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SEA OTTERS AND SHELLFISH FISHERIES IN CALIFORNIA: THE MANAGEMENT FRAMEWORK

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INTRODUCTION

Other papers in this volume have analyzed conflicts in underlying values and divergent economic and social perspectives on the sea otter/shellfish fisheries issue. As we have seen, significant differences exist in the philosophical perspectives of different groups and in the interests which each of them pursues. Existing management arrangements for the marine environment, however, afford little opportunity for potential reconciliation of such divergent interests.

Throughout history, government has traditionally played the role of arbiter among contending groups and interests and has, in fact, been the "judge" of "who gets what, when and how."[1] Among primitive traditional societies, for example, formal government institutions first arose as societal interests became more complex and disputes developed. An arbiter or judge (government) became necessary to arbitrate and decide among competing claims. In the marine area, however, such an

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I would like to acknowledge the assistance of a number of highly knowledgeable individuals, both in and out of government, who were kind enough to share their insights on sea otter management with me during a series of personal interviews conducted between September and December 1980. Thanks are also due to my Sea Grant Trainee, Phyllis Grifman, for her research assistance. The interpretations offered in this paper, however, are solely my own.

[1] This is the traditional definition of politics.

"arbiter" or overall manager that would be able to govern the use of marine resources and to arbitrate the resolution of disputes such as the sea otter/shellfish fisheries controversy--does not exist.

While the living marine resources that are the subject of this paper (e.g., sea otters, shellfish, kelp, finfish) are highly interactive parts of an overall ecosystem (and as such should be considered in a systemic perspective), the regulations that govern their use and protection emanate from a variety of different agencies at different levels of government and are based on different sources of law. The management framework that governs the marine resources at stake is thus highly complex.

This complexity is partially rooted in our federalism traditions, whereby we have always preferred to delegate responsibilities to different levels of government than to concentrate authority in any one center. In the marine area, federalism factors are especially prominent as the states retain control over many marine activities in the territorial sea (between 0 to 3 miles offshore, in most cases),[2] while the federal government has primary control over resources beyond the territorial sea. Complexity is also partially due to the fact that a large number of far-reaching pieces of federal legislation separately regulating distinct aspects of the marine environment were passed by the United States Congress in the past decade. Prominent examples include the Coastal Zone Management Act of 1972 (CZMA), the Marine Mammal Protection Act of 1972 (MMPA), the Endangered Species Act of 1973 (ESA), the Fishery Conservation and Management Act of 1976 (FCMA), and the Outer Continental Shelf Lands Act Amendments of 1978 (OCSLA) (U. S. Dept. of Commerce, 1979). Each of these Acts is the product of a very different combination of political forces--some emphasizing conservation factors (such as the MMPA and the ESA), some emphasizing use and development factors (such as the FCMA). Each of these Acts, too, is administered by different agencies or bureaus--each responsive to a different legislative mandate or mission and, ultimately, to a different management philosophy. Some of these Acts, moreover, pioneered novel concepts of management which have been difficult to interpret and to put into effect; prominent examples are the concepts of "optimum yield" in the Fishery Conservation and Management Act and "optimum sustainable population" in the Marine Mammal Protection Act. In view of these factors, the full implementation of this congressional body of marine law in the 1980s may at times prove problematic. As different agencies pursue their legitimately mandated goals and actions, these may come into conflict with the legitimately mandated goals and actions of other agencies. Administrative and scientific interpretations of novel management concepts may not always coincide.

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[2] Texas and Florida are exceptions to this general rule.

The purpose of this paper is twofold. The first (and most extensive) part of the paper describes, in some detail, the existing management framework related to marine mammals, with particular emphasis on the history of management of the sea otter in California. The management framework which governs the use of related marine resources, i.e., shellfish fisheries and hydrocarbon exploitation, is discussed also, although only in very cursory terms. Second, alternative management options are described. Hypothetical management options available in marine mammal/fisheries interactions are reviewed first. Next, the management options which have been most frequently discussed in the sea otter/shellfish fisheries case are presented. Finally, a general framework for evaluating management alternatives is posited.

It should be pointed out at the outset that this paper is not aimed at evaluating alternative management options. Instead, its purpose is to synthesize past and current discussions and preferences on management as well as to offer a general framework for evaluation. The task of making specific judgements about specific management alternatives remains for the policy makers and for other parts of this forum.

PART I: THE MANAGEMENT FRAMEWORK

Managing Marine Mammals: The Sea Otter

Prior to 1972, the states had primary authority over the regulation of marine mammals. This section summarizes sea otter management under state authority until 1972.

Sea Otter Management Prior to 1972

(See Table 1 for summary of management chronology).

As has been discussed in other papers in this volume, sea otters were generally considered to be extinct in California in 1900; however, a remnant group was known to exist (primarily to local residents) near Point Sur at least as early as 1913. California state law began protecting sea otters in 1913,[3] and in 1938, through the opening of Highway 1, the existence of the remnant population consisting of 100 to 150 animals became public knowledge. In 1941, the state established the California Sea Otter Game Refuge prohibiting the possession of firearms in state lands west of Highway 1 within boundaries which were enlarged in 1957 to the Carmel River in the north to Santa Rosa Creek, San Luis Obispo County, in the south. From the time of rediscovery to 1972, the

[3] Through the Fully Protected Mammal Statute enacted in 1913 which prohibits the taking or possession of fully protected mammals.

Table 1

SEA OTTER MANAGEMENT: 1911-1972

1911	International Fur Seal Treaty (United States, Russia, Great Britain, Japan). Prohibited taking fur seals and sea otters on high seas. Terminated 1941.
1913	California state law prohibiting possession of sea otters or skins in California. (Only a few people were aware of the presence of small numbers of sea otters in California [e.g., Pt. Sur lighthouse keeper, DFG wardens]. Not until Highway 1 opened in 1937-38, did the public become aware of the sea otter population at Bixby Creek on the Big Sur coast.)
1941	California Sea Otter Game Refuge instituted, from Malpaso Creek to Swiss Canyon Arroyo (two miles south of Point Sur) and from Castro Canyon to Dolan Creek. Firearm possession prohibited in this area.
1944	Fur Seal Act of 1944. Prohibits take of otters on high seas.
1957	California Sea Otter Game Refuge extended to include all land west of Highway 1 to the ocean from the Carmel River on the north to Santa Rosa Creek in Cambria on the south. No firearm possession.
1965	California Senate Fact Finding Committee, "Effect of sea otters on abalone population is relatively insignificant."
1967	California Senate Concurrent Resolution 74, "Determine feasibility of maintaining both sea otter and abalone populations."
1968	DFG, Report on the Sea Otter, Abalone and Kelp Resources in San Luis Obispo and Monterey Counties and Proposals for Reducing the Conflict Between the Commercial Abalone Fishery and the Sea Otter.
1968	DFG Sea Otter Research Project started. Capturing, tagging, and translocation studies.
1972	Marine Mammal Protection Act passed. Above-mentioned studies ceased as jurisdiction transferred to the United States Department of Interior--United States Fish and Wildlife Service.

otter remained under state control until this responsibility was pre-empted by the federal government through the Marine Mammal Protection Act of 1972. During this time, the otter population grew to approximately 1,700 and its range expanded from Seaside in the north to Cayucos in the south. (See Figure 1.)

Soon after the sea otter began to expand its range, conflicts with the shellfish fisheries developed. Odemar and Wilson report that as early as 1939, researchers were predicting the detrimental effects that the re-establishment of the sea otter population would have on human exploitation of shellfish resources, and that in the 1950s, fishermen began to complain that the sea otter was decimating abalone beds (Odemar and Wilson, 1974, p. 2). There exist few written records of the positions (and of the intensity of such positions) which different groups held in the 1950s. In the 1960s, on the other hand, a highly emotional public debate ensued between abalone fishermen who claimed that their shellfish resources were being depleted by the sea otter, and conservation groups who maintained that man, through such actions as overharvesting and polluting, was responsible for the demise of shellfish stocks--not the sea otter. During the first half of the 1960s, the California Department of Fish and Game (DFG), in fact, publicly adhered to the view of the conservation groups (although some of the department's staff biologists may have disagreed with this position). In 1963 testimony to the California Senate Fact Finding Committee on Natural Resources, the Deputy Director of the California Department of Fish and Game concluded that "...sea otters have been present off the coast of San Luis Obispo County for the past five years. Based on the best scientific information and records which we have, the sea otter, even though feeding on abalone, has not seriously depleted the abalone resource."[4]

Similarly, a 1965 California Senate Fact Finding Committee set up to examine the controversy concluded that, "Information supplied to the Committee on the sea otter's dietary habits...indicates that the effect of the sea otter on the abalone population is relatively insignificant." Therefore, in view of the "precarious position of the State's present sea otter population, the present program of complete protection should be continued indefinitely" (California State Senate, 1965, p. 1).

In the late 1960s, as new studies on the food habits of the sea otter were being conducted (Ebert, 1968), and as the sea otters neared the stretch of coast between Cambria and Point Estero (a highly productive shellfish area accounting for over 40% of the state's harvest of red

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[4]This testimony went on to point out that the shellfish depletion could be due to human factors such as the increased competition among commercial fishermen (figures cited showed that the number of licensed abalone fishermen grew from 11 individuals in 1938 to 505 in 1963) (Calif. Dept. of Fish and Game, 1963, pp. 1-6).

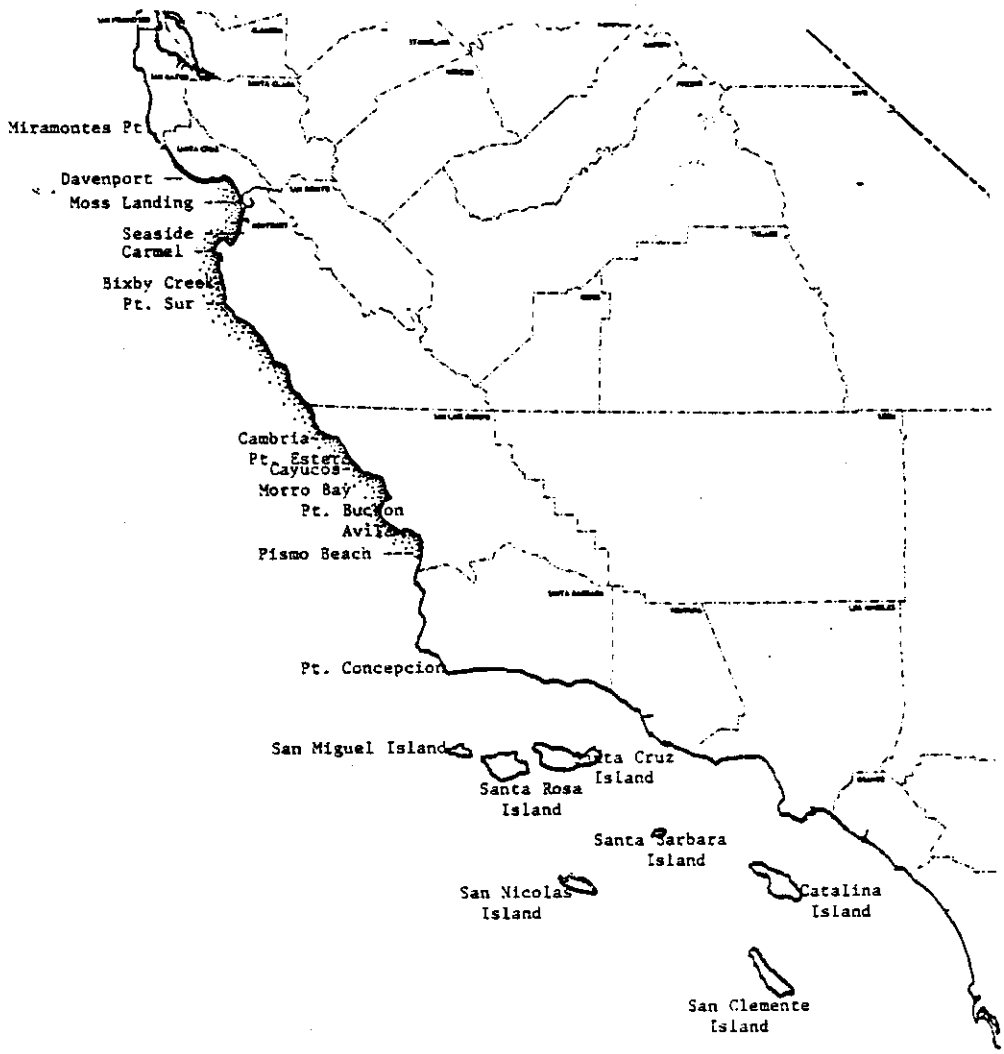

Figure 1

MAP OF CALIFORNIA SHOWING RANGE OF THE SEA OTTER

abalones), the public controversy intensified. In response, during the 1967 legislative session, the California State Senate passed Concurrent Resolution 74 requesting the Department of Fish and Game to determine the "feasibility and possible means of confining sea otters within the protection of the existing refuge or other means that would maintain the abalone and sea otter populations and would lessen the possibilities of resource conflict" (Bissell and Hubbard, 1968). DFG presented its report to the legislature in January 1968 making the following findings and recommendations: (1) presence of sea otters in significant numbers is not compatible with a commercial abalone fishery; (2) resolution of the sea otter/shellfish fisheries conflict should provide for maintenance of both resources (sea otters and abalone); (3) the state should initiate a number of short range and longer range studies to gather information necessary for confident, safe management of the sea otter and to provide a measure of relief to the commercial abalone industry; and (4) funding for these studies should partially come from federal sources (in particular, the federal Bartlett Bill, which called for the state to provide 50% of the necessary funds). The report ended by recommending that the state portion of these costs be borne by the commercial abalone fishery through increases in license fees and other levies.

From 1968 to the present, the state has consistently maintained a position which attempts to strike some balance between protection of the sea otter and preservation of human utilization of the shellfish fisheries through some form of "zonal" management.[5] Following the 1968 report, the state initiated the Sea Otter Research Project. For the next five years, DFG conducted a series of studies on sea otter biology--e.g., capturing, tagging, and translocating studies, mortality studies, habitat surveys, and food habits studies. As part of this research effort, a limited translocation experiment was carried out, removing otters from the Cambria-Point Estero area to provide some relief to the abalone fishery. This effort failed due to the return of some of the translocated otters and the continued natural influx of additional otters into the area. As the sea otter population continued to extend its range south, the commercial abalone fishery north of Morro Bay completely collapsed (Wild and Ames, 1974). While the intent of the Sea Otter Research Project had been to establish a base of knowledge necessary to formulate a management program, this effort was preempted in 1972 by the passage of the federal Marine Mammal Protection Act. Trapping and tagging operations in progress were terminated on December 21, 1972--the effective date of the MMPA.

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[5] This concept is discussed below in the section on management options.

Sea Otter Management After 1972

The Marine Mammal Protection Act was passed by Congress in 1972 largely as a response to the inability of international bodies (such as the International Whaling Commission) to reduce the alarming worldwide depletion of marine mammals due to overharvesting. The Act was supported by a broad coalition of conservation and environmental groups, humane groups, scientists, and state and federal agencies. It was opposed by fishermen concerned with the interference of some marine mammals with fishing operations (as in the tuna/porpoise case). This opposition, however, did not play a central role in the hearings prior to the passage of the Act. Review of the legislative hearings suggests that a broad coalition of conservation interests had achieved the momentum necessary to enact a protective Act; there are very few mentions in the hearings of potential conflicts between marine mammals and fisheries which might arise under a protective regime for marine mammals (U. S. House of Representatives, 1971; U. S. Senate, 1972).

On the contrary, the hearings underscored the numerous hazards to which marine mammals were being exposed--e.g., degradation of the ocean environment (through ocean dumping, pesticides, heavy metal contamination, etc.); man's increasing take of the fish stocks upon which the mammals depend; hazards due to vessel traffic and human operations. The combination of these hazards and the inadequacy of present knowledge of marine mammals in general, led the Congress to the belief that conservative action regarding these animals was required to prevent activities which might prove harmful or irreversible. As one Congressman commented, "As far as could be done, we have endeavored to build such a conservative bias into the legislation." (U. S. House of Representatives, 1971).

At its core, then, the MMPA is a protective Act. Protection was to be attained through a moratorium on the take[6] of marine mammals (i.e., a "complete cessation of the taking of marine mammals and a complete ban on the importation into the United States of marine mammals and marine mammal products"), a long term research effort to better understand marine mammals and their environment, and a set of prohibitions and penalties for violation of the Act's provisions. A number of exceptions to

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[6]The term "take" means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal (Sec. 3[13]).

the moratorium are allowed.[7] The "taking" of marine mammals under these exceptions must take into account the following considerations (sec. 103 [b]): (1) existing and future levels of marine mammal species and population stocks; (2) existing international treaty and agreement obligations of the United States; (3) the marine ecosystem and related environmental considerations; (4) the conservation, development, and utilization of fishery resources; and (5) the economic and technological feasibility of implementation.

Beyond this immediate (and tangible) protection, there is also a strong concern in the Act with the enhancement of marine mammals and the ecosystems of which they are a part. The Act, in fact, pioneers an ecosystemic view of the marine environment by declaring that

> ...marine mammals have proven themselves to be resources of great international significance, esthetic and recreational as well as economic, and it is the sense of the Congress that they should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management and that the primary objective of their management should be to maintain the health and stability of the marine ecosystem. Whenever consistent with this primary objective, it should be the goal to obtain an optimum sustainable population keeping in mind the optimum carrying capacity of the habitat (sec. 2[6]).

This language marks a departure from the species-by-species harvest orientation that had been dominant in marine mammal management. "Optimum sustainable population" (OSP) replaces "maximum sustainable yield " as a

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[7] The Act sets forth a number of exceptions to the moratorium: (a) the Secretary can issue permits for scientific research and public display after consultation with the Marine Mammal Commission and the Committee of Scientific Advisors. No permits are allowed during moratorium for depleted or endangered species except for scientific research permits; (b) the Secretary can issue permits for taking mammals incidental to commercial fishing operations after two years (no permit is required during the first two years but fishing operations must be conducted in accordance with regulations on gear and techniques designed to produce least practicable harm to mammals, with the goal of zero mortality); (c) the Secretary can, in consultation with the Marine Mammal Commission and consistent with the policy of the Act, waive the moratorium and issue permits to allow commercial taking and importation; (d) in case of economic hardship, the Secretary can allow the taking or importing until October 21, 1973; (e) for certain purposes, such as subsistence, arts and crafts, taking by certain Aleuts, Indians, and Eskimos is allowed; (f) the Pribilof Islands fur seal program is exempt from the moratorium and the permit system but the program must be studied for possible future modification. Certain of these exceptions can be granted only after appropriate public hearings.

management objective,[8] and an holistic approach to the ecosystem is stressed.

In terms of administration, the Act was to be administered by two federal departments. The Department of Commerce (through the National Marine Fisheries Service in the National Oceanic and Atmospheric Administration) was given authority over cetaceans (whales, dolphins, and porpoises), seals and sea lions, and the Department of Interior (through the United States Fish and Wildlife Service) was given authority over sea otters, polar bears, walruses, and manatees.[9]

In addition, the Act established a Marine Mammal Commission (MMC) and a Committee of Scientific Advisors to oversee and conduct research studies and to oversee the coordination of management activities (secs. 202 to 207). The Commission is an advisory body, with no authority for rulemaking or endorsement. Its major duties include: (1) review and study of existing domestic and international laws concerning marine mammals; (2) continuing monitoring of the condition of marine mammals, research programs, methods of management, etc.; (3) conducting studies it deems necessary in conjunction with conservation and protection; and (4) making policy recommendations to the various agencies charged with research, regulation and enforcement related to marine mammals.

The Act also provided for management authority to be returned to the states. Under section 109[2] of the Act, upon state petition, if the Secretary (of Interior or Commerce, whichever is applicable) determines that state laws and regulations are consistent with the Act, management authority may be returned to the state.

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[8]The implementation of these innovative concepts, however, has been problematic. The definitions of "optimum sustainable population" (OSP) and "optimum carrying capacity" (OCC) in the Act are tautological; optimum carrying capacity is used to define OSP and OSP is used in defining carrying capacity. In addition, scientific data to properly define these concepts in reference to specific marine mammals and their environments are largely inadequate. A "working definition" of OSP prepared by the National Marine Fisheries Service has been the object of significant scientific debate (Marine Mammal Commission, n.d.; Grifman, 1980).

[9]This split in jurisdiction followed already existing assignments of responsibilities. The Committee was not entirely satisfied with the jurisdictional split but retained the status quo in the hope and expectation of a forthcoming Department of Natural Resources (DNR), which would merge the two programs (U. S. House of Representatives, 1971, p. 179). (Although such a DNR was proposed under the Carter Administration, it has not been established.)

Following the enactment of the MMPA, the period of 1972 to 1980 for sea otter management witnessed a number of conflicts and debates, e.g., a prolonged effort of sorting out federal and state responsibilities and of defining who would have management authority; heightened interest group participation in this debate; and a series of controversies over specific scientific questions. This period also saw the establishment of a number of high quality baseline studies on the sea otter and its habitat.

Soon after the enactment of the MMPA, the California Department of Fish and Game began to prepare an application for a waiver of the moratorium and a return of management authority to the state. This was an effort which went through several iterations and reviews, and which was ultimately to fail. The state's request was consistently opposed by a number of conservation groups, most notably the Friends of the Sea Otter (a non-profit conservation group with over 4,000 members which had worked to promote the protection and enhancement of the sea otter and its habitat for over a decade). The position of this highly influential group has consistently been that the sea otter population should continue to expand naturally throughout its former range. As self-appointed spokespersons for the animal, the Friends are to be credited for their systematic, relentless, well prepared, and ever vigilant attention to management matters related to their preferred critter. Their input into management decisions during the 1972-80 period has been cogent, well researched and presented, timely, and, by and large, successful. The participation of other groups in the management debates of this period has been much more ad hoc and sporadic. While commercial fishermen made their voices heard at specific meetings and vented their emotions in the privacy of their boats and of their communities, this reaction seldom reached the public record in a systematic fashion.[10] Also, among those most affected, the abalone fishermen, were busy during this period with problems specific to their industry, i.e., establishing a program of limited entry for the fishery. The participation of sports groups was also sporadic, with groups becoming active and mobilized only as their immediate beaches were being affected.

In addition, the period from 1972 to present was punctuated by a number of scientific debates. These centered on the taxonomic status of the animal, the likelihood of potential environmental threats to the population, and the role of the sea otter in structuring the nearshore community. While these scientific debates are highly complex and require some scientific understanding, their essence can be briefly summarized here.

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[10] One exception to this general rule is the presentation of industry viewpoints presented at a meeting convened by California State Senator Donald L. Grunsky on the Sea Otter-Abalone Controversy, at the Moss Landing Marine Laboratory, November 24, 1969.

The debate over taxonomy has centered on the question of whether or not the California population of sea otters constitutes a separate subspecies from the Alaska population. Different views of this question have characterized the scientific literature (Roest, 1976, pp. 267-70; Davis and Lidicker, 1975, pp. 429-37) and have been pursued in the political arena. Conservation groups (such as the Friends of the Sea Otter) have advocated the position that the southern sea otter constitutes a separate subspecies (Enhydra lutris nereis) while others, such as the California Department of Fish and Game, have contended that subspecific separation of California sea otters from Alaskan sea otters is not scientifically justifiable (Miller 1980, pp. 79-81).

Although both the Marine Mammal Protection Act and the Endangered Species Act allow for protection of geographically isolated subpopulations of a species (such as the southern sea otter), the taxonomic debate has important (and yet unresolved) implications for management, particularly for the determination of "optimum sustainable population" under the Marine Mammal Protection Act. While it is clear that the southern population of sea otters is reproductively isolated from the northern population, it is not clear whether these populations were distinct before commercial exploitation occurred. If it could be proven that there are in fact no genetic differences between the populations, the estimate of population size for determining OSP would potentially be different than if distinct gene pools were definitely shown. If no genetic differences were found, the possibility of augmenting the southern sea otter with animals from Alaska arises; similarly, this could be a potentially viable means of ensuring the survival of the California population in the event of a large-scale oil spill. On the other hand, the absence of conclusive evidence of synonymity of southern and northern populations would preclude making OSP determinations based on both stocks.

The likelihood of large oil spills off the California coast and the damage they are likely to cause to the otter population have also been the subject of debate. Conservation groups have maintained that a large-scale oil spill off the California coast is inevitable for a variety of reasons, e.g., the hazardous location of the breeding population of the sea otter which is flanked by two major oil terminals (at Moss Landing in the north and at Estero Bay in the south), the increased oil traffic and oil drift from adjacent areas, and the proposed offshore oil exploration in areas adjacent to the sea otter's current and near future range. "Oil and otters don't mix," conservation groups contend, pointing to the fact that unlike other mammals, otters lack an insulating layer of blubber and depend entirely on their thick air-filled fur for protection from chill waters. Should the otter's fur become contaminated with oil and matted down, it would lose its insulating properties, resulting in overexposure and death (Davis, 1978). On the other hand, other groups, such as DFG, while acknowledging the potential for an oil spill, have held that it would be extremely unlikely that such an oil spill could

threaten the entire sea otter population. DFG has pointed out that no evidence exists that pollution or oil spills have ever caused the death of a sea otter in California (Calif. Dept. of Fish and Game, 1975). However, a study by Barabash-Nikiforov (1968) reports that over 100 sea otters were killed by a spill of gasoline and oil near the Kurile Island in the U.S.S.R.

The role of the sea otter in structuring the nearshore environment has also been the subject of speculation. While the detrimental effects of sea otter foraging on the human use of shellfish fisheries have been accepted by nearly all, potential long range benefits accruing to kelp forests through the re-establishment of sea otters have been suggested by several studies, mostly carried out in Alaska and the Aleutian Islands. Comparison of two chains of western Aleutian Islands showed the importance of the sea otter in determining littoral and sublittoral community structure. The presence of sea otters was associated with the removal of herbivorous invertebrate populations such as sea urchins, which in turn contributed to the growth of luxuriant kelp forests and of a large number of associated living resources. The authors conclude that the sea otter represents a "keystone species" which significantly determines the structure and dynamic relations of the nearshore environment, and its re-establishment along the Pacific coast of North America will have profound ecological effects (Estes and Palmisano, 1974).[11] Conservation groups have used such scientific findings to point to the potential beneficial long range consequences of sea otter foraging.

All of these issues came to a head in a 1977 decision by the Department of Interior to place the sea otter on the "threatened species" list, largely because of the potential threat of an oil spill, thus providing another layer of federal protection (the Endangered Species Act) on behalf of the animal. While the Federal Register notice explaining the "threatened" listing referred to the taxonomic status debate, it found that this question was not relevant to the determination of placing the animal under the "threatened" or "endangered" list, since "...Sections 3 and 4 of the Act [the Endangered Species Act] allow the listing of populations of species in portions of their range, as well as entire species and subspecies. Since the southern sea otter does form a significant population, it can be treated independently under the Act, regardless of its taxonomic status".[12]

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[11] Some California Department of Fish and Game scientists, however, question the applicability of the Alaska-based findings to California coastal waters (Ebert, 1981).

[12] Determination that the southern sea otter is a Threatened Species, Federal Register, Vol. 42, No. 10, January 14, 1977, p. 2965. This Federal Register notice utilized the subspecific designation, Enhydra lutris nereis, in the rulemaking, although this decision had no connection with the decision to list as threatened.

Subsequently, the DFG withdrew its petition for a waiver of the moratorium and, instead, obtained, after several rounds of negotiation, a research permit to conduct a number of tagging and translocation studies. Since 1977, the DFG has thus been involved in sea otter research studies, while the United States Fish and Wildlife Service has been preparing a "recovery plan" which will outline recommendations to promote the recovery of the sea otter population from its present threatened condition under the ESA. Fish and Wildlife has also been concerned with conducting extensive scientific studies on the sea otter and its habitat under the provisions of the MMPA. The Marine Mammal Commission, following its own mandate, has been spurring the concerned parties and agencies along to attain an expeditious resolution of the problem which meets the requirements of the Marine Mammal Protection Act.

Because the management events which have transpired between 1972-80 are too involved to be treated in detail in the body of this paper, they are summarized in Table 2. The following section discusses in more detail current (1980) agency responsibilities and activities.

Current Agency Responsibilities and Activities

As the management chronology in Table 2 suggests, the United States Fish and Wildlife Service (FWS) is the federal agency in charge of administering the provisions of both the MMPA and ESA in reference to the southern sea otter. The FWS carries out management, research, and enforcement activities related to the sea otter at both the Washington, D.C. and area office levels. The role of the DFG is currently solely one of cooperative research and enforcement in conjunction with the Fish and Wildlife Service. The Marine Mammal Commission advises these agencies on both scientific and policy matters.

A schematic diagram of the organization of the FWS is presented in Table 3. Review of this organizational chart suggests that the functions of administering ESA and MMPA mandated management, enforcement, and research activities are diffused throughout the organization. The Office of Endangered Species in Washington D.C. and the Regional Offices carry out functions related to the management of the ESA (e.g., listing and delisting threatened and endangered species and preparation of recovery plans). Relevant research functions under the MMPA are carried out in field stations in California under a line of authority which ultimately responds to an Associate Director for Research in Washington. The MMPA management and enforcement activities are carried out through yet another branch, the Associate Director for Wildlife Resources.

Table 2

CHRONOLOGY OF SEA OTTER MANAGEMENT 1972-1980

October 1972

Marine Mammal Protection Act is passed.

December 1973

Endangered Species Act is passed.

August 1974

DFG presents to FWS the first proposal to return management to the state. This was a brief document (circa seven pages) which called for: (1) restricting the sea otter range from Seaside (Monterey County) to Cayucos, San Luis Obispo County by live trapping and translocation of approximately 150 animals existing outside this range, (2) evaluating potential areas outside of this range where resource conflicts would not be present (Guadalupe Island in Mexico is specifically mentioned as a potential site), (3) exploring opportunities for public display in scientific and educational institutions, (4) conducting a research program.

November 1974

The DFG proposal is rejected by FWS, primarily because of the priority given in the proposal to avoiding fishery conflicts. Other values, FWS argued, need greater consideration--i.e., protection of the animal itself, evaluation of total impacts of the sea otter on the nearshore environment (not just those detrimental to shellfish fisheries), establishment of an invertebrate fishery reserve to include the coastal area having the best abalone and Pismo clam populations whereby sea otters would be removed from this reserve but would be allowed to increase and become established in all other areas; encouragement of mariculture of abalones; translocation of sea otters to other selected sites; study of the ecological relationships, particularly with regard to whether sea otters increase the total productivity of the environment.

Explanation of Abbreviations

DFG	California Department of Fish and Game
FWS	United States Fish and Wildlife Service
ESA	Endangered Species Act
MMPA	Marine Mammal Protection Act
MMC	Marine Mammal Commission
OSP	Optimum Sustainable Population

Table 2 (cont.)

CHRONOLOGY OF SEA OTTER MANAGEMENT 1972-1980

February 1975

Position statement by the California Chapters of the Sierra Club opposing the 1974 DFG proposal to return management to the State.[a] Restriction of the sea otter's range is dangerous and premature because tampering with an animal that is making a slow comeback from near extinction and that is still listed in the Redbook of Threatened Wildlife in the United States is inappropriate. Strongly oppose limiting the animal's range in any way, preferring to allow it to expand naturally along the California coastline as it has gradually been doing for the last 64 years. Particularly oppose artificial restriction of their range to the coastal area between Seaside and Cayucos which would make the entire California population extremely vulnerable to catastrophe, i.e., death from the oil spill potential from tanker traffic related to the two oil terminals at the northern and southern edges of the range. Recommend that, to provide a reserve group, a separate colony of otters be established well away from man-induced hazards. Oppose Guadalupe Island as a possible translocation site because of the lack of jurisdiction and surveillance by state or federal agencies. Prefer, instead, San Nicolas Island since it formerly had a significant sea otter colony, presently has a healthy marine mammal population, and is subject to minimal human activity.

May 1975

The Fund for Animals, Inc. requests the FWS to list as endangered species 216 taxa of plants and animals which appeared in Appendix I of the Convention of International Trade in Endangered Species of Wild Fauna and Flora which were not already on the United States List of Endangered and Threatened Wildlife. One of these 216 taxa was the Southern Sea Otter (Enhydra lutris nereis). This proposed rulemaking appears in the Federal Register on September 26, 1975.

November 1975

DFG comments on FWS proposed rulemaking putting the sea otter on the endangered species list. Requests that the southern sea otter (Enhydra lutris nereis) not be declared endangered or threatened as it does not fit any of the five factors used to determine if a species is endangered or threatened. Moreover, believes that the subspecies classification of Enhydra lutris nereis is invalid.

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[a]Letter from the Ventura Chapter of the Sierra Club to the Secretary of the California State Resources Agency, February 5, 1975.

Table 2 (cont.)

CHRONOLOGY OF SEA OTTER MANAGEMENT 1972-1980

January 1976

DFG submits its second request to delegate to the state the authority to conduct management and research under Section 109 (a)(2) of the Act, which requires a waiver of the moratorium to take sea otters as required under Section 101 (3)(A). DFG also announces its intention to submit a scientific research permit under Section 101 (a)(1) of the Act in the near future so that the "research projects contained in the management proposal be initiated as soon as possible." This second request for the return of management consisted of an impressive set of materials; close to 300 pages in text and summaries, and more than 400 pages of appendices. Objectives: (1) to provide adequate number of otters in specific areas, to protect, at the same time, the state's remaining recreational and commercial shellfish fisheries, and to enable possible development of marine aquaculture. Provisions: (1) enforcement of MMPA regulations, (2) restrict otter's mainland range from Miramontes Point in San Mateo County to Avila in San Luis Obispo County, (3) sea otters emigrating out of this range will be: translocated to the northern range limit, or be made available for scientific study or public display, (4) research program on population dynamics, (5) research program on long-term impact of sea otter foraging upon coastal ecosystem.

April 1976

Friends of the Sea Otter critique of DFG plan to FWS.[b] (1) Oppose a waiver of the moratorium and return of management to the state, (2) consider the southern sea otter to be a threatened and endangered subspecies, (3) propose establishment of a formal otter reserve from Miramontes Point to Avila (and the establishment of a second population on San Miguel Island) not for purposes of containment but to give the otters additional protection through the designation of a "State of California Fish and Game Subdistrict" and through increased warden protection, (4) support establishment and long-term monitoring of baseline studies in areas occupied and not occupied by otters (establish shellfish preserves free from human use to carry out baseline studies so that man's effects on the environment may be isolated), (5) support limited study and experiments of otter behavior.

[b] Letter from the Friends of the Sea Otter to the Secretary of Interior, April 1, 1976.

Table 2 (cont.)

CHRONOLOGY OF SEA OTTER MANAGEMENT 1972-1980

May 1976

DFG request to FWS for scientific permit to conduct research while petition for a waiver of the moratorium and a return of management to the state are being considered.

June 1976

Marine Mammal Commission letter to FWS commenting on DFG request for management and on the status of the sea otter. (1) The southern sea otter should be classified as a "threatened" species under the Endangered Species Act (under the ESA, in USC. 1532 [15], "threatened" is defined as any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range).(2) Although the taxonomic status of the sea otter is a matter of scientific controversy, it is irrelevant for a consideration of "threatened" status under the ESA. As an isolated population, the California sea otter fits the definition of "species" of the ESA and of "population stock" of the MMPA; the population is hence appropriately subject to the management regime of both statutes. (3) The population should be classified as "threatened" because of the potential impact of one or more oil spills, which coupled with the potential impact of a coincident severe natural storm or inclement weather could endanger the population in the foreseeable future. (4) The MMC recommends that the sea otter be classified as threatened and that sea otters be reintroduced into two or more locations previously occupied by these animals. Regardless of the threatened designation, however, translocation should be undertaken as it is a necessary and desirable management action to protect the existing population. (5) Implication for designation of "threatened status" for state application to return management: "threatened" status would make the population "depleted" under Sec. 3 (1)(B) of the MMPA. Under Sec. 101 (a)(3)(B) of the MMPA, the Secretary would thus be prohibited from issuing any permits, except for scientific research. A waiver of the moratorium would thus be precluded. California would only be able to apply for a research permit.

January 1977

The FWS designates the southern sea otter (Enhydra lutris nereis) as a threatened species. Summary of comments received prior to determination: out of 291 letters received,

Table 2 (cont.)

CHRONOLOGY OF SEA OTTER MANAGEMENT 1972-1980

289 favored listing as endangered. In addition, many hundreds of persons signed petitions supporting the endangered classification. Only two parties opposed listing, one being the state of California and the other being a university professor whose reasons largely paralleled those of the state. FWS finds that the animal should be designated as threatened, largely on the same grounds as the MMC opinion above, i.e., threat from oil spill potential emanating from the major oil unloading facilities at Moss Landing and at Estero Bay.

August, October 1977

MMC approves DFG research permit, with a number of modifications. In October 1977, DFG begins ESA sponsored studies on sea otter mortality rates and causes, interrelationship between the sea otter and its habitat, size distribution and movements, and sea otter translocation. In terms of translocation, DFG proposes to translocate up to 40 otters from present range and translocate in area north of migrant front. Also, work with FWS to examine Pacific coast for possible sites to establish additional population.

May 1978

Letter of SOME to DFG. (SOME stands for Sea Otter Management Education, a sports oriented group, whose policy is to "protect the California sea otter by working for the establishment of a separate isolated subpopulation of California sea otters outside the state of California, if necessary, while at the same time attempting to get the state of California and the federal government to accept the concept of zonal management of sea otters in California so as to protect valuable recreational and commercial shell-fisheries.") Opposes translocation experiments to the Santa Cruz coast, as proposed by the DFG research plan, because of the damage that would be incurred to the shellfish fisheries in the area. Maintains that such experimental translocation is premature because no permanent translocation sites have yet been selected. Proposes British Columbia as a potential translocation site.

August 1979

DFG changes translocation proposal away from actual translocation to simulated experiments (i.e., putting the animals in holding pens), in an effort to separate the effects of the handling and transportation methods from those imposed by releasing animals in unfamiliar surroundings.

Table 2 (cont.)

CHRONOLOGY OF SEA OTTER MANAGEMENT 1972-1980

August 1979

Sea Otter Workshop held at Santa Barbara Museum of Natural History. Summary of management positions expressed by different groups:[c] DFG: (1) favor zonal management, (2) management authority should be returned to the state, (3) oppose "threatened" designation, (4) all potential translocation sites should be explored using two criteria: (a) area must be capable of providing adequate shelter and sufficient food, (b) there must be minimal conflict between sea otters and existing or potential shellfish fisheries. FRIENDS OF THE SEA OTTER: (1) population should be allowed to expand naturally, oppose zonal management; (2) must establish two or more reserve breeding colonies away from oil spill potential; (3) favor San Nicolas Island as the best choice for a primary translocation; (4) oppose long distance translocations to Canada or other areas north of the contiguous United States; (5) ESA protection should be continued at least until two reserve breeding colonies have been established, MMPA protection should continue until OSP levels have been reached throughout former range; (6) support federal agent and state warden protection. SOME (SEA OTTER MANAGEMENT EDUCATION): (1) favor zonal management; (2) oppose threatened designation; (3) oppose San Nicolas as a translocation site; (4) oppose subspecies argument; (5) favor exploring possible translocation sites outside of California and possibly outside of the United States. Specifically favors Canada. CALIFORNIA ABALONE ASSOCIATION: (1) favors the translocation of sea otters to sanctuaries; (2) Port San Luis to the Davenport Pier should be designated as a sea otter sanctuary; (3) favor the translocation of sea otters to other states; (4) supports the return of management to the state; (5) oppose San Nicolas as a translocation site as they would soon disperse to all the other Channel Islands and to the mainland. IUCN (INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE): (1) restrictions of sea otter population (either in numbers or distribution) at this time to preserve local shellfish fisheries are premature and not in the best interest of this isolated and precariously situated population; (2) support threatened status; (3) favors establishing new colonies away from oil spill potential.

[c]Minutes of meeting taken by Dr. Maynard Silva, University of California, Santa Barbara.

Table 2 (cont.)

CHRONOLOGY OF SEA OTTER MANAGEMENT 1972-1980

December 1979

Meeting convened by the Marine Mammal Commission to review the process, including administrative considerations and responsibilities, by which the California sea otter issue(s) may be resolved and to establish a steering committee composed of representatives of the appropriate government agencies to coordinate and facilitate this process. Participants: FWS, MMC, DFG and its Sea Otter Scientific Advisory Committee. Principal contact personnel were to be designated by each agency.

June 1980

First draft of FWS recovery plan for the southern sea otter available for technical review only. Second technical draft due in December 1980.

July 1980

Second meeting of the inter-agency committee established by the Marine Mammal Commission. The Manager of the Area Office of the Fish and Wildlife Service in Sacramento was designated as sea otter spokesperson for FWS. Recovery plan process and timetable discussed. Extensive revisions of first draft suggested, e.g., more information on the risk and consequences of oil spills, consideration of options for minimizing the risk and possible consequences of oil spills, discussion of taxonomy question and implications of this debate for management options, more extensive consideration of alternative translocation sites. In reference to the latter, it was agreed to develop criteria to judge the biological/ecological suitability of possible transplant sites, compile and evaluate relevant biological/ecological information to identify and rank possible transplant sites in California, Washington, Oregon, British Columbia and Mexico, compile relevant socioeconomic information that should be factored into decisions concerning the suitability of potential transplant sites in the aforementioned areas, and to incorporate this information in the second technical review draft of the recovery plan.

November 1980

Newly formed shellfish fisheries group, Save Our Shellfish Committee, announces in an interview in Marine Mammal News that it is considering filing a petition with FWS to remove the sea otter from its current threatened status under the ESA.

Table 2 (cont.)

CHRONOLOGY OF SEA OTTER MANAGEMENT 1972-1980

December 1980

Letter of MMC to FWS expressing concern that the progress made to date on California sea otter problem has been too slow. Recommends that the FWS adopt the following approach: (1) Recognize the ultimate need for "zonal management" whereby the sea otter would be restored to additional sites within its former range although not to each and every area it once inhabited. (2) Recognize that zonal management will require establishing sea otter zones where the animals may be secure from human and oil threats and recover to optimum levels, and designating otter free areas because of unsuitable habitat, or because otters didn't previously inhabit such areas, because of hazards in translocation, or because of substantial conflicts with fisheries. (3) Realize that zonal management will necessitate development of new methodologies. (4) Realize that it is necessary to move expeditiously to establish a new sea otter site away from oil spill potential. (5) To select an appropriate translocation site and to accomplish the first translocation within 18 months.

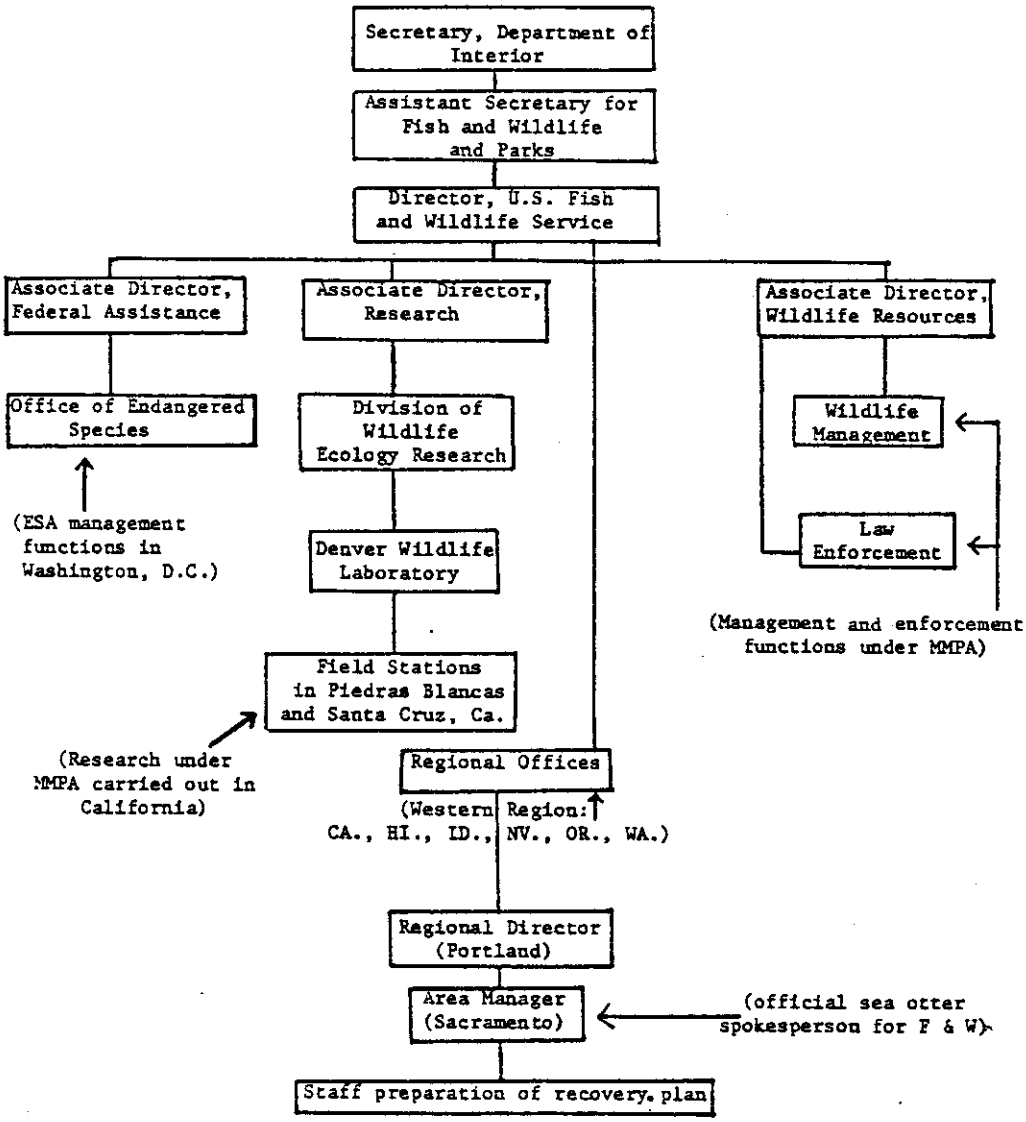
1972-1980

Major comparative research studies on the sea otter and its habitat are being carried out by the Denver Wildlife Laboratory of the FWS under MMPA funding at the FWS field station at Piedras Blancas Point and at San Nicolas Island. The comparative kelp ecosystem studies of these two areas (one currently occupied by otters, the other not occupied by otters), will help isolate the effects of sea otter foraging on nearshore marine communities. Moreover, the baseline study of San Nicolas Island (begun in 1980) may be useful in documenting changes which may occur in the marine ecosystem in the event of recolonization of San Nicolas by the sea otter.

Source: Data reported in this table relies on public documents transmitted during the months reported. Whenever other sources are used (e.g., letters from private groups) these are cited specifically as table footnotes.

Table 3

ORGANIZATION OF FISH AND WILDLIFE SERVICE WITH RESPECT TO SEA OTTER RELATED FUNCTIONS.[a]



[a]This is a simplified organizational chart pertaining only to sea otter related functions. Based on 1979 data and on communication with FWS personnel. Some titles may be out of date.

The diffusion of responsibilities throughout the organization and the lack of a central focus of authority on sea otter issues has baffled local groups not used to dealing with the intricacies of federal government bureaucratic organization and has confounded their efforts to request information and to provide public input into agency decisions. That this feeling may have been shared by other groups and agencies is suggested by the December 1979 request by the Marine Mammal Commission (see chronology) to have Fish and Wildlife designate a specific office or individual as a spokesperson on sea otter related matters. As noted in the chronology, the Area Manager in Sacramento has been designated as the official FWS spokesperson on this issue.

Under his supervision, a "recovery plan" to "restore the sea otter to non-threatened status and eventually to re-establish and maintain optimum sustainable populations in natural habitats throughout their historical range in the United States Pacific Coastal waters" was being prepared as of the time of this writing (December 1980). The major aspects of the first draft of the recovery plan (submitted for initial technical review in June 1980) were as follows: (1) research on biology and ecology of sea otters; (2) development of a sea otter monitoring program whereby declines in numbers and mortality causes may be ascertained expeditiously; (3) development of a habitat protection plan throughout the sea otter's former range (e.g., protecting existing and potential habitat against man-caused degradation that would preclude use of the habitat by sea otters); (4) translocation to other locations within their historical range--only sites within the United States should be considered to insure the continued protection of the animals under the ESA and MMPA; (5) development of a law enforcement plan to protect otters from illegal take and from harassment; (6) development of a contingency plan to capture, clean and move sea otters in case of an oil spill. Implementation of such a plan was proposed as a joint effort between FWS and DFG with funding from Fish and Wildlife (Benz and Kubetich, 1980). A second draft of this plan was to become available for technical review in December 1980, an "agency" review was expected to follow several months later, and adoption of a final plan by the FWS Director was expected by the end of 1981.[13] The recovery plan review process was thus confined to technical experts and other government agencies.

While a major goal of the endangered species program is to return a listed species to the point where it is no longer endangered or threatened through implementation of a recovery plan, it appears that in general, to date, the recovery plan process has been guided by few formal

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[13] These developments are discussed in the Epilogue section of this volume.

guidelines,[14] and that the agency has had limited experience with the actual preparation of recovery plans. As reported in a 1979 General Accounting Office study, for over 700 species on the threatened or endangered list, only 22 recovery plans have been approved (U. S. Office of the Comptroller General, pp. 68-77; U. S. House of Representatives, 1980, p. 6). The effectiveness of these plans in restoring the affected species to non-threatened status has also been limited. Since 1973, only one species has been deleted and six others have gone from endangered to threatened status (U. S. House of Representatives, 1980, p. 8).

It is also unclear whether any opportunities for public participation in agency decision making may be potentially available at some stage of the recovery plan process. Under the ESA, the major opportunity for citizen input is available during the listing and delisting process. Any interested person may petition the Secretary to list or delist an endangered or threatened species. The Secretary must review the status of the species that is the subject of the petition if the petitioner presents substantial evidence warranting the review (U. S. House of Representatives, 1980, p. 10). Once a species has been listed and a recovery plan process commenced, there appear to be no formal opportunities for public comment.[15] However, were a specific recovery plan to contain provisions for federal actions which may significantly affect specific groups or communities, it is possible that such actions could be subject to other federal provisions, such as the National Environmental Policy Act or Executive Order 12044 (regulatory analysis) which do allow for some form of public input. In the case of sea otter management, these are questions which are unclear at this point and are best left for consideration by the attorneys.

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[14] Sec. 1533(8) of Chapter 35 of the United States Code on the recovery plan process only calls for the Secretary to develop and implement a recovery plan, allowing for the procurement of services of appropriate public and private agencies and institutions and other qualified persons. No specific procedures are set forth, with the exception that recovery teams set up under the subsection will not be subject to the Federal Advisory Committee Act.

[15] According to the GAO study, the FWS has instructed recovery teams to address only biological considerations and to leave political, socioeconomic, and media relations concerns to the responsible FWS regional director and other federal and state agencies. GAO criticized the FWS on this question, i.e., "Recovery teams had developed and FWS had approved, recovery plans that were not readily attainable because they conflicted with the views, interest and responsibilities of participating individuals and agencies, or coordinating agencies did not have the funds to implement them" (U. S. Office of the Comptroller General, 1979, p. 75).

Management of Related Uses of the Marine Environment

While the discussion above has focused on the history of issues specifically related to sea otter management, this effort would be incomplete without at least cursory reference to the intricate framework of state-federal relations which governs the use of other, and highly related aspects of the marine environment--e.g., shellfish fisheries, and hydrocarbon exploitation. Responsibilities for managing these resources which may significantly impinge upon and affect the management of marine mammals, is also highly complex and involves a variety of government agencies at different levels of government. As mentioned in the introduction to this paper, however, existing management arrangements of the marine environment afford few opportunities for considering the interrelationships among these uses.

Agencies responsible for managing related uses of the marine environment are abstracted in Table 4. Management of fisheries from 0 to 3 miles offshore is largely the responsibility of the state government, while the management of fishery resources in the 3 to 200 mile zone is currently under federal jurisdiction through a new system of regional council government established under the Fishery Conservation and Management Act of 1976. While the state has formal authority and responsibility for managing fisheries in the 0 to 3 mile zone, state personnel, at times, have claimed that their responsibilities for properly managing shellfish fisheries have been preempted in certain areas by the total federal protection of marine mammals, specifically the sea otter.

The exploitation of offshore oil and gas resources is under the jurisdiction of the federal government through the 1953 Outer Continental Shelf (OCS) Lands Act. This Act charged the Secretary of the Interior with the responsibility for administering the mineral exploration and development of the outer continental shelf. Under the Department of Interior, the Bureau of Land Management (BLM) is designated as the administrative agency for leasing submerged federal lands, and the U.S. Geological Survey (USGS) for supervising production. In the 0 to 3 mile zone, under the Submerged Lands Act of 1953, responsibility for management of hydrocarbon operations rests with the state, i.e., with the Energy Resources, Conservation, and Development Commission (the State Lands Commission and the Division of Oil and Gas).

Current developments in offshore oil and gas leasing off the coast of California dramatically demonstrate the interconnection between marine mammal management and hydrocarbon exploitation. In October 1980, the Department of Interior deleted 127 tracts from Lease Sale #53 off the California coast (north of the Santa Barbara Channel to the Oregon border) following extensive protests by environmental interests and state agencies (Anon., 1980a, p. 4). At the time of this writing (December 1980), the Department of Interior was considering a petition to delete a number of tracts in the Santa Maria Basin because of the potential jeopardy to the threatened sea otter (Anon., 1980b, p. 4). Both

Table 4

MANAGEMENT OF SEA OTTERS AND RELATED USES OF THE MARINE ENVIRONMENT

Agencies concerned with sea otter management	Agencies concerned with shellfish fisheries management	Agencies concerned with hydrocarbon operations	Other Relevant Agencies
FEDERAL: Department of Interior - U.S. Fish and Wildlife Service national level: - Federal Assistance, Office of Endangered Species (ESA management) - Research, Denver Wildlife Laboratory (MMPA research) - Wildlife Resources (MMPA management and enforcement) regional level: - Regional Director - Portland - Area Manager - Sacramento (official sea otter spokes-person) - Marine Mammal Commission (MMPA research and management) (advisory) STATE: California Department of Fish and Game - Marine Resources Branch (research permit under MMPA, funding ESA) - Marine Resources Region (enforcement)	Primarily California Department of Fish and Game - Authority over 0-3 miles National Marine Fisheries Service - jurisdiction between 3-200 miles	FEDERAL: Department of Interior - Bureau of Land Management (leasing) - U.S. Geological Survey (supervise production) STATE: - Energy Resources, Conservation, and Development Commission - State Lands Commission - Division of Oil and Gas	FEDERAL: - Department of Interior -National Park Service (Channel Islands National Park) - Department of Commerce - National Oceanic and Atmospheric Administration - Office of Coastal Zone Management (Marine Sanctuary around Channel Islands) STATE: - California State Coastal Commission

the California Department of Fish and Game and the California Coastal Commission have joined environmental groups in requesting the deletion of the so-called "sea otter tracts." Environmental groups interested in the sea otter have also expressed concern at BLM's recent call for nominations for a proposed May 1983 sale (OCS #73) which encompasses an area stretching as far as 200 miles seaward from the three-mile state boundary, from the Oregon border on the north to the Mexican border on the south (Fulton, 1980).[16]

A number of other state and federal agencies may also become relevant actors in considerations of sea otter management, particularly as potential translocation sites are considered. The State Coastal Commission is of relevance primarily through the "consistency" provision of Section 307 of the Coastal Zone Management Act of 1972 whereby federal actions affecting the coastal zone must be consistent with approved state coastal zone management plans (Breeden, 1976). The National Park Service and the National Oceanic and Atmospheric Administration may also become relevant organizational actors as specific sites in the Channel Islands are considered for sea otter translocation. Through the newly created Channel Islands National Park, the National Park Service has jurisdiction primarily over land-based resources on Anacapa, Santa Cruz, Santa Rosa, and Santa Barbara Islands.[17] Through a newly created marine sanctuary, the National Oceanic and Atmospheric Administration has jurisdiction over six nautical miles seaward from the mean high water mark around the same islands. It is likely that management of fisheries in that area will be conducted under a cooperative agreement between the California Department of Fish and Game, the National Park Service and the National Oceanic and Atmospheric Administration.

Some Observations on the Management History

Our review of the long and complex history of sea otter management suggests a number of observations on the management process. First, this has clearly been a long-standing controversy; similar issues have been debated for at least the past 25 years. This debate, while intense, however, has largely been confined to a specialized (and attentive) public. The general public has seldom been involved (or interested).

Remarkably, positions on management have changed little over this long time span, with the exception of the Department of Fish and Game which at first did not fully appreciate the impact of sea otter foraging on the human exploitation of shellfish fisheries. Although details

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[16] Further developments on offshore oil are treated in the Epilogue section of this volume.

[17] The Park's boundaries extend one nautical mile out around each island. The state of California retains ownership of these submerged lands, and has management responsibilities for fisheries in the area in cooperation with the National Park Service.

have changed over time, the basic positions of other groups (e.g., conservation groups protecting the animal and commercial fishing interests) have remained essentially unchanged.

The controversy has been punctuated by a number of scientific debates--many of which still persist. Some of these may be essentially unanswerable, while others may necessitate much further work before definitive answers may be found. The first debate over the food habits of the sea otter (the extent to which they actually ingest shellfish which are also sought after by man), was a bitter one and one which seems to have subsided only recently. The role of human action in depleting shellfish resources, however, is still very much in question, being brought up not only in historical terms vis-a-vis such fisheries as abalone, but in more contemporary perspective with reference to the current expansion of the sea urchin fishery (Davis, 1980). The debate over taxonomy (whether the southern sea otter constitutes a separate subspecies or not) may never be settled decisively; some argue that convincing evidence on taxonomic synonymity can only be obtained through long-term studies of the genetic and morphological attributes of both Alaskan and Californian populations. It is possible, too, that the different opinions on the likelihood of threat from oil pollution and other environmental hazards may hinge more on different judgements on probabilities and on different levels of willingness to accept "risks" to the population in the face of uncertainty than on deeply grounded scientific facts--as this area of research (oil pollution sources) is notoriously underdeveloped. Definitive answers to the question of the extent to which the sea otter is a "keystone" species which significantly structures (and enhances) the nearshore environment will have to await the results of time-consuming and well-prepared scientific studies which involve some experimental manipulation, e.g., establishment of baselines, control groups, and the like.

Finally, the sea otter/shellfish fisheries issue has directly involved agencies and groups at the international, national, regional, and local levels. Each of these groups and agencies has been properly pursuing its legitimately mandated legislative mission or its group interest. To mention only the most prominent examples, at the state level, the Department of Fish and Game has been pursuing a management policy which attempts to strike a balance between protection of sea otters and human utilization of shellfish fisheries. This management stance fully conforms to DFG's obligations under Section 1700 of Chapter 7 of the Fish and Game Code which calls for both the conservation and utilization of California's living marine resources. The United States Fish and Wildlife Service, on the other hand, has been pursuing a management policy of complete protection for sea otters--properly following its protection mandates under the Marine Mammal Protection Act and the Endangered Species Act. The Marine Mammal Commission, as required in its own mandate, has been prodding different institutional actors along in reaching a suitable management solution.

As was mentioned in the introduction to the paper, however, as different agencies pursue their legitimately mandated goals and actions,

these may conflict with the legitimately mandated goals and actions of other agencies. This problem is clearly evident in this case. The state's mandate to conserve and utilize fisheries as well as recent federal legislation which promotes the development and utilization of fishery resources (e.g., the Fishery Conservation and Management Act and, more recently, the American Fisheries Promotion Act) can conflict with the federal protection of marine mammals under the Marine Mammal Protection Act. The problem with this management framework, however, is not simply that it is too complex or that different Acts may conflict. Perhaps the greater problem is that avenues for reconciling potential conflicts between different sources of marine legislation are not, at present, readily available.

We turn now to a discussion of the current management options.

PART II: MANAGEMENT OPTIONS

Theoretically, a wide array of alternatives may be available for managing marine mammals, ranging from total preservation to total eradication. The following range of possible options is adapted from a recent workshop on marine mammal/fisheries interactions (Mate, 1977):

1. Total preservation (allow natural expansion)
2. Containment or zonal management
3. Translocation
4. Collection for scientific research or public display
5. Hunting
   (a) by professional hunters
   (b) subsistence hunting
   (c) sports hunting
   (d) eradication

Reviewing the management positions which different groups have expressed over time (refer to Table 2), we find that the most commonly discussed alternatives with regard to the sea otter have been options one through four: total preservation, zonal management, translocation, and collection for scientific research or public display. Hunting, to my knowledge, has never been proposed as an option in a public document.

Looking more closely at the management preferences held by different groups or agencies at different points in time, we find that most of the approaches to management can be narrowed down to two major alternatives: (1) total preservation (unlimited natural range expansion) and (2) zonal management. The other options, translocation and collection for scientific and public display purposes, can be subsumed under these two major alternatives. It is interesting to note that some form of translocation appears to receive wide acceptance as a management method, but for different reasons. While protectionists view translocation as a method of ensuring the survival of the population (away from oil spill potential), others view it as a method of removing the problem from their doorsteps.

The two major alternatives and the values that they represent thus appear to be as follows:

1. Unlimited natural range expansion

This view maintains that it would be most beneficial for the sea otter and for the marine ecosystems in which it plays a significant role for the California otter to continue to distribute itself along the California and Baja California coasts and offshore islands, and to the north as well wherever its natural movements may take it (Friends of the Sea Otter, 1979). Implicit in this view is, first, a historical perspective which antedates the fur trade (i.e., the argument that "the sea otter was there first"); second, the belief that the sea otter is an endangered population living on "borrowed time" because of the oil threat potential; third, the notion that although sea otter foraging does have detrimental short-range effects in reducing shellfish fisheries, that twentieth century man himself has played an even more active role in decimating these fisheries; fourth, the belief that the long-term benefits of the sea otter in enhancing the nearshore environment (e.g., through regrowth of kelp and attendant living communities), will outweigh any short-range losses.

Translocation under this option is viewed as a necessary method for insuring the continued survival of the animal through the establishment of reserve breeding colonies away from the oil spill potential. Translocation, however, is also viewed with some caution as it may be hazardous to otters, and incomplete scientific information exists on such questions as the appropriate number and mix of animals that are needed to ensure successful translocations. California sites, such as San Nicolas Island, are preferred for translocation. Long distance translocation to Canada or to other areas north of the contiguous United States are opposed, because the otters would no longer be protected under the Marine Mammal Protection Act and the Endangered Species Act.

2. Zonal management

This option attempts to strike a balance between protection of the sea otters and use of shellfish fisheries by humans by setting aside certain areas for otters and others for use by recreational and commercial fisheries. Implicit in this view is, first, a twentieth century perspective on the California marine ecosystem, i.e., although perhaps they grew abnormally because of the absence of sea otters, shellfish fisheries did become available as economic and recreational opportunities for a growing California population in the twentieth century; second, the belief that the sea otter is not an endangered animal; third, the notion that in view of many competing demands on coastal and ocean resources, that a balance can be reached among different uses (a balance between marine mammal protection and commercial and recreational use of shellfish fisheries in this case).

While zonal management has been a long-standing option, methods for containing otters within a "zone" are not well established and would need further research. The major methods that have been discussed in the past have been: using natural barriers (rocky habitats and sandy stretches of beach) as zone boundaries, capturing otters straying away from these zones and making them available for scientific research and public display in oceanariums and the like, and capturing and translocating otters to other locations on the Pacific Coast. Some, however, doubt that such methods will prove feasible and maintain that the only practical means of implementing zonal management is by shooting (Estes, 1980, p. 13).

Translocation, then, is a management method that forms part of both of the major management alternatives that have been proposed. While there is agreement that second populations need to be established, there are intense differences of opinion as to where. As the chronology in Table 2 indicates, at different times the following sites have been proposed: Alaska, Canada, Washington, Oregon, the northern coast of California, San Nicolas Island and other Channel Islands, and southern California. Space limitations in this paper preclude summarizing the pro and con arguments that have been made about each of these sites. Perhaps most importantly, attention must be paid to the process by which suitable sites may be selected--both in terms of the criteria that should be used in making selections and the procedures that should be followed in making such selections (Marine Mammal Commission, 1980). The technological feasibility of translocation also needs to be assessed, as some current studies have expressed pessimism about its potential effectiveness as a management tool. Out of five attempted sea otter translocations in recent years, only one was clearly successful and at least three were almost certainly unsuccessful (Estes, 1980, p. 13). Translocation may also prove to be very costly as capturing, handling, and transporting sea otters involves a highly complex and time consuming process.

Most basically, explicit criteria must be designed by which management alternatives can be evaluated. A possible evaluative framework is abstracted in Table 5. The major considerations (or evaluative criteria) which, in my view, should be taken into account in judging different management alternatives include biological protection, socioeconomic impact, technological feasibility, administrative feasibility, enforcement feasibility, and administrative costs (Cicin-Sain, 1980). These considerations are either rooted in the objectives and requirements of the Marine Mammal Protection Act, or are, as in the case of administrative feasibility, for example, mostly called for pragmatic reasons (e.g., keeping down the costs of government).

The biological preservation criterion (i.e., insuring the current and long-term well-being of a particular species and of its ecosystem) is a primary objective of the Marine Mammal Protection Act. Section 2[6] of the Act states that, "marine mammals have proven themselves to

Table 5

EVALUATIVE CRITERIA FOR JUDGING MANAGEMENT OPTIONS

MANAGEMENT OPTIONS	EVALUATIVE CRITERIA					
	Biological Protection	Socioeconomic Impact	Technological Feasibility	Administrative Feasibility	Enforcement Feasibility	Administrative Costs
Option 1						
Option 2						
Option 3						
Option 4						

be resources of great international significance, esthetic and recreational as well as economic, and it is the sense of the Congress that they should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management and that the primary objective of their management should be to maintain the health and stability of the marine ecosystem." According to the MMPA, then, biological preservation is the major reason for management.

The socioeconomic impact criterion considers the nature and extent of the effects that decisions about marine mammal management may have on specific human groups or communities. This is a criterion for evaluation which could well stand on its own merit. One is always interested in how people are affected by government action and in questions of social equity--what is the overall cost and benefit to society accruing to specific government actions? This criterion is also partially rooted in the MMPA--with specific reference to fishery resources. Under Section 103(b) which prescribes regulations for the taking of marine mammals, the Secretary shall give full consideration to a variety of factors, including "the conservation, development, and utilization of fishery resources."

The technological feasibility criterion raises practical considerations as to whether a particular management alternative is workable given existing levels of scientific knowledge and technical capabilities. Taking translocation as an example, one might question the extent to which sufficient scientific knowledge is available on such variables as the appropriate number and mix of animals that would be necessary to carry out a successful translocation. This criterion is also rooted in the MMPA; Section 103 (b) [5] prescribes that the Secretary shall take into account "the economic and technological feasibility of implementation" in making regulations about the taking of marine mammals.

Administrative feasibility refers to very practical considerations of how a particular management alternative may be carried out. Given the highly complex intergovernmental system that characterizes this management area, what are the best organizational means for implementing a particular management option? What organizational adjustments may be necessary (e.g., adjustment of tasks, responsibilities, communication channels, hierarchical relationships)? What interagency and intergovernmental arrangements are most workable? Through what means can consultation with affected groups, individuals, or agencies best be accomplished?

Enforcement feasibility may, in fact, be considered as an aspect of administrative feasibility. Ascertaining the likelihood of effective enforcement of proposed regulations is a highly pragmatic consideration which needs to be taken into account. Adoption of regulations which may ultimately prove unenforceable (because of political opposition, logistical difficulties, or lack of adequate deployment of funds and personnel) may thwart the intent of any management regime and render it ineffective.

Minimizing the costs of management should be of concern in any consideration of management alternatives. As we discussed earlier, because of the technical difficulties involved in capturing, handling, and transporting otters, management methods such as translocation may prove to be very expensive. Different management alternatives should thus be systematically compared in terms of their cost-effectiveness. In addition, equity considerations as to who should properly bear the administrative costs of running and enforcing a regulatory system (currently being shouldered by the taxpayers) should be raised.

In summary, policy makers need to take into account a variety of biological, social, economic, technological, administrative, and enforcement feasibility considerations in evaluating alternative options for managing sea otters and shellfish fisheries in California. These considerations served as the framework for discussions on management options during the workshop sessions of the conference (see Workshop Questions). A summary of the substance of these discussions may be found in the Plenary Session, elsewhere in this volume.

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