

Transactions of the 52nd North American
Wildlife and Natural Resources Conference,
Quebec City, 1987.

From Whaling to Whalewatching¹

Whitney C. Tilt

*National Audubon Society
Washington, D.C.*

This paper examines the phenomenon of whalewatching, a multimillion dollar a year growth industry that treads a fine line: on one end lies a quality opportunity for the public to view endangered species and be exposed in general to the marine environment; on the other end lies the harassment of and adverse impact on an endangered species. However, in evaluating potential impacts to whales, managers must recognize that few affordable means exist for the average citizen to gain a firsthand appreciation of our rare and threatened wildlife—be they terrestrial or marine.

Whaling

The history of whaling is well-documented. The various species of right whales—slow, fat-laden and bouyant and, therefore the “right” whales to hunt—were pursued throughout the Atlantic, Pacific and Arctic oceans to commercial extinction. Sperm whales and gray whales fared little better. Regardless of American society’s view of modern whaling, many may look back on the days of sailing ships, wooden longboats and daring men with a certain amount of admiration for the resourcefulness and courage of the Yankee whaler. In addition to man’s romantic yearning to “go down to the sea in ships,” early whaling could be justified for utilitarian reasons—society’s need for whale oil, whale bone and other products.

What shape whaling would have taken if not for the innovative genius of Norwegian Svend Foyn is difficult to speculate. In 1868, armed with several technical innovations, Foyn set out on a whaling expedition aboard the *Spes et Fides*, and the modern era of whaling was launched. The successful hunting of the larger, faster rorqual whales revolved around the combined use of steam-power catcher boats, deployment of bow guns with grenade harpoons, and development of a “compensator” that controlled the strain on the harpoon line, preventing the struck whale from escaping by breaking free of the tackle (Tonnessen and Johnsen 1982).

No longer were the sleek rorqual whales out of reach. Now the large blue and fine whales could be hunted, and their 70–90 foot (21.3–27.4 m) lengths processed aboard floating factory ships. The organization of the International Whaling Commission (IWC) in 1946 proved ineffective in balancing conservation of whale resources while attempting to perpetuate the whaling industry. In the years following World War II, one after another of the world’s whale stocks approached “commercial” extinction. The distance between this economic indicator of “too much effort” and true extinction is narrow for a long-lived species with low fecundity, such as the whale.

¹This paper is a summary of research conducted on the North American whalewatching industry as part of the author’s Master’s degree at the Yale School of Forestry and Environmental Studies, New Haven, Connecticut.

In the 1970s, a change in human attitudes toward whales began to emerge—slowly at first and then with force. Research by Roger Paine and associates led to the publication of the “Songs of the Humpback Whale,” where whales sang complex and haunting songs (Payne and McVay 1971). Researchers like John Lily (1975) pointed to the size and complexity of the cetacean brain. A series of films on the great whales presented the public with a benign, even friendly animal that seemed. . . “human.” Gone was the utilitarian justification for killing whales, as plastics, synthetic oils and other substitutes became available. Furthermore, the image of whales harpooned with explosive projectives mounted on high prows of diesel-powered catcher boats destroyed any romantic vision of puny man pitted against the leviathan.

As Americans learned more about whales, they protested, lobbied, passed laws and succeeded in elevating the great whales to a level of high public interest and accountability. Pressure built through the 1970s and early 1980s until currently a *de facto* moratorium has been achieved. Whether this moratorium will become absolute or remain in force beyond the next decade remains to be seen.

Whatever the results of the whaling moratorium, one major change has emerged in the United States and many other nations. Instead of focusing on the consumption of the whale for its various parts, humans have begun to seek a more benign appreciation of cetaceans, e.g., a shift from consumptive to non-consumptive use of whales including whalewatching.²

Whalewatching Comes of Age

Though watching whales for pleasure has long been a human pastime, organized whalewatching in the United States appears to have begun in the 1950s on small, isolated scales in Hawaii and California. Whalewatching increased in size and popularity in the 1970s, its growth symbiotic with the momentum of the “Save the Whales” movement. In the 1980s whalewatching has become big business in areas of Alaska, California, Hawaii, and New England. Smaller operations are also found in the Pacific Northwest, Bay of Fundy, Gulf of St. Lawrence and other areas where coastal access and the proximity of whales coincide.

Commensurate with the growth of whalewatching’s popularity has come concern for the protection and conservation of the whales being watched. Unlike many endangered species that are sealed off from the public (intentionally or by nature of their rarity and habitat), the growth of organized whalewatching together with the coastal range of many whale species has made whales very visible and accessible. Such visibility is a mixed blessing, however, and the proper method of managing and conserving whales has become an increasingly difficult task for the agencies charged with such responsibilities.

Unlike the growth of other nature-based activities, whalewatching is the “exploitation” of several whale species listed as threatened and endangered species under the Endangered Species Act (ESA) and protected from all forms of taking including “harassment” under both the ESA and the Marine Mammal Protection

²The use of the term “nonconsumptive use” here is a euphemism, since all forms of so-called nonconsumptive use have the potential to consume—the question, therefore, is not whether a use is consumptive, but what level of consumption is acceptable or tolerable?

Act (MMPA).³ Proponents of whalewatching are quick to point out that whalewatching, when properly conducted, does not harm the whales, while being educational and increasing participants’ commitment to whale conservation. Opponents on the other hand, point out that whalewatching can adversely impact whales, while the industry is incapable of regulating itself. In addition, opponents argue, whalewatching does nothing to benefit whales. Resolution of these allegations is not easily reached.

The following presents an overview of four regions where significant whalewatching industries have developed. As space does not allow an exhaustive account (see Tilt 1985a, 1985b, 1986 for a fuller discussion), this paper seeks to identify those components in each region that serve as “signposts” for the continued health of cetacean populations and regional whalewatch industries. The history of these whalewatching industries, the different behavior and habitat needs of the whales being watched together with a broad host of other factors makes the whalewatch industry an unique business. Each whalewatching region has its own character, ontogeny and, subsequently, management needs.

California and Gray Whales

The western coast of the United States is home to a host of marine mammals and opportunities for marine mammal enthusiasts to see sea otters, sea lions, elephant seals, dolphins and a number of great whales, including blue whales and gray whales. As a result of the annual migration of the gray whale along the entire coastline, the gray whale is extremely visible along the Pacific Coast during its migration. This visibility and ready access to gray whales, coupled with the increased interest in whales, have led to the development of a large and diverse commercial whalewatching industry.

The gray whale, *Eschrichtius robustus*, is a medium-sized baleen whale, 35–50 feet in length, weighing 20–40 tons. The present population is found only in the North Pacific, but there is fossil and historical evidence that gray whales once existed in the Atlantic as well.

Gray whales undertake one of the longest known migrations of any mammal from the rich summer feeding grounds in Chukchi and Bering Seas south along the coast of North America to the sheltered lagoons of Baja California—a journey of some 6,000 miles (Figure 1). Courtship and mating behavior is observed during migration, and it is not unusual for calves to be born enroute.

After six to eight weeks, the whales arrive in Baja California, where the majority are concentrated in four lagoons—Scammon’s Lagoon (Ojo de Liebre) and adjacent Guerrero Negro Lagoon, San Ignacio Lagoon, and Magdalena Bay. The strong protective instincts of the mother gray whales have earned the species the nickname “devilfish” for their aggressive defense of young. After a few months, the calves begin to venture away from their mother’s sides and, by mid-February, newly pregnant females and others begin to leave the lagoons for the migration north.

As a result of its relatively small body size and coastal migration, the gray whale has a long history of exploitation by whalers. Pelagic whalers first appeared in the

³The ESA prohibits any person under the jurisdiction of the United States to “take” a listed species. Take is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (16 USC 1533 (3)(19)).

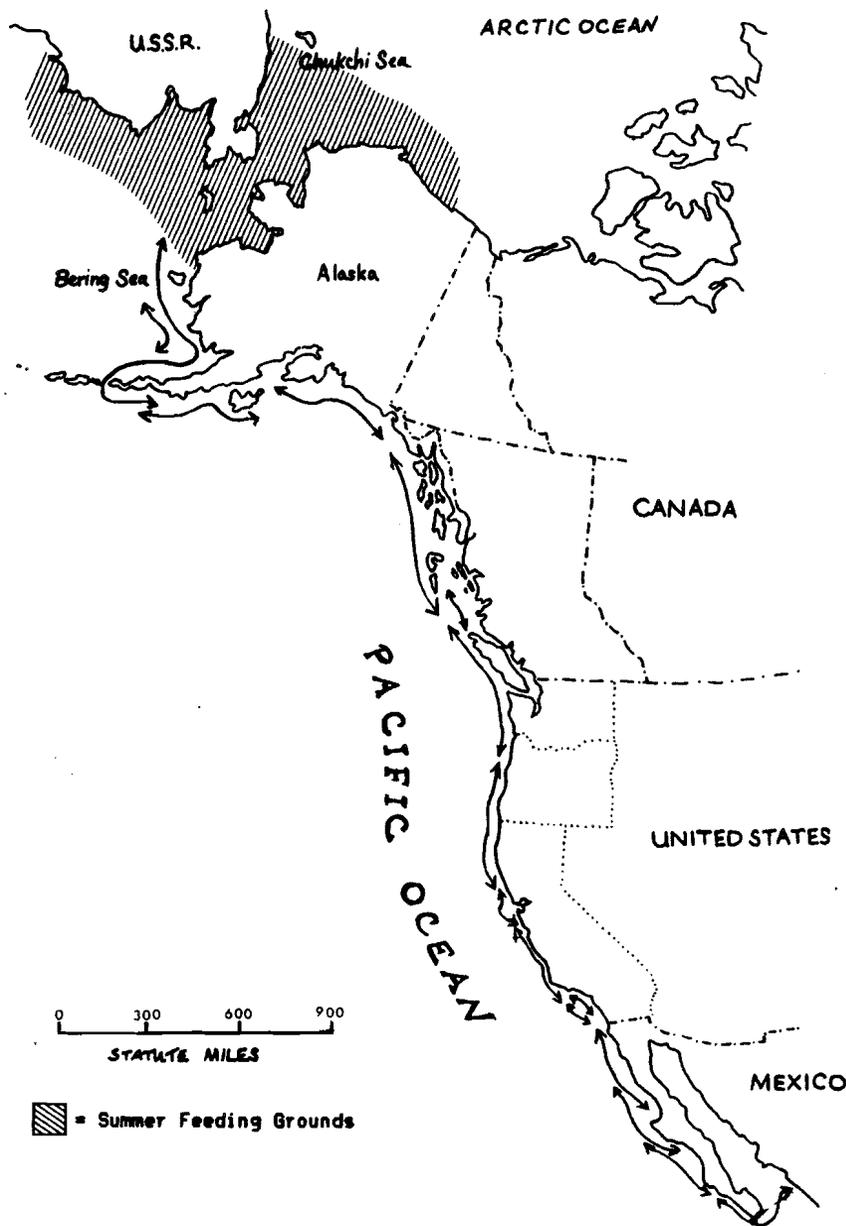


Figure 1. Migrational route of the California gray whale (adapted from the Oceanic Society 1983).

Pacific in the late 1700s, and two Yankee whalers first pursued gray whales in the lagoons of Baja in winter of 1845–46. They learned the dangers of hunting gray whales, as one man was killed and another badly injured. During 1845–1874, the peak years of pelagic whaling, more than 8,000 gray whales of the California herd were killed (not including calves). By the early 1870s, whalers along the coast of the Californias were experiencing reduced catches, and most turned to other whaling grounds. The gray whale continued to be exploited on its northern feeding grounds, as whalers turned to hunting gray whales when bowhead and right whales became scarce (Henderson 1984).

Protection of the gray whale in 1946 by the International Whaling Commission, together with the whale's migrational route along a "friendly" coast and protection of the breeding lagoons by the Mexican government, has allowed the western North Pacific gray whale population, or the "California" gray whale, to recover to a point where the population is increasing at an estimated rate of 2.5 percent per year (Oceanic Society 1983).

Whalewatching in the Californias

The gray whale is the focus of two major whalewatching centers—California and Baja California, with smaller industries found in Oregon, Washington, and British Columbia. California's whalewatch industry is the oldest and largest in terms of number of commercial operations. Some 31 different landings offer a wide range of cruises along the 500-mile (805 km) coastline from San Francisco to San Diego. Whalewatch vessels run the gamut from 50-foot (15.2 m) sportfishing boats and 45-foot (13.7 m) sailing yawls (complete with cocktail bar) to island ferries carrying 500 people and 150-foot (45.7 m) sailing schooners carrying 300 people. During the 1983–84 season, California landings operated approximately 74 boats, conducted in excess of 850 trips (± 50), and carried an estimated 255,000 passengers ($\pm 10,000$) (Tilt 1985a). This represents a gross revenue to the landings of approximately \$2.6 million. This figure, though, is conservative and fails to reflect the whalewatcher's impact on the regional economy in terms of meals, fuel, lodging and "whale paraphernalia."

The California industry witnessed a doubling in passengers carried from 1977–1981. More recently, the trend appears to have slowed, with the current level of whalewatching likely to be near the "saturation" level for both numbers of whalewatching operations and total number of participants. The future of whalewatching in California will likely be shaped more by maintaining a competitive edge over other landings than by the exploitation of new passenger markets. Stabilization of the whalewatching industry will also likely result in a "shake-out," with those operations offering quality trips and innovative marketing techniques successfully winning a larger share of the whalewatch market. This is particularly true in areas like Los Angeles, Newport Beach and San Diego, where the prospective whalewatcher has a broad range of whalewatches from which to choose. Two examples of innovative approaches include (1) the use of sailing yachts and schooners for whalewatching, and (2) the issuance of a "Whalewatch Guarantee," promising whales or the passenger gets another ride. Several landings surveyed in 1985 were "borderline" operations; competition and/or a primary interest in sportfishing will likely force them out of the whalewatch business.

The San Mateo Incident

Weather plays an important role in northern California with a bad season of weather likely to cripple small operations financially. Foul weather during the 1982–83 season forced the cancellation of approximately 60 percent of the scheduled trips and several whalewatching operations went out of business.

Another important factor in whalewatching is confidence in the safety of vessels engaged in whalewatching. This issue hit the headlines when the whalewatching vessel *San Mateo* was capsized by heavy swells at the mouth of Morro Bay on February 16, 1983. All 33 people including 24 school children were miraculously saved by the quick and decisive actions of rescue squads and volunteers. However, questions as to the seaworthiness of the vessel and the competence of the captain had a dramatic effect on the California whalewatching industry. Loss of business from school charters and walk-on trade hurt landings up and down the West Coast for the following two years, with some landings still reporting lower passenger totals in 1985. The incident clearly reflects the need for a high safety standard for passengers and vessels alike. The widely distributed and diverse nature of California whalewatching is part of this industry's character. But, as the *San Mateo* incident illustrates, they are bound together by their conduct and need for the public's trust.

Friendly Whales of Baja

The lagoons of Baja California are a mecca for whalewatchers utilizing long-range sportfishing boats out of San Diego. A history of whaling, shipping and harassment of gray whales in these lagoons came to an end in the mid-1970s as Mexico established Laguna Ojo de Liebre and Laguna Guerrero Negro as national refuges prohibiting unauthorized entry into the lagoons by ships, their tenders and low-flying aircraft. As whalewatching pressure shifted to Laguna San Ignacio, protective measures were also extended to this lagoon by designating the upper reaches a whale sanctuary and placing permit restrictions on the total number and conduct of the excursion vessels.

First documented in 1976, certain individual gray whales began to exhibit "friendly" behavior—a behavior that continues to delight visitors in recent years (Gilmore 1976). These whales seem to interact willingly with vessels and skiffs, even allowing themselves and their calves to be touched. In contrast, however, incidents continue to occur where gray whales, in apparent defense of their young, have jostled or attacked whalewatch vessels, reminiscent of the earlier days when whaling crews refused to go out alone against the "devilfish." Improved boathandling around whales and the respect rightfully paid a wild animal should help avoid future incidents. An average of 32 trips carrying some 800 passengers visited the "friendly whales of San Ignacio" annually during the period 1978–82 (Jones and Swartz 1984).

Studies of gray whales in San Ignacio by Jones and Swartz (1984) suggest that the whales "possess sufficient resiliency to tolerate the physical presence and activities of whalewatching vessels and skiffs and the noise produced by this level of activity without major disruption." Speaking to the phenomenon of "friendly whales," Jones and Swartz concluded that whether or not a whale exhibits curious behavior is entirely up to the animal: friendly whales find you; you don't find them.

Humpback Whales in Hawaii

Humpback whales (*Megaptera novaeangliae*) are widely distributed throughout the world's oceans. Like many other whale species, the humpback spends the summer

in high latitude feeding grounds and migrates to lower latitude waters during the winter to court, breed and calve.

Historically, the North Pacific humpback population was significantly impacted by whaling pressure in the first half of the twentieth century. The humpback whale has been hunted for centuries, including whaling by eastern Pacific aboriginals and Japanese shore whaling in the early 1600s. The advent of modern whaling, together with the decline of sperm and bowhead stocks, led to significant numbers of humpbacks being killed during the late 1800s and first half of the 1900s (Herman 1979). Prior to this intensive hunting, the humpback whale may have numbered in excess of 15,000 individuals. In the period 1905–1965, however, some 28,000 were killed by whalers, and the population on the North Pacific summering grounds for the period 1965–1974 was estimated at 850 animals (Rice 1977).

Humpback whales received international protection in 1966, when the International Whaling Commission prohibited the commercial taking of the species. In 1970 and 1972, the humpback received additional protection under the ESA and the MMPA, respectively. Since its protection from commercial whaling, the North Pacific population has slowly rebuilt to the present-day estimate of approximately 1,200 (NMFS 1984).

Humpbacks begin to arrive in the vicinity of the Hawaiian Islands in late October with their numbers peaking in late January through February. Upon arrival in the Hawaiian Islands, the whales distribute themselves inside the 100-fathom curve surrounding the main Hawaiian Islands, with the major areas of concentration on Penguin Bank, the waters bounded by the islands of Molokai, Lanai, Maui and Kahoolawe, and coastal waters of the Island of Hawaii from Kamakamaka Point to Keahole Point (Figure 2.)

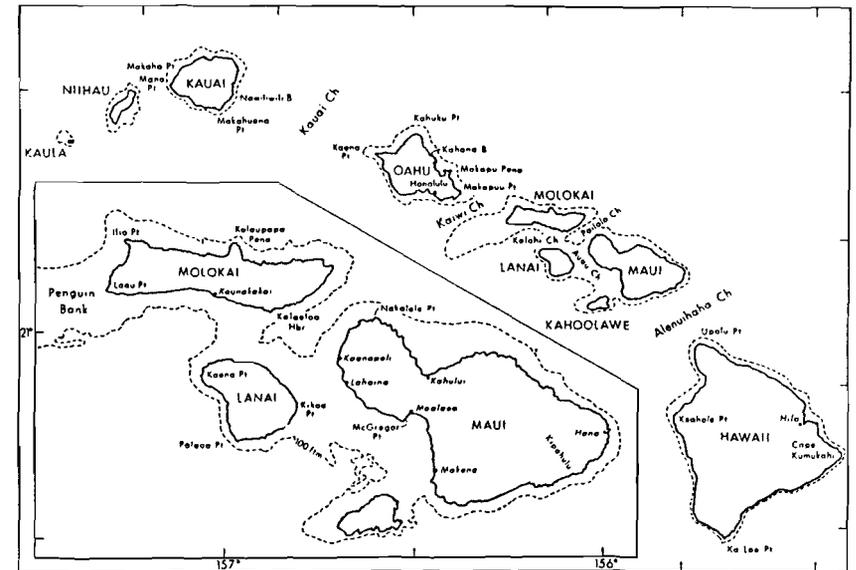


Figure 2. Main Hawaiian islands and 100-fathom contour (Herman 1979).

These warm, relatively sheltered waters provide habitat for activities of courtship, mating, calving and nursing. The annual arrival of humpback whales from their northern latitude feeding grounds in late October also marks the start of the whalewatching season. The major area of activity lies off the west coast of Maui, between the islands of Lanai and Kahoolawe.

Whalewatching in Hawaii

As in California, whalewatching began to grow in earnest in the late 1970s, with good sighting opportunities from shore points and boats. While data on the size and intensity of the Hawaiian whalewatching industry are limited, in excess of 4 million people visited Hawaii in 1982. Hawaii's Visitor Bureau estimates that 52 percent of the state's annual 5 million visitors use the state's ocean's resources, resulting in increased use of jet skis, outboards, parasails and other marine recreation (NOAA 1986). In 1983, it was estimated that 12 operators were engaged in commercial whalewatching statewide, with an estimated gross income of \$3 million (NOAA 1983). At an average price of \$15.00 per person, this figure represents some 200,000 passengers per season. Expansion of this industry in the Lahaina area is limited by a ceiling imposed by the State of Hawaii on the number of slips available to commercial vessels. The center for whalewatching is located on the west coast of Maui, where a prospective whalewatcher can "shop" for the whalewatch of their choice in Lahaina Harbor with 1983 prices ranging from \$15–\$30 for a two- to three-hour tour (Hoyt 1984). Several operators also run whalewatches from Kihei on Maui and out of Kewalo Basin on Oahu. In addition, prospective whalewatchers on Maui can call a "Whale Hotline," operated by the Pacific Whale Foundation, to learn complete whalewatch and whale sighting information.

While there can be no doubt that the popularity of whalewatching continues to grow, weather during the winter can be highly variable, and further expansion of whalewatch operations appears to be limited by a ceiling imposed on the number of slips available to commercial vessels in the Lahaina area.

Defining Harassment

In 1977, the Marine Mammal Commission, in cooperation with the National Marine Fisheries Service (NMFS), convened a workshop to consider problems facing the humpback in Hawaiian waters. The conference's first task was to define harassment in biological terms, including behaviors considered as indicators of harassment and types of human activities that might be considered "generic harassment" (Norris and Reeves 1978):

1. Stationary or nearly stationary whales beginning to move suddenly away from a site. Female/calf pairs are of particular concern since they may be resting or nursing.
2. Whales exhibiting any of the following behaviors—prolonged diving, underwater exhalation, zig-zag or evasive swimming, abrupt changes in direction of travel, and maintenance of distance from a vessel.
3. Whales showing increased wariness of approaching craft.
4. Females or "escorts" shielding calves from a vessel. This behavior may include tail swishing, interposition and surrounding of calves by adults.
5. Whales abandoning an area due to repeated approaches by vessels or some other form of human activity.

In addition to those behavioral indicators, the workshop identified several potential indicators of harassment that could reduce the biological fitness of the population including calf abandonment, decreased pregnancy rate and relocation to new assembly areas. Workshop participants called for a series of management efforts directed at (1) educating the public's behavior around whales, (2) a strong federal enforcement presence, (3) protection of wintering habitat, and (4) research of harassment and other human activity.

Hovercraft, military operations, scuba divers and boaters all posed potential threats to the wintering population of humpbacks. An important first step in exerting some form of control over these activities occurred in January 1979, when NMFS published a "Notice of Interpretation for Taking by Harassment" (44 *Federal Register* 1114). The notice listed guidelines defining harassment, and designated calving and breeding grounds where special guidelines were applicable. This notice—the first "interpretation" of harassment under the MMPA and ESA—gave NMFS a springboard for enforcement and habitat protection. In concert with the publication of these guidelines, efforts were made to educate the public through the publication and distribution of a pamphlet describing the humpback and guidelines for approaching whales.

Human use of Hawaiian nearshore waters for commercial and recreational purposes has been found to affect the behavior and distribution of humpback whales. Decreases in the number of cows and calves have been observed in the nearshore waters off Lahaina, while other studies have noted that increased human activity in localized areas is correlated with a decrease in the number of whales using those areas (Herman et al. 1980, Forestell in preparation).

Studies of whale/vessel interactions (including Baker and Herman 1984 and Bolt Beranek and Newman 1984) indicate that whales may respond to vessel traffic at distances from one to several kilometers. Responses are manifested by increased dive times, decreased blow intervals, change in travel direction and increases in aggressive displays. These responses appear to be short in duration, but a cumulative exposure to increasing levels of vessel traffic may deter whales from their preferred habitat.

While the available scientific information on vessel/whale interaction fails to provide precise guidance for establishing guidelines, NMFS is in the process of establishing 100 yards (91.4m) as an approach limit in Hawaiian waters and elsewhere, based on its experience in enforcing the prohibition of harassment (NOAA 1986).

Enforcing Harassment

Hawaii is the one area currently involved with active enforcement of whalewatching guidelines, with NMFS personnel assigned to Maui to patrol and investigate complaints. Prior to 1976, there were few complaints of whale harassment and no NMFS enforcement officers in Hawaii. With the growth in whalewatching's popularity, the number of harassment complaints has increased, with an average of four complaints per week directed to the Special Agents of NMFS (Shallenberger 1981). However, harassment remains a "gray area" of enforcement, and the number of harassment complaints has little relationship to the number of cases actually acted on.

A review of NMFS whale enforcement activities shows a close correlation between boating weather, timing of whale movements and the number of harassment complaints received. For example, in 1982–83, excellent weather led to large numbers of vessels using whale-occupied waters, with 79 reported incidents of harassment leading to the issuance of 21 warnings, 6 citations, and several cases still pending.

During the previous winter, inclement weather was the rule, with subsequently fewer complaints and enforcement actions.

Observations of NMFS enforcement agents and complaints from the public indicate that vessel and aircraft frequently approach closer than the distances prescribed in the "Notice of Interpretation." This is likely a contributor to the increased disturbance levels, and may be a factor in the redistribution of whales in the vicinity of Lahaina.

Hawaii's enforcement program appears to have been an effective part of managing vessel/whale interactions. A similar enforcement presence in other whalewatching regions, however, does not follow carte blanc. Lack of money and manpower, large areas to patrol, and the movements of whales themselves all play a part in defining NMFS's enforcement role.

When an harassment case is reported, the facts of the case are reviewed and a decision made as to whether substantial evidence is present to warrant investigation by NMFS Special Agents. Most harassment reports never proceed past this point, as a result of insufficient evidence. Harassment cases are hard to prove legally because of difficulty in determining what constitutes harassment. For example:

- What actions did the affected animal take that constitute harassment? Were these actions documented in terms of changes in blow sequence, courses changes, evasive actions by the whales, etc?
- Merely approaching too close to the whale, aside from riding right atop the animal, does not constitute a good case.
- Did the violator commit the act willfully, or was the person unaware of the guidelines and/or the whale itself?

At present, the Hawaiian Islands regulatory effort is unique to North America, with the exception of Glacier Bay, Alaska (Tilt 1985b). The Hawaiian Island area represents the only breeding/calving location for humpback whales within the direct jurisdiction of the United States. For enforcement purposes, special areas have been designated where the existing guidelines will be rigidly enforced by NMFS and Coast Guard personnel (44 *Federal Register* 1114). Similar enforcement of whale harassment in California, for example, is exacerbated by the huge area to be patrolled and the small number of enforcement personnel.

Whale Sanctuary Proposed

Hawaii has also been a focal point for the first attempt to establish a "whale sanctuary." Such a nomination was proposed in 1979 under the Marine Sanctuaries Program. The concept largely received the support of environmentalists and wildlife managers, but it soon became obvious that there was a lack of overall local support due to confusion about what the sanctuary designation meant in terms of further regulations, restricted access, etc. Similar concerns by local users have greeted other sanctuary designations, including the Point Reyes/Farallon Islands and Channel Islands National Marine Sanctuaries. In addition to concern over potential restrictions, much of the controversy centered on the boundaries of the sanctuary, with whale proponents calling for inclusion of all waters surrounding the major islands within the 100-fathom isobath. Balanced against this "ecological" approach was the concern that designation of such an extensive area would dilute management efforts. Unfortunately for the supporters of a whale sanctuary, the State of Hawaii withdrew its support for the designation shortly after a draft Environmental Impact Statement (EIS) was issued. As the EIS did not envision a federal-waters-only designation, and

the most important wintering areas lie within state jurisdiction, the Hawaiian Island Whale Sanctuary is currently on hold.

The sanctuary conflict is complex, with the majority of issues having little to do with whales. In a marine version of the "Sagebrush Rebellion," resentment against meddling outsiders, and the fear of adding one more layer of federal bureaucracy on state and local management of the islands, focused reaction against the sanctuary designation.

New England Humpbacks

Where Hawaii's whalewatching centers on wintering humpbacks and California's and Baja's on the migrating and wintering gray whale, New England has one of the richest assortment of cetaceans on their summer feeding grounds in North America. Recently, a small shoal in Cape Cod Bay, Stellwagen Bank, has eclipsed the entire whalewatch industry in terms of the number of passengers carried (Figure 3). In the arch from Gloucester to Provincetown, some 19 different operations offer whale-watches aboard more than 29 different vessels. In Provincetown alone, approximately 330,000 people went whalewatching during the 1985 season, with the entire industry responsible for some 1.5 million passengers carried (Tilt and Ramage unpublished). Where California's industry is distributed along 500 miles (805 km) of coastline, New England's industry is primarily centered on a narrow bank some 18 miles (29 km) long where humpbacks, fin, minke and right whales are possible sightings during a whalewatching season that extends from April to the end of October—the longest of any whalewatching season in North America.

The first whalewatches were offered out of Provincetown aboard Captain Al Avellar's *Dolphin* in 1975. In the years following, interest grew, as did the number of operations offering trips. In the beginning, vessels were sportfishing boats that traded in their baits to try whalewatching. Presently, the majority of vessels in New England are built specifically for whalewatching, with snackbar, heated cabin, wide beam and a \$600,000–\$900,000 price tag. Kelly (1983) estimated that 15 vessels carried more than 73,250 passengers in 1981. This represented a tenfold increase over trade in 1977. Since 1981, rapid growth has continued, with the majority of landings surveyed in 1985 reporting that business is continuing to increase. Due to limited berthing spaces, cost of vessels and market-orientated concerns, future growth of the Stellwagen Bank industry will likely be reflected in the upgrading of vessels and expansion of existing operations.

Humpback whales begin to arrive on the Bank between mid-March and mid-April. Whales are distributed in various densities throughout the area, moving in response to the availability of food, which is comprised primarily of sand lance (*Ammodytes americanus*). Humpbacks in other areas of the western North Atlantic, such as off Newfoundland, feed primarily on capelin, *Mallotus villosus* (Whitehead 1980). Capelin—similar in size, summer habitat and schooling behavior as sand lance—were the target of intensive pelagic fishing pressure during the 1970s that led to the fishery's near economic collapse in the mid-1970s. The effect of this fishing pressure on humpback whales and other marine species dependent on the capelin and similar baitfish is not fully appreciated. It is important to recognize that the whales of Stellwagen Bank are present to feed. Should sufficient quantities of food not be available on the bank, the whales will move elsewhere. Such a shift in the abundance

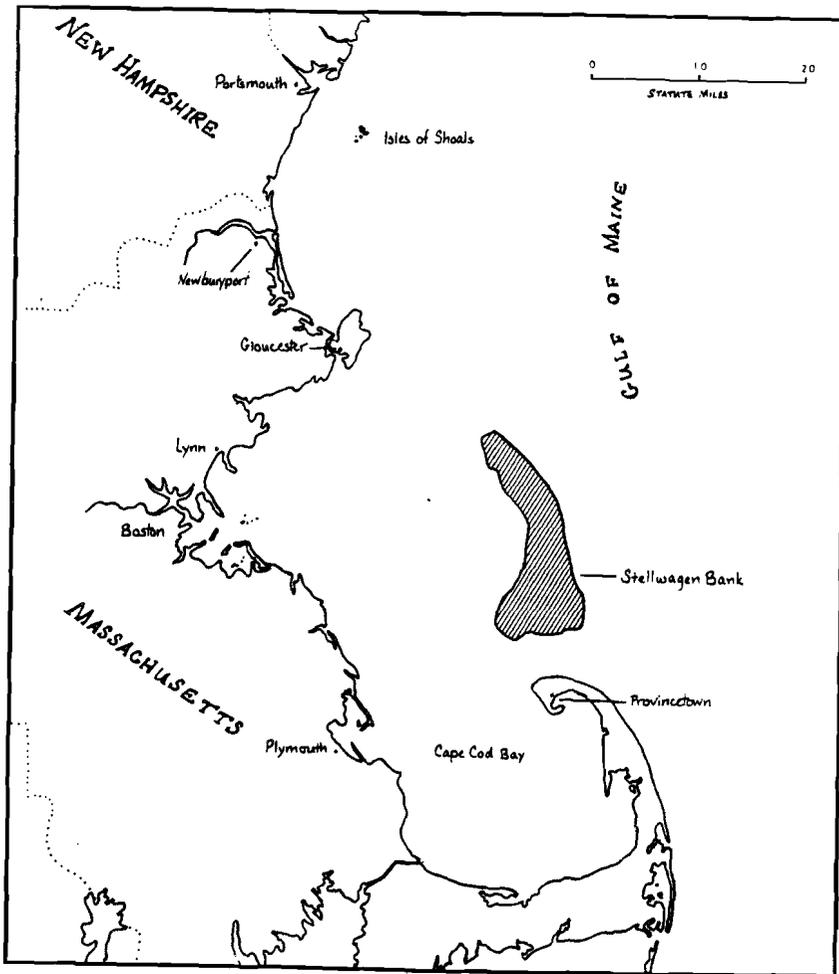


Figure 3. Cape Cod Bay, including Stellwagen Bank.

and distribution of whales was witnessed off New England in 1986. The whales were farther offshore than in previous years, causing whalewatching vessels to have to travel farther and longer in search of more widely distributed whales. The extent and duration of this shift in the feeding distribution of New England's summering whale stocks are unknown at this time.

The exponential growth of whalewatching in New England has led to healthy and unhealthy aspects of competition. On the positive side, the industry has a good safety record, places trained naturalists aboard the vast majority of vessels and exhibits a hunger to "do things right" in order to gain their share of the market. Researchers aboard New England whalewatching vessels have created a whale data base, allowing insights into the biology, behavior and population status of the western North Atlantic

humpback unequalled in the field of cetacean research (Katona et al. 1984). On the opposite side of the coin, competition between operations is often reflected on Stellwagen Bank as vessels vie for position on whales to satisfy the expectations of their passengers. In an article written for the *Cape Cod Times*, Howard and Sullivan (1984) recounted the experiences of a former naturalist aboard a whalewatching vessel operated out of Provincetown: "... the notorious competition between commercial operators forces the boats to race about chasing whales to be the first on the scene. Most of the time there is no problem ... but occasionally the activity is overbearing."

The last statement—"most of the time ... but occasionally"—is perhaps the single most important aspect of whale harassment in New England and elsewhere. If whales are plentiful with the number of boats dispersed over the bank, there will typically be no "harassment" incidents committed by the commercial vessels. However, when whales get scarce and transit times to and from port leave skippers with precious little time to seek out whales (as occurred during the 1986 season), pressure on located whales can be significant. The ethics of proper handling around the whales suddenly comes into conflict with the business side to give the passengers a good view. During the summer season, Stellwagen Bank may have up to three dozen commercial vessels and untold numbers of recreational craft whalewatching. The majority of the commercial vessels operate responsibly in relationship with the state-of-the-art knowledge of vessel handling on whales. However, as recreational vessels cut in front of well-behaved commercial vessels, passengers become impatient and demand, "If they can do that, why can't we? I paid good money for this whalewatch."

Whalewatching Survey

Designing a national policy for whale harassment offers a perfect illustration of the difficulties inherent in balancing conflicting uses and attitudes toward whales. Management agencies must be sensitive to these different attitudes, while also basing their management on science and congressional mandates (not necessarily in this order). The paucity of work examining the attitudes of American society toward whales and whalewatching was the motivation to conduct a preliminary survey of people participating in whalewatching along the California coast (Tilt 1986). A total of 900 surveys were distributed, with 310 returned to the study team.

The sample was found to generally consist of people who were California residents (90 percent), highly educated (79 percent with four or more years of college) and with annual incomes averaging \$30,000–\$40,000. Comparison of the whalewatching sample with the California census and National Nonconsumptive Use Survey (Shaw and Mangun 1984) found several strong correlations, suggesting that the relatively small size of the whalewatching sample was representative.

The survey asked 25 knowledge questions addressing a range of natural history, anatomy and marine mammal policy. The mean knowledge score for the sample was 0.56, with a gradient evident between "general" whale knowledge (i.e., that commonly touted by whalewatching crews, media, etc.) and the more specific, technical questions that require a greater exposure to whales and the marine environment than that gained from a single whalewatch or passive media exposure. When knowledge was cross-tabulated with demographics, a number of significant relationships were found. Knowledge was found to vary among whalewatch landings and to increase with subsequent number of whalewatches. In addition, those perceiving the gray

whale as "abundant" scored 10–30 points higher on the knowledge scale than those viewing the gray whales as "rare."⁴ Ability to identify cetaceans was generally low, with 35 percent of the respondents responding that they could identify only 1–3 species, while 19 percent indicated that they could not identify any.

The core of the survey was 35 attitude statements that sought to elicit whale-watcher's opinions to a variety of whale-related issues in order to gain an insight into public attitudes towards whales and their management. For example, 75 percent of the sample agreed that it is morally wrong to kill whales. When trade-offs were presented, however, the sample generally became more evenly distributed, i.e., 51 percent found agreement with killing nonendangered whales for food.

For 52 percent of the sample, the whalewatch on which they received the survey was their first experience with whalewatching. The whalewatch experience was also ranked by three-quarters of the sample as one of the most "fantastic" wildlife experiences they had ever participated in. In addition, the vast majority of the respondents agreed that seeing whales in the wild greatly increased their commitment to the cause of whale conservation.

This preliminary survey points out a number of attitudes and perceptions that should prove to be valuable in evaluating management and policy approaches for low-consumptive use of whales, such as whalewatching. For example, the whale-watching public—as represented in this sample—demonstrated a general willingness to pay more to go whalewatching, if the proceeds went toward whale research/education. And the majority of respondents placed the needs and protection of whales above the needs of the whalewatching industry and recreational benefits of whale-watching. Finally, the survey indicated that, while the public may possess some knowledge of general whale natural history, it knows little about the policy and management considerations involved in conserving the whale resource.

It would appear evident from the results of this preliminary study that further surveying of the public's knowledge and attitudes to whales and whalewatching would prove valuable. Furthermore, there is a need to "legitimize" the consumptive nature of whalewatching by making the experience as educational for the whale-watcher as possible while impacting the whale resource as little as possible.

Discussion

The bow lifts above the freshening swell. One hour out of port, many passengers still strain at the rail to be the first to spot a whale. Why do people pay good money, risk sea sickness, merely for the opportunity to scan the swaying horizon for hours for the fleeting glimpse of a blow or the back of a whale? Shaw (1987) noted: "Nothing about the visual stimuli [of whalewatching] is particularly aesthetic, and nothing about the actual activity (scanning the horizon) is intrinsically recreational. Nevertheless, the excitement of the participants is obvious, and for many, sighting a whale becomes a highlight of the trip. . . . The demand for this form of recreation comes from people's knowledge that the whales are the largest mammals, that they are intelligent, and that their existence has been threatened by human exploitation and from the human interest in learning more about these creatures."

⁴The gray whale population is an estimated 15,000–20,000 (Reilly 1984), and along the California coast can be considered common to seasonally abundant.

In evaluating the results of this research, it appears obvious that whalewatching can serve a valuable function in increasing the public's appreciation and knowledge of marine mammals and their commitment to whale conservation. It also appears that the whalewatching community represents a precarious balance between an interest in ensuring whales are not harassed and providing whalewatchers with a good view of whales. Based on the survey, it would appear that the whalewatching public places the needs and protection of whales above the needs of the whalewatching industry.

If whalewatching is to continue with minimal impact on whales (recognizing that we probably couldn't stop recreational whalewatching, even if we wanted to), it appears to me that several factors must be incorporated into any "whalewatching policy" evaluation:

1. *Perception change*—We must admit to ourselves that there is no such thing as a "nonconsumptive" use, just varying degrees of *low* consumptive use. Applied to whalewatching, this means we must conduct our activities with the lowest possible "consumption" of whales.
2. *Clarity of purpose*—Whether it is the creation of a whale sanctuary or consideration of regulations to govern the whalewatch industry, there must be honest and open communications among all parties. Otherwise, we risk clouding the waters to such an extent that the original purpose of the debate is lost, and everyone is left with a sour taste in their mouth. As Todt (1985) noted in evaluating the failure to designate a whale sanctuary in Hawaii, "local opponents have become frustrated by the feeling that Hawaii's concerns are being lost in the pro-sanctuary campaign being waged by environmentalists across the nation."
3. *Public education*—A major justification for whalewatching is its educational value. To legitimize this claim, skippers and naturalists must present accurate and timely information. I found that some naturalists in California needed to make their presentations "more colorful." With the color came inaccurate information. There is no need to embellish whale natural history, hence there is a real role for organizations involved with marine education to develop and distribute good, solid references and training methods to the whalewatching industry (much of this is underway, but more is needed).
4. *Boater education*—This is at the heart of vessel/whale interaction and harassment. Commercial whalewatch operators operate responsibly the majority of the time. Granted that there are times when tight schedules and sparse whales push operators into more aggressive handling, but clearly these operators are the easiest to educate in proper handling techniques because they have the most to lose (i.e., their captain's license and/or business). The weekend skipper, however, is a different story. Able to operate a boat without a license, possessing little to no knowledge of navigation or safe boat handling, the private boat operator is the biggest potential harassment threat to whales. Whether out of ignorance, contempt or from too many beers, recreational boaters are responsible for the majority of harassment incidents. Reaching the boater is also difficult, and efforts to date have been only partially successful.
5. *Research*—As with education, research is a major justification for whalewatching. Whalewatching vessels offer excellent platforms of opportunity for whale

research while providing naturalist services in return. Such research should be a fixture of all whalewatching operations, with the information shared with the rest of the whalewatching region.

6. *Network*—A loose whalewatching network, consisting of boat operators, naturalists and NMFS, has been established in New England. A similar network should be established in all whalewatching regions to update its members on new guidelines/regulations, state-of-the-art vessel handling, research and education, and advice on running whalewatching operations more effectively. Efforts are currently underway to establish such a network in California.
7. *Regulation*—In general, nationwide regulations should not be considered since too much variation exists between the various regions to be addressed adequately by a single set of regulations. In addition, NMFS and other management agencies must be allowed flexibility to deal within the regulatory framework created. Harassment is a very "gray" area which is not conducive to the black-and-white nature of regulations. Efforts to establish whalewatching guidelines, such as illustrated in Figure 4, should continue. Other approaches that may have some utility include licensing of commercial operators, limited entry or a "whalewatching tax" (revenues to go to enforcement and monitoring efforts). Regardless of the nature of regulation, if any at all, there is the need to involve whalewatch operators in the process and to be sensitive to their interests.

Summary

Whales are many different things to many different people. Whalewatching is an unique wildlife experience that has helped raise the level of awareness of whales and the marine environment in general. Next year, more than 2 million people are likely to participate in organized whalewatching nationwide. The contribution of this industry to the regional economies of California, Hawaii, New England and other areas with established industries is difficult to quantify, but clearly significant. Even given its popularity and economic benefits, however, whalewatching is an activity in conflict with itself. Few, if any, other industries of similar size have developed around the exploitation of a protected species (threatened and endangered). The ethical and legal ramifications of making money on a protected species are novel and unsettling to many people. It seems clear, though, that whalewatching is here to stay. The question that remains to be answered is: Under what kind of framework will whalewatching operate?

In closing, there are a number of risks attendant to whalewatching. First, there is the obvious risk that the whales themselves may be impacted. It is our responsibility to assess the impacts of whalewatching on whales and calibrate our management to the findings. Second, there is a growing threat that whalewatching will throttle itself on greed and pursuit of whalewatching dollars. Whalewatch operations must recognize that quality whalewatching will sell their operation in the long run, not merely the fastest boat, cheapest beer and showiest tee-shirt. Quality natural history, research contributions and avoidance of "cattle car" handling of passengers are a few of the elements of professional whalewatching. The same cautions hold true for municipalities—these towns should view the presence of whalewatching as a blessing that spreads money around the community rather than as a gold mine from which to extract a greater and greater percentage of the gross income. Finally, there is the

NEW ENGLAND WHALE WATCHING GUIDELINES

The National Marine Fisheries Service (NMFS) is the Federal Agency responsible for protecting whales under the Marine Mammal Protection Act (MMPA) of 1972 and the Endangered Species Act (ESA) of 1973. These Acts prohibit, among other things, the harassment of whales. Any violation of these Acts may result in either fines of up to \$10,000, imprisonment, and seizure of personal property involved in a violation, or any combination of the above. The NMFS considers harassment to be any intentional or negligent act or omission which substantially disrupts the normal behavior patterns of an animal protected under the MMPA and ESA. Reactions by whales that may indicate disruption of normal behavior patterns may include, but are not limited to: a rapid

change in direction or speed; prolonged diving; underwater course changes or evasive swimming patterns; interruption of feeding and nursing activities; or attempts by a whale to shield a calf from a vessel or human observer by tail slapping or by other protective movements. Continued harassment or disruption of the whales normal behavior may lead to whales abandoning their important feeding grounds or result in other less obvious effects.

In order to protect the whales and their environment and to promote better public awareness and understanding of the need to avoid harassment of whales, the NMFS is providing the following guidelines for whale watching in New England Waters:

GUIDELINES

When operating within one quarter of mile of whales (1500 feet):

Surface vessels should avoid excessive speed or sudden changes in speed or direction. Aircraft should observe the FAA minimum altitude regulation of 1000 feet over water.

When in close approach of whales (within 300 feet):

Do not approach stationary whales at more than idle speed.
Do not attempt a "head-on" approach to moving or resting whales.
Parallel the course and speed of moving whales.

When more than three vessels are in close approach of whales (300 feet):

Do not box in whales or cut off their path.
Take your turn and limit your time in close approach of whales (10-15 minutes is usually adequate).

Do not intentionally approach within 100 feet of whales.

If whales approach within 100 feet of your vessel, put engine in neutral and do not re-engage props until whales are observed at the surface, clear of the vessel.

Active whales require ample space. Breaching, lobtailing and flipper-slapping may endanger a vessel. Feeding whales often emit sub-surface bubbles before rising to feed at the surface. Stand clear of light green bubble patches.

Diving in the vicinity of whales is not advised due to the active and usually unpredictable behaviors of whales. Divers should not approach within 100 feet of whales.

In all cases, do not restrict the normal movement or behavior of whales, or take action that may evoke a reaction from whales or result in physical contact with a whale.

Figure 4. New England whalewatching guidelines.

chance that we may regulate the commercial industry out of existence. The last, however, is the easiest risk to avoid, if a little common sense and imagination are used together with good communication between all the parties involved.

References Cited

- Allen, K. R. 1980. Conservation and management of whales. Seattle: Washington Sea Grant. University of Washington Press. 107p.
- Baker, C. S., and L. M. Herman. 1984. Seasonal contrasts in the social behavior of the humpback whale. Honolulu: Kewalo Basin Marine Lab. 2p.
- Bolt Beranek and Newman, Inc. 1983. Investigations of the potential effects of underwater noise from petroleum activities on migrating gray whale behavior. Report No. 5366. Prepared for U.S. Dept. of Interior, Minerals Mgt. Service, Alaska OCS Office.

- Braham, H. W. 1984. Distribution and migration of gray whales in Alaska. Pages 249-266 in M. L. Jones, S. L. Swartz, and S. Leatherwood, eds., *The gray whale, Eschrichtius robustus*. Orlando, FL: Academic Press.
- Gilmore, R. M. 1976. The friendly whales of Laguna San Ignacio. *Terra* 15(1):24-28.
- Hardin, G. 1968. The tragedy of the commons. *Science* 162:1,243-48.
- Henderson, D. A. 1984. Nineteenth century gray whaling: Grounds, catches and kills, practices and depletion of the whale population. Pages 159-186 in M. L. Jones, S. L. Swartz, and S. Leatherwood, eds., *The gray whale, Eschrichtius robustus*. Orlando, FL: Academic Press.
- Herman, L. M. 1979. Humpback whales in Hawaiian waters: A study in historical ecology. *Pacific Science* 33(1):1-15.
- Herman, L. M., P. H. Forestell, and R. C. Antinola. 1980. Migration of humpback whales into Hawaiian waters. Final Report for Marine Mammal Commission, MMC 77/19. NTIS PB82-162332.
- Holt, E. 1984. *The whale watcher's handbook*. Garden City, NY: Doubleday and Co., Inc. 208p.
- Howard, P. E., and M. Sullivan. 1984. Watching the whales, is it helpful or harmful? *Cape Cod Times*, June 21:1, 10-11.
- Hurdall, J. 1978. A report on the general behavior of humpback whales near Hawaii, and the need for the creation of a whale park. *Oceans* 11(March):8-15.
- Jones, M. L., and S. L. Swartz. 1984. Demography and phenology of gray whales and evaluation of whalewatching activities in Laguna San Ignacio, Baja California Sur, Mexico. Pages 309-374 in M. L. Jones, S. L. Swartz, and S. Leatherwood, eds., *The gray whale, Eschrichtius robustus*. Orlando, FL: Academic Press.
- Katona, S. K., K. Balcomb, J. Beard, D. K. Mattila, C. A. Mayo, M. T. Weinrich, and F. Wenzel. 1984. The Atlantic humpback whale catalogue: 1984 update. Abstract presented at the Western N. Atlantic Marine Mammal Res. Assoc. Conf., December 1, 1984. Boston: New England Aquarium.
- Kellert, S. R. 1979. Public attitudes toward critical wildlife and natural habitat issues. Phase 1 of American attitudes, knowledge and behaviors toward wildlife and natural habitats. Washington, D.C.: Super. of Doc. 138p.
- Kelly, J. E. 1983. The value of whale-watching. Presented at Whales Alive Conference, Boston, MA, June 7-11, 1983.
- Leatherwood, S., R. R. Reeves, W. F. Perin, and W. E. Evans. 1982. Whales, dolphins, and porpoises of the eastern North Pacific and adjacent Arctic waters. NOAA Tech. Report NMFS Circular 444. Seattle, WA: NOAA, NMFS. 245p.
- Lily, J. C. 1975. *Lily on dolphins: Humans of the sea*. Garden City, NY: Anchor Press. 500p.
- Marine Mammal Commission. 1981. Annual report of the Marine Mammal Commission, calendar year 1981. A report to Congress. Washington, D.C.: Marine Mammal Commission.
- Mead, J. G., and E. D. Mitchell. 1984. Atlantic gray whales. Pages 33-53 in M. L. Jones, S. L. Swartz, and S. Leatherwood, eds., *The gray whale, Eschrichtius robustus*. Orlando, FL: Academic Press.
- National Oceanic and Atmospheric Administration. 1983. Proposed Hawaii humpback whale national sanctuary. Draft management plan and environmental impact plan. Washington, D.C.: Dept of Commerce, NOAA, Sanctuary Programs Division. 172p.
- . 1986. Proposed regulations governing approaching humpback whales in Hawaiian waters, proposed rule. *Federal Register* 51(226):42,271-73.
- Norris, K. S., and R. R. Reeves. 1978. Report on a workshop on problems related to humpback whales (*Megaptera novaeangliae*) in Hawaii. Prepared for Marine Mammal Commission. PB-280-794.
- Oceanic Society. 1983. *Field guide to the gray whale*. San Francisco: Legacy Publishing Co. 50p.
- Omura, H. 1984. History of gray whales in Japan. Pages 55-77 in M. L. Jones, S. L. Swartz, and S. Leatherwood, eds., *The gray whale, Eschrichtius robustus*. Orlando, FL: Academic Press.
- Payne, R. S., and S. McVay. 1971. Songs of the humpback whales. *Science* 173(3997):585-597.
- Reeves, R. R. 1984. Modern commercial pelagic whaling for gray whales. Pages 187-200 in M. L. Jones, S. L. Swartz, and S. Leatherwood, eds., *The gray whale, Eschrichtius robustus*. Orlando, FL: Academic Press.
- Reilly, S. B. 1984. Assessing gray whale abundance: A review. Pages 203-223 in M. L. Jones, S. L. Swartz, and S. Leatherwood, eds., *The gray whale, Eschrichtius robustus*. Orlando, FL: Academic Press.
- Rice, D. W. 1978. The humpback whale in the North Pacific: Distribution, exploitation, and numbers. In Norris and Reeves (1978), Report on a workshop on problems related to humpback whales. Appendix IV, 15p.
- Sayers, H. 1984. Shore whaling for gray whales along the coast of California. Pages 121-157 in M. L. Jones, S. L. Swartz, and S. Leatherwood, eds., *The gray whale, Eschrichtius robustus*. Orlando, FL: Academic Press.
- Shaw, W. W. 1987. The recreational benefits of wildlife to people. Pages 208-221 in D. J. Decker, and G. R. Goff, eds., *Valuing wildlife*. Boulder, CO: Westview Press.
- Shaw, W. W., and W. R. Mangun. 1984. Nonconsumptive use of wildlife in the United States. Resource publication 154. Washington, D.C.: Fish and Wildlife Service. 20p.
- Tilt, W. C. 1985a. Whalewatching in California, an industry profile. New Haven: Yale School of Forestry and Environmental Studies. 17p.
- . 1985b. Whales and whalewatching in North America. New Haven: Yale School of Forestry and Environmental Studies. 109p.
- . 1986. Whalewatching in California, a survey of knowledge and attitudes. New Haven: Yale School of Forestry and Environmental Studies. 40p.
- Tilt, W. C., and T. Ramage. In preparation. Evaluation of whalewatch industry in New England. Washington, D.C.: Natl. Audubon Society.
- Tonnessen, J. N., and A. O. Johnsen. 1982. *The history of modern whaling*. Berkeley: University of California Press. 798p.
- Whitehead, H., P. Harcourt, K. Ingham, and H. Clark. 1980. The migration of humpback whales past the Bay de Verde Peninsula, Newfoundland, during June and July, 1978. *Canadian J. Zool.* 58(5):687-92.