

American Perceptions of Marine Mammals and Their Management

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CHAPTER ONE: Introduction and Research Methodology

Most Americans associate marine mammals with two orders of animals—the cetaceans, including the whales and dolphins, and the pinnipeds, consisting of the seals, sea lions, and walrus. The more informed recognize another marine mammal order, the sirenians, represented in the United States by one species, the manatee, mainly found along the Florida peninsula. Less widely recognized as marine mammals, but still officially classified as marine mammals, include one ursine species, the polar bear, and a mustelid, the sea otter. This report will examine American views of all marine mammals and their management, although mostly focusing on, for reasons of greater significance and familiarity, the cetaceans and pinnipeds.

Marine mammals are among the most privileged yet beleaguered of creatures in America today. Many marine mammals enjoy unusually strong public interest and support, their popularity having expanded enormously during the past half-century.

Marine mammals are also relatively unique among wildlife in America in having been the recipients of legislation dedicated exclusively to their protection, management, and conservation. This law - the Marine Mammal Protection Act - is one of the most ambitious, comprehensive, and progressive environmental laws ever enacted. More problematically, various marine mammal species have been the source of considerable policy conflict and management controversy, both domestically and internationally, and an associated array of challenges to their well-being and, in some cases, future survival. Over-exploitation (e.g., commercial whaling) was the most prominent cause of marine mammal decline historically, although this threat has greatly diminished. Today, more indirect threats to many marine mammal species have emerged, particularly adverse effects associated with commercial fishing, marine pollution, oil and gas extraction, and even the non-consumptive use of marine mammals in the wild and captivity. These emerging threats, along with more traditional challenges associated with the continued and possible resumed harvest of some species, have thrust marine mammals into the center of major conflicts involving competing interests at state, national, and international levels.

The management of marine mammals in the United States is largely governed by the Marine Mammal Protection Act (MMPA) of 1972 as subsequently amended. The MMPA has resulted in expanded and improved conservation of marine mammals. The MMPA endorses the importance of these ocean species as a valued scientific, ecological, aesthetic, and economic resource. The MMPA further stresses the desirability of managing individual population stocks rather than just species, and pursuing optimal instead of maximum sustainable population goals. The MMPA also seeks to maintain the capacity of marine mammals to contribute to the health and stability of marine ecosystems. MMPA is designed to influence not only the actions of the federal government, but also individual states and other nations. The Act further focuses on prohibiting and, at times, managing the direct exploitation of marine mammals, as well as economic development impacts on and the non-consumptive use of marine mammals (e.g., captive display in zoos and aquaria and whale watching). A broad definition of "taking" marine mammals is employed, including direct exploitation and harvest, as well as the potential impact of activities such as fishing, shipping, oil and gas development, recreation, and others.

These and other provisions of the MMPA have provoked considerable controversy and debate. This contention partially originates in the visionary and often difficult to implement aspects of the Act - e.g., developing practical and agreed upon definitions of optimum sustainable populations, applying ecological management in the marine environment, regulating incidental take, defining humane treatment, and in other respects. Considerable controversy has also accompanied marine mammal protection efforts at

variance with powerful economic and political interests, curtailing traditional states' rights to manage resident wildlife, and the impact of protection efforts on international relations. A more conservative United States Congress during the 1990's - with strong interests in defending property rights, economic and natural resource development, and devolving authority from the Federal to state governments - has often clashed with elements of the MMPA. Reauthorization of the MMPA approximately every five years has placed the Act under the political scrutiny of various groups. This political context will likely be evident during MMPA reauthorization hearings expected this year.

Most marine mammal species are, nonetheless, the recipients of considerable public support in the United States and elsewhere, particularly in Western Europe. Widespread interest in these creatures is reflected in large and expanding numbers of visits to aquariums and zoos, the appearance of many books and movies, and a rapidly expanding whale watching industry that only recently developed one-half century ago. Additionally, major scientific discoveries about marine mammal biology and behavior have fostered public interest, as well as sympathy for creatures like the large whales that historically suffered from over-exploitation. The growth in numbers and influence of prominent environmental organizations, such as the World Wildlife Fund, The Humane Society of the United States, Greenpeace, the Center for Marine Conservation, and others, has further contributed to public awareness and concern for marine mammals.

This mix of expanding public interest, economic conflict, political controversy, and ambitious but difficult to implement provisions of the MMPA, all underscore the importance of understanding public views of marine mammals in seeking to manage and conserve these animals effectively. Developing acceptable regulatory standards is a function of adequate biological knowledge, as well as understanding public perceptions and values of marine mammals and preferences for alternative management strategies.

Sufficient knowledge of the human dimension of marine mammal management is, however, almost non-existent. Some systematically derived data exists on public values and understandings of particular species and uses, including attitudes toward whaling or toward manatees in Florida. This information, however, is limited in scope and geographic applicability, and often obsolete. No comprehensive national study of American views of marine mammals and their management has ever been attempted. This gap in our knowledge, the relevance of this information to current marine mammal policy and conservation, and its potential value in the impending MMPA reauthorization, all prompted this study.

Research Methods

A national study was conducted despite the difficulties and cost of this kind of research, because of the extent of various controversies regarding marine mammal conservation and management and the absence of existing data. This study covers a wide range of issues across a variety of species. Budgetary constraints also necessitated a limited sample size and limited the number of questions that could be asked. Additional investigation will, therefore, be required before definitive conclusions can be drawn regarding many of the subjects covered in this research.

The choice of issues examined was guided by extensive literature review and consultation with others. The topics covered are listed in outline form below. Brief background discussions of these issues are provided later in the presentation of results.

Survey Topics

I. Consumptive uses of marine mammals

- a. Whaling
- b. Commercial harvest of other marine mammal species
- c. Recreational harvest

II. Consumptive uses of marine mammals by native peoples

III. Conflicts between marine mammals and commercial fishing

- a. Operational conflicts (e.g., entanglement, harvesting techniques)
- b. Biological conflicts (e.g., food competition)

IV. Nonconsumptive uses of marine mammals

- a. Captive display in zoos, aquariums, and other facilities
- b. Whale watching

V. Social and economic development impacts on marine mammals

- a. Commercial shipping and recreational boating
- b. Marine pollution
- c. Coastal development
- e. Oil and gas extraction and transport
- f. Ocean mineral development

VI. Government programs and international relations

- a. MMPA goals and objectives
- b. International trade and access to American marine resources
- c. Marine sanctuaries

Additional issues might have been covered, although the topics listed are viewed as the most critical at this time. The number of survey questions devoted to each issue varies considerably. Far more questions focused on marine mammal-commercial fishing conflicts, whaling, and captive display than ocean pollution or coastal development. These differences reflect the perceived importance of various issues, degree of current contention, relative complexity of a topic, and the number of questions deemed necessary to cover an issue adequately. Budgetary constraints also limited the survey's length and, thus, the number of questions that could be asked.

A diversity of species were covered in the questions, including whales, dolphins, seals, sea lions, walrus, manatees, sea otters, and polar bears. This coverage varied considerably; there were far more questions focusing on whales and seals than on sea otters or polar bears. For many questions, no distinction was made among marine mammals.

Ninety-four attitude questions were included in the national survey. Seven additional questions focused on knowledge of marine mammals. Four behavioral questions were also included on environmental organization membership, visits to zoos and aquariums, and participation in whale watching and fishing. Demographic questions elicited information on respondents' age, place of residence, occupation, education, and gender. The complete survey can be found in Appendix A.

Nine survey drafts were developed and two pretests conducted. A telephone survey was conducted for both budgetary and quality control reasons. A mail survey option was rejected because of an anticipated poor response rate. A personal interview survey was viewed as prohibitively expensive and not likely to generate an adequate representation of minority and socioeconomically disadvantaged groups. The Center for Research and Public Policy in New Haven, Connecticut, was chosen to conduct the telephone survey for reasons of quality of previous work, competitive cost estimate, and logistical convenience.

Financial constraints limited the sample size to 1000 adult Americans 18 years and older. This sample included 950 residents of the 48 contiguous states and Hawaii, and a special sampling of fifty Alaskans. An over-sampling of Alaska residents was conducted because of the number of critical marine mammal conservation issues occurring in this state.

A national sample survey of this size yields an accuracy of approximately +/-3% on responses to the survey questions using a 95% confidence level (i.e., the results obtained would not occur by chance more than 5 times in 100). In other words, this sample size would not produce results expected to differ more than +/-3% from those obtained by all qualified Americans being contacted and responding to the survey.

The telephone interviews occurred between August 3 and August 22, 1998. Experienced and trained

interviewers were used in the data collection. Interviews took place between 5 and 10 PM on weekdays, and 10 AM and 4 PM on weekends. Approximately 15% of the interviews were randomly monitored to assure quality control. A computerized random digit dialing procedure generated a random sample of listed and unlisted numbers. Survey Sampling, Inc. of Fairfield, Connecticut, provided the random national sample. Interviews were conducted in either English or Spanish, depending on the primary language of the respondent. All data analysis took place at Yale University.

CHAPTER TWO: American Views of Marine Mammals

Chapters two and three review the results of the study of American perceptions of marine mammals, their management, and conservation. The current chapter focuses on the entire American public; the next chapter emphasizes variations among groups in the US population distinguished by area of residence, demography, and certain activities. To expedite the presentation, figures and tables are presented at the end of each chapter. Bar graphs are employed in the current chapter to facilitate the reading and interpretation of findings. Because of limited space, titles used in the figures and tables are abbreviations of the entire questions, which can be found in Appendix A.

Statistically significant comparisons among groups are derived from analysis of variance and chi square statistics. Scales were also developed to allow comparisons of broad views of marine mammals and their management among varying groups. Factor analysis techniques were used to cluster questions for scaling purposes.

The presentation of results follows the order of issues listed in chapter one. This sequence is not meant to imply any hierarchy of importance. The findings in this chapter examine the entire American public, including a limited over-sampling of Alaska residents. This slight sampling bias was considered insufficient to warrant weighting Alaska responses to mitigate their disproportionate representation in the overall national sample. Differences among Alaskans and non-Alaskans are reviewed in the next chapter.

I. Consumptive Uses of Marine Mammals

The notion of "consumptive" use refers to the harvesting of marine mammals for various commercial and sometimes recreational purposes. Unsustainable exploitation of marine mammals was a major historic cause for the decline and endangerment of many species, particularly the large cetaceans. This level of exploitation played a role in the passage of the U.S. Marine Mammal Protection Act of 1972, as well as a global moratorium on the commercial harvest of whales in the 1980's.

The recovery of some whales and other marine mammal species precipitated renewed efforts, and accompanying controversy, to resume commercial harvests. Norway, Japan, and Iceland have been major proponents of resumed whaling of abundant species, such as the minke whale. Other nations, such as Great Britain, have objected to any lifting of the global moratorium on commercial whaling, citing "no pressing nutritional, economic, or social needs" that justify the commercial killing of whales. This debate has been complicated by some native peoples maintaining a traditional hunt of whales and other marine mammals, permitted under the Marine Mammal Protection Act and International Whaling Commission rules. A recent decision to allow the Makah of Washington state to resume whaling of recovered gray whales approximately 70 years after the last harvest of this species has contributed to the controversy regarding aboriginal and other culturally based whaling.

Several recent studies of public attitudes toward commercial whaling have found widespread opposition to the practice in the United States, Canada, Germany, England, and Australia, although moderate to strong support for whaling by native peoples who traditionally harvested this animal for subsistence purposes. By contrast, a majority of citizens of Japan and Norway strongly support commercial whaling of abundant species. Other recent data suggests residents of the United States and other Western nations might support a regulated harvest of minke whales for food and as an aspect of traditional culture if no impact occurred on the species population. Data in this section and the next on native peoples address

aspects of this issue. This discussion largely focuses on whaling.

Many reasons have been offered for harvesting whales and other marine mammals and attitudes toward these varying rationalizations were examined. As the results of Figures 1 - 4 reveal, a large majority of Americans objected to most reasons for whaling, with the exception of obtaining medicines or, as more fully covered in the next section, whaling by native peoples who traditionally hunted this animal. Less than 15% of the general public supported harvesting whales to obtain industrial products such as lubricating oil, as well as for decorative or luxury food products. Additionally, more than 60% of the American public opposed "commercial whaling under any circumstance" (Figure 5). Figures 6 and 7 reveal very little support for whaling of abundant species by any nation interested in whaling, with less than one-third of Americans in favor of whaling by relatively wealthy nations like Japan or Norway, even though these countries may possess a whaling tradition. On the other hand, some 70% of the American public supported whaling of abundant species by poor nations with limited food supplies (Figure 8). More than four-fifths of respondents also favored America limiting its trade with nations like Japan and Norway if they commercially harvested whales in violation of American laws and/or international agreements (as will be discussed in more detail later in the chapter) (Figure 87). Finally, some 70% or more of Americans morally objected to killing whales, and were against harvesting whales because of their presumed intelligence and capacity to experience pain and suffering (Figures 9 and 10).

Public attitudes toward commercially harvesting various marine mammal species and other terrestrial wildlife (all described as abundant and well managed) are indicated in Figures 11 - 20. Consistent with the previous results, less than one-fifth of Americans supported the killing of presumably abundant whales for commercial purposes. Some three-quarters and more of the public disapproved of harvesting abundant seals, walruses, sea otters, and dolphins for a commercial product. Among terrestrial wildlife, most respondents objected to killing elephants and bears for a commercial purpose, although one-third or more endorsed the harvest of deer, ducks, and alligators. Only 12% of the American public endorsed the recreational and/or commercial harvest of polar bears and walruses, assuming an abundance of both species (Figure 21).

II. Uses of Marine Mammals by Native Peoples

The harvest by native peoples of marine mammals has at times been contentious, although permitted under MMPA rules in certain circumstances. More than 70% of the American public endorsed the right of native peoples to hunt abundant marine mammals if this use were for personal food consumption and/or obtaining clothing (Figure 22). A majority also endorsed native peoples hunting abundant whale species if this activity were considered an integral part of their traditional culture (Figure 23). On the other hand, a large majority of Americans objected to native peoples harvesting abundant marine mammals if this use were commercially motivated, emphasized seemingly non-essential products, the species was endangered, the activity had limited cultural significance, and the harvest employed modern weaponry. Specifically, some two-thirds of the national sample objected to native peoples harvesting abundant marine mammals for commercial sale of food and/or clothing, and some four-fifths disapproved of commercial sale of these animals for jewelry and other decorative products (Figures 24 - 26). Moreover, some 60% of Americans objected to Alaska natives hunting an endangered species like the bowhead whale, even if this hunt were a part of traditional culture (Figure 27). Additionally, a substantial majority disapproved of native peoples hunting the recovered gray whale, if the last harvest of this animal occurred more than one-half century ago (Figure 28). Finally, nearly 60% of the national sample objected to native peoples killing whales and seals with modern weaponry like automatic rifles (Figure 29).

III. Conflict between Marine Mammals and Commercial Fishing

Conflicts between marine mammals and commercial fisheries operations have been the source of considerable controversy. Particularly contentious issues include incidental taking of marine mammals during fishing operations, entanglement in fishing gear, habitat impacts resulting from certain fishing practices, food competition, parasite transmission, and others. This overall topic can be divided into two major sources of conflict. First, what has been called "operational conflicts" - for example, damage to fishing gear through entanglement or incidental take of marine mammals. Second, more "biological conflicts," such as competition between commercial fisheries and marine mammals for identical food sources or parasite transmission from marine mammals to commercial fish species.

Mortality inflicted on certain dolphin species by commercial tuna operations contributed to the passage of the original Marine Mammal Protection Act. Despite progress on this particular issue, commercial fishing operations continue to be a major source of incidental mortality of many marine mammal species. The development of large-scale drift net fishing, for example, has been associated with major impacts on various marine mammal species. Entanglement and discarding of fishing equipment has also had a pronounced effect on certain marine mammal species.

Various questions in the national survey examined public attitudes toward the relative priority of commercial fish prices and marine mammal protection. Most Americans favored marine mammal conservation over lower fish prices. Specifically, some four-fifths indicated a willingness to pay "a little more for fish" if fishing practices resulted in fewer numbers of marine mammals being harmed or killed (Figure 30). Moreover, nearly 90% indicated certain fishing practices should be outlawed if they resulted in many marine mammals being killed, even if this resulted in "slight increases in the price of fish" (Figure 31). A somewhat related but conversely worded question also found more than three-quarters of the American public objecting to the use of fishing methods that harvested "fish at a reasonable price" but killed marine mammals (Figure 32). A similar proportion reported they would not purchase the least expensive tuna fish if it resulted in the killing of dolphins (Figure 33).

On the subject of operational conflicts, some four-fifths of the public objected to commercial fishing operations being permitted to kill seals or sea lions that stole "their" fish or damaged fishing equipment (Figure 34). Additionally, the great majority of respondents opted for non-lethal techniques to minimize damage to fishing equipment caused by abundant seals and sea lions, including relocating seals and/or commercial fishing operations (Figures 35 - 36). A near majority also favored using nets or other physical barriers (less than 30% disapproving of this option), although cited as the most expensive methodology (Figure 37). Finally, less than 10% of the public supported the use of lethal practices, such as shooting or poisoning seals and sea lions, to reduce this conflict, although these methods were described as the least expensive options (Figures 38 and 39).

A substantial proportion of respondents, nonetheless, sympathized with the plight of commercial fishing operations that conflicted with abundant marine mammals. Nearly 60% objected to penalizing commercial fishermen who unintentionally harmed marine mammals, and one-third disapproved of requiring commercial fishermen to use expensive equipment to protect abundant seal populations (Figures 40 and 41).

A similar pattern of results emerged with respect to more biological conflicts including commercial fishing operations and marine mammals. Approximately three-fifths of Americans disapproved of reducing abundant seal and sea lion populations allegedly responsible for consuming large quantities of commercially valuable fish (Figure 42). Additionally, some 80% endorsed limits on commercial fishing in Alaska responsible for declines in the Steller sea lion presumably caused by competition for the same food resource (Figure 43). The overwhelming majority of respondents also favored protecting habitat important for fish reproduction and limiting commercial fishing operations as the most preferred methods for increasing declining commercial fish populations, only some one-fifth favoring reductions in seal or sea lion populations to achieve this result (Figures 44 - 46).

Finally, 90% of the American public indicated that a major priority of the Marine Mammal Protection Act should be minimizing conflicts between commercial interests, such as fishing and oil and gas operations, and marine mammal protection, as discussed in more detail later in the chapter (Figure 80). The public was divided, however, regarding establishing marine sanctuaries in areas historically important for commercial fishing (Figure 94).

IV. Nonconsumptive Uses of Marine Mammals

Interest in observing marine mammals in the wild and in captivity has expanded greatly in recent years. Whale watching is the most popular nonconsumptive use of wild marine mammals. This activity first appeared along the California coast in the 1950s, focusing on the migration of gray whales from the Arctic feeding grounds to the breeding and calving lagoons of the Baja peninsula. New England whale watching

soon followed, becoming a well-established and lucrative industry by the 1970s. A 1992 international study of whale watching reported approximately three million people in over twenty countries participated in whale watching, expending some \$318 million, in contrast to \$38-56 million spent in 1988, and just \$14 million in 1981. Other data suggests whale watching can foster more appreciative and concerned attitudes toward whales and marine mammals, although little evidence indicates the activity encourages substantially greater knowledge of marine mammals or their conservation. In the current study, some 12% of the American public reported whale watching 1-2 times, and some 5% more than three times, during the past five years (Figure 47).

Viewing marine mammals in captivity has similarly grown in popularity. The appeal of seeing wild animals in zoos and aquariums is suggested by more Americans visiting these facilities each year than attending all professional baseball, basketball, and football games combined. More than 125 million Americans visit the nation's 100+ zoological parks annually, and more than 350 million attend 600+ facilities worldwide. Additionally, more than 10 million Americans annually visit the country's 35 leading aquariums, often motivated to see the estimated 1,500 marine mammals on display. In the current study, 37% of the national sample reported visiting a zoo or aquarium 1-2 times, 22% 3-5 times, and 19% on more than five occasions during the past five years (Figure 48).

Despite extensive public interest, considerable controversy has developed regarding the viewing of marine mammals in the wild and in captivity. Concerns about possible harassment of wild whales during feeding, migration, and reproduction have precipitated debate over management practices and controls, and led to attempts at educating and monitoring the participating public and whale watching industry. Critics of marine mammals in captivity have expressed concern about high rates of accidental injuries, psychological distress, fatalities, and shortened life spans. Some people and groups morally object to the confinement of these animals for entertainment purposes, particularly when the focus is on performing "tricks" or as a device to lure visitors and guests. Some marine mammals have even been illegally released. The widespread popularity of the feature film, "Free Willy," reflects the passions aroused by this issue. By contrast, those in favor of maintaining marine mammals in captivity - under presumably humane, educationally, and scientifically appropriate conditions - have defended the activity as a source of enhanced scientific understanding and expanding public interest and support for marine mammals, as well as a relatively benign form of entertainment.

In the current study, more than 70% of the national sample disagreed that they were uninterested in the design of marine mammal exhibits so long as they could easily see the animals (Figure 49). Almost all respondents indicated captive marine mammals should be kept under the most natural conditions possible, even if it meant the animals were more difficult to observe (Figure 50). Some three-quarters of the American public further expressed a preference for marine mammals displaying natural behaviors rather than performing "tricks and stunts" (Figure 51). On the other hand, the public was somewhat evenly divided about wanting to see dolphins perform "tricks" rather than just swimming in a tank (Figure 52).

Some four-fifths of the national sample believed zoos and aquariums should not be permitted to display marine mammals unless major educational and/or scientific benefits resulted, a finding nearly identical to that reported in a 1991 study of the Canadian public (Figure 53). Similarly, more than 90% of the respondents indicated that these facilities should not be allowed to keep marine mammals in captivity unless they demonstrated that the animals were well maintained both physically and mentally (Figure 54). Nearly 90% supported government restrictions on exporting marine mammals to countries with captive facilities that did not meet American educational and/or treatment standards (Figure 55). Some 60% of the national sample objected to capturing wild dolphins and whales for display in zoos and aquariums (Figure 56). Additionally, three-quarters disapproved of keeping whales and dolphins in captivity if it resulted in significantly shortened life spans (Figure 57). Forty percent nonetheless approved, although 54% opposed, allowing hotels to exhibit dolphins, assuming these animals were maintained under conditions similar to the best known aquariums (Figure 58).

Attitudes toward seeing marine mammals in the wild focused on whale watching. Only 17% of the general public supported the notion that the best whale watching depended on the boats getting as close as possible to the whales (Figure 59). Additionally, more than four-fifths of the national sample objected to

interfering with the behavior of whales so people could get a good look at these animals (Figure 60). Most Americans approved of limiting the number of whale watching boats to avoid harming whales, even if it meant fewer viewing opportunities (Figure 61). Finally, almost three-quarters of the public endorsed whale watchers paying a small fee (e.g., 5-10% of the cost of participation) to help pay the costs of whale conservation and management (Figure 62).

V. Social and Economic Development Impacts on Marine Mammals

Most harmful impacts on marine mammals have historically been associated with excessive exploitation of various species. In more recent times, the rapid expansion of human commerce, technology, and population have led to many new forms of indirect habitat, behavioral, and contamination impacts on many marine mammal species. Some of these impacts can be readily comprehended, such as the effects of large-scale oil spills and boat collisions. Some indirect impacts are, however, quite subtle and insidious, often defying adequate recognition and scientific understanding, such as the potentially harmful effects of discarded synthetic plastics or high levels of manufactured chemical contaminants like PCB's that accumulate in the fatty tissues of dolphins, seals, and other marine mammals. Some species, like beluga whales in the St. Lawrence River, are currently so chemically contaminated that they technically qualify as toxic waste under Canadian law. High noise levels associated with oil and gas development, shipping, military, and other ocean activities represent another insidious and insufficiently understood threat with potentially adverse effects on marine mammal communication, feeding, and reproduction. Significant shifts in the behaviors of gray and fin back whales in the presence of extensive vessel traffic suggest this impact could be significant. This study examined American attitudes toward a number of these economic and social impacts, including commercial shipping, recreational boating, chemical pollution, discarding of wastes, coastal development, oil and gas exploitation, and military activity.

Most Americans supported restrictions on the routes of commercial vessels that injured marine mammals even if it led to higher shipping costs (Figure 63). The public was divided, however, regarding the desirability of governmental regulation of shipping activities to protect marine mammals (Figure 64). Nearly 90% nonetheless approved of placing restrictions on powerboats to reduce injuries and deaths to the Florida manatee (Figure 65). Some three-quarters of the public also supported limiting cruise ships and recreational boating in marine sanctuaries intended to protect marine mammals, as discussed in more detail later in the chapter (Figures 89 and 91).

Most Americans supported controls on discarding of chemical contaminants in the ocean potentially harmful to marine mammals. Some four-fifths objected to using chemicals that harmed marine mammals, even if this impact had not been definitively proven (Figure 66). Additionally, nearly unanimous support existed for levying severe fines for discarding chemicals and plastics in the marine environment known to harm marine mammals (Figure 67). When confronted with a similar but reversibly worded question, over 80% disagreed that they would support discarding chemicals in the ocean harmful to marine mammals if the chemicals were important to people (Figure 68). Only 7% of the public believed it necessary to dispose of garbage in the ocean that injured marine mammals (Figure 69).

Nearly four in five respondents favored limiting offshore oil and gas development harmful to marine mammals, even if it resulted in "slightly higher gasoline prices" (Figure 70). Indicative of the public's inclination to subordinate oil and gas development to marine mammal protection, more than 70% favored limits on sound levels associated with oil drilling if the noise significantly interfered with whale communication (Figure 71). Additionally, some 80% of the national sample supported restrictions on oil exploration and transport in areas with known sea otter populations (Figure 72).

A significant majority of Americans disagreed that it was unrealistic to restrict coastal development just to protect marine mammals like seals or the Florida manatee (Figure 73). Considerable ambivalence was nonetheless expressed toward developing ocean minerals (38% in favor, 49% against) if it harmed abundant marine mammals (Figure 74). The public did, however, overwhelmingly support limiting military tests that injured marine mammals (Figure 75).

VI. Government Programs and International Relations

Various laws, programs, and government agencies associated with marine mammal conservation and

management have been the focus of controversy, particularly the U.S. Marine Mammal Protection Act (MMPA). The need to reauthorize the MMPA approximately every five years has often accentuated this political conflict. Support for passing the MMPA in 1972 originated in the desire to control the effects of marine mammal exploitation associated with whaling and the killing of seal pups, as well as the impacts of incidental taking of dolphins stemming from tuna fishing operations. Since that time, a number of factors have spurred controversy regarding the MMPA. A sample of these issues includes ambitious but difficult to implement aspects of the Act, major threats to marine mammals from various sources of direct and indirect mortality, and the possible impact of marine mammal protection on international political and trading relations. Public views of some of these issues have already been considered - e.g., incidental take associated with commercial fishing and oil and gas operations, harassment stemming from non-consumptive use, the rights of native peoples, and captive display. This section considers an additionally contentious issue involving the potential of the American government to punish other nations who violate our MMPA, as well as international whaling agreements, by restricting imports or denying access to resources within our coastal Exclusive Economic Zone. This issue has precipitated a major trade dispute brought before the World Trade Organization (WTO) under the rules of the General Agreement on Trade and Tariffs (GATT).

This section also considers public attitudes toward a government program not specifically focusing on marine mammals but often affecting marine mammal conservation and management, the Marine Sanctuary Program. The Marine Sanctuaries Program began about the same time as the MMPA. Although in theory the ocean counterpart of the national park system, marine sanctuaries have been largely under-funded and understaffed, as well as lacking in public recognition and support. Most better known sanctuaries (e.g., the Florida Keys in the Atlantic Ocean or the Pacific Ocean Channel Islands) have distinctive terrestrial features and relatively clear boundaries. Major obstacles to a more ambitious and effective Marine Sanctuary Program, thus, include staffing and funding problems, ambiguous physical features, and uncertainties regarding permitted human uses.

The national sample was questioned regarding support for various Marine Mammal Protection Act goals and objectives. Strong support existed for all the objectives listed (Figures 76 - 80). The most endorsed goals included preventing marine mammal extinction, protecting important feeding and breeding habitat, and minimizing harm and suffering to marine mammals. Slightly less, but still strongly supported, goals included maintaining and restoring abundant marine mammal populations and minimizing conflicts between marine mammals and commercial activities, such as commercial fishing operations and oil and gas development.

The MMPA established an independent Marine Mammal Commission given primarily scientific and policy oversight responsibilities but no actual management authority (duties mainly vested with the National Marine Fisheries Service of the Department of Commerce and the Fish and Wildlife Service of the Department of Interior). Respondents were questioned about the value of retaining the Marine Mammal Commission. Nearly two-thirds supported, with only 14% disagreeing, that the country needs a small independent agency like the MMC having only scientific and advisory responsibilities (Figure 81). Conversely, only 14% supported the elimination of the Marine Mammal Commission as a waste and duplication of government activities and responsibilities (Figure 82).

Only one-quarter of the national sample believed international trade was too important, economically and politically, to restrict because other nations were in violation of our MMPA (Figure 83). On the other hand, some four-fifths of the American public supported penalties being imposed on countries in violation of domestic as well as international marine mammal protection laws and agreements (Figures 84 - 86). More than 90% also favored restrictions on fishing activity of other nations in American waters in violation of marine mammal protection laws and agreements. Approximately four-fifths of the respondents further endorsed limiting American exports to violating nations. Finally, 80% and more of the national sample supported the idea of America limiting the imports of even important economic and political allies like Japan and Norway if they harvested whales and other marine mammals in violation of American or international laws and agreements (Figures 86 and 87).

Several questions focused on marine sanctuaries described as areas of the ocean intended to conserve

unusual plants, animals, or important environmental and cultural features. Three-fifths and more of the respondents favored restricting six activities within marine sanctuaries that adversely effected abundant marine mammal populations, including oil and gas development, recreational boating and fishing, cruise ships, whale watching, snorkeling, and diving activities (Figures 88 - 93). Respondents were divided, however, regarding establishing marine sanctuaries in areas important for commercial fishing (Figure 94). Finally, some four-fifths of the national sample supported marine sanctuaries having budgets and staffs comparable to those of terrestrial national parks, even if this necessitated additional government funding (Figure 95).

The next chapter provides additional perspective on American views of marine mammal conservation and management, focusing on variations among key demographic and activity groups.

CHAPTER THREE VARIATIONS IN THE AMERICAN POPULATION

This chapter examines the views of diverse groups in American society toward marine mammals and their conservation and management. Comparisons are made among Alaskans and non-Alaskans, and the national sample distinguished by age, education, gender, and population of the town or city of present residence. Additional comparisons include Americans distinguished by knowledge of marine mammals, membership in an environmental organization, visits to zoos and aquariums, and participation in whale watching and recreational fishing. Only significant differences or particularly important results are highlighted to expedite the presentation and avoid undue repetition.

Scale results are also presented. Four scales were developed on the following subjects:

- Support for harvesting abundant whale populations or species
- Support for harvesting abundant marine mammals other than whales
- Support for commercial fisheries and other economic development activities despite possibly harmful impacts on marine mammals
- Support for protecting marine mammals from presumably inhumane treatment and suffering

The scales are based on clusters of questions derived from factor analysis results that yielded 6 to 12 questions per scale, with each scale being statistically independent from the other. Responses to particular questions were assigned a score, depending on the frequency distribution of answers, all question scores summed for a particular scale, and a mean scale score generated for each individual standardized on a 0 to 1 scoring range.

I. Alaskans and non-Alaskans

As indicated, a special sampling of fifty Alaska residents was conducted. This over-sampling occurred for several reasons. First, Alaska has an unusual abundance of marine mammals, both in absolute numbers and diversity of species. Second, Alaska's economy is highly dependent on natural resource exploitation, including commercial fisheries, oil and gas extraction, ecotourism, and commercial and subsistence hunting and trapping. Third, Alaska's population includes an unusually large number of indigenous people, as well as a relatively high percentage of persons who hunt, fish, and maintain subsistence lifestyles. Finally, the MNTA largely preempted state authority to manage marine mammals, replacing it with a federally dominated system. Although provisions of the MMPA specify the possibility of returning management authority to individual states, this option has been rarely exercised, and tense state-federal relations have been an occasional element of MMPA programs and activities in Alaska. All these factors underscore the importance of Alaska in marine mammal conservation and management.

Background statistics reveal no significant difference among Alaskans and non-Alaskans in perceived knowledge of marine mammals, although 14% of Alaskans compared to 8% of non-Alaskans said they possessed a great deal of knowledge of marine mammals. Greater contact with marine life among Alaskans is suggested by 76% of Alaskans versus 47% of non-Alaskans having fished at least one or more times during the past five years (50% of Alaskans compared with 25% of non-Alaskans fished five or more times). 44% of Alaskans versus 15% of non-Alaskans also reported having whale watched at least once during this time period.

Alaskans were no more likely than other Americans to support the reduction of abundant seal and sea lion populations to protect commercially valuable fish species or increase commercial fish stocks (Figures 96 and 97, Tables 1 and 2). Alaskans were, however, less inclined than other Americans to endorse limits on commercial fishing activity to augment fish stocks, although two-thirds of Alaskans supported this idea (Figure 98 and Table 3). Alaskans were also less willing to restrict commercial fishing operations to protect the Steller sea lion, although again a majority of Alaskans supported this limitation (Figure 99 and Table 4).

Alaskans were similar to others in the national sample in favoring methods of fishing that resulted in fewer injuries and deaths to marine mammals despite the possibility of higher fish prices (Figures 100 and 101, Tables 5 and 6). Alaskans were more likely, however, to accept shooting as a control methodology and to oppose relocating fishing operations as a way of reducing marine mammal-commercial fisheries conflicts (Figures 102 and 103, Tables 7 and 8). Most Alaskans, like other Americans, strongly objected to using poisons to mitigate this conflict, over 60% preferring relocation of marine mammals, although Alaskans were quite divided about the use of nets or other physical barriers as a control methodology (Figures 104 - 106, Table 9 - 11). Fewer, but still a majority, of Alaskans compared to non-Alaskans supported penalties being imposed on commercial fishermen who unintentionally harmed marine mammals (Table 12). More ambivalent views were expressed by Alaskans toward requiring that fishermen use more expensive equipment to protect abundant seals from being injured and killed (Figure 107, Table 13).

A greater inclination to support the harvest of various marine mammal species (assuming populations were abundant and well managed) occurred among Alaskans compared to non-Alaskans, although opinions among Alaskans were quite divided (Figures 108 - 111, Tables 14 - 17). Alaskans were less likely than other Americans to object to commercial whaling, or oppose whaling for moral and ethical reasons, although views among Alaskans were still quite split (Figures 112 - 114, Tables 18 - 20). Alaskans consistently expressed greater support for native peoples hunting whales for traditional purposes, particularly for food and clothing, as well as employing modern weaponry (Figures 115 - 119, Tables 21 - 25). A large majority of Alaskans, nonetheless, objected to native peoples, as well as other nations, harvesting marine mammals (especially whales) for commercial sale of jewelry, food, decorative, or industrial products (Figures 120 - 123, Tables 26 - 29). Moreover, 62% of Alaskans, like non-Alaskans, objected to native peoples hunting endangered marine mammals like the bowhead whale, even though this hunt was a part of traditional native culture (Figure 124, Table 30). Only a minority of Alaskans supported a harvest of recovered gray whales by native peoples who once hunted this animal (Figure 125, Table 31). Significantly more Alaskans than non-Alaskans, although still a small minority, endorsed the hunting of abundant polar bear and/or walrus populations (Figure 126, Table 32).

Like other Americans, a majority of Alaskans (although typically to a lesser extent) supported restrictions on oil and gas development that harmed marine mammals (Figures 127 - 129, Tables 33 - 35). Alaskans also supported protecting marine mammals over various marine development and recreation activities like commercial shipping and whale watching (Figures 130 and 131, Tables 36 and 37). Alaskans like non-Alaskans endorsed the imposing of penalties on other nations who violated American or international marine mammal protection laws and agreements (Figures 132 - 136, Tables 38 - 42). Finally, most Alaskans like others in the national sample expressed strong support for having a Marine Mammal Commission, as well as overwhelmingly endorsed various goals of the Marine Mammal Protection Act (Figures 137 - 143, Tables 43 - 49).

Other Demographic Findings

Several demographic analyses were conducted, including comparisons among Americans distinguished by age, education, place of residence, and gender. The review of these results will be brief, mainly highlighting significant differences, and relying on scale results more than individual question findings to emphasize important variations.

II. Age

Elderly respondents generally revealed a more utilitarian attitude toward utilizing and exploiting marine mammals and their habitats. Americans greater than 65 years of age expressed significantly more support for commercial fishing interests over marine mammal conservation, especially if protecting marine mammals resulted in higher fish prices. Elderly respondents were also more inclined to support the harvest of abundant marine mammal species, and to endorse various ocean and coastal development activities, even if this harmed marine mammals. By contrast, younger respondents were more inclined to support the humane treatment of marine mammals. These findings are illustrated by the scale and question results of Tables 50 - 57.

III. Education

Americans with less than a high school education generally expressed greater support for various marine resource activities, especially commercial fishing, despite the possibly adverse effects on marine mammals. Less educated respondents were also more inclined to endorse the utilization of abundant marine mammal stocks. Differences among respondents with a high school and college education, however, were often insignificant. Moreover, relatively few variations occurred among education groups regarding the humane treatment of marine mammals. Educational group findings are revealed in Tables 58 - 65.

IV. Place of Residence

The national sample was further distinguished by the population of the towns and cities where the respondents resided. Few significant differences in attitudes toward marine mammal conservation and management occurred among Americans distinguished by urban, suburban, small town, and rural residence. These inconsequential variations are illustrated by the scale results of Tables 66 - 69.

V. Gender

Few significant variations occurred among male and female respondents. Female respondents did, however, occasionally reveal a greater willingness than males to endorse the humane treatment of marine mammals, especially whales. Females also voiced greater opposition than males to harvesting abundant marine mammals and concern for marine mammals in zoos, aquariums, and other display facilities. By contrast, males were less opposed than females to various ocean development activities that adversely affected marine mammals, although most males favored marine mammal conservation over various socioeconomic activities that injured or harmed these animals. Gender variations are illustrated by the findings of Tables 70 - 81.

Variations among Knowledge and Activity Groups

The national sample was further distinguished by knowledge of marine mammals, visits to zoos and aquariums, whale watching, fishing, and membership in an environmental organization.

VI. Knowledge of Marine Mammals

The respondents reporting knowing nothing, a little, a moderate amount, or a great deal about marine mammals (the distribution of responses across these categories is indicated in Figure 144). Americans who reported the least knowledge of marine mammals were generally more inclined to support ocean development, particularly commercial fishing, despite adverse effects on marine mammal populations. Additionally, respondents who indicated knowing nothing about marine mammals expressed greater support for harvesting abundant marine mammals, particularly whales, and objected less often to whale watching and captive display activities that harmed marine mammals. Differences were often statistically insignificant among persons who reported a little, a moderate amount, or a great deal of knowledge about marine mammals. These variations are illustrated in Tables 82 - 99.

VII. Visits to Zoos and Aquariums

Respondents were compared based on visiting zoos and/or aquariums none, 1-2, and 3 or more times during the past five years. Negligible differences occurred among these groups in views of marine mammals and their management. Respondents who more frequently visited zoos and aquariums indicated greater opposition to captive display in facilities that did not maintain these animals properly (Table I 00).

VIII. Whale watching

Americans were distinguished by having never, 1-2, or 3 or more times whale watched during the past five years. Limited differences were found among these groups. Frequent whale watchers generally expressed greater support for protecting marine mammals that competed with various human economic, social, and recreational activities.

IX. Fishing

The national sample was distinguished by those who never, 1-2, or 3 or more times recreationally fished during the past five years (the distribution of respondents across these categories is indicated in Figure 145). Moderate differences occurred among the national sample distinguished by fishing participation. Active fishers were generally more inclined to endorse the harvest of abundant marine mammals, as well as express support for commercial fishing interests over the protection of marine mammals. These differences are illustrated by the findings of Tables 101 - 104.

X. Membership in an Environmental Organization

Finally, Americans were divided among those who were a member of none, 1-2, or 3 or more environmental organizations (the distribution of responses across these categories is indicated in Figure 146). Respondents belonging to no environmental organization were more likely to support the utilization of abundant marine mammals, as well as favor commercial, particularly fishing, interests over marine mammal protection and conservation. Additionally, non-members were less concerned about the humane treatment of marine mammals. These patterns are revealed in Tables 105 - 119.

CHAPTER FOUR: CONCLUSIONS

The final chapter offers a brief summary of the major findings of a study of American perceptions of marine mammals and their conservation. As previously indicated, this study represents the first comprehensive overview of how Americans view marine mammals, including such issues as various consumptive and non-consumptive uses of marine mammals, conflicts between marine mammals and diverse socioeconomic activities, and regulatory approaches to marine mammal management.

Restricted funds limited the sample size and data collection procedures employed in this study. Additionally, many issues and topics were considered, necessitating the limited coverage of any one topic. Additional research will be required before entirely confident conclusions can be drawn. Despite these qualifications, this study provides an initial indication of American views toward marine mammals and their management based on a scientifically developed and systematically administered survey of a randomly selected national sample.

Consumptive Uses of Marine Mammals

Widespread opposition was expressed among most Americans toward commercial whaling, often for ethical reasons. This finding is consistent with the results of other studies, although some research has suggested support for the harvest of abundant whale species for restricted practical purposes, assuming an effective regulatory approach. Opposition to commercial whaling in the current study occurred among all demographic and activity groups, although the degree of objection at times varied significantly. Alaskans, the elderly, those who were less educated, those who were less knowledgeable, those who fished, and those who were not members of an environmental organization were generally less opposed to harvesting whales, although a majority of these groups still objected to the commercial exploitation of

this animal. Opposition to the commercial utilization of other marine mammals was also revealed, including seals, sea otters, walruses, and polar bears.

Views toward the traditional harvest of marine mammals by native Americans were often variable, although a majority of Americans generally supported this use if it were subsistence-oriented. On the other hand, most of the public objected to the commercial harvest of marine mammals, particularly whales, by native peoples, as well as hunting endangered whale species or resuming the harvest of the recovered gray whale after more than a half century. A majority of Americans also opposed native peoples' use of modern weaponry to harvest marine mammals. Alaskans were generally more inclined to support the indigenous exploitation of marine mammals, although a majority still objected to commercially harvesting marine mammals or the hunting of endangered species.

Commercial fishing-marine mammal conflicts

Most Americans supported the protection of marine mammals over commercial fishing interests, even if it resulted in higher consumer prices. This view was shared by all groups, although support for protecting marine mammals over commercial fishing operations was less evident among Alaskans, the elderly, those who were less educated, those who were less knowledgeable, and those who fished. The most preferred strategies for mitigating conflicts between marine mammals and commercial fishing were non-lethal rather than lethal approaches, including relocation of marine mammals and/or commercial fishing operations.

Nonconsumptive uses of marine mammals

A majority of Americans objected to captive display of marine mammals in zoos and aquariums unless the animals were well cared for and demonstrated educational and scientific benefits resulted. Most Americans also favored controls on whale watching to ensure the safety and conservation of whales. All groups shared these views, although they tended to be less evident among the elderly, those who were less educated and those who were least knowledgeable of marine mammals.

Social and economic development conflicts

Most Americans supported limiting various economic development activities in the ocean that harmed marine mammals. These activities included commercial shipping, disposing of wastes, chemical pollution, coastal development, and oil and gas extraction and transport. More ambivalent views were expressed toward ocean mineral development that adversely affected marine mammals. These views occurred among all Americans, although less manifest among the elderly, those who were less educated, those who were less knowledgeable, and those who did not belong to an environmental organization. Alaskans generally objected less than non-Alaskans to oil and gas development, although a majority of Alaskans opposed this activity if it injured or killed marine mammals.

Government programs and international relations

Most Americans expressed strong support for various goals of the US. Marine Mammal Protection Act, as well as for maintaining the scientific and policy oversight responsibilities of the Marine Mammal Commission. Strong support was also expressed for imposing trade penalties or denying access to resources in American waters of nations (even ones with strong political and economic ties to the United States) who violated American or international marine mammal protection laws and agreements. Most Americans favored restricting various activities within marine sanctuaries to protect marine mammals and other marine life, and the great majority endorsed increased funding and staffing for marine sanctuaries. These views occurred among all groups, although less so among the elderly and respondents with limited education.

Conclusion

The results of this study largely revealed strong support for marine mammal protection among the great majority of Americans. Marine mammals, especially whales, and to a somewhat lesser extent seals and sea lions, enjoyed strong public interest and concern for their welfare and conservation. Most Americans indicate a willingness to render significant sacrifices to sustain and enhance marine mammal populations and species. Despite concern for various commercially important ocean activities, including commercial

fishing and oil and gas extraction, these interests did not supercede the public's inclination to protect marine mammals. Most Americans consistently indicated a desire to modify or alter these and other human activities in the marine environment to protect marine mammal populations and species, even if it necessitated sacrifice on society's part. Americans further affirmed the importance of maintaining the Marine Mammal Protection Act and the Marine Mammal Commission to ensure the domestic and international well-being of marine mammals. These findings clearly indicate that marine mammals possess considerable aesthetic, scientific, and moral support among the great majority of Americans today.

This report will examine American views of all marine mammals and their management, although mostly focusing on, for reasons of greater significance and familiarity, the cetaceans and pinnipeds. Marine mammals are among the most privileged yet beleaguered of creatures in America today. CHAPTER TWO: American Views of Marine Mammals Chapters two and three review the results of the study of American perceptions of marine mammals, their management, and conservation. The current chapter focuses on the entire American public; the next chapter emphasizes variations among groups in the US population distinguished by area of residence, demography, and certain activities. 4 Marine mammals are animals that live in a marine or aquatic environment and are characterized by four major common elements. 150 Steven R. Kellert, *American Perceptions of Marine Mammals and Their Management* (1999). 151 See Eurostat Report, *Sustainable Development in the European Union: A Statistical Glance from the Viewpoint of the UN Sustainable Development Goals* 117 (2016). 152 TFEU, *supra* note 83, at art. MARINE MAMMAL MANAGEMENT PLAN numbers of dolphins including *Sousa chinensis* during a one-off aerial survey in the Pilbara. According to Jefferson (2000), this species usually occurs close to the coast, generally in depths of less than 20 m. They have been reported from both clear and turbid water environments, and in a variety of coastal habitats, from coastal lagoons and enclosed bays with mangrove stands and seagrass beds through to open coastal waters with coral reefs (Corkeron et al. 2000). 2000 analysis of the abundance and distribution of other marine mammals; and. 2000 correlation of marine mammal distribution and modelled sub tidal habitat, to determine if sub-tidal habitat is present to support conservation significant species. Kellert's (1999) study of American perceptions of marine mammals and their management shows clearly that most people support the various goals of the United States Marine Mammal Protection Act. Most are willing to render significant sacrifices to sustain and enhance marine mammal populations and species. These findings clearly indicate that marine mammals possess considerable aesthetic, scientific, and moral support among the great majority of Americans today. (Kellert 1999, p iv) As a scientist, I am often criticized for being anti-science. This is not so.