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THE ORIGIN AND EVOLUTION OF OCEAN NOISE REGULATION UNDER THE U.S. MARINE MAMMAL PROTECTION ACT

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This article reviews the U.S. regulation of ocean noise under the Marine Mammal Protection Act (MMPA). Drafted in 1972 in response to the high mortality rate of dolphins in tuna nets, the MMPA reduced by-catch by establishing a moratorium on all “takes” of marine mammals. This moratorium distinguishes the MMPA as an especially powerful environmental law, but as the perception of which activities caused a “take” broadened, the moratorium has made the MMPA more difficult to administer. Ocean noise illustrates this phenomenon: the recognition of noise as a type of “take” has resulted in arbitrary enforcement of the law, a costly burden on enforcement agencies, and ineffective protection from noise for marine mammals. We propose several changes to the law to address these problems, including a wider application of the General Authorization, the use of Marine Protected Areas as a regulatory tool, and an overhaul of the MMPA’s broad definition of harassment.

I. INTRODUCTION

The Marine Mammal Protection Act (MMPA) was signed into law by President Richard Nixon on December 21, 1972. The Act established a

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federal responsibility, shared by the Departments of the Interior and Commerce, for the conservation and management of marine mammals. Created primarily to protect marine mammals from the threat posed by tuna fishing, it also encompassed other threats, including polar bear hunting in Alaska, the harvest of harp seals in Canada, and commercial whaling. One threat, however, not envisioned at the time was noise.¹ When the MMPA was first enacted, there was no recognition that sounds associated with anthropogenic activities such as oil exploration, shipping, and military exercises could adversely affect marine mammals or other biota.²

Over the years, noise has been acknowledged as a potential threat to marine mammals and entire marine ecosystems. An increasing number of studies have shown that noise may pose a risk to marine mammals because they rely on their own echolocation and communication skills for survival.³ Recently, noise has been linked to other physiological and behavioral effects that could injure or kill marine mammals.⁴ Scientific evidence also shows that noise could influence fish, crustaceans, and other marine life.⁵ These threats have gained attention in recent years in response to several

1. In this paper no distinction is made between the terms “noise” and “sound.” They are often used interchangeably. Noise is a relative term and has been defined as “sound or a sound that is loud, unpleasant, unexpected, or undesired,” and “sound or a sound of any kind.” THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE 1228 (3d ed. 1992).

2. See generally Robert J. Hofman, *Marine Sound Pollution: Does It Merit Concern?*, 37 MARINE TECH. SOC’Y JOURNAL 61 (2003). Similar comments were made by Roger Gentry of the National Marine Fisheries Service, at the Shipping Noise and Marine Mammals meeting held in Arlington, VA on 17-19 May 2004.

3. For background on these echolocation skills, see WHITLOW W.L. AU, THE SONAR OF DOLPHINS (1993).

4. For a general overview of the effects of sound on marine mammals, see W. JOHN RICHARDSON ET AL., MARINE MAMMALS AND NOISE (1995).

5. For a summary of the most recent scientific research on health threats to sea life from noise, see COMM. ON CHARACTERIZING BIOLOGICALLY SIGNIFICANT MARINE MAMMAL BEHAVIOR, NAT’L RESEARCH COUNCIL OF THE NAT’L ACADS., MARINE MAMMAL POPULATIONS AND OCEAN NOISE: DETERMINING WHEN NOISE CAUSES BIOLOGICALLY SIGNIFICANT EFFECTS (2005) [hereinafter DETERMINING BIOLOGICALLY SIGNIFICANT EFFECTS]; COMM’N ON GEOSCIENCES, ENV’T AND RESOURCES, NAT’L RESEARCH COUNCIL, MARINE MAMMALS AND LOW-FREQUENCY SOUND (2000) [hereinafter MARINE MAMMALS AND LOW-FREQUENCY SOUND (2000)]; COMM. ON GEOSCIENCES, ENV’T AND RESOURCES, NAT’L RESEARCH COUNCIL, LOW-FREQUENCY SOUND & MARINE MAMMALS: CURRENT KNOWLEDGE AND RESEARCH NEEDS, 27-30 (1994) [hereinafter LOW-FREQUENCY SOUND AND MARINE MAMMALS (1994)]. See also Arnold Banner & Marine Hyatt, *Effects of Noise on Eggs and Larvae of Two Estuarine Fish*, 102 TRANSACTIONS OF THE AM. FISHERIES SOC’Y 134 (1973); J.P. Lagardere, *Effects of Noise on Growth and Reproduction of Crangon crangon in Rearing Tanks*, 71 MARINE BIOLOGY 177 (1982).

dramatic events linking anthropogenic, or man-made, noise, with the strandings and deaths of a number of marine mammals.⁶ Consequently, there has been growing demand by environmental groups and non-governmental organizations to regulate and control anthropogenic sources of noise in the sea.

However, a great deal of scientific uncertainty still exists over the effects of noise on the ocean ecosystem and on marine mammals in particular. Considerable research is currently being carried out to determine exactly what these effects are, but the nature of this acoustic research often requires the issuance of permits under the MMPA. Determining who must apply for these permits, who receives them, and how noise-creating activities can be regulated has resulted in lawsuits, injunctions, and controversy at the highest levels of government. This paper attempts to identify the problems with the present state of noise regulation under the MMPA, discover the origins of those problems, and recommend changes that will result in regulation that more closely matches the scientific understanding of ocean noise, is more aligned with the original intent of the MMPA, and thus, has the potential to better protect marine mammals.

II. LEGISLATIVE HISTORY OF THE MARINE MAMMAL PROTECTION ACT AND OCEAN NOISE REGULATION

Anthropogenic sound in the ocean was not regulated by MMPA permits or authorizations until 1981, nearly a decade after the MMPA was enacted. To date, three sets of amendments to the MMPA have been relevant to noise regulation. First, in 1981, the Small Take Program was added to allow small incidental takes (it was first applied to noise from oil and gas exploration). Second, in 1994, statutory definitions for harassment were established and two new types of authorizations were added to streamline the permitting program—the Incidental Harassment Authorization (IHA) and the General Authorization (GA). Third, in 2003, a new provision was created to ease the restrictions on the incidental take requirements for naval

6. For an overview of several controversial strandings, see ELENA MCCARTHY, INTERNATIONAL REGULATION OF UNDERWATER SOUND: ESTABLISHING RULES AND STANDARDS TO ADDRESS OCEAN NOISE POLLUTION (2004). See also A. Frantzis, *Does Acoustic Testing Strand Whales?*, 392 NATURE, March 5, 1998 at 29; U.S. DEP'T OF COMMERCE & SEC. OF THE NAVY, JOINT INTERIM REPORT, BAHAMAS MARINE MAMMAL STRANDING EVENT OF 15-16 MARCH 2000 (2001) [hereinafter BAHAMAS STRANDING EVENT INTERIM REPORT].

operations by redefining Level B harassment for military readiness activities.

*A. The Enactment of the MMPA and the Establishment
of the Permitting Program*

The National Environmental Policy Act (NEPA) of 1969 signalled the beginning of an unprecedented burst of environmental legislation in the United States. President Nixon designated 1970 as the “year of progress,” and in terms of environmental legislation, this was largely true.⁷ In 1970 alone Congress passed the Water Quality Improvement Act of 1970, the Resource Recovery Act of 1970, and the Clean Air Amendments of 1970.⁸ In the four years that followed, Congress passed the Clean Air Act, the Endangered Species Act (ESA), further amendments to the Clean Water Act (also known as Federal Water Pollution Control Act Amendments), and the Marine Mammal Protection Act.⁹

The MMPA was an ambitious response to a narrow but serious problem: in 1971 alone, over 350,000 dolphins were estimated to have been killed in tuna purse-seine nets.¹⁰ The MMPA addressed the issue by declaring a sweeping moratorium on all “takes” of marine mammals. The MMPA defined a “take” as “to harass, hunt, capture, or kill or attempt to harass, hunt, capture or kill any marine mammal.”¹¹ While the acts of hunting, capturing, and killing were relatively straightforward, the definition of harassment was (and still is) a major source of tension in the MMPA. “Harass” was not statutorily defined until 1994, but in practice the term was interpreted to mean any documented change in distribution or behavior caused by human activity.¹²

Responsibility for enforcing the MMPA was split between two agencies. The Fish and Wildlife Service (FWS) was responsible for sea

7. J. BROOKS FLIPPEN, NIXON AND THE ENVIRONMENT 130-33 (2000).

8. Water Quality Improvement Act, Pub. L. No. 91-224, 84 Stat. 91 (1970); Resource Recovery Act of 1970, Pub. L. No. 91-512, 84 Stat. 1227 (1970); Clean Air Act Amendments of 1970, Pub. L. No. 91-604, 84 Stat. 1676 (1970); ROBERT V. PERCIVALET AL., ENVIRONMENTAL REGULATION, 494-95 (4th ed. 2003).

9. Clean Air Act Amendments of 1970, *supra* note 8; Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816 (1972); Endangered Species Act of 1973, Pub. L. No. 93-205, 87 Stat. 884 (1973); Marine Mammal Protection Act of 1972, Pub. L. No. 92-522, 86 Stat. 1027 (1972) [hereinafter MMPA].

10. 1982-1983 NAT'L MARINE FISHERIES SERV. ANN. REP. ON THE MMPA 2.

11. 16 U.S.C. § 1362(13) (Supp. 1972).

12. STEVEN L. SWARTZ & ROBERT J. HOFMAN, MARINE MAMMAL AND HABITAT MONITORING: REQUIREMENTS, PRINCIPLES, NEEDS, AND APPROACHES (1991).

otters, walrus, polar bears, and manatees, and the National Marine Fisheries Service (NMFS) was responsible for all other oceanic marine mammals—whales, porpoises, seals, and sea lions.¹³ This division in jurisdiction remains the same today.¹⁴

NMFS and the FWS were both responsible for enforcing the moratorium on takes. This task manifested itself largely in the administration of several specific exceptions to the moratorium.¹⁵ First, Indians, Aleuts, and Eskimos were exempted from the moratorium under certain conditions.¹⁶ Second, a “waiver” of the moratorium could be obtained, though those were costly, time-consuming and subsequently rare.¹⁷ Third, the MMPA established a separate permitting program to allow specific takes under certain circumstances by permitted groups. This permitting program was (and continues to be) administered by NMFS and FWS.

The first version of the MMPA permitting program, published in the Federal Register in 1972, outlined who could legally “take” marine mammals and under what circumstances.¹⁸ Permits were available for those collecting marine mammals for public display (for zoos, circuses, and

13. The Secretary of the Interior was initially assigned responsibility and delegated it to the FWS. The Secretary of Commerce nominated the National Oceanic and Atmospheric Administration (NOAA) in charge, which deferred authority to NMFS.

14. Marine Mammal Protection Act, Report to the Secretary of Commerce, 38 Fed. Reg. 20,564 (Aug. 1, 1973).

15. 16 U.S.C. § 1371 (Supp. 1972).

16. Indians, Aleuts, or Eskimos who reside in Alaska, and live on the coast of the North Pacific Ocean or the Arctic Ocean are allowed to “take” marine mammals without the need for permits for subsistence and handicrafts, as long as the animal won’t be wasted, and as long as the Secretary of Commerce or Interior hasn’t set out special guidelines to protect the stock. 16 U.S.C. § 1371(b).

17. Hofman, *supra* note 2, at 67. Title 16 U.S.C. § 1371 states that:

The Secretary, on the basis of the best scientific evidence available and in consultation with the Marine Mammal Commission, is authorized and directed . . . to determine when, to what extent, if at all, and by what means, it is compatible with this Chapter to waive the requirements of this section . . . *Provided, however,* That the Secretary, in making such determinations, must be assured that the taking of such marine mammal is in accord with sound principles of resource protection and conservation as provided in the purposes and policies of this Chapter: *Provided further, however,* That no marine mammal or no marine mammal product may be imported into the United States unless the Secretary certifies that the program for taking marine mammals in the country of origin is consistent with the provisions and policies of this Chapter. Products of nations not so certified may not be imported into the United States for any purpose, including processing for exportation.

16 U.S.C. § 1371(a)(3)(A). The only waiver on record is one that the state of Alaska applied for.

18. 38 Fed. Reg. at 20,565.

theme parks), scientific researchers, and those that could demonstrate that they suffered “undue economic hardship.”¹⁹ These groups were obliged to obtain permits to conduct any activities that could create a “take.” Without a permit, any form of “take” was explicitly prohibited.

The initial structure of the MMPA—a moratorium with specified exceptions—reflected the scientific understanding of anthropogenic effects on marine mammals in 1972. Scientific research that required killing animals or removing skin samples and fishing activities that resulted in marine mammal deaths by the thousands were easy to identify as harms that would require permits. But this moratorium-based scheme proved inflexible as less obvious threats came to light.

The 1972 version of the MMPA stipulated that all permit applications for research or display must first be reviewed by the Marine Mammal Commission and its Board of Scientific Advisors. However, neither body had been appointed at the time the permit regulations were created.²⁰ Because the committees needed to approve the permits, scientific research and display permits could not legally be granted. In 1973, as a quick fix to the problem, NMFS accepted applications for “Economic Hardship Permits” (intended for commercial purposes) from researchers and public displayers of marine mammals, even though the criteria for issuance did not match the characteristics of the applicants.²¹

In effect, marine mammal scientists and displayers were granted permits without being held to the same standard as commercial applicants who had to prove economic hardship to obtain the same type of permit. NMFS wrote at the time:

While undue economic hardship must be shown in all cases to qualify for an exemption, a lesser degree of economic hardship is considered ‘undue’ in cases involving sound scientific research that does not involve the killing of any marine mammals, than for those cases involving the kill of animals for commercial purposes.²²

19. NMFS states: “[t]he permit program’s primary interest is to prevent any significant harmful effect on the populations of marine mammals or their environment when they are being removed from the wild and to maintain their health and well-being after they are taken.” 1977-1978 NMFS ANN. REP. ON THE MMPA 10.

20. The problem was rooted in the fact that the Commission and its Committee on Scientific Advisors had not been appointed until after the interim regulations were published. 38 Fed. Reg. at 20,565.

21. The criteria for economic hardship permits were set forth in § 216.12 and § 216.13 of the MMPA. *Id.*

22. 38 Fed. Reg. at 20,565.

To summarize, scientists did not have to prove the same degree of economic hardship as commercial applicants, as long as they were not going to kill marine mammals. In this way, scientists were accommodated so that their research could continue.²³

Accommodating researchers, even when it required liberal interpretation of the permitting regulations, was in keeping with the intention of the lawmakers. The 1972-1973 report of the Secretary of Commerce on the MMPA stated, “[a]lthough the Act declares a moratorium on the taking of marine mammals, the Act clearly intended that research on marine mammals be continued”²⁴ As such, within the MMPA there is a special exception for marine mammal science.²⁵ Lawmakers encouraged research in part to aid in the management of marine mammals. According to a report made by the Secretary of Commerce on the MMPA, the Senate Committee on Commerce was presented with strong evidence “that total and complete protection without scientific management was not the best answer to solving the problems of marine mammals.”²⁶ Therefore, Congress recommended there be exceptions for scientific research.²⁷ This recognition prompted both the House of Representatives Committee on Merchant Marine and Fisheries and the Senate Committee on Commerce to recommend exceptions to the moratorium on takes for science.²⁸ The belief that law and science went hand-in-hand had profound effects on how the permitting program was administered in its early years: scientists were accommodated because research was viewed as critically important to the management of marine mammals under the MMPA. Over the last thirty years, however, the treatment of scientific research under the permitting program has changed.²⁹

23. *Id.*

24. *Id.*

25. 16 U.S.C. § 1371(a).

26. 1977-1978 NMFS ANN. REP. ON THE MMPA, *supra* note 19, at 1.

27. *Id.*

28. NMFS wrote in its annual legislative history, “[a]lthough the Act declares a moratorium on the taking of marine mammals, the Act clearly intended that research on marine mammals be continued.” 38 Fed. Reg. at 20,565.

29. As early as 1975, NMFS began to consider the value of the research, specifically “whether the granting of the permit [was] required to further a bona fide, necessary, and, or desirable scientific purpose.” Marine Mammals, report to the Secretary of Commerce, 41 Fed. Reg. 30,154-55 (July 22, 1976). The Director of NMFS was also legally required to consider the anticipated benefits from the scientific research relative to the possible effects of the proposed taking. *Id.*

B. Leading to the 1981 Amendments (1975-1981)

This section outlines the time period leading up to the 1981 amendments, beginning with regulation of the oil and gas industry by the United States Geologic Survey (USGS) and the Alaska Division of Minerals in 1975. This history, though not specifically on the subject of the regulation of noise by the MMPA, provides insight into the rationale for the addition of the Small Take Program in 1981.

Although the MMPA did not initially distinguish between takes, in 1975 NMFS began dividing scientific takes into levels based on severity. These scientific takes, which required an authorization known as a Scientific Research Permit (SRP), were divided into three categories:

- (1) Activities requiring the removal of living marine mammals from the ecosystem which include: (a) Killing wild animals for the collection of biological specimen materials and measurement data; and (b) Holding animals in captivity for laboratory-oriented research;
- (2) Activities requiring the removal of dead marine mammals from the ecosystem;
- (3) Activities not requiring the removal of marine mammals from the ecosystem, nor involving any significant probability of accidental injury or death, which include (a) Capturing, tagging, and/or marking, followed by release of the animals; (b) Marking and/or tagging by means of a remote technique, not involving capture and release; (c) Taking skin samples from cetaceans to determine sex; (d) Collecting measurement data and limited biological specimen material from living, restrained animals; (e) Taking by actions technically considered as harassment, such as may occur in the course of aerial surveys, population counts, filming and sound recording activities, not involving direct contact with any marine mammals.³⁰

These three categories reveal the informal beginning of the classification of “takes” based on severity—a legal distinction that would be statutorily defined years later.³¹

30. *Id.*

31. This wording seems to be the first distinction between “Level A” harassment and “Level B” harassment, which was later statutorily defined in 1994. Category (e) also resembles the General Authorization category—an authorization established in 1994 for scientific researchers who inflict only Level B harassment on non-ESA species. 41 Fed. Reg. at 30,154.

When these categories were defined, the oil and gas industry, which had a significant ocean presence, was not required to get permits under the MMPA. At the time, the Alaska Division of Minerals and the United States Geological Survey³² were responsible for overseeing oil and gas exploration.³³ These two regulatory bodies were advised by the Alaska Department of Fish and Game, the FWS, and NMFS on all marine mammal matters “to ensure that the proposed actions will not place marine mammals at a disadvantage.”³⁴ By 1975, it was clear to the Alaska Division of Minerals, the USGS, and the Marine Mammal Commission that oil and gas exploration activities in some situations could adversely affect some species of marine mammals.³⁵ This acknowledgement set the stage for the addition of the 1981 Small Take Program six years later.

Initial concerns about oil and gas exploration focused on the use of explosives. In fact, the first regulatory action imposed on the oil and gas industry involved a ban on explosives in the Beaufort Sea to protect ringed seals in 1975.³⁶ The oil and gas industry complied with the ban³⁷ and companies (including Imperial Oil and Esso Resources) responded by funding scientific studies to examine the effects of noise on marine mammals in 1977.³⁸ It was this oil and gas-funded research off the coast of

32. The Department of Interior delegated responsibility to USGS.

33. Jurisdiction was split because forty percent of the Beaufort Sea is comprised of Alaska state waters and the other sixty percent falls under federal jurisdiction. In 1982, the Minerals Management Service was formed to oversee oil and gas exploration. U.S. Dep’t of Int., *A New Age Begins* (a History of the U.S. Geological Survey), <http://pubs.usgs.gov/circ/c1050/age.htm> (last visited Nov. 21, 2007).

34. In 1980, NMFS and BLM held several coordinating meetings to discuss what the responsibilities of each agency were in terms of marine research programs. The November meeting between the two departments set the stage for the amendments to the MMPA in 1981. The first meeting took place in Seattle, Washington in November, 1980. 1980-1981 NMFS ANN. REP. ON THE MMPA 20.

35. In 1975 the Marine Mammal Commission recognized that “[a]ctivities associated with the discovery, recovery, and transport of oil and gas reserves from the outer continental shelf (OCS) may have direct or indirect effects on marine mammals and/or the ecosystems of which they are a part.” 1977 MMC ANN. REP. 63.

36. *Marine Mammal Protection Act Improvement: Hearing on H.R. 4084, Before the Subcomm. on Fisheries and Wildlife Conservation and the Environment of the H. Comm. on Merchant Marine and Fisheries*, 97th Cong. 280 (1981) [hereinafter *1981 MMPA Hearings*] (statement of Larry G. Bowles, Manager of Government Affairs, Geophysical Service, Inc.).

37. The oil and gas industry switched to compressed air for winter over-ice operations off the coast of Alaska until 1979 when the industry switched again to vibrator energy. *See id.*

38. Examples of scientific papers include: MARK A. FRAKER, THE 1977 WHALE MONITORING PROGRAM MACKENZIE ESTUARY, N.W.T. (F.F. Slaney & Co. Ltd. 1977);

Alaska and Canada that first suggested noise from seismic exploration could be correlated with behavioral changes in marine mammals. This was also the first research designed expressly to study the effects of noise on marine mammals.³⁹

NMFS and FWS, in their capacities as advisors, suggested that in mid-March USGS halt oil and gas exploration in waters deeper than eighteen feet in the event that oil exploration interfered with the pupping of ringed seals in the area. They were concerned that if the mother seals were “sufficiently disturbed” by noise from the exploration, they might abandon their pups when the young seals were too young to fend for themselves.⁴⁰ Not surprisingly, the oil and gas industry contested the recommendation of the advisory agencies to halt exploration and funded its own research to study the effects of noise on ringed seals.⁴¹ It was this threat of regulation that motivated much of the scientific research on the effects of noise on marine mammals in the 1970s—a trend that largely continues today.

For several years in the late 1970s, the USGS and the Alaska Division of Minerals concurred with the oil and gas industry and did not limit seismic exploration based on the potential effects of noise on marine mammals.⁴² But in 1980, the tide turned as mounting evidence indicated that some marine mammals could be affected by noise. Citing the sensitivity of ringed seals to sound, the USGS and Alaska Division of Minerals prohibited oil exploration after mid-March, despite the fact that the ice was still thick enough to support exploration.⁴³ The agencies claimed that the Marine Mammal Protection Act’s prohibition on “takes” was the reason exploration could not continue.⁴⁴

Hofman, *supra* note 2 (citing MARK A. FRAKER & P.N. FRAKER, THE 1979 WHALE MONITORING PROGRAM MACKENZIE ESTUARY, N.W.T (LGL Ltd. 1979)).

39. Roger Payne and Douglas Webb, *Orientation by Means of Long Range Acoustic Signaling in Baleen Whales*, 188 ANNALS OF THE NEW YORK ACAD. OF SCI. 110 (1971) (discussing the effects shipping noise has on the acoustic signaling of baleen whales).

40. 1981 MMPA Hearings, *supra* note 36, at 280.

41. *Id.* at 279-81.

42. According to Bowles, “each year the data presented by the advisory agencies for consideration by the permitting authorities were considered by the permitting agencies, and by industry, to be unscientific, inconclusive, extremely subjective and, therefore, unreliable for the purpose of prohibiting acquiring urgently needed energy exploration data.” *Id.* at 281.

43. After the same stipulation in 1981, the oil and gas industry appealed the decision to the Director of USGS and was successful. However, the State of Alaska upheld its previous ruling and did not extend exploration in state waters to the industry.

44. The agencies “have all told us time and again that the reason for their intransigence on the issue is that the Marine Mammal Protection Act as it is now written, gives them insufficient room for interpretation of what constitutes a taking of the animals . . .” 1981 MMPA Hearings, *supra* note 36, at 281.

C. *The 1981 Amendments: The Addition of the Small Take Program*

Due to the new limits imposed on oil and gas exploration, the industry lobbied heavily for an exception to the MMPA moratorium, which resulted in the 1981 Small Take Program. The Small Take Program was pitched as a new exception for the “incidental taking of insignificant numbers of marine mammals.”⁴⁵

The effects of oil and gas exploration, especially noise, were still uncertain, and the oil and gas industry maintained that its exploration activities did not cause “takes.” But the ambiguity over the definition of “take” meant that if there ever *were* definitive evidence that noise was strongly correlated with changes in marine mammal behavior, a strict interpretation of the MMPA moratorium would likely require that oil and gas exploration be halted completely.⁴⁶ As James Walsh, the acting administrator of NOAA at the time, pointed out, “There is the danger that [oil and gas exploration], if evidence indicates that it is harassment, would, therefore, constitute illegal activity presently and would not be able to proceed unless and until the requirements of the act are satisfied.”⁴⁷ Thus, the 1981 Small Take Program ensured that the oil and gas industry could continue exploration off of Alaska even if research definitively showed that noise could cause a “take.” Larry Bowles, a representative of the oil industry as the manager of the Government Affairs for Geophysical Service Inc., plainly summed up the oil industry’s position: “[m]ainly, what we are concerned about is to be allowed to operate on the ice as long as it is safe to operate on the ice. We would just like to see some administrative procedures set up so [we would be allowed] to do that.”⁴⁸

The 1981 Small Take Program expanded permitted activities to include any specified activity (other than commercial fishing) within a specified geographical region that could cause the incidental, *but not intentional*, taking of small numbers of marine mammals that were not endangered or

45. *Id.* at 282. Larry Bowles of GSI urged the Subcommittee on Fisheries and Wildlife Conservation to pass this amendment, to “allow more reasonable administration in matters involving, at the most, incidental taking of insignificant numbers of marine mammals during operations conducted to satisfy other vital needs of our society.” *Id.*

46. *1981 MMPA Hearings, supra* note 36, at 308. James Walsh said: “The statute defines take broadly to include harassment. We don’t know definitively whether the use of sounding gear is in fact this kind of thing. We don’t know definitively whether this activity alters the behaviour of animals to such an extent that it would amount to harassment and therefore a take.” *Id.* at 307.

47. *Id.*

48. *Id.* at 286 (statement of Larry Bowles).

threatened.⁴⁹ NMFS supported the addition of the Small Take Program in hope that it would simplify the already over-complicated permitting system.⁵⁰ Robert Eisenbud, from the General Counsel of the Marine Mammal Commission, also supported the new permit category, stating that requiring oil and gas to apply for a full-blown exception to the moratorium seemed like “overkill.”⁵¹

The establishment of the Small Take Program, prompted by the oil exploration industry, proved the efficacy of the MMPA in its early days. The moratorium was taken seriously: it threatened to shut down oil exploration if no exceptions were put in place. For this reason the oil and gas industry lobbied for an exemption, even though this exemption placed the industry squarely under the authority of NMFS and FWS. In short, the oil and gas industry sought government oversight to protect itself from the effects of the moratorium.⁵²

49. In 1986, the Small Take Program was widened to allow small incidental takings of threatened or endangered species of marine mammals under certain conditions, outlined in an official “incidental take statement,” also administered with a Letter of Authorization (LOA). The 1986 amendments changed Section 101(a)(5) of the MMPA and Section 7 of the Endangered Species Act (ESA). The inclusion of ESA-listed species in the 1986 expansion of the Small Take Program had significant implications for noise producers. The addition of this category allowed noise producers to incidentally take threatened species. This amendment resolved a conflict that had existed between MMPA and the ESA. Contrary to the MMPA, the ESA allowed incidental takes of endangered and threatened marine mammals, if the impacts were negligible. This expansion resolved the conflict between the statutes by allowing for takes of threatened species as long as the impacts were “negligible” and measures to ensure “the least practicable adverse impact” were prepared by NMFS. The amendments also changed Section 7(b)(4) of the ESA to clarify that any taking “authorized in an incidental take statement issued in conjunction with a Section 7 consultation, must satisfy Section 101(a)(5) of the MMPA.” 1986-1987 NMFS ANN. REP. ON THE MMPA 3-6.

50. James Walsh said that NOAA supports the creation of a new category that would reduce “the kind of complicated process . . . into something a little more simplified for small groups of non depleted stocks.” 1981 MMPA Hearings, *supra* note 36, at 308 (statement of James Walsh, Acting Administrator, NOAA).

51. *Id.* at 308 (statement of Robert Eisenbud, General Counsel, Marine Mammal Commission).

52. See International association of Oil & Gas Producers E & P Sound and Marine Life Programme, <http://www.soundandmarinelife.org> (last visited Oct. 22, 2007). In 2006, the oil and gas industry again acted proactively by establishing a “Joint Industry Programme on Sound and Marine Life.” Funded by several oil and gas-producing companies, the Joint Industry supports research on the sounds produced by offshore industry operations, their possible effects on marine mammals, and mitigation measures. International association of Oil & Gas Producers, Goals and Scope of the Programme, <http://www.soundandmarinelife.org/Site/index.html> (last visited Sept. 21, 2007). It provides funding on the order of eight million dollars annually for scientists to produce high quality research papers in peer-reviewed journals. *Id.*

The Small Take Program was enforced through a new type of “permit”—a Letter of Authorization (LOA).⁵³ The first LOA application for an incidental small take was a request by the International Association of Geophysical Contractors to allow the taking of ringed seals incidental to on-ice seismic activities in 1982.⁵⁴ The application focused on noise: “[t]here is concern by biologists that female seals may react to the acoustic stimulus produced by seismic activities by abandoning their pups.”⁵⁵ Other LOAs for takes by noise followed—including those granted to the Air Force for taking sea lions incidental to space shuttle launches from Vandenberg Air Force Base, California. Later LOAs were applied to such activities as naval operations and coastal construction. In 1986, section 101 of the MMPA was amended to broaden permitted small takes to species listed as endangered or threatened under the ESA.⁵⁶

These LOAs for noise disturbances represented the first time underwater noise production was explicitly controlled by the MMPA. As such, they represented the first unequivocal, legal acknowledgement that underwater noise could be interpreted as injurious to marine mammals. It is important to understand the context in which this occurred. Ocean noise was thought to be correlated with behavioral disruption—which was considered harassment, and harassment was considered a type of “take.” Concern, however, was not simply over the welfare of the animals themselves. Alaskan Natives and their representatives were worried that noise from oil and gas exploration could drive bowhead whales from Alaskan waters, making them unavailable for subsistence uses for Natives—a use guaranteed by the MMPA.⁵⁷ In effect, the interest in regulating anthropogenic noise was, at least in part, to ensure that whales stayed in Alaskan waters so they could be hunted and eaten or made into handicrafts.⁵⁸ As such, the 1981 Small Take Program stipulated that

53. 50 C.F.R. § 216.106 (2006).

54. 1981-1982 NMFS ANN. REP. ON THE MMPA 11.

55. Regulations Governing Small Takes of Marine Mammals Incidental to Specified Activities, 47 Fed. Reg. 9027, 9028 (Jan. 4, 1982).

56. 1987-1988 NMFS ANN. REP. ON THE MMPA 15. The first application to the Small Take Program for Endangered/Threatened Species was made by Amoco Production Co., Inc. to take bowhead and gray whales by “noise, un-permitted discharge (oil spills) and physical obstruction” during exploration for oil and gas in Alaska State Waters. *Id.*

57. 16 U.S.C. §1371(b)(1).

58. Hofman, *supra* note 2, at 71. Robert Hofman, Scientific Program Director of the Marine Mammal Commission and an active member of the congressional hearings, said in an email about the 1986 LOA amendments, “Alaska natives were concerned that shifts in bowhead movement patterns would compromise their ability to hunt bowheads and other marine mammals as they had for millennia.” E-mail from Robert Hofman, Scientific

incidental takes should be authorized only “if the total of such taking will have a negligible impact on . . . the availability of that population for subsistence uses in Alaska.”⁵⁹ The 1986 expansion of the LOA included a similar subsistence guarantee for bowhead whales and marine mammals.⁶⁰

The LOA was designed as a way to preserve the authority of the moratorium by permitting different activities with similar effects.⁶¹ This modification to the MMPA was based on new scientific understanding that the old permit categories did not cover all types of allowable takes. The addition of the Small Take Program marked an important shift in the enforcement of the MMPA: the emphasis moved away from “takers” (fishermen, researchers and public displays) and toward the individual “takes” themselves.

D. Leading to the 1994 Amendments

In 1988, NMFS called for a thorough review of the permit program. It was pitched as a routine check-up: “[t]he permit program has been operating for about [fifteen] years, and NMFS believes it is time to review the policy, criteria and procedures used to evaluate applications and to issue and monitor permits,” read a statement by NOAA in the annual report of the MMPA.⁶² One of the objectives was to streamline administrative procedures related to permit authorization.

In the course of the review, it became clear that the permitting program was in a bad state. In 1989, NMFS declared that the permit program had

Program Director of the Marine Mammal Commission present at the 1981 Committee meetings on the subject of the Incidental Take Authorization (June 7, 2004). William Lang, a scientist at the Minerals Management Service, says of the scientific research surrounding noise at the time: “the real issue, in Alaska at public hearings, was not very much on what hearing impacts seismic had on bowheads but if they would be displaced away from traditional hunting grounds . . . I can not say this was very inspiring for the science teams.” E-mail from William Lang, Research Coordinator, Minerals Management Service, to Dr. Elena McCarthy (June 7, 2004).

59. H.R. REP. NO. 97-228 (1981), *reprinted in* 1982 U.S.C.C.A.N. 1458. For more information see 1981 MMC ANN. REP. 15; 1981-1982 NMFS ANN. REP., *supra* note 54, at 7.

60. Hofman, *supra* note 2, at 71.

61. Although the oil and gas industry lobbied for the new category, it was potentially applicable to any activity didn’t already qualify for an exception.

62. The review was intended to “identify administrative procedures that result in a more streamlined and efficient process and determine the circumstances under which the National Environmental Policy Act applies to the permit program.” 1987-1988 NMFS ANN. REP., *supra* note 56, at 16.

become “increasingly complex and controversial.”⁶³ By 1993, after five years of review, the problems with the permitting program were deemed “fundamental and extensive” and there was even concern over “whether the existing permit program was consistent with applicable law.”⁶⁴

Noise regulation was identified as particularly problematic. The difficulty in regulating noise was articulated by the National Academy of Sciences (NAS) in a report entitled “Low-Frequency Sound and Marine Mammals,” released several months before the passage of the 1994 amendments to the MMPA. The NAS report found that the scientific permitting scheme (the special exception created for scientists when the Act was passed) “actively discourages and delays the acquisition of knowledge that would benefit conservation of marine mammals, their food sources, and their ecosystems”, and called regulation of scientific research “unnecessarily restrictive” and “self-defeating.”⁶⁵ The Academy was even less enthusiastic about the other permit category applied to noise—the 1981 Small Take Program (designated SIT, Small Incidental Take, in the report). “Not only is the SIT authorization process for basic research complicated and time-consuming,” the report read, “but the small incidental take provisions of the MMPA allow only for cases in which a small number of marine mammals will be subject to a negligible effect.”⁶⁶ Incidental takes that would affect more than a small number of animals—often the case with acoustic oceanography that transmitted low-levels of sound over far distances—were not even eligible for a permit.

By 1994, concerns over noise regulation laid bare the problem of arbitrary compliance with the MMPA. Biologist Peter Tyack of the Woods Hole Oceanographic Institution argued that there was a double standard in the permitting program. He stated:

[e]xtensive research shows that whales are disturbed by loud ships when they are many miles away. These results suggest that, under current regulations, most ships ‘take’ thousands of marine mammals a year by harassment. These ‘takes’ are completely predictable in many areas of high marine mammal density. If commercial ships operated under the same rules as researchers, they could seldom leave the harbor. The inconsistencies of this policy do no good for marine mammals and are vulnerable to challenge in court.⁶⁷

63. 1988-1989 NMFS ANN. REP. ON THE MMPA 27.

64. 1992-1993 NMFS ANN. REP. ON THE MMPA 74.

65. LOW FREQUENCY SOUND AND MARINE MAMMALS (1994), *supra* note 5, 27-30.

66. *Id.* at 33.

67. *Hearing on the Reauthorization of the Marine Mammal Protection Act Before the Subcomm. on Environment and Natural Resources of the H. Comm. on Merchant Marine*

Prompted by increasing controversy over the permitting program and the results of NMFS' review, an extensive set of amendments that significantly reshaped the structure of the permitting system were introduced in 1993. According to NMFS, its proposed amendments were intended to streamline the regulations and make "administration of the permit program more efficient, consistent, and predictable."⁶⁸ They were meant to get to the heart of the arbitrary and ineffectual nature of noise regulation.⁶⁹

E. The 1994 Amendments

The 1994 amendments to the MMPA probably have had the greatest impact on ocean noise regulation. Most importantly, the term "harassment" was finally statutorily defined. The definition specified two types of harassment to differentiate between intensities of takes: "Level A" harassment corresponded to "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild" and "Level B" harassment corresponded to:

any act of pursuit, torment, or annoyance which—(i) has the potential to injure a marine mammal or marine mammal stock in the wild, or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.⁷⁰

These definitions guided the creation of a General Authorization (GA) and an Incidental Harassment Authorization, the permits for two new categories of "takes." The GA created a permit option for scientific researchers who would cause intentional, low-level disturbance, which was the newly dubbed "Level B" harassment.⁷¹ In accordance with the original intent of the law, particular attention was paid to streamlining the permit process for scientists. For example, a General Authorization could be

and Fisheries, 103rd Cong. (1994) (statement of Peter L. Tyack, Biologist, Woods Hole Oceanographic Institution).

68. 1992-1993 NMFS ANN. REP., *supra* note 64, at 74.

69. The amendments took over a year to become law. On March 22, 1994 a version was passed by the House but then amended by the Senate: the word "harm" was removed from the definition of the "take" outlined in the act. This left the bill at an impasse, creating further delay. Ultimately "harm" was dropped from the definition and S.B. 1636 became Pub. L. No. 103-238. 1994 MMC ANN. REP. TO CONGRESS 5.

70. 16 U.S.C. § 1362 (18)(A)(ii) (1994). *See also* 1994 NMFS ANN. REP. ON THE MMPA 6.

71. 16 U.S.C. § 1374(c)(3)(C).

issued without the usual thirty-day public comment period if the delay could result in “the loss of unique research activities.”⁷² The General Authorization embodied one of the founding principles of the law: it put a premium on scientific research and went out of its way to accommodate it.⁷³

The second permit category added in 1994, later dubbed the “Incidental Harassment Authorization” (IHA), streamlined the authorization of activities (other than fishing) that caused the incidental take of small numbers of animals *only by harassment*.⁷⁴ This amendment was an offshoot of the existing Small Take Program. Small takes *not* by harassment would still require a Letter of Authorization.⁷⁵ The Incidental Harassment Authorization was administered under a “permit-like system” with each authorization generally valid for one year.⁷⁶

The creation of the GA and IHA greatly expanded the permitting categories for noise (see Figures 1 and 2). Authorizations were granted for rocket launches, physical oceanography, and seismic surveying.⁷⁷ The GA and IHA were meant to delineate between small take activities that cause only “harassment” and those that have the potential to be more serious.

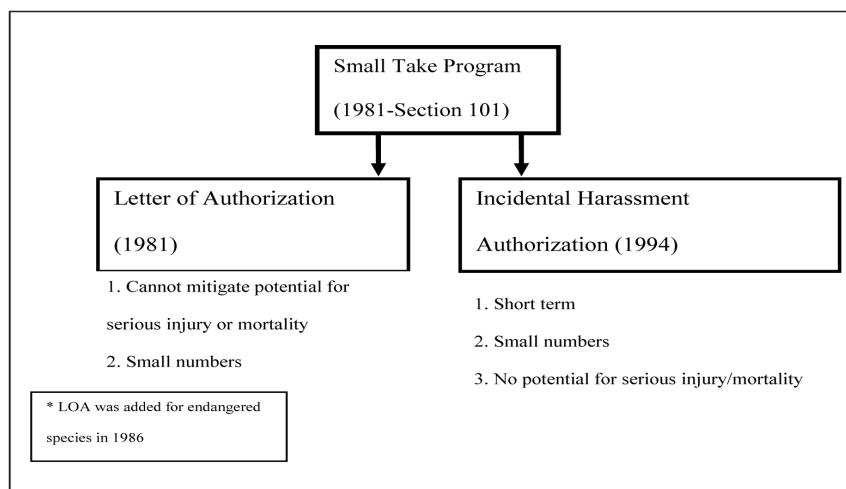


Figure 1. Permit categories for incidental takes applicable to noise. (Date in parenthesis corresponds to the year when the category was added).

72. *Id.* § 1374(c)(3)(A).

73. 1994 NMFS ANN. REP., *supra* note 70, at 64-65.

74. 1994 MMC REP., *supra* note 69, at 228.

75. *Id.*

76. 50 C.F.R. § 216.107(3)(e). *See also* 1994 MCC REP., *supra* note 69, at 266-67.

77. 1996 NMFS ANN. REP. OF THE MMPA 38-40

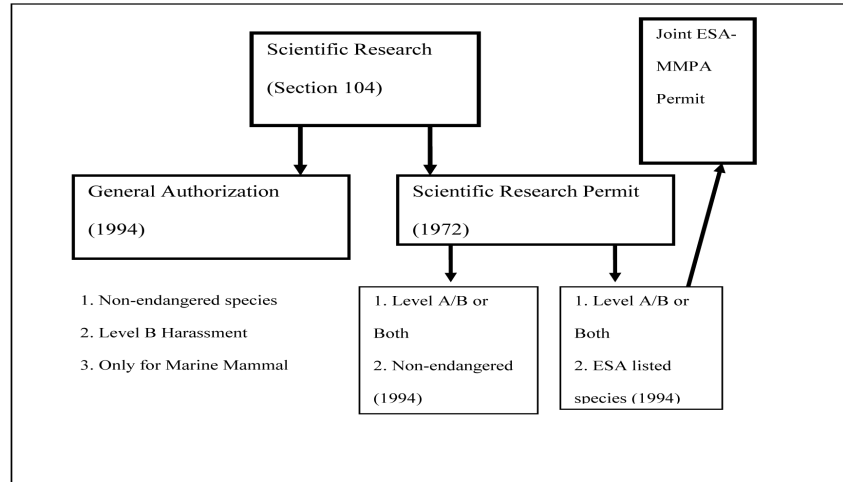


Figure 2. Permit categories for scientific research applicable to noise. (Date in parenthesis corresponds to the year when the category was added).

Although the 1994 amendments to the MMPA were intended to simplify and streamline the permitting process, the harassment definition polarized the participants in the ocean noise debate, many of whom felt that the definition of harassment was still too broad. Because Level B harassment could be interpreted in different ways, the MMPA remained open to lawsuits and non-compliance. Some worried that the definition would not provide adequate protection for marine mammals because it required an “‘act of pursuit, torment, or annoyance’ to constitute harassment.”⁷⁸ Others argued that the harassment definition was overly restrictive and included acts that had only a small likelihood of disturbing marine mammals.⁷⁹ As for noise regulation specifically, even after the delineation between types of harassment, Level B harassment was still broad enough to include almost any activity because noise (which was created by nearly

78. *Hearing on the Reauthorization of the Marine Mammal Protection Act before the Subcomm. on Oceans, Fisheries and Coast Guard of the S. Comm. on Commerce and Transp.*, 108th Cong. (2003) (statement of Dr. Rebecca Lent, Dep. Asst. Admin. for Fisheries, NMFS) [hereinafter *2003 MMPA Reauthorization Hearings*].

79. *Id.* (statement of David Cottingham, Executive Director, Marine Mammal Commission). At the same hearing, Senator Ted Stevens agreed that the definition of harassment was detrimental to the permitting program, noting that if the most sensitive animal was harassed by an action, that action would be illegal: “[o]f hundreds of thousands of mammals, the Navy is to be stopped of its research if it is charged with harassing one individual.” *Id.* (statement of Senator Ted Stevens).

every ship, airplane, and jet ski) could be considered a disturbance. However, the mere existence of a harassment definition meant that NMFS acknowledged that some activities did not require a permit. But the definition did not successfully distinguish between activities that did or did not need a permit and in turn allowed for inconsistent and arbitrary regulation.

F. The 2003 Amendments

The shortcomings of the 1994 harassment definition became clear when discussion about the MMPA was reopened in Congress in 2003. David Cottingham, the executive director of the Marine Mammal Commission, said that the 1994 redefinition of harassment “was intended to bring greater certainty to determining what would and would not constitute a taking by harassment. However, that amendment has not had the desired result.”⁸⁰ Level B harassment was redefined, but only for military readiness and scientific research activities by or on behalf of the Federal Government, to be any act that disturbs or is likely to disturb a marine mammal stock “*to a point where such behavioral patterns are abandoned or significantly altered.*”⁸¹ Another significant consequence of these amendments was that a “military readiness activity” could be exempted from any part of the MMPA, including exemption from the geographical and numerical restrictions required for obtaining a small take permit.⁸² This change incited controversy in the environmental community because it ultimately held military operations to a lower standard than other regulated activities.⁸³

III. SPECIFIC EXAMPLES OF NOISE REGULATION

The following section examines two instances that illustrate the shortcomings of the noise regulation regime under the MMPA. It focuses on the arbitrary nature of determining which activities require permits, as well as the lengthy and often expensive process of obtaining them.

80. *Id.* (statement of David Cottingham).

81. National Defense Authorization Act for Fiscal Year 2004, Pub. L. No. 108-136, § 319(a)(B)(ii), 117 Stat. 1433 (2004) (emphasis added) [hereinafter NDAA 2004].

82. *Id.* § 319(f).

83. David Phillips, Director of the International Marine Mammal Project told the *Earth Island Journal* that the amendments are “the most egregious assault on wildlife laws in this country. These amendments will roll back 30 years of progress in federal protection of whales, seals, dolphins, and endangered species.” Mark J. Palmer, *RIP, Keiko*, 19 *EARTH ISLAND J.* (2004), available at http://www.earthisland.org/eijournal/new_articles.cfm?articleID=872&JournalID=77.

*A. Controlled Exposure Experiments—An Example of
Arbitrary Regulation*

One example of the MMPA's inconsistent and arbitrary approach to implementing noise regulation policies occurred in New England waters—the summer home of the endangered right whale (*Eubalena glacialis*).⁸⁴

Dr. Doug Nowacek is a scientist at Florida State University whose research focuses on how right whales react to ship noise in an attempt to understand why they remain in the paths of oncoming vessels. Part of his work involves carrying out playback experiments of simulated ship noise to determine if whales respond to such sounds and, if so, in what manner they react. These experiments, known as Controlled Exposure Experiments (CEE), use source levels that are lower than those of actual ships and transmit sounds within a smaller bandwidth.⁸⁵

Dr. Nowacek's colleague, Dr. Scott Kraus, had originally requested a permit from the NMFS Permit Office to perform these playback experiments along with other types of research.⁸⁶ However, NMFS advised Dr. Nowacek that if his CEE were removed from the application, the permit could be issued faster and Dr. Kraus' other less controversial experiments could proceed.⁸⁷ Even after the removal of the controversial CEE from the permit application, it took one year for Dr. Kraus to obtain his permit from NMFS.⁸⁸ In the end, Dr. Nowacek decided to conduct his CEE exclusively within the territorial waters of Canada, where he was only required to obtain a permit from the Canadian Department of Fisheries and Oceans—a process that required approximately one week of his effort.⁸⁹ It is worth

84. See Amy R. Knowlton, et al., *Shipping/Right Whale Workshop*, 31-36 (New England Aquarium Forum Series Report 97-3, Boston). Fewer than 350 are thought to exist; ship strikes cause roughly half of their human-induced mortalities. *Id.* See also E-mail from Dr. Douglas Nowacek, Biological Oceanographer, Florida State University, to Elena McCarthy, Ph.D. (Nov. 3, 2005) (on file with author).

85. Email from Dr. Nowacek, *supra* note 84. Dr. Nowacek indicated that it was too difficult to reproduce the entire bandwidth that ships produce. *Id.*

86. Dr. Nowacek was a co-principle of the investigation, while Dr. Kraus, of the New England Aquarium, was the lead principle. *Id.* The permit application was officially submitted by Dr. Kraus. See 66 Fed. Reg. 52,594 (Oct. 16, 2001).

87. Email from Dr. Nowacek, *supra* note 84.

88. *Id.* See 66 Fed. Reg. at 52,594 (Dr. Kraus's permit application); 69 Fed. Reg. 10,680 (Mar. 8, 2004) (Dr. Kraus's amended permit application).

89. Interview with Dr. Douglas Nowacek, Biologic Oceanographer, Florida State University (Feb. 3, 2006). Dr. Nowacek spent approximately one week on required permitting activities including writing the permit application, following up with the Canadian Dept. of Fisheries and Oceans, and submitting the final report. *Id.* The results of his experiments can be found in D. Nowacek, M. Johnson & P. Tyack, *North Atlantic Right Whales Ignore Ships*

noting that while CEE experiments require permits, the ships that actually create the sounds simulated by the CEE experiment do not.

Dr. Nowacek's work is the very research needed to determine the effects of anthropogenic noise on mammals. When scientists are prevented from studying the effects of ship noise to develop methods of protecting whales from harmful underwater sound, while the very ships creating such noise are simultaneously allowed to operate unregulated in the same area, the permit requirements are arbitrary.

Certain types of research considered "invasive" or "controversial" are not allowed under the current permitting process, or may require the creation of an Environmental Assessment or even an Environmental Impact Statement under NEPA.⁹⁰ The National Research Council (Council) has expressed concern that such regulatory burdens actively discourage researchers from pursuing those more invasive or controversial studies.⁹¹ Furthermore, the Council states, "[e]xperienced researchers are the ultimate source for expanding our knowledge of marine mammals. A policy that interferes with the development of this resource appears to be self-defeating."⁹² These developments thus present a significant challenge for NMFS: protecting marine life from intense underwater sound is impeded if experiments to determine its effects on animals cannot be carried out.

B. The Red-Tape of Obtaining a Permit

Another example of the logistical and bureaucratic burden created by the MMPA's permitting program is illustrated by the events surrounding the research of Dr. Peter Tyack, a marine mammal biologist at the Woods Hole Oceanographic Institution. In May 2002, Dr. Tyack endeavored to conduct several acoustic experiments on marine mammals.⁹³ One set of experiments was scheduled to take place in the Mediterranean Sea to test a new "whale-finding" sonar.⁹⁴ The sonar system, built by Dr. Peter Stein of Scientific Solutions, Inc., was designed to help protect marine mammals from other types of sound, such as powerful low-frequency Navy sonar, air guns for seismic surveys, and explosives.⁹⁵ The premise was that the high-

but Respond to Alarm Stimuli, 271 PROCEEDINGS OF THE ROYAL SOCIETY B: BIOLOGICAL SCIENCES, 227-31 (2004).

90. 16 U.S.C. §216.33 (c)(2)(v)(A).

91. LOW-FREQUENCY SOUND AND MARINE MAMMALS (1994), *supra* note 5, at 29.

92. *Id.* at 30.

93. Peter L. Tyack Application for Scientific Research Permit, 65 Fed. Reg. 57,319 (Aug. 31, 2000).

94. *Id.*

95. *Id.*

frequency sonar would operate like a fish finder, alerting the military and others to the presence and location of marine mammals before high-intensity acoustic activities were initiated.⁹⁶

Dr. Tyack duly applied to NMFS for amended versions of permits that he had previously been issued to conduct similar research in previous years.⁹⁷ This amended research permit was issued on September 25, 2000.⁹⁸ Several months later, however, his experiments were halted when a permanent injunction was issued by the United States District Court of Northern California.⁹⁹ The injunction was the result of a lawsuit filed by various environmental groups alleging that NMFS had illegally issued Dr. Tyack's most recent permit.¹⁰⁰

The court issued the injunction because it found that NMFS had failed to take into account the controversial nature of Dr. Tyack's proposed experiments.¹⁰¹ NMFS, in its own defense, argued that the permit was not controversial because no comments had been received throughout the entire thirty day public comment period following its publication in the Federal Register.¹⁰² The agency also testified that the whale-finding sonar device that Dr. Tyack incorporated in his research was designed to *reduce* harm to

96. *Id.*

97. 65 Fed. Reg. at 57,319; 66 Fed. Reg. 40,235 (Aug. 2, 2001); 67 Fed. Reg. 35,965 (May 22, 2002). These permits were issued as 981-1578-01, -02, and -03, respectively.

98. 65 Fed. Reg. at 57,319. NMFS determined his permit application was valid under the MMPA and that his experiments qualified for a categorical exclusion (CATEX) under NEPA. *Id.* A CATEX is invoked when a proposed activity demonstrates no significant impacts on the environment. Therefore, NMFS could issue the permit without going through the labor-intensive process of drafting an Environmental Assessment or an Environmental Impact Statement. *Id.* For more information on the NEPA compliance process, see NOAA ADMIN. ORDER (NOA) Series 216-6, *Environmental Review Procedures for Implementing the National Environmental Policy Act*, § 6.03 (May 20, 1999) [hereinafter NOAA ORDER].

99. *Hawaii County Green Party v. Evans*, No. C-03-0078 SC, 2003 U.S. Dist. LEXIS 7653, at *2, (N.D. Cal. May 2, 2003).

100. *Id.* Environmental groups claimed that NMFS had violated NEPA by not performing an Environmental Assessment, and therefore NMFS had incorrectly invoked a CATEX. *Id.*

101. *Id.* The court claimed that NMFS had failed to correctly follow its own stipulations regarding the issuance of a CATEX. *Id.* One of the stipulations was that NMFS may not invoke a CATEX when the activity is subject to public controversy based on the environmental consequences. *Id.* According to the court, Dr. Tyack's experiments were controversial because of 1) their potential environmental consequences; 2) a significant number of people have worked hard to protect marine mammals from potentially harmful human activity; 3) other court cases relating to acoustic experiments on marine mammals had recently been filed in the same district; and 4) NMFS itself acknowledged the controversial nature of the experiments when Dr. Tyack applied for his original permit (NMFS created an EA for the original permit). *Id.* See also NOAA ORDER, *supra* note 98, § 6.03(a).

102. *Hawaii County Green Party*, 2003 U.S. Dist. LEXIS 7653, at *2.

marine mammals from anthropogenic activities, and the delay in the development of this device was therefore not in the best interest of marine mammals. Ultimately, however, NMFS's argument was overruled and the court granted the injunction.¹⁰³

The court invalidated several of Dr. Tyack's permits, finding that the public controversy and potential environmental consequences associated with his research prohibited the issuance of the permit.¹⁰⁴ Furthermore, the court added that NMFS was required to prepare an Environmental Assessment for this experiment and for similar acoustic testing on marine mammals.¹⁰⁵

This court ruling created an additional burden on NMFS regarding scientific research—it implied that all future acoustic research would require the creation of costly and detailed Environmental Assessments.¹⁰⁶ In the end, Dr. Tyack spent tens of thousands of dollars and lost over twenty days of valuable research time due to lawsuits and delays stemming from controversy over his attempts to carry out experiments that were, in fact, designed to determine the effects of man-made noise on whales.¹⁰⁷

Five months after the injunction was issued against NMFS for Dr. Tyack's research, the court's ruling came into play. Dr. Peter Stein, the developer of the whale-finding sonar, submitted a permit application to NMFS to conduct similar acoustic research on gray whales off the coast of California.¹⁰⁸ This time, NMFS duly prepared an Environmental Assessment and held a public meeting, and the permit was issued on December 23, 2003.¹⁰⁹

On January 8, 2004, the same plaintiffs that attempted to enjoin NMFS from implementing Dr. Tyack's research filed a complaint seeking to

103. *Id.*

104. *Id.* For a list of the factors considered by the court, see NOAA ORDER, *supra* note 98, § 5.05(c). Of four existing permits, two were invalidated. Furthermore, NMFS later created an EA for the proposed research and in June 2003, a finding of no significant impact and permit 981-1707 was issued to Dr. Tyack. Because at the time of the court's ruling, Dr. Tyack was operating under the third amended permit, the effect of the injunction was to stop his experiments.

105. *Id.*

106. *Id.* The court enjoined NMFS from issuing any permit allowing similar research without first completing an Environmental Assessment under NEPA. *Id.*

107. E-mail from Dr. Peter Tyack, Senior Biology Scientist, Woods Hole Oceanographic Institution, to Elena McCarthy (May 6, 2004) (on file with author). Dr. Tyack indicated that his research was postponed one year, one month of ship time was lost, and over one month of his time was required to reapply for his research permit.

108. *Id.*

109. NMFS found that no significant impact existed and the permits were issued together shortly thereafter. *Id.*

permanently enjoin Dr. Stein from conducting his research.¹¹⁰ Here, the court rejected the plaintiffs' arguments and denied their motion for permanent injunction because it did not see a possibility of irreparable harm.¹¹¹ Dr. Stein's research was allowed to continue, but not before substantial time delays and additional costs had been incurred in the process.

The irony in the Tyack and Stein cases, also found in Dr. Nowacek's case, is that these scientists were required to obtain a permit to conduct the type of research that is considered essential to "enhance survival or recovery of a species." Because the MMPA is tightly linked to procedural laws such as the NEPA and the Administrative Procedure Act (APA), the issuance of permits can be easily challenged in court. The ease with which these permits can be challenged imposes significant financial and administrative burdens on both NMFS and the permit applicants, and results in lost opportunities to carry out valuable scientific research. Furthermore, the decisions in the Tyack and Stein cases seem to indicate that extensive analyses under NEPA will be required for any research that may affect marine mammals in the future. This results in a re-allocation of NMFS resources to bureaucratic rather than scientific or conservation efforts. When the courts require a costly and time-consuming Environmental Assessment for the issuance of every noise permit, NMFS is stripped of the resources and legal authority to prioritize and properly address legitimate threats to marine mammals.¹¹² What's more, the unpredictable and labyrinthine process of obtaining permits, along with the constant threat of lawsuits, has had a "chilling effect on research because scientists are afraid to propose projects that may be delayed or never approved."¹¹³

IV. THE MAGNITUDE OF THE PROBLEM

The examples in the preceding section illustrate the troubled status of the NMFS permitting program¹¹⁴ as applied to anthropogenic ocean noise: it is arbitrarily applied and inefficient to administer. The next section

110. *Australians for Animals v. Evans*, 301 F. Supp. 2d 1114 (N.D. Cal. 2004).

111. *Id.* at 19-24.

112. See *Marine Mammal Protection Act Amendments of 2003: Hearing on H.R. 2693 Before the Fisheries Conservation, Wildlife and Oceans Subcomm. of the H. Resources Comm.*, 108th Cong. 9-10 (2003) (statement of Peter F. Worcester Ph.D., Research Oceanographer, Scripps University) [hereinafter *MMPA Amendments Hearings*].

113. Mike Carlowicz & Andrea Baird, *Caught in the Middle of the Marine Mammal Protection Act*, OCEANUS, Apr. 6, 2006.

114. In this paper, the term "permitting process" is used generally to refer to the procedure for obtaining Scientific Research Permits, General Authorizations, LOAs and IHAs.

discusses the effects that these shortcomings have had on the major stakeholders involved in the issue of ocean noise regulation.

A. *The Regulated*

The regulatory burden for protecting marine mammals appears to fall inequitably on different industries and activities.¹¹⁵ The range of regulations that apply to different sources of sound in the sea has evolved to include a system of permitting and authorizations that is often considered arbitrary and unfair.¹¹⁶ In general, those who must adhere to the unwieldy process of obtaining NMFS permits to conduct their work find the process expensive and quite inefficient.¹¹⁷ Furthermore, it is not always clear when

115. These problems have been most notably recognized by the U.S. Oceans Commission, which has called for legislative action requiring NMFS to specify more clearly the categories of activities that are subject to permitting, and to improve the efficiency of the permitting program generally. U.S. COMM. ON OCEAN POLICY, AN OCEAN BLUEPRINT FOR THE 21ST CENTURY 311-12 (2004) [hereinafter OCEAN POLICY BLUEPRINT]. Other critics, including the National Academy of Sciences, have raised concerns that the permitting process is arbitrary and that the regulatory burden is unfair relative to the harm posed to marine mammals. See, e.g., LOW-FREQUENCY SOUND AND MARINE MAMMALS (1994), *supra* note 5, at 4-7; MARINE MAMMALS AND LOW-FREQUENCY SOUND (2000), *supra* note 5, at 70. The President of the Consortium for Oceanographic Research and Education (CORE) recently testified that the complex and lengthy MMPA permitting process has become a major impediment to conducting ocean research. *The Marine Mammal Protection Act: Hearing Before the Subcomm. on Oceans, Fisheries and Coast Guard of the S. Comm. on Commerce, Science & Transp.*, 108th Cong. (2003) (statement of Rear Admiral Richard D. West, USN (Ret.), President, CORE) [hereinafter 2003 MMPA Hearings]. In another controversy over a similar lawsuit related to Columbia University's seismic research, Dr. James Yoder, the National Science Foundation's Director of Ocean Science, acknowledged that the entire permitting process was contentious, and opined that the lawsuit really had not resolved the controversy about when and where a permit is required. See, e.g., Laura DeFrancesco, *Mexico Ocean Survey Shut Down*, THE SCIENTIST, Oct. 30, 2002, at 1030-34. One permit applicant recently testified before Congress that:

The current regulatory procedures [under the MMPA] are complex and fraught with delays, costly both in time and money, and uncertain in their outcome. The current regulatory structure makes obtaining the necessary authorizations for using sound in the sea so arduous that it is having a chilling effect on a wide variety of important and valuable uses of sound in the seas, as well as on the research needed to improve our understanding of the impacts of underwater sound on marine life.

MMPA Amendments Hearings, *supra* note 112 (statement of Peter F. Worcester, Ph.D., Research Oceanographer, Scripps University).

116. See Eugene Buck & M. Lynne Corn, ENDANGERED SPECIES: DIFFICULT CHOICES, Congressional Research Service Rep. to Cong., 15 (2004).

117. U.S. Representative Nick Rahall has stated, "I am astounded that the same department that can plan for wars not even imagined and can deploy thousands of women and men around the world is somehow unable to navigate through the permitting process." *Reauthorization of the Marine Mammal Protection Act: Hearing on H.R. 4781 Before the*

and for what activities a permit is required. The complex process of determining if a permit is required is illustrated in Appendix A.¹¹⁸

Once it has been determined that an activity does indeed require a permit, applicants are required to submit their request six months to a year ahead of time, depending on the type of permit requested.¹¹⁹ The permit application process is illustrated in the figure below.

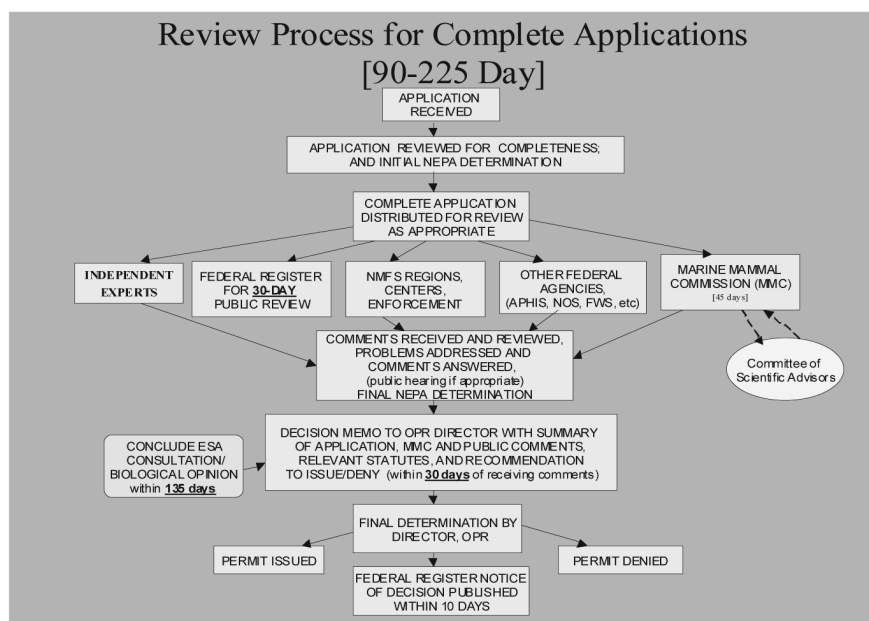


Figure 3. The NMFS Review Process for Permit Applications.¹²⁰

Subcomm. on Fisheries, Conservation, Wildlife and Oceans of the H. Comm. on Resources, 107th Cong. 3 (2002) (statement of U.S. Rep. Nick Rahall). For more support for the assertion that the NMFS permitting process is inefficient and burdensome, see, e.g., *MARINE MAMMAL COMM. ANN. REP.*, 114 (2003); *2003 MMPA Hearings*, supra note 115 (statement of Nina Young, Director of Marine Wildlife Conservation, The Ocean Conservancy); *National Security Readiness Act of 2003: Hearing Before the H. Resources Comm.*, 107th Cong. 1 (2003) (statement of Karen Steuer, Senior Policy Advisor, National Environmental Trust) [hereinafter *Nat'l Security Readiness Act Hearings*].

118. NOAA Fisheries, Office of Protected Resources, *Authorizations and Permits for Protected Species*, <http://apps.nmfs.noaa.gov/questionnaire/questionnaire.cfm> (last visited Nov. 20, 2007).

119. Simona Perry Roberts, National Marine Fisheries Service Office of Protected Resources, Presentation at the Acoustical Society of America Meeting (Dec. 4-6, 2001).

120. NOAA Fisheries, Office of Protected Resources, Marine Mammal Permits FAQs, http://www.nmfs.noaa.gov/pr/permits/faq_mmpermits.htm (last visited Nov. 20, 2007).

In a congressional hearing on the proposed amendments to the MMPA, Dr. Tyack testified that “[i]t is ironic that far from exempting research from an effective prohibition, NMFS has grown an elaborate process for permitting negligible harassment takes by researchers, while ignoring widespread and predictable lethal takes caused by activities that do not benefit marine mammals.”¹²¹ It was Dr. Tyack’s primary concern that the current NMFS permitting process would have the result of “holding research designed to protect marine mammals to a higher standard than activities that do not benefit them.”¹²² The MMPA’s approach to noise, as discussed earlier, is a compilation of regulations and amendments, modified when necessary as the scientific understanding of underwater noise effects has evolved. The result is a law that does not acknowledge ocean noise in a larger context. The law imposes upon the scientists who use sound to study marine mammals the requirement to undertake the complicated and expensive process of obtaining scientific research permits; other groups, such as acousticians, who conduct a variety of surveys and experiments utilizing sonic emissions, must obtain an incidental harassment authorization. Meanwhile, however, other groups that also produce a substantial amount of noise, such as noise released by shipping vessels, are subject to little or no regulation at all.

B. The Regulators

While the situation for these over-regulated scientists and researchers seems dire, it may be equally bad for the regulators themselves. While the average processing time for permits has increased significantly over the past four to five years, the number of permits requested has not increased. This could indicate that the types of permits issued are increasingly more complex and controversial. For example, recent court rulings, such as those in the Tyack and Stein cases, indicate that extensive analysis under NEPA is required for any acoustic research that may affect marine mammals, thereby prolonging the permitting process and making it more expensive to obtain a permit. Consequently, it appears that new burdens are being placed on the already taxed resources of NMFS.¹²³

121. *MMPA Amendments Hearings*, *supra* note 112 (statement of Dr. Peter Tyack, Senior Biologist, Woods Hole Oceanographic Institution).

122. *Id.* Dr. Tyack argues that NMFS has singled out and focused its regulatory efforts on “easy targets” such as scientific research and whale watching—activities that actually stand to benefit whales. Peter Tyack, *Lets Have Less Public Relations and More Ecology*, 32 OCEANUS 1, 103-08 (1989).

123. *See MMPA Amendments Hearings*, *supra* note 112 (statement of Dr. Peter F. Worcester).

According to NMFS, permits and general authorizations pertaining to animals that are *not* threatened or endangered under the ESA are almost always issued in a timely manner (often within ninety days) and are generally not controversial.¹²⁴ Dr. Rebecca Lent, the Deputy Assistant Administrator for Fisheries of NMFS, testified that “these types of permits do not present problems that need to be addressed during reauthorization [of the MMPA].”¹²⁵ However, as far back as 1985, NMFS acknowledged that its permit system authorizing takes for scientific research and public display was “one of the most extensive administrative programs in NMFS.”¹²⁶ In addition to issuing permits, the NMFS Permitting Office is responsible for reviewing legislation, writing regulations, conducting NEPA analyses, ESA consultations, responding to litigation, answering congressional inquiries, managing the inventory of captive marine mammals, managing public outreach efforts and overseeing rehabilitation issues and placement of stranded marine mammals.¹²⁷

Other delays in the permitting process are often the result of complex and time-consuming ESA and NEPA requirements, not the process itself.¹²⁸ This dependence of the NMFS permitting program on numerous environmental laws is illustrated in Figure Four.

124. *Id.* (statement of Dr. Rebecca Lent, Deputy Assistant Administrator for Fisheries, NMFS).

125. *Id.*

126. 1984-1985 NMFS ANN. REP. ON THE MMPA 4.

127. Eugene Nitta, Presentation at the Acoustical Society of America Meeting: A Summary of LOAs Issued over the Last Three Years (Dec. 4-6, 2001).

128. These include the preparation of an EA and an EIS under NEPA, or a Section 7 consultation under the ESA. NMFS claims that its ability to be responsive in dealing with permit applicants is dependant on its ability to provide scientific analysis to carry out its regulatory responsibilities in a timely manner. *Hearing Before the Subcomm. on Military Readiness of the H. Comm. On Armed Services*, 107th Cong. (2002) (statement of Dr. William Hogarth, Assistant Administrator for Fisheries, NMFS). The MMPA presently imposes a thirty-day deadline for agency action on a scientific research permit. 16 U.S.C. §1374 (c)(3)(C).

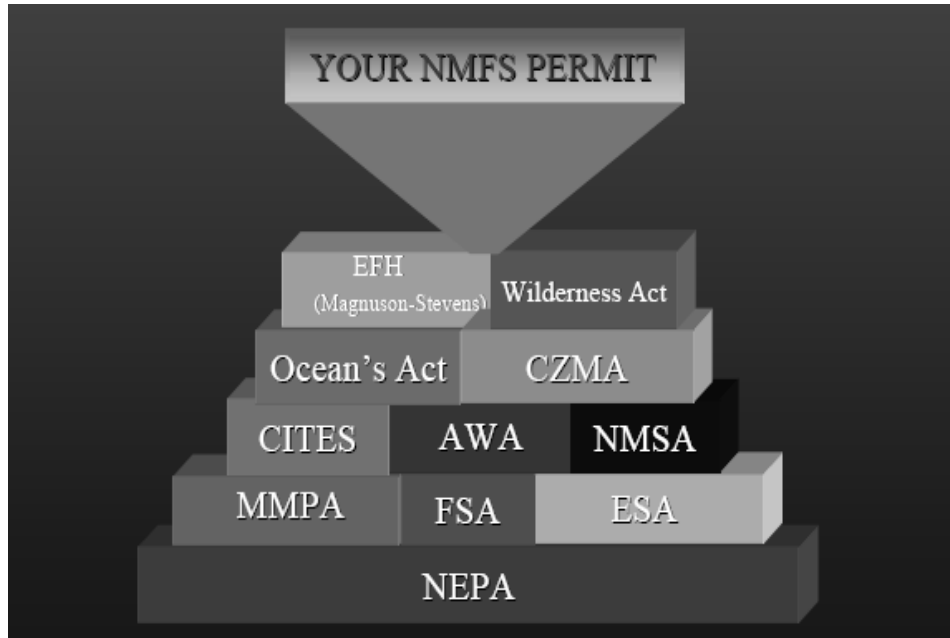


Figure 4. This figure illustrates the variety of laws that the permit must take into account.¹²⁹

Another substantial hurdle for NMFS is anticipating how courts will rule on a given permit request and, generally, which way the pendulum of public opinion will swing. One example is the Tyack case, in which the court ruled that NMFS should have acknowledged the controversial nature of the proposed experiments, despite the lack of public comments during the public comment period.¹³⁰ Ruling that “it is completely implausible for Defendant to argue today that absence of public comments leads inescapably to the conclusion that there is also an absence of public controversy concerning the environmental effects of the actions authorized under the [permits],”¹³¹ the court effectively placed an additional burden on NMFS to interpret when an action was controversial *regardless* of the absence of public opposition. This sets a precedent for NMFS to *anticipate* controversial permit applications even before they become controversial. However, one might question the validity of a public comment period if the

129. NOAA Fisheries, *Marine Mammal Permits FAQs*, *supra* note 120.

130. *See Hawaii County Green Party*, 2003 U.S. Dist. LEXIS 7653.

131. *Id.*

comments, or lack thereof, are not given adequate consideration by the court.

NMFS's lack of resources and its broad legal mandate have been major impediments to efficient and well-balanced regulation. This has created a process that is reactionary and takes a narrow view of the activities that are to be regulated, leaving many activities (such as shipping) unregulated. Consequently, it appears that NMFS's hands are therefore tied and the agency is bound to develop rules based on vague directives and guidance provided by a Congress that is increasingly pressured by environmental groups, military interests, and industrial activities.

C. *The Marine Mammals*

While the threat of noise pollution to marine mammals should not be underestimated, statistics indicate that the legal focus on noise-producing activities neither results in a logical allocation of resources, nor does it lead to the best protection of marine mammals. For example, between 1996 and 2000, in the Northeast and Southeast regions of the United States, 3664 marine mammals were killed in the course of fisheries operations.¹³² Indeed, the U.S. Commission on Ocean Policy identified bycatch as the greatest global threat to cetaceans in 2004.¹³³ Other threats to marine mammals include ship strikes. Ship strikes have proven fatal to whales in sixty-eight percent of all known cases and cause roughly half of human-induced mortalities in the endangered right whale.¹³⁴ In total, almost eighty-five percent of ship strikes either killed or injured mammals, yet commercial ships are not required to obtain any sort of permit under the MMPA.¹³⁵

In addition, it is evident that, in comparing the legal treatment of noise-producing activities with other *potential* threats to marine mammals, a substantial disparity exists. For example, oil spills cause far more known "takes" than ocean noise. The Exxon-Valdez spill of 1989 and the Prestige spill off the coast of Spain in 2002 were responsible for thousands of "takes" of marine mammals.¹³⁶ Although the possibility of an oil spill is arguably minimal, the risks to marine mammals are serious and well understood. Yet because of the structure of the MMPA, which singles out activities that *intentionally* interact with marine mammals, no permitting requirements are imposed on other, perhaps more threatening, activities.

132. NOAA Tech. Mem. NMFS-NE-169, 318 (2002).

133. OCEAN POLICY BLUEPRINT, *supra* note 115, at 306.

134. NOAA Tech. Mem. NMFS-OPR-25, 3 (2004).

135. *Id.*

136. *See* MARINE MAMMALS AND THE EXXON VALDEZ (Thomas R. Loughlin, ed. 1994).

The above statistics are meant to highlight the extent of the discrepancy between an acoustic research experiment that potentially causes Level B harassment takes and the well-documented death of marine mammals due to collisions with ships, fisheries bycatch, and oil spills. These statistics also suggest that the public and the government consider it reasonable that marine mammals may suffer, and maybe even die, in the course of some activities. In light of this apparent concession, it is odd that so much energy, in the form of lawsuits, injunctions, and permit requirements, has been put forth to halt the potential threats of ocean noise from scientific research. These examples are not meant to call into question whether or not ocean noise should be regulated, but rather to provide evidence for the claim that the current requirements for permitting acoustic activities under the MMPA have not always led to the best protection for marine mammals. Even the non-partisan U.S. Commission on Ocean Policy acknowledges that the most critical risks to marine mammals are fishery bycatch and hunting, yet “unfortunately, attention has centered instead on high-profile lower impact issues, such as the possible effect of ocean noise on marine mammals.”¹³⁷

To understand the threat from ocean noise in a wider context, it is useful to examine the establishment of the Stellwagen Bank National Marine Sanctuary off the coast of Massachusetts. This area was formally acknowledged to be of great environmental importance in 1992 when it became a national marine sanctuary.¹³⁸ Two years later its importance was further enhanced when the area was designated a “critical habitat” for northern right whales.¹³⁹ The map in Appendix B shows the boundaries of the sanctuary located just north of Cape Cod.

Displayed on the map are several activities that could pose a threat to marine mammals within the sanctuary. The box in the lower right hand corner marks the location of a U.S. Navy test range. The north-westerly lines define the shipping lanes into the port of Boston, which pass directly through the sanctuary. Ship strikes accounted for forty-seven percent of Northern right whale deaths from 1991-1998.¹⁴⁰ No right whale deaths have been linked to acoustic research. Yet, acoustic experiments on right whales require permitting, and shipping does not. Indeed, as Dr. Tyack testified in congressional hearings on his acoustic experiments:

137. U.S. COMM. ON OCEAN POL’Y, PRELIMINARY REPORT OF THE U.S. COMMISSION ON OCEAN POLICY, (2004).

138. Pub. L. No. 532, § 2202 (1992).

139. 59 Fed. Reg. 28,793 (June 3, 1994) (codified at 50 C.F.R. pt. 226.203).

140. A.R. Knowlton & S.D. Kraus, *Mortality and Serious Injury of Northern Right Whales (Eubalaena glacialis) in the Western North Atlantic Ocean*, 2 J. CETACEAN RESEARCH & MGMT.: SPECIAL ISSUE 2, 193-208 (2001).

So many highly endangered right whales are killed by vessel collision, that population models predict this additional mortality may drive the species to extinction. Yet there is no regulation of this risk, nor to my knowledge has any ship been prosecuted for striking a whale and killing it. It is ironic that far from exempting research from an effective prohibition, NMFS has grown an elaborate process for permitting negligible harassment takes by researchers, while ignoring widespread and predictable lethal takes caused by activities that do not benefit marine mammals.¹⁴¹

V. DEFINING THE CAUSES OF THE PROBLEMS

The previous section discussed the impacts of noise regulation under the MMPA on the major stakeholders. This section identifies and considers the underlying causes of the problems in an attempt to develop and evaluate effective solutions.

A. *The MMPA and its Moratorium*

The foundation of the MMPA is its moratorium: the moratorium is a blanket prohibition on all takes, except for strictly-defined cases.¹⁴² In practice, this has led to a reversal of the regulatory burden: those who apply for exemptions from the moratorium are, in effect, the ones who face regulation. On the other hand, those who have not applied for permits (such as commercial shipping firms) remain largely unregulated. The moratorium-esque nature of the MMPA has made the law very complicated and difficult to enforce since its inception. While some might argue that this approach is appropriately conservative and precautionary in nature, the moratorium has resulted in arbitrary enforcement towards some “takers”, and no enforcement at all, towards others.

There is no doubt that the MMPA derives its strength from the moratorium. The MMPA is distinguished from other environmental laws because it mandates proactive protection from all “takes” without a great deal of balancing of other interests. However, a sweeping moratorium structure can be especially problematic for an environmental law for two reasons. First, the marine mammals that the MMPA seeks to protect are not scientifically well-understood. It is hard to differentiate between activities that should and should not be permitted when it is questionable, on a basic

141. *MMPA Amendments Hearings*, *supra* note 112 (statement of Dr. Peter Tyack).

142. 1977-1978 NMFS ANN. REP. ON THE MMPA 1.

level, what actually harms marine mammals. Second, a moratorium is difficult to enforce because the threat is constantly changing. As technology advances and various environmental impacts change, the threats to marine mammals also change. As our ability to perceive threats becomes more refined, recognizable “takes” (as defined by the MMPA) become more widespread and enforcement becomes impossible. This threatens to recast the MMPA as a symbolic expression of values, but little more.

Under the statutory definition of “take,” noise was considered harassment and therefore illegal. This interpretation meant that more and more activities were technically breaking the law by causing “takes” without a permit. Nevertheless, NMFS tended to regulate those who were already subject to regulation, as opposed to targeting those who may have posed greater risks. If one goes back to the origins of the MMPA, the regulatory burden has been reversed over the last thirty years, at least in the case of noise. Scientists who were once exempted from its requirements are now the group facing the greatest regulatory burden.¹⁴³

NMFS was hardly at fault; it was charged with a mandate disproportionate to its capacity. In the face of enormous scientific uncertainty and a rigid moratorium-based law with out-of-date permit categories, NMFS needed to determine what constituted a threat to marine mammals and regulate accordingly.

B. Scientific Uncertainty

The issue of ocean noise pollution is largely a result of new technology (new types of acoustic research, more powerful sonars, faster ships, etc.). As such, much uncertainty exists over the effects of such technologies on ocean ecosystems. Consequently, as with many regulatory agencies, NMFS must make decisions in spite of gaps in scientific understanding and incomplete data sets.

Figure 5 below illustrates the many factors that can contribute to producing an effect from noise on marine mammals. The sheer number and variability of these factors illustrate the complexity of the problem. Only in the intersection of all three circles can one be sure of a correlation. This Venn Diagram clearly illustrates the scientific uncertainty inherent in determining the effects of noise on marine life. Although the factors found in the circles entitled “Noise Sources” and “Environmental Properties” are usually easily characterized or measured, the factors found in the “Marine Mammal” circle are much more difficult to ascertain.

143. See discussion *supra* Parts IV(A)-(B).

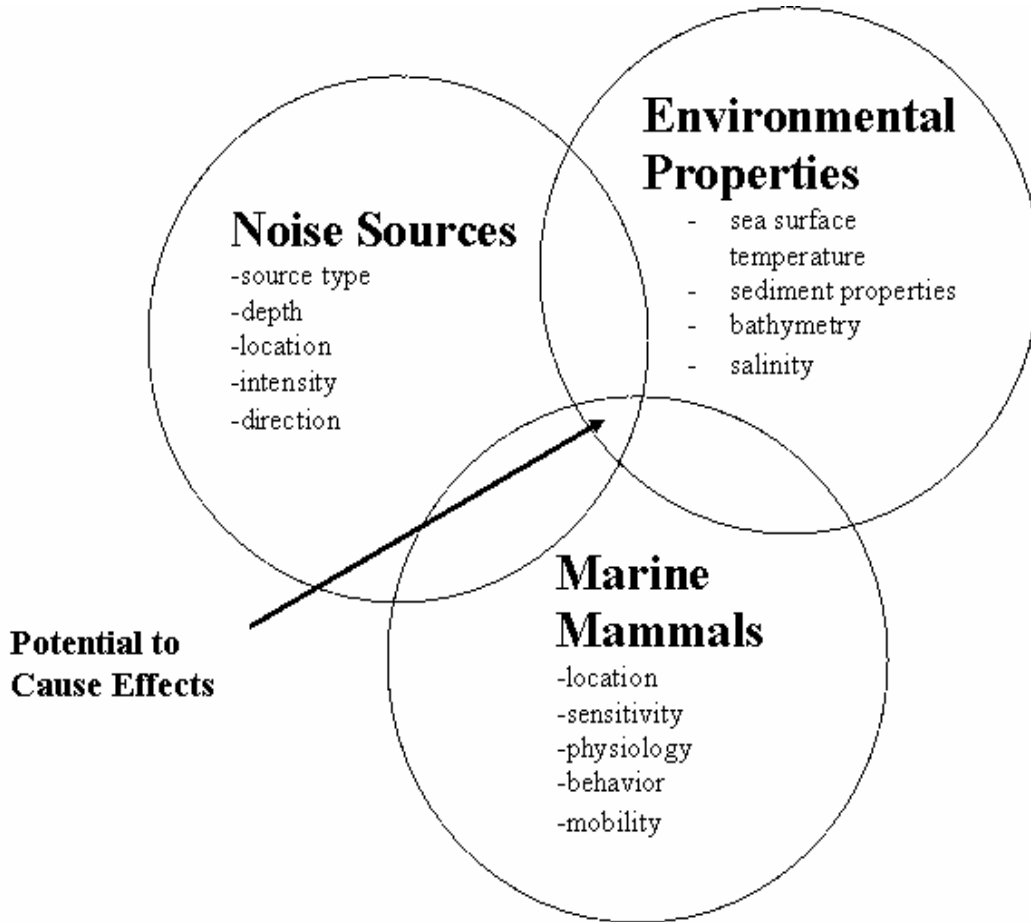


Figure 5. Scientific uncertainty chart. This chart shows the relationships between various factors involved in assessing the risk of a noise source.

Ocean noise brought to light the inherent challenges in enforcement of the MMPA. Technological advances and a more refined view of human impact on the environment actually led to more scientific uncertainty, rather than less. Eventually, it became clear that humans were “taking” marine mammals in ways that had not been considered by the drafters of the MMPA, but it was not always known how the takes were occurring or their severity. The moratorium structure of the MMPA made it difficult for NMFS to adapt its rulemaking to these new types of takes because of the uncertainty over what types of activities were to be regulated in the first place. Given that science cannot predict the precise location of marine mammals, let alone

determine the effects of any pollutant over thousands of square miles, NMFS was faced with a herculean task.

C. Definition of Harassment

Soon after the MMPA was enacted, it became clear that NMFS needed guidelines to help determine which activities should be allowed to take marine mammals and which should not. Nevertheless, even after the 1994 MMPA amendments and the statutory definition of harassment, it remains unclear who needs to apply for a permit for activities that create noise. Almost all noises created by anthropogenic activities could hypothetically fall under the Level B harassment definition and require a permit. However, requiring every boat-owner or jet-skier to obtain a permit for “takes” is not a sensible approach.¹⁴⁴ Thus, the statutory definition of harassment has not eliminated the arbitrary compliance problem nor has it lessened the regulatory burden on NMFS.

VI. POTENTIAL SOLUTIONS

This section outlines specific modifications to the MMPA, its concurrent policy, and other measures that could result in a more streamlined permitting process. Some of these recommendations incorporate suggestions from authorities such as the Consortium for Oceanographic Research and Education (CORE), the National Research Council (NRC), the National Science Foundation (NSF), the U.S. Commission on Ocean Policy, and other individuals and groups.

A. Redefining Harassment

One way to address the problems created by the rigid structure of the MMPA is to better determine which activities should fall under the moratorium, starting with a clearer definition of the term harassment and distinction between harmful and safe activities. Currently, Level B harassment is defined as “any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption or behavioral patterns, including, but not limited to,

144. In 2000, a committee of the U.S. National Research Council emphasized, “[i]f the current interpretation of the law for Level B harassment (detectable changes in behavior) were applied to shipping as strenuously as it is applied to scientific and naval activities, the result would be crippling regulation of nearly every motorized vessel operating in U.S. waters.” *LOW-FREQUENCY SOUND AND MARINE MAMMALS* (2000), *supra* note 5, at 69.

migration, breathing, nursing, breeding, feeding, or sheltering.”¹⁴⁵ This definition has proved to be far too broad for consistent interpretation.

It is hard to imagine an activity *without* the potential to disturb a marine mammal. Seemingly benign ocean activities like swimming or kayaking may have the potential to disturb a behavioral pattern of a marine mammal; even activities far from the ocean have the potential to disrupt behavioral patterns. For example, the heating of the ocean due to global warming may affect the behavioral patterns of marine mammals.¹⁴⁶ This means that if the MMPA were strictly interpreted, it follows that any activity that contributes to global warming in any way would have to apply for a permit. This is not only impractical and, indeed, nearly impossible, but also not in line with the goal of meaningful protection of marine mammals. When a literal interpretation of a law’s statutory language makes it impossible or unreasonable to implement, the law becomes merely symbolic.

What should be done to amend the harassment definition to more clearly distinguish between activities that merit NMFS oversight and those that do not? A number of proposals have attempted to achieve this distinction. The U.S. Commission on Ocean Policy suggests that the harassment definition should be changed to cover only activities that “*meaningfully disrupt* behaviors that are *significant to the survival and reproduction* of marine mammals.”¹⁴⁷ In a 2000 report issued by the NRC, the NRC recommended that “Level B harassment should be limited to meaningful disruption of biologically significant activities that could affect demographically important variables such as reproduction and longevity.”¹⁴⁸

Amending the definition so that it only covers disturbances of biologically significant behavioral patterns is a start, but if the new definition is considered carefully, it still remains too vague for consistent enforcement of the MMPA. As the NRC stated in its 2005 report, “[o]n reflection, it became clear that animals in the wild rarely spend substantial amounts of time engaging in activities that are not biologically significant. Even seemingly frivolous activities, such as play, can be biologically significant.”¹⁴⁹ The NRC proposed a conceptual model “that identifies the different stages required to move from marine mammal behavior to a determination of

145. NDAA 2004, § 319(a)(b)(ii).

146. M.P. Simmonds & S.J. Isaac, *The Impacts of Climate Change on Marine Mammals: Early Signs of Significant Problems*, 41 ORYX 1, 19-26 (2007).

147. OCEAN POLICY BLUEPRINT, *supra* note 115, at 312 (emphasis added).

148. LOW-FREQUENCY SOUND AND MARINE MAMMALS (2000), *supra* note 5, 87-88.

149. DETERMINING BIOLOGICALLY SIGNIFICANT EFFECTS, *supra* note 5, at 19 (citing, MARK BEKOFF & JOHN BYERS, ANIMAL PLAY: EVOLUTIONARY, COMPARATIVE, AND ECOLOGICAL PERSPECTIVES (Cambridge Univ. Press 1998)).

population effects of behavioral change.”¹⁵⁰ The model uses best available research to relate the acoustic signal to the behavioral response, and then makes a determination about how the behavioral response affects vital functions of the animal and the population in general.¹⁵¹ This model attempts to answer the question: what activities affect marine mammals in a “biologically significant” way?

This article endorses this science-based approach and proposes an amendment that is even more explicit: for an activity to be categorized as harassment under the MMPA, it should be an activity that has been documented, by way of *bona fide* scientific research, to cause injury or meaningful disruption to a vital process. Specifically, Level A harassment should be defined as any activity that has been *strongly correlated* with injury to a marine mammal. Level B harassment should be an activity that has been *strongly correlated* with behavioral changes that meaningfully disrupt vital processes, such as reproduction and survival. To employ these definitions, NMFS would have to determine which activities, based on the scientific literature, have been shown to cause injury or significant disruption to these vital processes. This recommendation is based on the belief that the precautionary principle is not necessarily the best approach to noise regulation under the MMPA.

It may seem counterintuitive that reversing the burden of proof prescribed by the precautionary principle (so that ocean noise makers no longer shoulder the entire burden of proof) would lead to better protection for marine mammals, but it is not suggested that a reversal of the precautionary principle is a good policy for *all* environmental problems. In most cases it *does* seem reasonable for the burden of proof to fall on the “polluter,” or the one proposing the potential harm. However, the issue of ocean noise differs from many other environmental issues because the MMPA sometimes mandates precaution to the point of inhibiting scientists from conducting essential experiments. This could lead to a paralysis of research, which could lead to a dearth of information about marine mammals, which leads to a stalemate in legislation, and ultimately results in compromised protection for marine mammals. This overly-precautious application of the precautionary principle is self-defeating; the very aim of the principle—which is to offer the best protection to the environment—is not achieved by the current statutory definitions of harassment.¹⁵²

150. DETERMINING BIOLOGICALLY SIGNIFICANT EFFECTS, *supra* note 5, at 4.

151. *See id.*

152. For more information on the Precautionary Principle, see David Kriebel et al., *The Precautionary Principle in Environmental Science*, 109 ENVIRONMENTAL HEALTH PERSPECTIVES 9 (2001).

This new definition would not compromise the protection of marine mammals from *known* threats. For example, mid-frequency active sonar would still be regulated and classified as Level A harassment based on the scientific papers following the strandings that took place in the Bahamas in 2000.¹⁵³ The use of air guns in pupping areas¹⁵⁴ would probably still be classified as a Level B harassment activity based on research published in the scientific literature.¹⁵⁵ In other words, the revision is intended to reduce oversight for those activities that have *not* been shown to cause biologically significant disruption to marine mammals, namely activities associated with scientific research. The requirement for “demonstrated effects” as a basis for the harassment definition would do much to reframe the MMPA as the scientifically-driven law that it was intended to be. Science would determine the regulations, instead of the regulations determining the science.

Two potential pitfalls need to be addressed. First, is it possible to implement a science-based regulatory regime without creating vast amounts of new work for the already overburdened NMFS? It would seem possible based on the concept proposed in the 2005 NRC report on marine mammals, which proposes techniques for determining when noise causes biologically significant effects.¹⁵⁶

The second, and perhaps more challenging pitfall, is deciding what it means for an activity to be demonstrated as harmful. The Endangered Species Act (ESA) provides a useful example of how this may be accomplished. The FWS and NMFS determine which species are endangered and threatened by relying “solely on the basis of the best scientific and commercial data available.”¹⁵⁷ Debate over the use of such scientific evidence often relates to how rigorous the science must be to merit action under the ESA.¹⁵⁸ Other

153. See BAHAMAS STRANDING EVENT INTERIM REPORT, *supra* note 6; P.D. JEPSON ET AL., *Gas-Bubble Lesions in Stranded Cetaceans*, NATURE 425, 575-76 (2003).

154. “Pupping Areas” refers generally to the breeding and nursing grounds of marine mammals. For more information on different types of takes in pupping areas, see Taking of Marine Mammals Incidental to Specified Activities, 71 Fed. Reg. 174 (Sept. 8, 2006).

155. W. JOHN RICHARDSON ET AL., *supra* note 4, at 371-76.

156. See DETERMINING BIOLOGICALLY SIGNIFICANT EFFECTS, *supra* note 5.

157. 16 U.S.C. § 1533(b)(1)(A) (2001). The statute explains that:

The Secretary shall make determinations required by subsection (a)(1) of this section solely on the basis of the best scientific and commercial data available to him after conducting a review of the status of the species and after taking into account those efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species, whether by predator control, protection of habitat and food supply, or other conservation practices, within any area under its jurisdiction, or on the high seas.

Id.

158. See *id.* § 1533(b)(6).

disputes have focused on what FWS should do in the case of inadequate knowledge and incomplete information. In such cases, it has been standard practice to apply the precautionary principle and err on the side of protection.¹⁵⁹ In fact, several cases have proceeded in this fashion.¹⁶⁰ The process dictated by the ESA is relevant to this paper's recommendations concerning the MMPA because it relies on similar uncertain scientific criteria to develop regulatory measures. The difference lies with whom should carry the burden of proof. When it comes to noise in the ocean, this burden is nearly always put on the sound producer. This paper suggests that in the case of noise, if there is no data documenting harm or significant disruption, the benefit of the doubt should be given to the sound producer and the activity should proceed. Noise regulation driven only by scientific data would result in a regulatory burden that is better aligned with the magnitude of the threats posed to marine mammals.

B. Increased use of the General Authorization

The General Authorization (GA) was created to provide a streamlined permit option for those activities that might harass marine mammals but not in a serious way. If NMFS is intent on maintaining the Level B category, then the permitting scheme for Level B harassment takes should be simplified and applied to a wider range of activities.

To accomplish this, the requirements of the GA should incorporate a broader spectrum of takes. Presently, the MMPA specifies that an activity is eligible for a GA (which is less cumbersome than a Letter of Authorization) if it has a negligible impact on only a "small numbers of marine mammals."¹⁶¹ As proposed by the NRC, the term "small numbers" should be removed from the definition for *all* activities, not just military readiness.¹⁶² Simply put, even takes that negligibly impact large numbers of marine mammals should qualify for a GA.¹⁶³ This is a logical approach when one considers the definition of negligible: "so small or unimportant or of so little consequence as to warrant little or no attention."¹⁶⁴ Given this definition, it seems illogical to differentiate between unimportant impact on small numbers or unimportant

159. BUCK & CORN, *supra* note 116, at 6.

160. *See Sw. Ctr. for Biological Diversity v. Babbitt*, 215 F. 3d 58 (D.C. Cir. 2000); *Sw. Ctr. for Biological Diversity v. Babbitt*, 926 F. Supp. 920 (D.C. Ariz. 1996).

161. 16 U.S.C. § 1371 (a)(5)(D) (2001).

162. LOW-FREQUENCY SOUND AND MARINE MAMMALS (2000), *supra* note 5, at 70-72.

163. 2003 MMPA Hearings, *supra* note 115 (statement of Rear Admiral Richard D. West, USN (Ret.)).

164. THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE 1209 (3d ed. 1992).

impact on large numbers of marine mammals. By taking out the “small numbers” provision, more activities would fall under the GA. In addition to decreasing the burden on those involved in activities with no significant impact on marine mammals, NMFS would have a more manageable workload because many more applicants would fall under the more simplified GA permitting process.

These “new” GAs would allow the use of standard ocean instrumentation (e.g., multibeam sonar systems, fathometers, side scan sonar systems), which have the potential for unintentional “taking” by harassment and have a negligible impact on the affected species and stocks.¹⁶⁵ Such GAs should include provisions that exclude critical habitat or other particularly sensitive areas.

C. Defining Categories of Activities that Constitute a Threat and Use of Programmatic Permitting

The use of GAs as proposed above would effectively result in the authorization of *classes* of activities, rather than authorization for individual vessels or sound sources. This approach has often been suggested in the past and was proposed most recently in 2004 by the U.S. Commission on Ocean Policy.¹⁶⁶ Specifically, the Commission suggests that “Congress should amend the MMPA to require the [NOAA] to more clearly specify categories of activities that are allowed without authorization, those that require authorization, and those that are prohibited.”¹⁶⁷ CORE has also testified that NMFS guidance or a legislative mechanism should be provided to clarify how the MMPA applies to a wider variety of standard, routine sound sources.¹⁶⁸ The creation of a list designating exactly which noise-making activities require oversight (and provisions for its periodic institutional review) would reduce the ambiguity in the permitting program and would help eliminate litigation over arbitrary regulation.¹⁶⁹

165. *Id.* See 2003 MMPA Hearings, *supra* note 115 (statement of Rear Admiral Richard D. West, USN (Ret.)).

166. OCEAN POLICY BLUEPRINT, *supra* note 115, at 312. See also MMPA Amendments Hearings, *supra* note 112 (statement of Dr. Peter Tyack).

167. OCEAN POLICY BLUEPRINT, *supra* note 115, at 312.

168. 2003 Reauthorization Hearings, *supra* note 78, 3-4 (statement of David Cottingham).

169. NOAA Fisheries is currently undertaking a more comprehensive evaluation of risk assessment, taking into account biological factors such as species-specificity and physiological limits, while also providing considerable attention to other factors such as uncertainty. E-mail from Dr. Leila Hatch, Ocean Noise Specialist, Stellwagen Bank National Marine Sanctuary, to Dr. Elena McCarthy (Feb. 24, 2007).

The use of programmatic permitting is consistent with this approach, and has often been suggested by those who would rather see the MMPA regulate classes of activities collectively, as opposed to separate individual actions. This type of programmatic permitting increases efficiency by combining environmental analyses for several research projects at one time.¹⁷⁰ It is essential, of course, that any programmatic permits be subject to periodic review and to substantially incorporate findings from the latest scientific research.

D. Expanding the Use of SRPs to all Types of Research

Among many physicists and oceanographers there is concern that the permit process creates a major impediment to oceanographic research, beyond marine mammal-specific research.¹⁷¹ One way to eliminate this lengthy permitting process for oceanographic research is to broaden the scope of the scientific research permit to include not only research on marine mammals but other types of scientific research as well (e.g., acoustic thermometry studies).¹⁷² NMFS has also acknowledged the need for “a streamlined general authorization process for incidental Level B harassment of marine mammals, similar to that used for Scientific Research Permitting.”¹⁷³

E. The Use of an Ecosystem-Based Approach to Permitting

An ecosystem-based approach to permitting would concentrate management efforts on the preservation of habitats rather than the protection of individual species.¹⁷⁴ Such an approach would shift NMFS efforts from a

170. See Notice of Intent to Prepare an Environmental Impact Statement on Issuance of Permits for Research on Northern Right Whales in the Atlantic and Pacific Oceans, 79 Fed. Reg. 60,285-60,287 (Oct. 17, 2005).

171. See MARINE MAMMALS AND LOW-FREQUENCY SOUND (1994), *supra* note 5, at 29-31. The NRC has reported that the “lengthy and unpredictable duration of [the permitting] process can create serious difficulties for research.” *Id.* at 29. This concern was also echoed in the congressional testimony of Rear Admiral West. 2003 MMPA Hearings, *supra* note 115 (statement of Rear Admiral Richard D. West). See also LOW-FREQUENCY SOUND AND MARINE MAMMALS (2000), *supra* note 5, at 4.

172. MMPA Amendments Hearings, *supra* note 112, at 10 (statement of Dr. Peter F. Worcester).

173. *The Magnuson-Stevens Fishery Conservation and Management Act: Hearing before the Subcomm. on Oceans and Fisheries of the S. Comm. on Commerce, Science and Transp.*, 106th Cong. (10-11) (1999) (statement of Penelope Dalton, Assistant Administrator, National Marine Fisheries Service).

174. This has been witnessed in all aspects of ocean management (e.g., fisheries, oil and

focus on incidental, individual sources of noise to a more holistic approach that incorporates the cumulative and long-term effects of noise on the entire ecosystem.¹⁷⁵ The U.S. Commission on Ocean Policy and the NRC have also advocated for the use of ecosystem-based management principles in order to better coordinate management actions, reduce duplication and conflicts, and to take full advantage of available resources.¹⁷⁶ Most recently, this ecosystem-based approach has been incorporated in proposed amendments to the MMPA, which call for further research to be targeted at ecosystem-based problems.¹⁷⁷

The following scenario illustrates the problem of focusing on individual species instead of the ecosystem as a whole. If ocean noise policy were to focus solely on the effects of noise on large whales, it would stand to reason that regulations within a whale sanctuary or a Marine Protected Area (MPA) should prohibit the generation of noise in the frequency range of the whales' sensory system.¹⁷⁸ However, if the use of acoustic gillnet pingers was *not* prohibited in the same area, the pingers could drive the whales' prey out of the area leaving them with no food source.¹⁷⁹ Thus, it is important that noise regulation under the MMPA incorporate cumulative, long-term impacts of *all* sources of noise on species and habitats.

gas, tourism and development). For a discussion of these other aspects of ocean management, see, e.g., Lawrence Juda & Richard Burroughs, *The Prospects for Comprehensive Ocean Management*, 14 MARINE POL'Y, 23-36 (1990); Lawrence Juda & Timothy Hennessey, *Governance Profiles and the Management of the Uses of Large Marine Ecosystems*, 32 OCEAN DEV. & INT'L L., 43, 47-67 (2001).

175. For a discussion of the alternative methodologies and their long-term implications, see MCCARTHY, *supra* note 6.

176. LOW-FREQUENCY SOUND AND MARINE MAMMALS (2000), *supra* note 5, at 63. See also OCEAN POLICY BLUEPRINT, *supra* note 115, at 258.

177. Endangered and Threatened Species; Revision of Critical Habitat for the Northern Right Whale in the Pacific Ocean, 70 Fed. Reg. 66,343 (proposed Nov. 2, 2005) (to be codified at 50 C.F.R. pt. 226). Specifically, the proposed language identified studies of two areas that should be given priority: the Bering Sea-Chukchi Sea ecosystem and the California coastal marine ecosystem.

178. A Marine Protected Area is defined as "any area of inter-tidal or sub-tidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment." Graeme Kelleher, *Guidelines for Marine Protected Areas*, in BEST PRACTICE PROTECTED AREA GUIDELINES SERIES NO. 3, xi (1999).

179. A theory has been proposed that gillnet pingers designed to keep harbor porpoise from gillnets work not because they drive them away, but because they keep away herring, a major food source of the porpoise. See S.M. Dawson, *Pingers, Porpoises, and Power: Uncertainties with Using Pingers to Reduce Bycatch of Small Cetaceans*, 84 BIOLOGICAL CONSERVATION 141, 146 (1998).

Regulating noise more stringently within MPAs is another strategy in keeping with an ecosystem-based approach. This strategy was most recently employed by John Thwaites, the Australian Minister of the Environment, who imposed restrictions on seismic activities in the Twelve Apostles Marine Park.¹⁸⁰ The Minister emphasized that a higher environmental test applies in MPAs, thereby creating an additional layer of protection for MPAs.¹⁸¹ Other MPAs have also incorporated noise restrictions, such as Point Reyes National Seashore near San Francisco (which prohibits jet-skis) and Glacier Bay National Park in southeastern Alaska (which restricts noise from cruise ships).¹⁸²

A final ecosystem-based approach to regulating noise incorporates the use of a noise-budget, a concept proposed by the Committee on Potential Impacts of Ambient Noise in the Ocean on Marine Mammals.¹⁸³ The Committee suggested the development of a global ocean noise budget that includes both ambient and transient events so that distribution and sources signatures of all anthropogenic noise sources in an area could be considered.¹⁸⁴ Such an approach is presently being adopted to describe the ocean noise budget within the spatially explicit boundaries of the Stellwagen Bank National Marine Sanctuary.¹⁸⁵

F. Increase Resources Allocated to Permitting Agencies

The lack of resources within NMFS has long been recognized as a factor contributing to its highly problematic permitting process.¹⁸⁶ Even the MMC has acknowledged that one of the causes of the lengthy permitting process is insufficient staffing to handle the workload at NMFS Office of Protected Resources.¹⁸⁷ In 2004, Congress established a ten million dollar “marine

180. TheAge.com, No Seismic Tests at Twelve Apostles (Oct. 17, 2003), <http://www.theage.com.au/articles/2003/10/16/1065917549657.html>.

181. *Id.* For more on the Twelve Apostles Marine Park, see http://www.parkweb.vic.gov.au/1park_display.cfm?park=271 (last visited Nov. 15, 2007).

182. For a discussion of noise restrictions in MPAs, see MCCARTHY *supra* note 6, at 219-34. See also 36 C.F.R. § 13.65 (2006); RANDALL REEVES, THE VALUE OF SANCTUARIES, PARKS AND RESERVES (PROTECTED AREAS) AS TOOLS FOR CONSERVING MARINE MAMMALS (prepared for the Marine Mammal Commission) (Dec. 2000).

183. OCEAN STUDIES BOARD, NAT'L RESEARCH COUNCIL, OCEAN NOISE AND MARINE MAMMALS 4, 11 (2003).

184. *Id.* at 127-29.

185. Email from Dr. Leila Hatch, *supra* note 169.

186. See 2003 MMPA Hearings, *supra* note 115 (statement of Nina Young); 2003 MMC ANN. REP., *supra* note 117, at Chapter IX; National Security Readiness Hearings, *supra* note 117 (statement of Karen Steuer).

187. MARINE MAMMAL COMM. ANN. REP., 114-15 (2004).

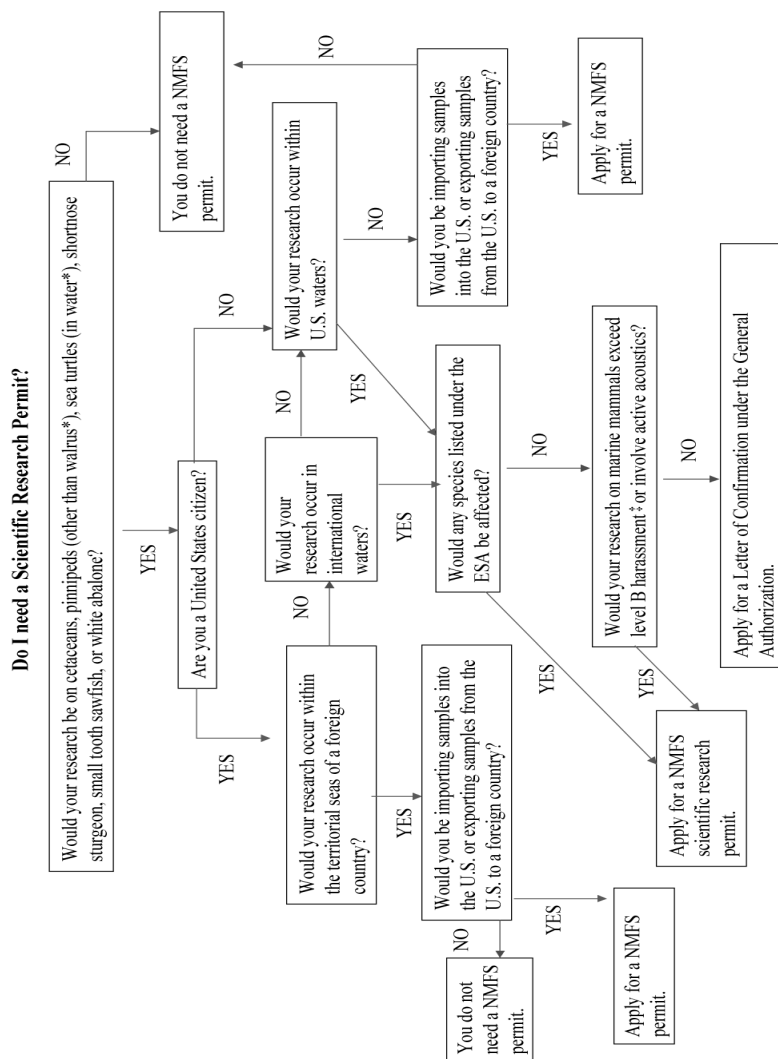
mammal initiative” under the appropriations legislations for the 2005 fiscal year. Of that, one million dollars was to be used to hire additional staff for “permitting functions” at NMFS Office of Protected Resources.¹⁸⁸ If NMFS is to implement an ecosystem-based approach to ocean noise regulation, even more funding and staffing may be required in the future.

VII. CONCLUSION

The severity of the threat posed by noise to marine mammals remains uncertain; different sound sources have different effects in different environments on different marine mammals. These variables, combined with scientific uncertainty over the effects of anthropogenic noise on marine life, further complicate the task of regulating ocean noise. Despite uncertainty about its effects, ocean noise has garnered a great deal of attention and, in many cases, has been strictly regulated. This regulation spans many activities, impacting oil and gas exploration, naval operations, scientific research and may soon affect commercial shipping and recreational activities. But the recognition of noise as a threat to marine mammals, and its subsequent regulation, has exposed serious flaws in the MMPA.

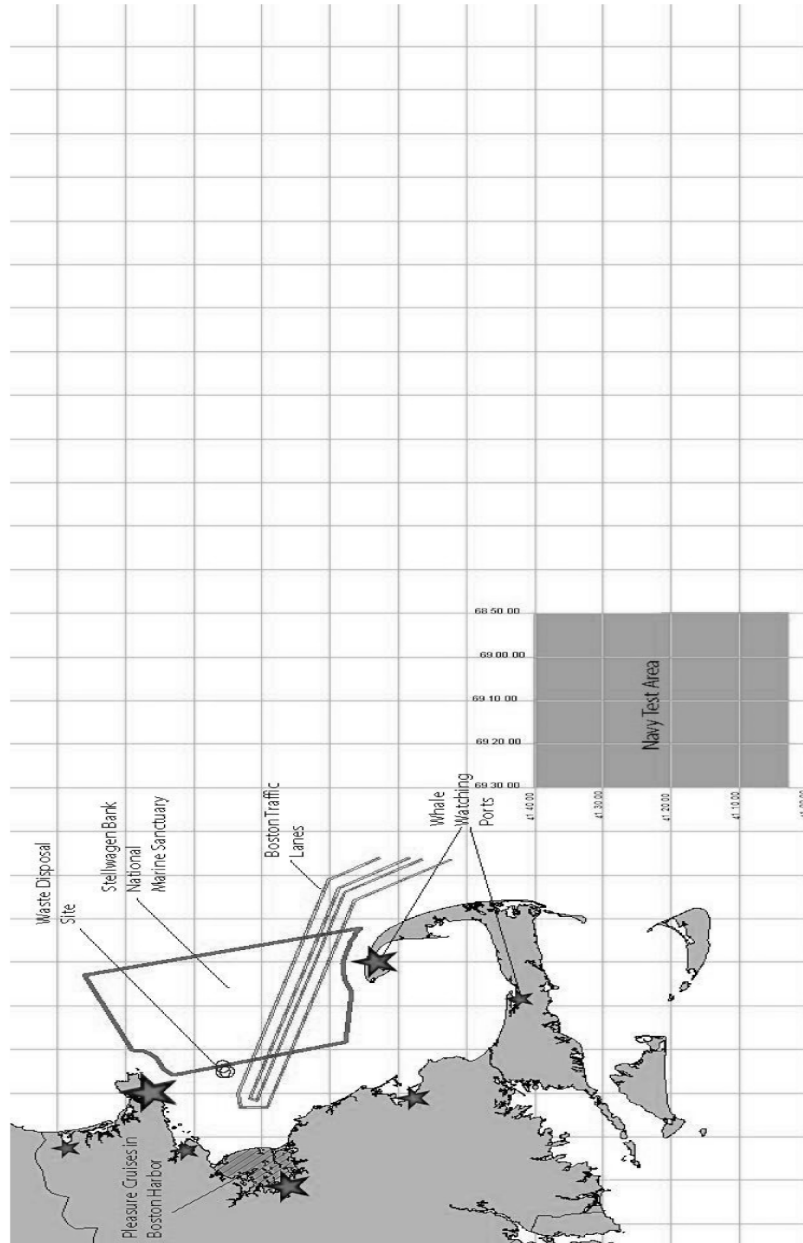
Where did things go wrong? Perhaps the moratorium-structure of the law (which declares all “takes” illegal) combined with the broad definition of harassment (also deemed a “take”) are the two major shortcomings in the law. The moratorium-type nature of the MMPA results in an inflexibility that threatens to render the law merely symbolic. The harassment definition, despite multiple attempts at revision, still does not clearly delineate between safe and harmful activities, and it is becoming more and more difficult to define harassment as years pass and our ability to detect minor behavioral changes increases. However, the ambiguity of this definition has had a profoundly negative consequence in the case of noise regulation; it has created an unequal regulatory burden which is not proportional to the threat posed to marine mammals. Moreover, such a regulatory burden actively discourages scientists from pursuing the very science that is required to inform the law; marine mammal researchers cannot protect marine life from intense underwater sound if they cannot carry out experiments to determine how the animals are affected.

188. Consolidated Appropriations Act, Pub. L. No. 108-199 (2004); NMFS FY 2005 Annual Operating Plan (Mar. 11, 2005). The one million dollars earmarked for NMFS Office of Protected Resources did not, however, translate to increased funding for the acoustics program or ocean noise research. In fact, funding for salaries and research associated with acoustics and marine mammal mitigation measures has actually decreased (for salaries) and flat-lined (for research) since 2003. Interview with Dr. Leila Hatch, *supra* note 169.



*For research on sea turtles on land, walrus, sea otters, polar bears, and manatees, contact the U.S. Fish & Wildlife Service.
 † Level B harassment is defined as "any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal...but which does not have the potential to injure a marine mammal..."

Appendix A. The NMFS Permitting Decision Tree.



Appendix B. Stellwagen Bank National Marine Sanctuary and Shipping Lanes into Port of Boston.