comments and input.

The Convention on the Conservation of Migratory Species of Wild Animals⁵⁴

Article III(4) of this treaty requires parties that are "Range States" to "endeavour" "(b) to prevent, remove, compensate for or minimize, as appropriate, the adverse effects of activities or obstacles that seriously impede or prevent the migration of the species; and (c) to the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to further endanger the species . . ." The United States is not one of the 81 parties to this treaty,⁵⁵ and it has relatively weak enforcement provisions, saying only in Article XIII that disputes should be resolved through negotiation and that, if negotiations are unsuccessful, countries "may, by mutual consent, submit the dispute to arbitration . . ." Nonetheless, its substantive provisions can be viewed as reflective of the consensus of international views on this subject, and as supporting customary international law norms requiring countries to protect wild migratory species.

The Biodiversity Convention⁵⁶

This treaty confirms in Article 3 the principle that emerged from the 1972 Stockholm⁵⁷ and 1992 Rio Declarations⁵⁸ that "States have . . . the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction." The treaty also contains general provisions saying

54. Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979, reprinted in D. Hunter, J. Salzman, and D. Zaelke, *International Environmental Law and Policy—Treaty Supplement*, 2002 Edition (New York: Foundation Press, 2002), p. 320.

55. Convention on Migratory Species, http://www.wcmc.org.uk/cms/cms_banner.html (accessed 1 March 2003).

56. Convention on Biological Diversity, 5 June 1992, preamble, UNEP/Bio. Div/CONF/L.2, S. Treaty Doc. No. 103-20, *International Legal Materials* 31 (1992) at 818, 822–3.

57. Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration), UN Doc. A/CONF.48/14, 7, *International Legal Materials* 11 (1972) at 1416, 1420.

58. Rio Declaration on Environment and Development, 14 June 1992, UN Doc. A/CONF.151/5/Rev.1(1992), *International Legal Materials* 31 (1992) at 874.

that countries, should, when feasible, promote and protect biological diversity.

The Biodiversity Convention utilizes what some have called a “purer form” of the precautionary principle, stating in its preamble that “where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat. . . .”⁵⁹ In addition, Article 14(1)(a) requires contracting parties to undertake “environmental impact assessment[s] of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimizing such effects and, where appropriate, allow for public participation in such procedures.”

The Biodiversity Treaty has a dispute settlement provision saying that disputes should be resolved through conciliation unless the parties agree to compulsory submission to an arbitral panel or to the International Court of Justice. This treaty has achieved almost-universal acceptance, with 187 ratifications.⁶⁰ The United States signed this treaty in 1993, but the U.S. Senate refused to ratify it in 1994.

The International Whaling Convention⁶¹

This Convention’s text does not say anything directly about acoustic impacts on whales, or indeed about pollution of the habitats of whales. But Article V does authorize the contracting parties to “adopt regulations with respect to the conservation . . . of whale resources, fixing . . . (c) open and closed waters, including the designation of sanctuary areas” Various committees have examined the acoustic issues, and the 1999 Report of the Scientific Committee “stated that noise-producing activities (such as seismic surveys or sonar operations) should not be conducted in critical habitats at certain times of the year, which could greatly reduce exposing mothers and calves or breeding animals to high sound levels. It supported measures to mitigate adverse effects of noise wherever possible and stressed the need for further research.”⁶²

59. S. McCaffrey, “Biotechnology: Some issues of general international law,” *Transnational Law* 14 (2001): 91, 97.

60. Parties to the Convention on Biological Diversity, <http://www.biodiv.org/world/parties.asp> (accessed 1 March 2003).

61. International Convention for the Regulation of Whaling, 2 December 1946, 161 U.N.T.S. 72, 10 U.S.T. 952.

62. Dotinga and Oude Elferink (n. 51 above), p. 169 (citing IWC/51/4, para. 11.4.1 and Annex H, para. 7.1).

Regional Cetacean Agreements

Two regional agreements designed to address small cetaceans have been adopted pursuant to the 1979 Bonn Convention on Migratory Species.⁶³ The Agreement on the Conservation of Small Cetaceans of the Baltic and North Sea of 17 March 1992 (ASCOBANS)⁶⁴ has been ratified by all eight countries in the region. The Conservation and Management Plan provides that the parties shall work toward “the prevention of other significant disturbance, especially of an acoustic nature” of the species involved, and various meetings and studies have been undertaken to address this issue.⁶⁵ The Agreement on the Conservation of the Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)⁶⁶ has now been ratified by seven nations and signed by eight others. A number of the contracting parties to these two treaties are also members of the North Atlantic Treaty Organization (NATO).

RELEVANT PRINCIPLES OF CUSTOMARY INTERNATIONAL LAW

The Duty to Avoid Causing Harm to Shared Resources and the Common Heritage

Principle 21 of the Stockholm Declaration on the Human Environment⁶⁷ affirmed the responsibility of States “to ensure that activities within their jurisdiction and control do not cause damage to the environment of other states or areas beyond the limits of national jurisdiction.”⁶⁸ The introduc-

63. See text accompanying n. 54 and 55 above.

64. Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas, 17 March 1992, <http://www.oceanlaw.net/texts/summaries/ascobans.htm> (accessed 1 March 2003).

65. Dotinga and Oude Elferink (n. 51 above), pp. 169–70.

66. Agreement on the Conservation of the Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS), 24 November 1996, <http://www.oceanlaw.net/texts/summaries/accobams.htm> (accessed 1 March 2003).

67. Declaration of the United Nations Conference on the Human Environment, UN Doc. A/CONF.48/14, 7, *International Legal Materials* 11 (1972) at 1416, 1420. See generally L. Sohn, “The Stockholm declaration on the human environment,” *Harvard Journal of International Law* 15 (1973): 423, and M. Akehurst, “International liability for injurious consequences arising out of acts not prohibited by international law,” *New York Journal of International Law* (1985): 3.

68. See also Principle 2 of the 1992 Rio Declaration (n. 58 above), and Restatement (Third) of Foreign Relations Law (1987), Section 601. Philippe Sands in *Principles of International Environmental Law*, vol. I (1995), p. 186 concludes that taken together Principle 21 and Principle 2 “establish the basic obligation underlying environmental law and the source of its further elaboration in rules of greater specificity.” The International Court of Justice has referred to “every State’s obligation not to allow knowingly its territory to be used for acts contrary to the rights of other

tion of acoustic pollution into the ocean, which causes damage to marine mammals and other marine species in the exclusive economic zones of other nations and in the high seas beyond national jurisdiction, would certainly violate this norm of customary international law.

The Precautionary Principle

The precautionary principle, or “precautionary approach” as some countries and commentators prefer to call it, has evolved into a norm with real content.⁶⁹ It mandates that studies precede action, and that interdisciplinary environmental impact assessments be written and distributed, with public input.⁷⁰ It shifts the burden to those that would undertake a new development or use of an environmental resource, replacing the old approach that

States,” *Corfu Channel Case (United Kingdom v. Albania)*, 1949 I.C.J. 4, and this central principle is also relied upon in the *Trail Smelter Arbitration*, 3 R. Int’l Arb. Awards 1905, 1938 (1941), holding that “no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another.”

69. The essence of this norm was articulated in the 1992 Rio Declaration as “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.” Rio Declaration (n. 58 above), at 879. For detailed analysis of the precautionary principle, see, for example, D. Freestone, “The Precautionary Principle,” in *International Law and Global Climate Change*, ed. R. Churchill and D. Freestone (London: Graham & Trotman/M. Nijhoff, 1991), p. 21; E. Hey, “The precautionary concept in environmental policy and law: Institutionalizing caution,” *Georgetown International Environmental Law Review* 4 (1992): 303; J. E. Hickey, Jr., and V. R. Walker, “Refining the precautionary principle in international law,” *Virginia Environmental Law Journal* 14 (1995): 423; G. D. Fullem, Comment, “The precautionary principle: Environmental protection in the face of scientific uncertainty,” *Willamette Law Review* 31 (1995): 495; J. M. Macdonald, “Appreciating the precautionary principle as an ethical evolution in ocean management,” *Ocean Development and International Law* 26 (1995): 255; J. M. Van Dyke, “Applying the precautionary principle to ocean shipments of radioactive materials,” *Ocean Development and International Law* 27 (1996): 379; J. Cameron and J. Abouchar, “The Status of the Precautionary Principle in International Law” in *The Precautionary Principle and International Law: The Challenge of Implementation*, ed. D. Freestone and E. Hey (The Hague: Kluwer Law International, 1996), p. 29; M. Territo, “The precautionary principle in marine fisheries conservation and the U.S. Sustainable Fisheries Act of 1996,” *Vermont Law Review* 24 (2000): 1351; R. Unger, “Brandishing the precautionary principle through the Alien Tort Claims Act,” *New York University Environmental Law Journal* 9 (2001): 638; V. R. Walker, “Some dangers of taking precautions without adopting the precautionary principle,” *Environmental Law Reporter* 31 (2001): 10040.

70. For a listing of international agreements requiring environmental assessments, see D. Hunter, J. Salzman, and D. Zaelke, *International Environmental Law and Policy* (New York: Foundation Press, 1998), pp. 366–70.

had imposed the burden on the environmentalists who challenged such activity.⁷¹ It requires those countries and companies that want to undertake new developments to engage in scientific studies to determine the effect of their initiatives, and also to consider less intrusive approaches. It accords respect to ecosystems and living creatures for their own sake, without requiring that they prove themselves to be useful or to have marketplace value. It rejects the idea that risks and costs can be transferred from one region to another, or from this generation to future ones, and it requires that risks and costs be internalized in order to force decision makers to engage in a fair and sober analysis before deciding to proceed with a project. And ultimately it requires that we proceed slowly in the face of uncertainty, constantly testing and monitoring the effects of our activities.

The precautionary principle has become the foundation of a number of important recent treaties designed to manage fishing resources and to protect the marine environment, including the 1995 Migratory and Straddling Stocks Agreement⁷² and the 2000 Honolulu Convention,⁷³ and it has also been recognized in regional and national decisions. The European courts have led the way in applying the precautionary principle,⁷⁴ and Euro-

71. *Ibid.*, p. 360.

72. 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, UN Doc. A/CONF.164/37, *International Legal Materials* 34 (1995): 1542.

73. The Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, Honolulu, 4 September 2000, (accessed 26 March 2001); see generally V. Botet, "Filling in one of the last pieces of the ocean: Regulating Tuna in the Western and Central Pacific Ocean," *Virginia Journal of International Law* 41 (2001): 787.

74. The most significant decision of the European Court of Justice occurred in 1998, when the Court upheld the European Commission's decision to ban all bovine animals and all beef and veal products from the United Kingdom, based on the EC's judgment that all risks of transmission from bovine spongiform encephalopathy (mad cow disease) could not be excluded. The *Queen v. Ministry of Agriculture, Fisheries and Food, Commissioners of Customs & Excise, ex parte National Farmer's Union, David Burnett and Sons Ltd.*, R.S. Case C-147-96, [1998] E.C.R. I-2211. In response to the argument of the English National Farmers' Union that this decision violated the principle of proportionality, the Court acknowledged that the principle of proportionality required that the least onerous alternative be chosen, but ruled also that "[w]here there is uncertainty as to the existence or extent of risks to human health, the institutions may take protective measures without having to wait until the reality and seriousness of the risks become fully apparent." *Ibid.*, para. 63. The Court repeated this statement in *United Kingdom v. Commission of the European Communities*, Case C-180/96, [1998] E.C.R. I-2265, para. 99. In another important decision, the Court of First Instance in Europe rejected a challenge to a decision that had withdrawn an antibiotic from the list of authorized animal feeds by quoting from the statement above, referring to the precautionary principle, and adding that "[t]here can be no question but that the requirements of the protection of public health must take precedence over economic considerations."

pean institutions have also fully embraced it.⁷⁵ The British government has recognized that it should be widely followed,⁷⁶ as have courts in, for instance, India, Pakistan, the Netherlands, Australia,⁷⁷ and Hawaii.⁷⁸

Alpharma, Inc. v. Council of the European Union, Case T-70/99 R, [1999] E.C.R. II-2027, para. 3.

75. The European Community (EC) has been promoting reliance upon the precautionary principle “in the international arena, in general, and in the WTO [World Trade Organization], in particular.” See, for example, Hans-Joachim Priess and Christian Pitschas, “Protection of public health and the role of the precautionary principle under WTO law: A Trojan Horse before Geneva’s walls?” *Fordham International Law Journal* 24 (2000): 519, 520 (adding that “The EC relied on this principle in EC Measures Concerning Meat and Meat Products (Hormones), and it recently submitted a communication on the very same principle to the WTO Committee on Sanitary and Phytosanitary Measures. The Commission also published a communication on the precautionary principle . . . at the beginning of this year, and the Council issued a resolution on the precautionary principle at the Nice summit.”). The EC issued a “Communication” in 2000 stating that the precautionary principle is “a full-fledged and general principle of international law.” “Communication on the Precautionary Principle, Communication from the Commission of the European Communities, COM(2000) 1 final (2 February 2000),” http://europa.eu.int/comm/off/health_consumer/precaution.htm. See M. Geistfeld, “Reconciling cost-benefit analysis with the principle that safety matters more than money,” *New York University Law Review* 76 (2001): 114, 176–8.

76. The 1990 British White Paper entitled “This Common Inheritance: Britain’s Environmental Strategy,” September 1990, Cm 1200, provides the following guide to all British governmental activities: “We must analyze the possible benefits and costs both of action and of inaction. Where there are significant risks of damage to the environment, the Government will be prepared to take precautionary action to limit the use of potentially dangerous pollutants, even where scientific knowledge is not conclusive, if the balance of the likely costs and benefits justifies it. This precautionary principle applies particularly where there are good grounds for judging either that action taken promptly at comparatively low cost may avoid more costly damage later, or that irreversible effects may follow if action is delayed.”

77. See references in Unger (n. 69 above), p. 664 (citing *Zia v. WAPDA*, Human Rights Case No. 15-K (Pakistan S.C. 1992), http://www.elaw.org/custom/custompages/resourceDetail.asp?profile_ID=280; *Vellore Citizens Welfare Forum v. Union of India & Ors.*, (1995) 5 S.C.C. 647, 703, http://www.elaw.org/custom/custompages/resourceDetail.asp?profile_ID=199; *A.P. Pollution Control Board v. Prof. M.V. Nayudu (Retd.)*, (1999) 2 S.C.C. 718, *Leach v. National Parks & Wildlife Service*, (1993) 81 L.G.E.R.A. 270; *Simpson v. Ballina Shire Council*, (1994) 82 L.G.E.R. 392; and *Greenpeace Australia Ltd. v. Redbank Power Co.*, (1995) 86 L.G.E.R.A. 143). A Dutch court relied upon the precautionary principle in *Vander Eudt-Louwerse B. V. et al. v. State Secretary of Transport, Public Works and Water Management*, JM 2001/99 (Netherlands Administrative Law Division of the Council of State, 26 April 2001), see NILOS Newsletter, no. 19 (February 2002): 5.

78. The Hawaii Supreme Court ruled in *In the Matter of Water Use Permit Applications, Waiahole Ditch Combined Contested Case Hearing*, 9 P.3d 409, 466–67 (Hawaii 2000), that “the precautionary principle simply restates the [Water] Commission’s duties under the [Hawaii] constitution and [Hawaii’s Water] Code. Indeed, the lack of full scientific certainty does not extinguish the presumption in favor of public trust purposes or vitiate the Commission’s affirmative duty to protect

When risks are anticipated, the precautionary principle requires those creating the risks to work with potentially affected nations to prepare for foreseeable emergency contingencies,⁷⁹ to create appropriate liability regimes to ensure that injured parties are properly compensated,⁸⁰ to notify other countries of situations threatening harmful effects on their environment,⁸¹ and of course to take every appropriate precaution to prevent or limit damage to the environment.⁸² “A strict application of the precautionary principle would require additional research of a broader scope to eliminate the possibility of long-term, irreversible harm to the marine ecosystem or any of its living components before the SURTASS LFAS system can be deployed globally.”⁸³

The Polluter-Pays Principle

Another general principle of international law is that when a State violates its international obligations, it has a duty to make reparations for the wrongs committed. The Permanent Court of International Justice (PCIJ) stated in the *Chorzow Factory Case* that “reparation must, as far as possible, wipe out all the consequences of the illegal act and reestablish the situation which would, in all probability, have existed if that act had not been committed.”⁸⁴ The International Court of Justice (ICJ) also recognized in the *Gabcikovo-Nagymoros Case* that “[i]t is a well-established rule of international law that

such purposes wherever feasible.” The Hawaii Supreme Court cited, as evidence that “[t]he precautionary principle’ appears in diverse forms throughout the field of environmental law,” the cases of *Ethyl Corp. v. EPA*, 541 F.2d 1, 20-29 (D.C. Cir.), cert. denied, 426 U.S. 941 (1976); *Lead Industries v. EPA*, 647 F.2d 1130, 1154-55 (D.C. Cir. 1980), cert. denied, 449 U.S. 1042 (1980); and *Les v. Reilly*, 968 F.2d 985 (9th Cir. 1992), cert. denied, 507 U.S. 950 (1993). “As with any general principle, its meaning must vary according to the situation and can only develop over time. In this case, we believe the [Water] Commission describes the [precautionary] principle in its quintessential form: at minimum, the absence of firm scientific proof should not tie the Commission’s hands in adopting reasonable measures designed to further the public interest.” 9 P.3d at 467.

79. See, for example, *Law of the Sea Convention* (n. 48 above), Article 199.

80. *Ibid.*, Article 235.

81. *Ibid.*, Article 198; *Rio Declaration* (n. 58 above), Principle 18.

82. See Philippe Sands, *Principles of International Environmental Law* vol. I, pp. 194–5 (1995), citing the *Stockholm Declaration* (n. 57 above), Principles 6, 7, 15, 18 and 24, the 1978 UNEP Draft Principles, Principle 1, the 1982 World Charter for Nature, the growing network of specific environmental conventions, the *Trail Smelter Arbitration*, 3 R. Int’l Arb. Awards 1905 (1941), and the *Lac Lanoux Arbitration* (*Spain v. Fr.*), 12 R. Int’l Arb. Awards 281, 24 I.L.R. 101 (1957).

83. E. Gardner, “The Precautionary Principle as Applied to Marine Acoustic Activities,” in *Emerging Issues in National Ocean and Coastal Policy*, ed. H. N. Scheiber (Berkeley, California: Ocean Governance Study Group, 1999), pp. 9, 12.

84. *Chorzow Factory Case*, P.C.I.J., Series A, No. 17, p. 47.

an injured State is entitled to obtain compensation from the State which has committed an internationally wrongful act for the damage caused by it.”⁸⁵ The emission of low-frequency-active sonar is not an inherently “wrongful act,” but it can be wrongful and harmful if its operation falls short of accepted international standards and has the effect of harming the marine environment.

The Duty to Cooperate

Another principle well established in customary international law is the requirement of cooperation among States in making decisions that may substantially affect the environment. Principle 24 of the Stockholm Declaration states:

International matters concerning the protection and improvement of the environment should be handled in a co-operative spirit by all countries, big or small, on an equal footing. Cooperation through multilateral or bilateral arrangements or other appropriate means is essential to effectively control, prevent, reduce and eliminate adverse environmental effects resulting from activities conducted in all spheres, in such a way that due account is taken of the sovereignty and interests of all States.⁸⁶

This principle had earlier been utilized by the arbitral tribunal in the 1957 Lac Lanoux Arbitration,⁸⁷ where it was held that, as a matter of customary international law, a State that is engaging in behavior likely to impact the environment of another State significantly is obliged to involve the affected state in discussions regarding these activities. Article 197 of the Law of the Sea Convention makes this duty obligatory with regard to activities that may impact the marine environment:

States shall co-operate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this Convention,

85. Case Concerning the Gabčíkovo-Nagymoros Project (Hungary / Slovakia), 1997 I.C.J. 7, 81 (Sept. 25, 1997).

86. Stockholm Declaration (n. 57 above), Principle 24, <http://www.unep.org/Documents/Default.asp?DocumentID=97> (accessed 16 March 2002); see also D. Hunter, J. Salzman, and D. Zaelke, *International Environmental Law and Policy* (New York: Foundation Press, 1998), p. 287.

87. Lac Lanoux Arbitration (Spain v. Fr.), 12 R. Int'l Arb. Awards 281, 24 I.L.R. 101 (Trib. Arb. 1957).

for the protection and preservation of the marine environment, taking into account characteristic regional features.⁸⁸

What About the Immunity of Military Vessels?

Article 236 of the 1982 Law of the Sea Convention contains the following, somewhat confusing, language:

The provisions of this Convention regarding the protection and preservation of the marine environment do not apply to any warship, naval auxiliary, or other vessels or aircraft owned or operated by a State and used, for the time being, only on government non-commercial service. However, each State shall ensure, by the adoption of appropriate measures not impairing operations or operational capabilities of such vessels or aircraft owned or operated by it, that such vessels or aircraft act in a manner consistent, so far as is reasonable and practicable, with this Convention.

Articles 31 and 32 provide further explanation, making it clear (in Article 32) that the warship is itself immune from seizure but also (in Article 31) that the flag State of the vessel “shall bear international responsibility for any loss or damage to the coastal State resulting from the non-compliance by a warship . . . with the provisions of this Convention or other rules of international law.” It would thus be improper to seize a military vessel engaging in polluting activity, but the government that owns such a vessel is duty bound to provide compensation for damage caused by the vessel and Article 235(3) requires nations to work together to establish meaningful liability and compensation regimes to ensure that victims can recover for their losses and that the marine environment is protected.

What About the Self-Defense Purposes of LFAS?

In its Nuclear Weapons advisory opinion,⁸⁹ the International Court of Justice said, “The Court does not consider that the treaties in question could have intended to deprive a State of the exercise of its right of self-defence under international law because of its obligations to protect the environment. Nonetheless, States must take environmental considerations into account when assessing what is necessary and proportionate in the pursuit of legiti-

88. Law of the Sea Convention (n. 48 above).

89. Legality of the Threat or Use of Nuclear Weapons General List No 95, Advisory Opinion of July 8, 1996, 1996 I.C.J. 226.

mate military objectives.” The Court then went on to quote from Principle 24 of the 1992 Rio Declaration,⁹⁰ which says that “Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development as necessary.”

Although the right to self-defense permits the use of force in appropriate situations, governments are now being held liable for environmental damage caused by their acts of warfare. Examples include the United Nations Compensation Commission’s rulings holding Iraq liable for the extensive environmental damage caused by its military activities during the Gulf War,⁹¹ and Article 55 of the 1977 Protocol No. 1 to the 1949 Geneva Conventions,⁹² which requires combatants to take care “in warfare to protect the natural environment against widespread, long-term and severe damage.” Also relevant is Article 35(3) of Protocol I prohibiting the use of weapons that “are intended, or may be expected, to cause” such damage.

The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques, which the United States ratified in 1980, prohibits the use of techniques that modify the environment and cause “widespread, long-lasting or severe” destruction, damage or injury to another party.⁹³ The focus of this convention is on “deliberate manipulation of natural processes,” but its language would also appear to prohibit actions that incidentally have the effect of altering or eliminating a species or ecosystem.⁹⁴ In its Nuclear Weapons advisory opinion, the ICJ said, refer-

90. Rio Declaration (n. 58 above).

91. The Compensation Commission was created by Security Council Resolution 687, which states that claims are to be paid from a fund generated by Iraqi oil sales after 2 April 1991. In June 2001, the Commission awarded Kuwait \$108.9 million for environmental remediation efforts. C. Lynch, “Kuwait War Claim Approved,” *Washington Post*, 28 September 2000; “Kuwait unveils plan to treat festering desert wound,” *Science* 293 (2001): 1410. See generally www.unog.ch/uncc/start.htm (accessed 9 June 2002).

92. Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977.

93. Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD Convention), 18 May 1977, 31 U.S.T. 33, 1108 U.N.T.S. 151. “Widespread” is defined as “encompassing an area on the scale of several hundred square kilometers;” “long-lasting” is something that lasts “for a period of months or approximately a season;” and “severe” is something “involving serious or significant disruption or harm to human life, natural and economic resources or other assets.” United States Arms Control and Disarmament Agency, *Arms Control and Disarmament Agreements: Texts and Histories of the Negotiations* (Washington, D.C.: Arms Control and Disarmament Agency, 1990), pp. 211–13.

94. Article II of the ENMOD Convention defines “environmental modification techniques” as “any technique for changing—through the deliberate manipulation of natural processes—the dynamics, composition or structure of the Earth, includ-

ring to the language in 1977 Geneva Protocol I, that “these provisions embody a general obligation to protect that natural environment against widespread, long-term and severe environmental damage.”

OPTIONS TO ADDRESS THE PROBLEM AT THE INTERNATIONAL LEVEL

If the use of this polluting active sonar in the world’s oceans violates governing principles of international law, do mechanisms exist to limit the use of this technology?

Dispute-Resolution Procedures under the Law of the Sea Convention— The International Tribunal for the Law of the Sea

The Law of the Sea Convention establishes binding dispute-resolution procedures, and these could be invoked directly by an injured State against any other state that is utilizing LFAS in a manner that damages the marine resources of the victim State or the marine environment generally. The United States could argue that these procedures cannot be invoked against it until it ratifies the Convention, but they appear to have become applicable to the United States, at least in part, through the U.S. ratification of the 1995 Straddling and Migratory Stocks Agreement, as explained later.

Article 286 of the Law of the Sea Convention says that: “Subject to section 3, any dispute concerning the interpretation or application of this Convention shall . . . be submitted at the request of any party to the dispute to the court or tribunal having jurisdiction under this section.” In Section 3, Article 297(1)(b) says that the compulsory jurisdiction provisions apply “when it is alleged that a State in exercising the aforementioned freedoms, rights or uses [referring to freedom of navigation and “other internationally lawful uses of the sea,” that is, military activities related to self-defense] has acted in contravention of this Convention or of laws or regulations adopted by the coastal State in conformity with this Convention and other rules of international law not incompatible with this Convention.” This language is thus explicit in establishing compulsory jurisdiction over claims that military activities damage coastal resources and pollute the marine environment.

Article 298(1)(b), however, allows a country to issue a written declaration saying that it does not accept compulsory jurisdiction over “disputes

ing its biota, lithosphere, hydrosphere and atmosphere, or of outer space.” The “biota” are the flora and fauna of a region, and, therefore, a military technique that has the effect of causing damage to some or all of the marine fauna is certainly prohibited by this convention.

concerning military activities, including military activities by government vessels and aircraft engaged in non-commercial service.” Argentina, Cape Verde, Chile, France Norway, Portugal, Russia, Slovenia, Tunisia, and Ukraine have issued such declarations. Those countries that have exempted military matters through a declaration are still required by Article 279 to settle their disputes through peaceful means according to the procedures listed in Article 33 of the United Nations Charter.

The 1995 Straddling and Migratory Stocks Agreement⁹⁵

Article 30 of this Agreement (which the United States ratified in 1996 and which came into effect on 11 December 2001 when the 30th nation deposited its ratification) says that the dispute resolution provisions in the Law of the Sea Convention “apply *mutatis mutandis* to any dispute between States parties to this Agreement concerning the interpretation or application of this Agreement, whether or not they are also Parties to the [Law of the Sea] Convention.” Because the 1995 Agreement has just recently come into force, it is not clear how exactly this language will be interpreted, but Canada (which, like the United States, has ratified the 1995 Agreement) recognized the potential use of the dispute-resolution procedure and issued an explicit declaration to the 1995 Agreement exempting military activities from the compulsory procedures pursuant to Article 298(1)(b) of the Law of the Sea Convention.⁹⁶ Significantly, however, the United States did not file a similar declaration when it ratified the 1995 Agreement.⁹⁷

The dispute-resolution procedures under the 1995 Agreement could become important if a state whose resources were being damaged by LFAS sought to invoke them, because this Agreement requires all contracting parties to protect living marine resources and it is predicated explicitly on the precautionary approach. The governing principles in Article 5(d), (f), and (g) require contracting parties to “assess the impact of . . . other human activities . . . on . . . stocks and species,” to “minimize pollution,” and to

95. 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, UN Doc. A/CONF.164/37, 8 September 1995, *International Legal Materials* 34 (1995): 1542.

96. Declarations to 1995 Straddling and Migratory Stocks Agreement, http://www.un.org/Depts/los/convention_agreements/fish_stocks_ag... (accessed 1 March 2003).

97. *Ibid.* The United States did file a declaration choosing the special arbitral tribunal established in Annex VIII of the Law of the Sea Convention as its preferred mechanism for resolving disputes.

“protect biodiversity in the marine environment.” And Article 6(2) says that “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.” The use of LFAS in a manner that caused damage to marine species, interfering, for instance, with their habitats or reproductive activities, would appear to violate these responsibilities.

International Court of Justice

Sixty-four countries have accepted the compulsory jurisdiction of the International Court of Justice with regard to other countries that have similarly accepted this jurisdiction. (The United States withdrew its acceptance of the Court’s compulsory jurisdiction in 1986.) A country that has accepted this jurisdiction would be able to challenge the use of the LFAS system by another country that has similarly accepted the Court’s compulsory jurisdiction, and a number of NATO countries have issued such declarations and thus could be named as defendants.⁹⁸ Jurisdiction against a country using LFAS in a manner that damages living resources of another country might also be obtained through another treaty, possibly through one of the “Friendship, Commerce, and Navigation” treaties that the United States signs with its trading partners.

The International Maritime Organization (IMO)

“The IMO is the competent organization to address vessel-source pollution at the international level.”⁹⁹ But the IMO has not given the LFAS issue any particular attention thus far,¹⁰⁰ and it generally does not deal with military

98. The countries that have accepted the Court’s compulsory jurisdiction are: Australia, Austria, Barbados, Belgium, Botswana, Bulgaria, Cambodia, Camerouns, Canada, Colombia, Costa Rica, Cyprus, Democratic Republic of Congo, Denmark, Dominican Republic, Egypt, Estonia, Finland, Gambia, Georgia, Greece, Guinea, Guinea-Bissau, Haiti, Honduras, Hungary, India, Ivory Coast, Japan, Kenya, Lesotho, Liberia, Liechtenstein, Luxembourg, Madagascar, Malawi, Malta, Mauritius, Mexico, Nauru, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Pakistan, Panama, Paraguay, Philippines, Poland, Portugal, Senegal, Somalia, Spain, Sudan, Surinam, Sweden, Swaziland, Switzerland, Togo, Uganda, United Kingdom, Uruguay, and Yugoslavia.

99. Dotinga and Oude Elferink (n. 51 above), p. 171.

100. But see IMO Resolution A.720(17) (adopted in 1991), which also allows areas to be designated as particularly sensitive sea areas if they fulfill designated ecological criteria such as unique or rare ecosystem, diversity, vulnerability, or scientific, recreational, or historical significance.

vessels or with living resources. It may be possible for countries concerned about potential LFAS pollution coming from ships to get the attention of the IMO and create a focus for this issue, and, if so, nongovernmental organizations (NGOs) may then also be able to play a useful supporting role.

The European Court of Human Rights

The European Convention on Human Rights protects the “right to life” in Article 2 and “the right to respect for private and family life, his home and his correspondence” in Article 8.¹⁰¹ The language in Article 8 was used to protect the rights of a family that was forced to abandon its home after noxious fumes from a waste treatment facility violating environmental standards made the daughter sick.¹⁰² In its conclusion, the European Court of Human Rights stated that the Spanish government “did not succeed in striking a fair balance between the interest of the town’s economic well-being—that of having a waste-treatment plant—and the applicant’s effective enjoyment of her right to respect for her home and her private and family life.”

It may be possible to build upon this case to bring a broader claim on behalf of the marine environment, or on behalf of endangered cetacean species. The language used by the European Court focuses on the rights of individuals to family and home, and the right to live in a world with diverse creatures may require another step forward. Perhaps if it could be stressed that migratory cetacean species are “common property” shared by all of us, then a claim brought on their behalf, or based on the loss each of us suffers if we lose biological diversity, might be possible.

A Lawsuit in the United States?

The Alien Tort Claims Act (ATCA) provides non-U.S. citizens with an avenue to bring suits in U.S. federal courts for torts committed in violation of fundamental principles of international law.¹⁰³ The ATCA states that: “The district courts shall have original jurisdiction of any civil action by an alien for a tort only, committed in violation of the law of nations or treaty of the United States.”¹⁰⁴ In 1980, the U.S. Court of Appeals for the Second Circuit

101. European Convention for the Protection of Human Rights and Fundamental Freedoms, 4 November 1950, 312 U.N.T.S. 222, Eur. T.S. No. 5 (1950), revised by Protocol 11.

102. *Lopez Ostra v. Spain*, App. No. 16798/90, 20 Eur. H.R. Rep. 277 (Eur.Ct.H.R. 1994).

103. 28 U.S.C. sec. 1350 (1994).

104. *Ibid.* Most recent cases utilizing the ATCA have involved gross human rights violations. See generally Unger (n. 69 above).

in *Filartiga v. Peña-Irala*,¹⁰⁵ expanded the reach of ATCA to include suit for violations of modern international law. A claim under ATCA must be brought (1) by a foreign citizen (2) for a tort (3) in violation of the laws of nations.

It might be possible for a non-U.S. citizen to bring a suit to challenge the use of LFAS in ocean areas where cetaceans and other marine species will be harmed. The substantive law would appear to be in place to support the claim that this activity violates norms of customary and treaty law, as explained above. Several difficult procedural problems would, however, have to be confronted. First, how would the plaintiff establish sufficient “injury” to satisfy the “standing” requirements in federal court? Second, how would the plaintiff overcome the claim of “sovereign immunity” that a defendant would raise, if the defendant were the U.S. government,¹⁰⁶ or the government of any foreign country?¹⁰⁷ If a private company could be identified as defendant, that would eliminate the sovereign-immunity problem, but the plaintiff would then need to establish that the private entity was bound by international law, perhaps because it was working in concert with a government.¹⁰⁸

Generally, in determining whether a norm of international law is applicable, the court must look to see if the alleged violation is definable, obligatory, and universally condemned.¹⁰⁹ The district court in *Beanal v. Freeport-McMoran, Inc.*¹¹⁰ set forth the following requirements:

(1) [N]o State condones the act in question and there is a recognizable

105. *Filartiga v. Peña-Irala*, 630 F.2d 876 (2d Cir. 1980).

106. A claim against the United States would be governed by the Federal Torts Claims Act, 28 U.S.C. sec. 2680, which allows claims for injuries resulting from “ministerial” acts, for example, negligence, but not for those resulting from “discretionary” acts. The decision to use LFAS would almost certainly be classified as a discretionary act, and thus the immunity granted to the federal government would appear to block a lawsuit filed against the federal government. But see *Alvarez-Machain v. United States*, 107 F.3d 696 (9th Cir. 1996) (allowing a claim to proceed against the United States for an abduction in violation of international human rights norms).

107. The Foreign Sovereign Immunities Act, 28 U.S.C. sec. 1605(a)(5)(A) permits actions to be brought in U.S. courts against foreign governments for tortious acts or omissions, but only if the damage occurs “in the United States” and is not caused by “the exercise or performance or the failure to exercise or perform a discretionary function regardless of whether the discretion be abused.” For a claim to be successful, therefore, the effect of LFAS would have to occur in the territorial sea of the United States (the first 12 nautical miles from the coasts) and it would have to be concluded that the damage resulted from negligence, rather than from a discretionary decision of the foreign government.

108. See, for example, *Doe I v. Unocal*, 2002 WL 31063976 (9th Cir. 2002), opinion withheld pending en banc review, 2003 WL 359787 (9th Cir. 2003).

109. *Filartiga*, 630 F.2d at 881.

110. *Beanal v. Freeport-McMoran, Inc.*, 969 F. Supp. 362 (E.D. La.1997).

“universal” consensus of prohibition against it; (2) there are sufficient criteria to determine whether a given action amounts to the prohibited act and thus violates the norm; (3) the prohibition against it is nonderogable and therefore binding at all times upon all actors.¹¹¹

The *Filartiga* court indicated that the Supreme Court has held that the law of nations “may be ascertained by consulting the works of jurists, writing professedly on public law; or by the general usage and practice of nations; or by judicial decisions recognizing and enforcing that law.”¹¹² Thus, principles such as the precautionary principle, the polluter-pays principle, and the duty to cooperate could provide the basis for an ATCA claim.

The U.S. Court of Appeals for the Second Circuit rejected this approach in September 2003, however, ruling that the claim by Peruvian citizens that the activities of a U.S. copper smelting company in Peru caused severe lung disease and thus violated their rights to life, to health, and to sustainable development did not state a cause of action under the Alien Tort Claims Act, because such “rights” “are insufficiently definite to constitute rules of customary international law.”¹¹³ The court ruled that although they are recognized in international treaties and resolutions, they are “boundless and indeterminate,” expressing “virtuous goals” but at such a “level of abstraction” that they “state abstract rights and liberties devoid of articulable or discernable standards and regulations.”¹¹⁴ This court emphasized that customary international law had not crystallized regarding acts of intranational pollution, and thus that U.S. courts should not provide judicial forums for these acts, but it may still be possible to pursue claims in U.S. courts involving acts of pollution that cross national boundaries or ones that occur in common spaces like the high seas.¹¹⁵

111. 969 F.Supp. at 370. On appeal, in *Beanal v. Freeport-McMoran, Inc.*, 197 F.3d 161, 167 (5th Cir. 1999), the court ruled that a claim based in part on the precautionary principle did not present a cognizable claim as a violation of customary international law under the Alien Tort Claims Act, 28 U.S.C. sec. 1350, because the claimants had not shown that the principle enjoyed “universal acceptance in the international community” or had “articulable and discernable standards” sufficient to “constitute international environmental abuses or torts.” See, in contrast, the opinion of the Hawaii Supreme Court in *In the Matter of Water Use Permit Applications, Waiahole Ditch Combined Contested Case Hearing*, 9 P.3d 409, 466–67 (Hawaii 2000), described above in n. 78.

112. *Filartiga*, 630 F.2d at 880.

113. *Flores v. Southern Peru Copper Corporation*, – F.3d –, 2003 WL 22038598 (2d Cir. 2003).

114. *Ibid.* at *16 (quoting from *Beanal*, 197 F.3d at 167).

115. Another court that refused to allow ATCA claims based solely on principles that “do not set forth any specific proscriptions, but rather refer only in a general sense to the responsibility of nations” is *Amlon Metals, Inc. v. FMC Corp.* 775 F. Supp. 668 (S.D.N.Y. 1991). The court would not accept a claim based solely on the alleged violation of Principle 21 of the Stockholm Declaration (n. 57 above), which confirmed that states have a responsibility to ensure that activities within their

CONCLUSION

Substantive principles of international law have evolved through treaties and the development of customary international law, and they now clearly prohibit pollution of the marine environment. Noise is polluting energy, and the incredibly loud noises that will be emitted by the navies of the United States and its NATO allies through their active sonar program, and by scientists using this technology for other purposes, have been shown to interfere with marine life and must certainly be classified as pollution. In 2002 and 2003, three judges in three different cases in the U.S. District Court for the Northern District of California issued opinions blocking and limiting the use of sonar based on violations of U.S. laws.¹¹⁶ Legal challenges in U.S. courts relying on U.S. environmental laws will remain a good method of addressing the risks created by LFAS and related sonars, but, because U.S. judges do permit continued testing of LFAS and because Congress may exempt military sonar from U.S. environmental laws,¹¹⁷ it is also necessary to consider international remedies. Although international law respects military activities necessary for self-defense, military decision makers must balance the military benefit against the risks to the environment. The use of untested technologies likely to have a significant impact on marine life for a limited military goal that can probably be achieved through other means would certainly be considered by most observers to be a violation of international law.

Procedural mechanisms are not always in place to protect the substantive international law norms that have emerged in recent years, but it may be possible to use existing and recently created tribunals to protect the ocean creatures threatened by LFAS. The most promising approach would be to use the dispute-resolution procedures found in the Law of the Sea Convention. Even though the United States has not ratified the Convention, it would appear to be possible for a concerned country to bring a claim against the United States pursuant to the 1995 Straddling and Migratory Species Agreement, which the United States has ratified and which is now in force.¹¹⁸

Political efforts can also be pursued, utilizing international organizations such as the International Maritime Organization and the European Parliament. Lawsuits can be filed in national and regional courts, in the United States using the Alien Tort Claims Act, and also in the European Court of Human Rights, although significant procedural barriers would need to be overcome.

jurisdiction do not cause environmental damage to other states. The court stated that the plaintiff's reliance on Principle 21 was "misplaced, since those Principles do not set forth any specific proscriptions, but rather refer only on a general sense to the responsibility of nations." *Ibid.*, at 671.

116. See text at (n. 5–12 above).

117. See (n. 13 above).

118. See text at (n. 95–7 above).

The principles that have emerged in treaties and recent cases make it clear that it is impermissible to introduce pollution into the marine environment, especially not at the level presented by the planned use of low frequency active sonar, which will impose severe risks on marine life. Because of the serious and perhaps devastating impact LFAS can be expected to have on marine mammals and other ocean life, it is likely that any tribunal allowed to address the merits of this controversy would act conscientiously to restrict the use of this new technology, drawing upon the existing treaties and principles of international law described earlier.