DRAFT

ENVIRONMENTAL ASSESSMENT

on

ISSUING A QUOTA TO THE MAKAH INDIAN TRIBE FOR A SUBSISTENCE HUNT ON GRAY WHALES FOR THE YEARS 2001 AND 2002

Prepared by

U.S. Department of Commerce

National Oceanic and Atmospheric Administration

National Marine Fisheries Service

January 12, 2001

TABLE OF CONTENTS

1. PURPOSE AND NEED FOR ACTION

In 1997, the International Whaling Commission (IWC) approved a quota of 620 gray whales for an aboriginal subsistence harvest during the years 1998 through 2002. The basis for the quota was a joint request by the Russian Federation (for a total of 600 whales) and the United States (for a total of 20 whales). The National Oceanic and Atmospheric Administration (NOAA) in 1998 and 1999 granted an allocation of up to five whales a year to the Makah Indian Tribe, whose subsistence and ceremonial needs had been the foundation of the U.S. request to the IWC. In May 1999, Makah hunters killed one gray whale.

Now, as the result of an opinion by the U.S. Court of Appeals for the Ninth Circuit (*See* Section 2.5 of this EA), NOAA must examine the environmental consequences of allocating any gray whales to the Makah Tribe for the years 2001 and 2002. NOAA's objective is to accommodate Federal trust responsibilities and treaty whaling rights to the fullest extent possible, by fulfilling the Tribe's cultural and subsistence needs, while ensuring that any tribal whaling activity does not threaten the Eastern North Pacific gray whale population.

This Environmental Assessment (EA) considers four alternatives for issuance of the IWC quota to the Makah Tribe, including a no-action alternative that would not grant the Makah Tribe a quota.

2. BACKGROUND

2.1. Makah Tradition of Whaling

The Makah Tribe's tradition of whale hunting extends at least 1500 years into the past. In addition to subsistence benefits, whale hunting and its associated components fulfilled important ceremonial and social functions for the Makah. Whaling was so important to the Tribe that it explicitly secured its rights to continue whaling in the 1855 Treaty of Neah Bay, entered into with the U.S. Government. That Treaty is still the primary legal instrument defining the legal relationship between the U.S. Government and the Tribe.

The Tribe continued to whale until the 1920s, when a number of external factors led to the decline of tribal whaling. The U.S. Government, in an attempt to instill western values and practices, undermined Makah whaling traditions and failed to provide the assistance for whaling it had promised the Tribe in the Treaty of Neah Bay. Epidemics that reduced the Tribe's numbers by some 75% killed many whalers before they could pass on their traditions to the next generation. In addition, commercial whaling by non-Indians led to a drastic decline in the Eastern North Pacific gray whale population available to the Makah hunters, forcing the Tribe to rely on other sources of food.

Tribal members learned other ways of making a living as contact with western civilizations increased, but the Tribe never forgot its history of whaling. The Makah Tribe managed to "store away" its cultural whaling traditions in anticipation of a time when these traditions could be revived.

On May 5, 1995, after the Eastern North Pacific gray whale had been removed from the list of endangered species, the Makah Tribe informed NOAA that it wanted to resume ceremonial and subsistence whaling. According to the Tribe, its cultural and subsistence needs include a harvest of up to five whales a year, the ability to hunt whales safely using traditional methods, and the ability to practice the ceremonial aspects of whaling.

More information about the Makah Tribe's tradition of whaling can be found in Renker (1997) and in Section 4.2.4.a. of this EA.

2.2. IWC and Governance of Aboriginal Whaling

In 1946, the United States signed the International Convention for the Regulation of Whaling (ICRW). Each Contracting Government to the ICRW is represented on the IWC. The IWC recognizes aboriginal whaling as a category distinct from commercial whaling and exempt from the current moratorium on commercial whaling. The ICRW specifically states that the IWC may not allocate specific quotas to any particular nationality or group of whalers. Because of this prohibition, the IWC sets an overall aboriginal subsistence harvest for the relevant stock, based on the request of Contracting Governments on behalf of aboriginal hunters.

Quotas for aboriginal subsistence whaling are set based on cultural and subsistence need, provided that the quotas are either sustainable or else low enough to allow stocks to recover if they had previously been depleted by commercial whaling. There is no formal IWC definition of aboriginal subsistence whaling, only working group guidelines that have never been formally adopted.

2.3. IWC Action on Quota Requests

In 1996, NOAA and the Makah Tribal Council signed an agreement, in which the Makah Tribe undertook to prepare a needs statement for submission to the IWC, and NOAA agreed to present to the IWC an adequate needs statement as the foundation for a quota request. During the 1996 IWC annual meeting, NOAA and the Makah Tribe decided to withdraw the request and resubmit it in 1997.

Before signing a second agreement with the Makah Tribal Council and submitting another request to the IWC the following year, NOAA prepared an EA (*see* section 2.5). At the 1997 annual meeting, the IWC set a quota for aboriginal subsistence use of gray whales from the eastern stock in the North Pacific. The gray whale quota was based upon a joint presentation by the Russian delegation on behalf of the Chukotka people, and the U.S. delegation on behalf of the Makah Tribe. This joint request delineated the subsistence needs for gray whales by the Chukotka and the Makah Tribe. The total requested quota of 620 gray whales over a five-year period assumed an average annual harvest of 120 whales by the Chukotka people and an average annual harvest of four whales (not to exceed five in any year) by the Makah Tribe. The IWC approved the joint request for the aboriginal subsistence use of gray whales by consensus, without objection. Approval of the quota, in accordance with IWC procedure, is the only mechanism by which the Commission recognizes the

needs of an aboriginal group and determines that a particular use of whales is consistent with the aboriginal subsistence whaling guidelines.

2.4. Makah Hunt under IWC Quota

NOAA granted the Makah Tribe a quota of up to five gray whales in 1998, but the Tribe did not take any whales that year. In 1999, NOAA again granted a quota of up to five whales. On the morning of May 17, 1999, in the Pacific Ocean south of Cape Flattery, Washington, the tribal crew struck and killed a gray whale. The whale was towed to the beach in Neah Bay, where, after tribal ceremonies, it was butchered by tribal members. The meat and blubber were consumed by members of the Makah Tribe and during tribal ceremonies. Details of this take are described in Section 4.2.4.a.2 of this EA. No whales were taken during the rest of 1999 or during the spring season in 2000.

The United States reported the Makah take at the 1999 and 2000 annual meetings of the IWC. The IWC made no change to the gray whale quota nor took any other action as a result of these reports.

2.5. Explanation of Legal Issues

Through domestic measures and international treaties, Congress and the Executive Branch have sought to ensure conservation of wildlife while recognizing the essential rights of Indians to hunt and fish to maintain their culture. At the forefront of this issue lies the trust responsibility toward American Indian tribes that requires the U.S. Government to fulfill certain fiduciary responsibilities, including the protection of tribal rights to natural resources. The United States is party to two treaties that are relevant to Makah whaling: the 1855 Treaty of Neah Bay and the 1946 ICRW. Like any statute enacted by Congress, both of these treaties have the force of law. Brief discussion of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) has also been included in this section.

2.5.1. Federal Trust Responsibility

The concept of "trust responsibility" is derived from the special relationship between the Federal Government and Indians, first delineated by Supreme Court Chief Justice John Marshall in Cherokee Nation v. Georgia, 30 U.S. 1 (5 Pet.) (1831). Later, in Seminole Nation v. United States, 316 U.S. 286 (1942), the Court noted that the United States "has charged itself with moral obligations of the highest responsibility and trust" toward Indian Tribes. The scope of the Federal trust relationship is broad and incumbent upon all Federal agencies. The U.S. Government has an obligation to protect tribal land, assets, and resources, as well as a duty to carry out the mandates of Federal law with respect to American Indian and Alaska Native tribes. This unique relationship provides the Constitutional basis for legislation, treaties, and Executive Orders that grant unique rights or privileges to Native Americans to protect their property and their way of life.

In furtherance of this trust responsibility and to demonstrate respect for sovereign tribal governments, the principles described above were incorporated into Secretarial Order No. 3206,

dated June 5, 1997, and signed by the Secretaries of Commerce and Interior. This Order, entitled "American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act," directs both Departments to carry out their responsibilities under the ESA in a manner that harmonizes the Federal trust responsibility to tribes, tribal sovereignty, and statutory missions of the Departments, so as to avoid or minimize the potential for conflict and confrontation.

On May 14, 1998, President Clinton issued Executive Order (EO) 13084 requiring each Federal agency to establish meaningful consultation and collaboration with Indian tribal governments in formulating policies that significantly or uniquely affect their communities. Entitled "Consultation and Coordination with Indian Tribal Governments," the order requires agency policy making to be guided by principles of respect for tribal treaty rights and responsibilities that arise from the unique legal relationship between the Federal Government and Indian tribal governments. Furthermore, on issues relating to treaty rights, EO 13084 directs each agency to explore, and, where appropriate, use consensual mechanisms for developing regulations.

President Clinton, on November 6, 2000, signed EO 13175, which replaced EO 13084. The order carries the same title and strengthens the government-to-government relationship between the United States and Indian tribes. It ensures that all Executive departments and agencies consult with Indian tribes and respect tribal sovereignty as they develop policy on issues that impact Indian communities.

2.5.2. Treaty of Neah Bay

In 1855, the United States entered into the Treaty of Neah Bay with the Makah Tribe. This treaty explicitly secures the Tribe's right to continue whaling at its usual and accustomed grounds. The Treaty of Neah Bay is the only treaty between the United States and an Indian tribe that expressly provides for a tribe's right to whale.

Under the Constitution, Congress has the power to abrogate Indian treaties. However, the U.S. Supreme Court has stated that Congressional abrogation must be clear, either expressly in the legislation, or through unambiguous expression in the accompanying record that Congress examined the conflict with the Indian treaty and actively chose to resolve the conflict by abrogating the Indian treaty. (*See* Minnesota v. Mille Lacs Band of Chippewa Indians, 526 U.S. 172, 202-203 (1999). No act of Congress (including the Whaling Convention Act (WCA) and the MMPA) has explicitly abrogated the Treaty of Neah Bay or the Makah right to conduct whaling as reserved in that treaty. Nothing in the WCA or MMPA, nor their legislative histories, even mentions the Treaty of Neah Bay. Congress does not appear to have considered that any conflict might exist between those laws and the whaling right in the Makah treaty.

In dealing with whaling activity conducted under the Treaty of Neah Bay, Federal and state governments are constrained by a large body of law addressing the regulation of fishing and hunting under that and similar treaties. Government agencies must show that a regulation of the exercise of treaty fishing rights is "necessary for the conservation of fish." Tulee v. Washington, 315 U.S. 681, 684-85 (1942). This holding has become known as the "conservation necessity" standard.

"Conservation necessity" has been interpreted narrowly in the cases following Tulee, limited to measures essential to the perpetuation of a particular run or species of fish. (*See* United States v. Washington, 384 F.Supp. 312, 342 (W.D. Wash. 1974), aff'd, 502 F.2d 676, 685 (9th Cir. 1975), cert. denied, 423 U.S. 1086 (1976). Subsequent decisions have allowed a reasonable margin of safety against extinction, but have clarified that only the least restrictive means of achieving a conservation purpose are acceptable. Mille Lacs Band of Chippewa Indians v. Minnesota, 952 F.Supp. 1362, 1382 (D. Minn. 1997), aff'd, 124 F.3d 904 (8th Cir. 1997), aff'd, 526 U.S. 172 (1999); United States v. Washington, 384 F.Supp. at 342. Preventing the depletion of deer in local areas has been rejected as a justification for harvest regulation, where there was an overall quota and an acknowledgment that deer would reoccupy any depleted area. Mille Lacs, 952 F. Supp. at 1382.

2.5.3. International Convention for the Regulation of Whaling

The ICRW has as its objective the proper conservation of world whale stocks, thus making possible the orderly development of the whaling industry. The ICRW established the IWC to provide for a continuing status review of whale stocks and for such additions or modifications of the agreed conservation measures as might be desirable. The ICRW is implemented domestically through the WCA, which governs U.S. participation in the IWC and management of whaling activities under U.S. jurisdiction. Although gray whales are also protected under the MMPA (*See* 2.5.4), Section 113 of the MMPA specifically states that the provisions of the MMPA are in addition to, and not in contravention of, existing international treaties, conventions, or agreements (e.g., the ICRW).

To ensure consistency between its domestic and international obligations, the U.S. Government has taken the position that the United States should obtain IWC approval of an appropriate harvest quota before authorizing aboriginal subsistence whaling. (*See* 50 CFR 230.) The Makah Tribe believes that the whaling provisions of the Treaty of Neah Bay have never been abrogated and that the U.S. obligation to the Tribe takes precedence over U.S. obligations under the ICRW. Although the Tribe does not believe that a Makah subsistence harvest requires IWC approval, the Tribe has worked cooperatively with NOAA to obtain that approval in order to provide its members with the certainty that they can take whales on a limited basis without legal impediment. Other groups have taken the position that the ICRW takes precedence, in part because it is the later treaty. These groups believe the Tribe's right to take whales has been superseded and, therefore, that the United States is under no obligation to allocate a quota to the Tribe for the harvest of gray whales.

NOAA has noted that it is possible to honor obligations contained in both the Treaty of Neah Bay and in the ICRW by granting the Makah a gray whale quota for ceremonial and subsistence within the range of the quota obtained from the IWC.

2.5.4. Marine Mammal Protection Act and Endangered Species Act

After careful analysis, the Departments of Commerce and Interior concluded that the MMPA does not abrogate Indian treaty rights to harvest marine mammals. Where there is no conservation obstacle to the harvest, the National Marine Fisheries Service (NMFS) has not objected to the taking

of marine mammals by Indian tribes with reserved rights. For example, the Makah Tribe harvests Pacific harbor seals and California sea lions with the acquiescence of NMFS.

On June 16, 1994, the Eastern North Pacific gray whale was removed from the ESA's list of Endangered and Threatened Wildlife and Plants. As required under section 4(g) of the ESA, NMFS drafted a "5-year Plan for Research and Monitoring of the Eastern North Pacific Population of Gray Whales" to monitor the status of the stock for a period of at least five years following delisting. NMFS' Plan provided that the Gray Whale Monitoring Task Group would conduct the comprehensive status review. Completed in August 1999, this review recommended that the stock's classification continue as non-threatened.

2.6. Other Environmental Assessments and Environmental Impact Statements

The Makah hunt is likely to occur in and/or adjacent to the Olympic Coast National Marine Sanctuary (Sanctuary). An Environmental Impact Statement (EIS) was prepared prior to designation of the Sanctuary (NOAA 1993). The EIS includes discussion of the Makah Tribe, treaty rights, and the inter-relationship between the Tribe and the Sanctuary in more detail than are contained herein.

In preparation for the 1996 IWC meeting, NOAA revised its regulations pertaining to whaling (61 FR 29628, June 11, 1996). The revised regulations established the mechanism for managing aboriginal subsistence whaling in the United States and broadened the existing regulations to encompass the possibility of Makah whaling if the IWC were to grant the Makah a quota. The regulations did not authorize whaling of any kind nor did it address the specifics of the Makah interest in whaling. The purpose of the revision to the whaling regulations was solely to set up a mechanism to implement IWC decisions.

Prior to the 1997 IWC Annual Meeting, NMFS formally analyzed the environmental impacts of a decision to support or not support whaling, and to determine whether an annual subsistence quota of up to five Eastern North Pacific gray whales would significantly affect the quality of the human environment. A draft EA was distributed for public comment on August 22, 1997. After reviewing and addressing the comments received, NMFS issued a final EA and Finding of No Significant Impact on October 17, 1997.

U.S. Congressman Jack Metcalf, Breach Marine Protection, and several other plaintiffs brought a lawsuit, Metcalf v. Daley, in October 1997, alleging that the U.S. Government had violated the National Environmental Policy Act (NEPA), the WCA, and other statutes. In September 1998, the U.S. District Court for the Western District of Washington ruled in favor of the U.S. Government on all issues.

On June 9, 2000, the Ninth Circuit Court of Appeals overturned one aspect of that decision, ruling that the 1997 EA should have been completed before the U.S. and the Makah Tribe entered into a cooperative agreement. That agreement had provided that, if the Tribe prepared an adequate needs statement documenting a cultural and subsistence need to harvest gray whales, NOAA would request

a quota of gray whales from the IWC. Two judges on a three-judge panel held that the timing of the EA, which was completed after the 1996 agreement was signed and before the 1997 annual meeting of the IWC, may have predisposed the preparers to find that the whaling proposal would not significantly affect the environment. The Court ordered NOAA to set aside that finding and comply with NEPA under circumstances that would ensure an objective evaluation of the environmental consequences of the gray whale harvest.

Following the Court action, NOAA rescinded its cooperative agreement with the Makah Tribe on August 11, 2000. The Makah Tribe responded on August 31, 2000, that it does not accept NOAA's rescission of the agreement. NOAA subsequently set the gray whale quota for 2000 at zero (65 FR 75186, December 1, 2000) and is setting the 2001 gray whale quota for 2001 at zero, pending completion of its NEPA analysis.

2.7. Federal Licenses Necessary to Implement the Proposed Action

A license is issued to whaling captains through the procedures set out in NOAA regulations (50 CFR 230.5), for aboriginal subsistence whaling allowed by the IWC. These procedures require that whaling may only be conducted in accordance with a cooperative agreement between the relevant Native American whaling organization and NOAA. NOAA must also publish aboriginal subsistence whaling quotas and any other limitations on such whaling in the Federal Register (50 CFR 230.6).

3. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

3.1. Alternative 1 - Grant Makah Tribe the IWC Quota With Restrictions to Target Hunt on Migrating Whales (similar to the 1999 regime)

Under this alternative, NOAA would grant the Makah Tribe the IWC quota of up to five whales a year for ceremonial and subsistence purposes, with restrictions on the time, place, and/or manner of the hunt similar to those in place during the Tribal hunts in 1999. The hunt would be structured with the intent of targeting migrating whales by limiting the area of the hunt to the ocean area of the Tribe's usual and accustomed grounds (U&A) (outside the Straits of Juan de Fuca westward of a line from Bonilla Point in Canada to Tatoosh Island off northern Washington), and by limiting the timing of the hunt to occur only when the northward or southward gray whale migrations are underway. This alternative would allow the Makah Tribe to determine when it conducts a hunt within a prescribed migration season in the ocean area of its U&A. It is expected that the Makah Tribe would use the methods utilized in 1999, which included pursuit and harpooning from a canoe, followed by immediate dispatch of a harpooned whale with a large caliber rifle discharged from a motorized vessel. The hunt would be restricted to either five gray whales landed or seven whales struck, and the hunt would be terminated either when five gray whales are landed or seven whales are struck, whichever occurs first in a given year. (Seven strikes is the limit for 2001 and 2002 set in the 1997 agreement between NOAA and the Makah Tribal Council.)

Under any of the quota alternatives (1, 2, and 3), utilization of the whale would be limited to ceremonial and subsistence use. Commercial use would be forbidden, consistent with the purpose and intent of the IWC subsistence quota. In accordance with IWC and NOAA regulations, takes of a calf or of a female accompanied by a calf (referred to as 'mother-calf pairs') would be prohibited.

3.2. Alternative 2 - Grant Makah Tribe the IWC Quota With Restrictions That Allow a Limited Hunt on the Pacific Coast Feeding Aggregation

Under this alternative, NOAA would grant the Makah Tribe the IWC quota of up to five whales a year for ceremonial and subsistence purposes, with restrictions that allow a limited hunt on the Pacific coast feeding aggregation. Under this alternative, the Tribe would not be entirely restricted to targeting migrating whales (as in Alternative 1). It would have the flexibility to determine when and where the hunt occurs in the U&A, so long as the hunt does not adversely impact the Pacific coast feeding aggregation of gray whales off the West Coast. This alternative would acknowledge the Makah Tribe's request to conduct a limited hunt in the summer in the Straits and to hunt in the ocean in September and October when weather conditions are more tolerable. The overall annual quota of five whales landed or seven whales struck described in Alternative 1 would be retained, and restrictions would be established for the number of strikes/landings permitted outside the migration period and/or inside the Tatoosh-Bonilla line to ensure that the Pacific coast feeding aggregation is not adversely impacted. This alternative would allow the Makah Tribe to determine how it wants to conduct a hunt and to set hunting seasons in its entire U&A, so long as the IWC quota is not exceeded, restrictions regarding takes from the Pacific coast feeding aggregation are followed, and the hunt is humane. It is expected that the Makah Tribe would use the methods utilized in 1999, which included pursuit and harpooning from a canoe and immediate dispatch of a harpooned whale with a large caliber rifle discharged from a motorized vessel.

3.3. Alternative 3 - Grant Makah Tribe the IWC Quota Without Time-Area Restrictions

Under this alternative, NOAA would grant the Makah a quota of up to five whales a year for ceremonial and subsistence purposes, without any Federal restrictions on the time or place of the hunt. This alternative would allow the Makah Tribe to determine when and where to hunt gray whales in its U&A. The overall annual quota of five whales landed or seven whales struck described in Alternative 1 would be retained.

3.4. Alternative 4 - (No Action) - Do Not Grant Makah Tribe the IWC Quota

Under this alternative, NOAA would deny the Makah Tribe a whaling quota for cultural and subsistence purposes. Several scenarios are conceivable under this option: 1) the Makah Tribe might litigate to force the government to honor its treaty rights; 2) NOAA could encourage and assist the Tribe in non-lethal whaling ventures such as whale watching or ecotourism; 3) NOAA could compensate the Tribe for its loss; and 4) the Makah Tribe could proceed to hunt gray whales under its treaty right without issuance of a quota.

4. AFFECTED ENVIRONMENT

4.1. Geographic Location

4.1.1. Makah Tribe's Usual and Accustomed (U&A) Grounds

The Treaty of Neah Bay reserves the Makah's "right of taking fish and of whaling or sealing at usual and accustomed grounds and stations." The Makah Tribe is the only tribe in the United States with this specific whaling provision in a treaty. Makah whaling would occur in the Makah Tribe's U&A located off northern Washington in U.S. waters north of 48°02'15" N. latitude (at the Norwegian Memorial), east of 125°44'00" W. longitude, and west of 123°42'30" W. longitude (at Tongue Point just east of Crescent Bay in the Straits of Juan de Fuca). The Makah U&A is within the Olympic Coast National Marine Sanctuary in coastal waters (note the Sanctuary extends further south than the Makah U&A, but does not extend as far into the Straits of Juan de Fuca as the Makah U&A; it ends at Koitlah Point just inside the Straits). The Makah U&A overlaps two of the National Wildlife Refuges (Flattery Rocks and Quillayute Needles) in northern Washington.

4.1.2. Olympic Coast National Marine Sanctuary

NOAA designated the Olympic Coast National Marine Sanctuary (Sanctuary) in 1994 under the National Marine Sanctuaries Act, on the basis that the site possesses a unique and nationally significant collection of flora and fauna and cultural/historical resources. It adjoins lands in the Olympic National Park and U.S. Fish and Wildlife Refuges. The area is managed as part of a network of 13 marine sanctuaries throughout the United States.

The Sanctuary encompasses approximately 2,500 square nautical miles of coastal and ocean waters, and the submerged lands thereunder, off the central and northern coast of the State of Washington. The Sanctuary boundary extends from Koitlah Point due north to the United States/Canada boundary seaward to the 100-fathom isobath. The seaward boundary of the Sanctuary approximates the 100-fathom isobath in a southerly direction from the U.S./Canada boundary to a point due west of the Copalis River, transecting the heads of Juan de Fuca and Quinault Canyons and touching the edge of Nitinat Canyon. The shoreward boundary of the Sanctuary is the mean low water line when adjacent to Indian reservations and state and county lands. When adjacent to Federally managed lands, the coastal boundary extends to the mean high water line. The coastal boundary cuts across the mouths of all rivers and streams.

The Sanctuary is a highly productive, nearly pristine ocean and coastal environment that is important to the continued survival of several ecologically and commercially important species of fish, shellfish, and marine birds and mammals. Its rugged and undeveloped coastline makes the region one of the more dramatic natural wonders of the coastal United States, paralleling the majestic splendor of such terrestrial counterparts as Yosemite National Park and the Grand Tetons. The region's high biological productivity is fueled by seasonal enhanced upwelling along the edge of the

continental shelf, especially at submarine canyons, during periods of high solar radiation and northwesterly winds.

The diversity of habitats that make up the Sanctuary supports a great variety of biological communities. The unusually large range of habitat types include: offshore islands and rocks (most within the three National Wildlife Refuges: Flattery Rocks, Quillayute Needles, and Copalis); some of the most diverse kelp beds in the world; intertidal communities; erosional features such as rocky headlands, seastacks, and arches; interspersed exposed beaches and protected bays; submarine canyons; the continental shelf, including a broad shallow plateau extending from the mouth of the Juan de Fuca canyon; and continental slope environments. The numerous seastacks and rocky outcrops along the Sanctuary's high energy coastline, coupled with a large tidal range and wave splash zone, support some of the most diverse and complex intertidal and subtidal zones in the United States.

In addition to the Sanctuary's value with respect to its biological resources, the region encompasses significant historical and cultural resources including Indian village sites, ancient canoe runs, petroglyphs, Indian artifacts, and numerous shipwrecks. An important feature of the Sanctuary is its proximity to four Native American reservations and the U&A's of the Makah, Quileute, Hoh, and Quinault Indian Tribes.

The management goal of the Sanctuary is to protect the marine environment and other resources and qualities of the Sanctuary while allowing for compatible and sustainable resource uses. The Sanctuary accomplishes this mandate through a combination of regulations, research, education, and resource protection programs. Within the Sanctuary, regulations prevent or reduce the most common and potentially devastating threats to populations of marine mammals and birds, critical habitats, and fundamental ecological processes. Bans on offshore oil and mineral exploration, drilling, seabed disturbance, pollution discharge, and restrictions on low flying aircraft provide critical protection to the marine environment of the Olympic Coast. These protections would be diminished or simply not exist without marine sanctuary designation.

While some activities are prohibited, sanctuaries do not impose a total prohibition on human use. Activities such as fishing, shipping, and recreational use are allowed as long as they are compatible with the primary objective of protecting marine resources. The nature and extent of allowed activities are defined through regulation and in a detailed management plan based on the unique qualities of each sanctuary. Research and monitoring evaluate the effectiveness of sanctuary programs and regulations. Each sanctuary's management plan is periodically updated to reflect new information and in consideration of program effectiveness. As a result of this review, changes in regulations can be proposed.

Through its regulations, the Sanctuary recognizes the pre-existing Treaty rights of the Native American tribes that share the Sanctuary's coastal border, including the Makah Tribe along the northern portion of the Sanctuary. Throughout the designation process for the Sanctuary, NOAA consistently affirmed that the Sanctuary would operate with full recognition of treaties and the legal

opinions, including U.S. v. Washington, which upheld those treaty rights.

Sanctuary regulations prohibit the taking of marine mammals and birds in or above the Sanctuary, except as authorized by NMFS or the U.S. Fish and Wildlife Service (USFWS) under the authority of the MMPA and the Migratory Bird Treaty Act, or pursuant to any treaty with an Indian tribe to which the United States is a party, provided that the treaty right is exercised in compliance with applicable U.S. law. In this case, the Makah Tribe has a pre-existing treaty right to take whales as defined in the Treaty of Neah Bay.

4.1.3. Wildlife Refuge

The two National Wildlife Refuges within the Makah Tribe U&A off the coast of northern Washington, Flattery Rocks and Quillauyte Needles, are part of a complex of 870 islands, rocks, and reefs extending for more than 100 miles along Washington's Pacific coast from Cape Flattery to Copalis Beach. These islands are protected from human disturbance and predators, yet are close to abundant ocean food sources. They are a vital refuge where 14 species of seabirds nest and raise their young. The total population of seabirds, waterfowl, and shorebirds may exceed a million birds. Sea lions, harbor seals, sea otters, porpoise and whales are common around the islands. Most of the coastal islands are designated as wilderness. These islands are closed to the public in order to protect seabird nesting sites, but can be viewed from the coastal highway or ocean beaches.

The refuges on the Washington coast are managed under the USFWS National Wildlife Refuge System to preserve and protect habitat for seabirds and other wildlife. Collectively the refuges total over 430 acres. Surveys and monitoring are a significant part of the biological program. The refuges are within the boundaries of the Sanctuary and the Olympic National Park.

4.1.4. Coast Guard's Restricted Navigation Area

On November 10, 1999 (64 FR 61209), the Coast Guard issued final regulations at 33 CFR 165.1310 that establish a permanent regulated navigation area (RNA) along the northwest Washington coast and in a portion of the entrance of the Strait of Juan de Fuca. The establishment of a RNA allows the Coast Guard to impose restrictions on vessel activities in a specified area for specified purposes. In this case, the RNA was established to reduce the danger of loss of life and property in the vicinity of Makah whale hunting activities. Within this RNA, a moving exclusionary zone (MEZ) around the Makah hunting vessel is created for the duration of each hunt.

The Coast Guard first published a notice of proposed rulemaking on this RNA on July 22, 1998 (63 FR 39256), and requested public comments. On October 1, 1998 (63 FR 52603), the Coast Guard published an interim final rule entitled "Regulated Navigation Area, Strait of Juan de Fuca and Adjacent Coastal Waters of Washington; Makah Whale Hunting" and allowed for further public comments.

The RNA extends out 12 nautical miles from shore along the Washington coast from the southward

end of the Makah Tribe's U&A at 48°02'25"N latitude, then north to Cape Flattery, and then east to 124°34'W longitude. The regulation does not affect normal transit or navigation in the RNA except during, and in the immediate vicinity of, a hunt. Within the RNA, an MEZ will surround one Makah whale hunt vessel engaged in whaling. For the duration of each hunt, vessels and persons are excluded from the column of water from the surface to the seabed within a radius of 500 yards centered on a Makah whale hunt vessel. Except for Makah whaling vessels, a media pool vessel, and vessels with Coast Guard authority to navigate within the MEZ, vessels operating in the RNA during a Makah whale hunt may not enter, and must avoid being overtaken by, the MEZ. The regulation imposes no other restrictions on navigation.

The activation of the MEZ is signaled by the flying of the international numeral pennant 5 from a Makah whale hunt vessel. Only one Makah vessel actually engaged in whale hunt operations is authorized to fly the international numeral pennant 5 within the RNA at any one time. The MEZ is only active while whaling operations are ongoing and the international numeral pennant 5 is flown.

The Coast Guard, in implementing this rule, acknowledged that the Makah's intended use of harpoons and a .50 caliber rifle, the unpredictable actions of a whale once struck, and the unforgiving nature of a cold ocean environment called for carefully tailored safety measures. The RNA was implemented in order to reduce dangers to nearby vessels and persons during Makah whale hunting operations by minimizing the risks from the uncertain movements of a pursued, wounded, or towed whale and from the dangers of high powered rifle fire.

The Coast Guard recognized that there is a public interest in the media's recording and documenting this event. The rule allows a single press pool vessel within the MEZ subject to certain restrictions. Requiring other members of the public, including potential protesters, to remain 500 yards away from the hunt was deemed by the Coast Guard to be a reasonable restriction, considering the serious safety concerns presented by a whale hunt.

4.2. Eastern North Pacific Gray whale

There are two populations of gray whales (*Eschrichtius robustus*) in the North Pacific: the eastern North Pacific population that migrates along the west coast of North America between Mexico and Alaska, and the western North Pacific (or "Korean") population that migrates along the coast of eastern Asia (Rice et al. 1984). Gray whales were historically found in the North Atlantic Ocean, but are currently found only in the North Pacific (Rice et al. 1984). The most recent summary of population structure in gray whales, prepared for the 52nd meeting of the IWC in June/July 2000, found strong evidence, including significantly different genetic diversity (i.e., haplotypic diversity), that the eastern and western North Pacific populations of gray whales should continue to be managed as separate stocks (Swartz et al. 2000).

The gray whale is readily recognized by a mottled gray color and lack of a dorsal fin. Instead of a dorsal fin, it has a low hump, followed by a series of 10 or 12 knobs along the dorsal ridge of the tail stock, which are easily seen when the animal arches to dive. The adult gray whale is 36 to 50 feet

long and weighs between 16 and 45 tons. Both male and female gray whales reach sexual maturity when they are between five and 11 years old, with the average being eight years (Rice 1986).

Female gray whales usually breed once every two years. The gray whale breeding season is limited primarily to a three-week period in late November and early December near the start of their southward migrations. However, if no conception occurs at that time, a second oestrus cycle can occur within 40 days (Rice and Wolman 1971), such that a few females may breed as late as the end of January on the winter grounds (Jones and Swartz 1984). During the following summer, the pregnant females put on 25% more weight than the non-pregnant females. Females ready to give birth often, but not always, resort to certain shallow, protected lagoons in Baja California. Gray whale calves are born in the winter after a gestation period of about 13.5 months. At birth, the calves are 15 feet long and weigh close to 1,000 pounds. The mothers' rich milk, containing more than 50% fat, nourishes the calves for several weeks on the winter grounds and during the long migration to the summer grounds. The calves grow rapidly and, by August, when they are weaned, they are approximately 28 feet long. During the remaining two or three months on the summer grounds, calves feed heavily, and by the time they head south in late autumn, they are approximately 30 feet long (Rice 1986). Additional information on the life history of gray whales can be found in Rugh et al. (1999a), Jones et al. (1984), Rice (1986), Rice et al. (1984), and Rice and Wolman (1971).

The eastern North Pacific gray whale population has made a remarkable recovery since its depletion in the early 1900s caused by commercial whaling. This population originally received protection from commercial whaling in 1937 with the International Agreement for the Regulation of Whaling. Protection continued under the 1946 ICRW (Reeves 1984).

Gray whales were listed as endangered under the ESA on June 2, 1970 (35 FR 8495). Then, following a comprehensive evaluation of their status (Breiwick and Braham 1984), NMFS concluded on November 9, 1984 (49 FR 44774), that this population should be listed as threatened, instead of endangered, under the ESA. However, no further action was taken until 1991 when a subsequent review was completed and made available to the public on June 27, 1991 (56 FR 29471). The latter review showed the best available abundance estimate (in 1987/88) was 21,296 whales with an average annual rate of increase of 3.29% (Buckland et al. 1993). Calculations indicated that this population was approaching carrying capacity (Reilly 1992). Therefore, NMFS proposed, on November 22, 1991 (56 FR 58869), that this population be removed from the list of endangered and threatened wildlife under the ESA. After an extensive review period, NMFS published a final notice of determination (58 FR 3121, January 7, 1993) that this population should be removed from the list because the population had recovered to near its estimated original population size and was neither in danger of extinction throughout all or a significant portion of its range, nor likely to again become endangered within the foreseeable future. On June 16, 1994 (59 FR 31094), the eastern North Pacific gray whale population was formally removed from the list of endangered and threatened wildlife under the ESA.

As required under section 4(g) of the ESA, NMFS drafted a five-year plan to monitor the status of the stock for a period of at least five years following the delisting. In accordance with this draft plan,

a workshop was convened by NMFS on March 16-17, 1999, in Seattle, Washington, to review the status of the stock based on research conducted during the five-year period following delisting. Results of the workshop indicated that there was no apparent reason to reverse the previous decision to delist this stock and that it was currently neither endangered nor threatened (Rugh et al. 1999a).

4.2.1. Current Abundance, Trends and Status

Recent estimates of the size of the entire population come from the analyses of systematic shore counts of southward migrating gray whales initiated in 1967/68 at Yankee Point near Monterey, California, where the majority of the population pass within two to three kilometers of shore. These shore counts moved to Granite Canyon (seven kilometers south of Yankee Point) in 1974/75 and continued there for most years up to 1997/98. Analysis of these shore-based counts indicate that in 1997/98 the eastern North Pacific gray whale population was 26,635 whales (95% CI = 21,878 to 32,427) (Hobbs and Rugh 1999).

An analysis of abundance estimates from shore-based counts indicate that the population increased by approximately 2.5% per year (SE=0.3%) between 1967/68 and 1995/96 (Buckland and Breiwick *In press*). A Bayesian analysis of gray whale population dynamics for the same period suggested the rate of increase of the population could have been 3.4% (95% CI=2.5-4.2%), if the Russian natives had not conducted a harvest (Wade and DeMaster 1996).

Shore-based sighting surveys were conducted to estimate the number of northward migrating gray whale calves passing Piedras Blancas, California, for seven consecutive years (1994-2000). Additional research included: (1) aerial surveys to determine offshore distribution in 1994 and 1995; (2) the use of thermal sensors in 1994-1996 to measure day/night migration rates; and (3) concurrent replicate watches near the peak of each migration to estimate sightings missed by the standard watch team. During good conditions, calf counts were 325 in 1994, 194 in 1995, 407 in 1996, 501 in 1997, 442 in 1998, 141 in 1999, and 96 in 2000. Correcting these counts for periods not on watch and for calves missed produced final estimates of 927 calves (SE = 88.85) for 1994, 614 calves (SE =65.72) for 1995, 1132 calves (SE = 65.98) for 1996, 1520 calves (SE = 83.07) for 1997, 1323 calves (SE = 77.84) for 1998, 428 calves (SE = 55.53) for 1999, and a preliminary estimate of 282 calves (SE = 28.93) for 2000. Calf production indices (calf estimate/total population estimate) are 4.0%, 2.7%, 5.1%, 6.8%, 5.0%, 1.6% and 1.0% for the years 1994-2000 respectively. Fluctuations in calf production over this time period were positively correlated with the length of time that primary feeding habitat was free of pack ice during the previous year.

Wade (1994) reported that, based on a Bayesian analysis of the census data between 1967/68 and 1993/94, the eastern North Pacific stock of gray whales was between 0.51 and 0.97 of its carrying capacity, and that the rate of net production at the maximum net productivity level was 0.033 (95% CI: 0.023-0.044). However, this conclusion was regarded as questionable at the 1994 IWC Scientific Committee meetings, because the analysis may have been unduly influenced by the 1992 census and because the variance of the abundance estimate was likely underestimated (i.e., negative biased). When incorporating the 1995/96 abundance estimate, Wade and DeMaster (1996) estimated the

maximum net productivity rate ($R_{MAX)}$ from the period between 1967/68 and 1995/96 at 0.053 (95% CI: 0.031-0.113). This estimate is not significantly different from the default rate for R_{MAX} of 0.04 for cetaceans (Wade and Angliss 1997).

Under the MMPA, all human-caused mortalities are evaluated relative to the species' Potential Biological Removal level (PBR), which is the NMFS management strategy for achieving the primary goal of the MMPA to prevent any marine mammal stock from being reduced below its optimum sustainable population level (OSP), and to restore stocks that have been reduced below that level. The PBR is defined as the product of the minimum population estimate, one-half the maximum theoretical net productivity rate, and a recovery factor: $PBR = N_{MIN} \times 0.5R_{MAX} \times F_R$. The N_{MIN} for the eastern North Pacific gray whale stock was estimated as the 20th percentile from the log-normal distribution for the estimates of abundance (i.e., 24,477), based on the most recent survey to determine abundance. Based on recommendations from the Alaska Scientific Review Group, NMFS used a R_{MAX} value of 0.053 in calculating a PBR for this stock in 2000 (Ferrero et al. *In prep*.). Lastly, NMFS used 1.0 as the recovery factor (F_R) for this stock, which is the upper limit of the range of values for non-listed stocks that are increasing while undergoing removals due to subsistence hunters (Wade and Angliss 1997). Thus, for the eastern North Pacific stock of gray whales, the PBR is 649 animals (24,477 x 0.5 x 0.053 x 1.0) (Ferrero et al. *In prep*.).

PBR calculations (Wade and Angliss 1997) and performance simulations (Wade 1998) have been based on the concept of averaging mortality over a given time period. In the simulations by Wade (1998), true mortality was allowed to vary annually around the PBR with a coefficient of variation as high as 0.8. The performance of the management scheme was deemed adequate under these circumstances. In many fisheries, estimates of mortality are subject to error and are often not conducted annually; these estimates are typically averaged over several years (Wade and Angliss 1997). Therefore, in assessment of impacts on the population, NMFS does not restrict its assessments of quotas to annual values. As long as the average over the three-year period is less than the PBR, the take should be considered sustainable within the framework of the PBR management strategy (Wade and Angliss 1997).

The eastern North Pacific stock of gray whales has been increasing in recent years despite known harvests. Based on currently available data, the estimated annual level of human-caused mortality and serious injury (83), which includes mortalities from commercial fisheries (6), subsistence harvest (76), and ship strikes (1), does not exceed the PBR (649) for the eastern North Pacific stock of gray whales (Ferrero et al. *In prep*.).

4.2.2. Migration

Gray whales migrate south out of the Bering Sea through Unimak Pass, Alaska, from late October to early January, with peak numbers of whales (when 50% of the sightings have been recorded at a shore station) going through Unimak Pass on or about December 12 (Rugh 1984, Rugh et al. 1999a). The peak of the southward migration observed in the 1970s was the last two weeks of November and first three weeks of December, but a one-week shift in migration dates has occurred since the 1970s

(Rugh et al. 1999a). The estimated time of migration through Unimak Pass in recent years is consistent with observations made in central California at Granite Canyon, where NMFS has a counting station that operated in 1993/94, 1995/96 and 1997/98 (Hobbs and Rugh 1999). Using an estimated travel speed of 144 km/day (Swartz et al. 1987), southbound gray whales should be able to travel the estimated 5,000 km from Unimak Pass to Granite Canyon in 35 days (Rugh et al. 1999a). Sighting rates are very low in mid-December at Granite Canyon, peaking on January 15 (plus or minus three days), and ending in mid-February. The southward migration generally ends in mid-February just as the northward migration begins. This migration timing appears to be consistent from Oregon to Mexico and through all the years for which data are available (Rugh et al. 1999a). In California, the last of the southbound animals sometimes overlap with the first northbound migrants. This overlap suggests that only a portion of the migrating population is in the waters of Mexico during the winter, while the remainder is distributed in the coastal waters of southern and central California (Swartz 1986).

The southward migration is segregated by age, sex, and reproductive status (Rice and Wolman 1971); the vanguard is led by near-term pregnant females, followed by oestrus females and mature males. The last phase includes immature animals of both sexes. Gray whales begin to arrive in the coastal lagoons of Guerrero Negro, Ojo de Liebre (Scammon's Lagoon), San Ignacio, and Bahia Magdalena in late December and early January, and reach maximum densities there by mid-February (Jones and Swartz 1984). While the majority of the calves are believed to be born within or near these coastal lagoons, sightings of newborn calves migrating south past central and southern California in January and February have increased over the recent past (Shelden et al. 1995). Assuming calving dates have been consistent over the years, the change in observations of calves well north of Mexican waters may be related to the delayed onset of the migration (Buckland and Breiwick *In press*), resulting in females not migrating as far south as Mexico by the time parturition occurs. Delays in the migration may be a function of increased competition for food among this stock, which results in more extensive foraging for food in northern latitudes and requires whales to travel farther when they start to migrate south (Rugh et al. 1999a).

The northward migration from the southern range occurs in two distinct phases segregated according to age, sex, and reproductive condition (Poole 1984, Swartz 1986). In central California, the first phase begins in mid- to late-February and includes newly pregnant females. They are followed by adult males, anestrous females and immature whales of both sexes. These northbound migrants pass central California and Oregon in February and March and are observed entering the Bering Sea through Unimak Pass from late March through May each year (Braham 1984). The northward migration is slower than the southward migration (Pike 1962). The last group of whales to leave the wintering grounds are the females with calves of the year, departing one to one-and-a-half months after the others. Their protracted departure from the winter range begins in late March and continues until May in some years. Females with calves migrate more slowly than whales without calves, presumably to accommodate nursing and the slow swimming speed of calves. Females with calves are observed passing through central California to Oregon from late March through June (Herzing and Mate 1984, Perryman et al. 1999) and are seen entering the Bering Sea from May through June (Braham 1984).

There has been relatively little effort off Washington to document the timing of the migration because: 1) during their southward migration, gray whales travel well offshore through this area (Pike 1962; Green et al. 1995); 2) access to strategic observation sites is poor, and there is a lack of appropriate facilities; and 3) winter weather in the Pacific Northwest is typified by strong winds, high seas, rain, and fog, making it unlikely that the entire migration could be documented annually.

In 1998, NMFS attempted to document the southward migration off northern Washington by placing an observer in the Tatoosh Island lighthouse (Jones 1999). During 12 days of observation from November 30 to December 16, gray whales were sighted on only three occasions (December 2, 4, and 14). The low number of sightings was attributed by Jones (1999) to the possibility that whales were migrating farther offshore out of sighting range or that the study period possibly represented the early stages of migration, thus few whales were in the vicinity. NMFS also conducted six aerial surveys off northern Washington in November and December 1998 and in January 1999 to assess migration timing and distance from shore (Shelden et al. 1999). Only six pods of gray whales were sighted during aerial surveys: none during two surveys in November; three pods during two surveys in December; and three pods during two surveys in January. The pods sighted ranged from 5.5 to 47 km offshore during these surveys. Because of the low number of sightings and limited survey effort (due to poor surveying conditions from inclement weather), Shelden et al. (1999) drew no conclusions on migratory timing.

Pike (1962) reported that the southward migration off Washington and British Columbia began in late September and October, peaked in late December, and ended in late January, based on observations by lighthouse and light-ship operators in the late 1950s. He noted, however, that few southbound migrants are seen off Washington and British Columbia because of reduced visibility in winter months. Studies just north of Washington, along Vancouver Island from November 15 to May 1 from 1972 to 1977 found that the southward migration in this area occurred from November to mid-January with a peak in the last two weeks in December (Darling 1984). This study showed northward migration in this area begins in February, peaks in late March and early April, and continues through May or early June. Studies to the south of Washington, off central Oregon from 1978-1981, found the southward migration in this area was from early December to mid-February with a peak in the first week of January (Herzing and Mate 1984).

NMFS funded a more recent study on southward migration timing off Oregon from December 5, 1998, to February 15, 1999, which showed the start of the migration was three weeks later and the peak was six days later than the 1978-91 study (Mate and Poff 1999). However, there has been a one-week delay in the migration since the 1970s, so the timing of the migration in 1998/99 was on schedule relative to dates observed in California through the 1980s and 1990s (Rugh et al. 1999a). There are anecdotal reports of southbound gray whales as early as mid-November in central California, but these and Pike's (1962) report of gray whales in September in Washington may represent movements of whales in summer feeding aggregations rather than migrants from the northern feeding grounds in western Alaska.

Some studies suggest that gray whales migrate farther offshore of Washington during the southward

migration. Pike (1962) observed many gray whales migrating off Washington between 8-28 km offshore, with a single sighting of three gray whales 37 km west of Cape Flattery. Green et al. (1995) reported that gray whales occur significantly farther offshore in Washington during the southward migration versus the northward migration. The mean distance offshore for southbound migrants off Washington was 25.2 km compared to 11.8 km offshore during the northward migration (Green et al. 1995). Shelden et al. (2000) reported southward migrating gray whales as far as 47 km offshore of Washington.

Although past scientific literature (Pike 1962, Darling 1984, Herzing and Mate 1984) indicates the southward migration can occur off Washington in November, an analysis of recorded travel speeds, estimated distances, and known dates from recent studies at Unimak Pass and Granite Canyon (Rugh et al. 1999b) indicates southward migrating gray whales would be expected to begin occurring off Washington in early December, peaking on or about January 5, and ending in the first week of February. Most of the southward migration (between the 10th and 90th percentile sighting dates) occurs across a period of 43 days, but the entire migration may take more than 70 days to pass through an area (Rugh et al. 1999a). The northward migration would be expected to occur from late February to the end of June, with adult females and calves passing through the area after mid-March.

4.2.3. Pacific Coast Feeding Aggregation

Most eastern North Pacific gray whales spend the summer in the shallow waters of the northern and western Bering Sea and in the adjacent waters of the Arctic Ocean; however, some remain throughout the summer and fall along the Pacific coast as far south as southern California. Observations of gray whales in summer months in locations well south of Alaska are not recent occurrences; they have been documented during periods of low and high population abundance (Gilmore 1960, Pike 1962, Rice 1963, Gilmore 1976, Patten and Samaras 1977, Nerini 1984, Mallonee 1991, Avery and Hawkinson 1992, Clapham et al. 1997, Sanchez-Pacheco et al. *In press*). These animals have been referred to as "summer residents," a term first used by Pike (1962) to describe gray whales that occurred off British Columbia during June through September. However, photo-identification studies show that these whales 1) move widely within and between areas on the Pacific coast to feed in the summer and fall, 2) are not always observed in the same area each year, and 3) may have several year gaps between resightings in studied areas (Calambokidis and Quan 1999, Quan 2000), so the term "summer resident" or "seasonal resident" is a misnomer. This EA uses the term "Pacific Coast Feeding Aggregation" to distinguish these gray whales from those that feed in the northern and western Bering Sea/adjacent waters of the Arctic Ocean.

Gray whales have distinctive natural markings (pigmentation and scars) on their dorsal area that can be used to distinguish individual animals. Researchers began taking photographs of the dorsal area of gray whales in the 1970s off Vancouver Island. They found that individual gray whales could be distinguished by comparing photographs, and the movements and occurrence of individual animals within and between years could be monitored (Darling 1984).

Studies on the behavior and movements of gray whales along the Vancouver Island coast during the

summer (Darling 1984) found that most of the gray whales were within one kilometer of the coast, and that their most common behavior was feeding. Darling (1984) used photo-identification to identify individual whales. He found that many gray whales traveled throughout the summer to various feeding sites separated by as much as 77 km, while other whales spent the entire summer in a single bay. He also documented whales using different feeding sites (separated by as much as 150 km) in different years. Not every whale was seen each year, suggesting that some whales spent the summer outside of his study area. Variation in prey availability and foraging success by whales is likely to complicate any pattern of habitat usage and the length of fidelity to a particular area. In discussing the variation in annual turnover patterns of gray whales (i.e., frequency and pattern of sightings), Darling (1984) proposed two plausible explanations: 1) a single "northwest coast" group of whales that mixed and was not completely observed between years because of varying effort and a limited spatial scale for observation; and 2) a Vancouver Island group of whales, some of which return annually for a series of years (from two to at least eight) and then go elsewhere, probably on full migration, while others spend only one summer in the area. Both of these explanations are plausible, but they are not necessarily mutually exclusive; both may be true to some degree. The interpretation of movement patterns and fidelity of gray whales during the summer and fall depends on the spatial and temporal scales of the observations.

Photo-identification of individual gray whales in Washington began in 1984 by Cascadia Research Collective (CRC) (Calambokidis et al. 1994). Calambokidis et al. (1994) developed a catalog of these individual whales and had 76 individual whales in the catalog by 1993. Resights of these whales indicated that some whales returned over several years to the same areas to feed in the summer, while others were seen only once or twice and during only one year. Of the 76 whales referred to in the 1993 CRC catalog, only 17 (22.3%) had been observed during more than one year from 1984-1993 (Calambokidis et al. 1994). Only eight of the 17 whales (10.5%) were seen in the same area during a subsequent year, indicating that overall site fidelity may have been low. Calambokidis et al. (1994) also discussed seasonal residency or tenure of individual whales and defined this parameter as the "minimum estimate of time present between the first and last sighting." The longest tenure recorded was 112 days for one whale; the average tenure was 47 days. This method, however, assumes that whales were in the area during the full extent between sightings, even during periods of long gaps between sightings when they could have traveled out of the region.

In 1996, NMFS began annual vessel surveys for gray whales in the summer and fall in northwestern Washington waters and off southern Vancouver Island. Gosho et al. (1999) documented within-year movements between the northwest Washington outer coast and both sides of the Strait of Juan de Fuca (southern Vancouver Island and Washington), and a between-year shift in whale concentration from northern Washington in 1996 to the Strait of Juan de Fuca in 1997. In 1997 and 1998, the whales occurred more frequently off the southern Vancouver Island than in Washington waters. Although a relatively large number of whale sightings were made, the photo-identification of the whales showed that only 18 individuals were present in 1996 and 28 individuals in 1997. Most of the whales identified in 1996 and 1997 had been sighted in previous years: 78% (14 of 18 whales) of the individuals in 1996 had been observed in previous years, and 82% (23 of 28) of the whales in 1997 (Gosho et al. 1999). The percentage of whales in this area observed in previous years

dropped in 1998 to 56% (32 of 57) -- 44% were newly identified whales (Calambokidis et al. 1999). The gray whales moved between areas along the Washington coast, in the Strait of Juan de Fuca, and off the coast of Vancouver Island. Despite intensive survey effort, the absence of identified animals suggests that they had moved out of the study area during the season and later returned. Of the 28 whales identified in 1997, 62% were observed in 1996. Of the whales identified in 1996, 65% were re-sighted in 1997 (Gosho et al. 1999).

In 1998, photo-identification studies were expanded to survey suitable habitat (at varying levels of effort) from northern California to southeast Alaska. By expanding the spatial coverage, the observed range of within-season movements likewise expanded, and a better understanding of between-year movements was achieved. Within-year movements of 57 whales were documented between various regions along the coast, with the most frequent movements between northern Washington, the Strait of Juan de Fuca, and southern and central Vancouver Island (Calambokidis et al. 2000a). Larger scale movements were also documented from northern California and Oregon to southern and central Vancouver Island.

Of the whales identified in all areas in 1998, 55% had previously been seen in another year in Washington and were already part of the CRC photo-catalog (Calambokidis et al. 2000a). Gray whales that have been seen in northern Washington and the Strait of Juan de Fuca have also been seen in other years in all other regions along the coast (Calambokidis et al. 2000a). Although it is not possible to quantify the amount of movement between regions without several more years of range-wide surveys, the following examples illustrate the range of movements. A whale (CRC #68) that was seen in 1996 and 1997 by Gosho et al. (1999) in the Strait of Juan de Fuca was not seen in that same area in 1998 but was seen in southeast Alaska. Likewise, another whale (CRC #127) that had been seen in the Strait of Juan de Fuca in 1997 was only seen in northern California in 1998. A third whale (CRC #145), with a tenure of 99 days near southern Vancouver Island and northern Washington in 1996, was seen only in the central Vancouver Island and Oregon regions during 1998. Such occurrences may be the result of range expansion in an increasing population, or reflect the gray whales' predilection to forage widely for suitable prey species.

Photo-identification studies off northern Washington, Vancouver Island, Oregon and California continued in 1999. Calambokidis et al. (2000b) reported 216 different gray whales in these study areas. Only 39% (84) were known from previous years. Very few gray whales were observed off the coast of Washington in 1999, but there were unusually high numbers of gray whales in Puget Sound with only 18% (6 of 33 different whales) identified from prior years in any area. Calambokidis (2000b) also reported 45 different whales observed by CRC on one day (May 20, 1999) in coastal waters just north of La Push of which 6 (13%) were identified in prior years. Since this observation occurred 3 days after and about 10 miles south of the site of the Makah hunt, Calambokidis et al. (2000b) note that the findings indicate that seasonal resident whales are present during the time and area of the Makah whale hunt, but are a relatively small proportion of the animals. Calambokidis (2000b) noted that these results should be treated cautiously since 1999 appeared to have been an anomalous year for gray whale sightings, and also noted that there does not appear to be any clear way to distinguish between whales that remain in Washington and those

that move out of the area.

Some of the identifiable individual gray whales in the Pacific coast feeding aggregation returned to the same areas of the Pacific Northwest coast over multiple years (Darling 1984, Darling et al. 1998, Calambokidis et al. 1994). Studies off the west coast of Vancouver Island, British Columbia (Darling et al. 1998), revealed that some gray whales exhibited seasonal site fidelity in response to seasonal abundance of a variety of prey types. Recent photographic re-identifications suggest, however, that these whales also range widely within other coastal areas as far south as northern California and as far north as southeast Alaska from spring to fall (Calambokidis and Quan 1999). This could account for gaps in year-to-year resightings at specific locations, but the whales could also have migrated into the Bering Sea to feed in the intervening years. There have been no photo-identification studies in the northern feeding areas (northern and western Bering Sea and adjacent waters of Arctic Ocean) to determine if any of these whales occur in northern waters between and within years that they are sighted in study areas on the west coast. The wide ranging movements and lack of annual continuity in sightings argues against views that a significant number of these whales show localized site fidelity (Calambokidis et al. 1999). However, several gray whales that have been identified in northern Puget Sound near Everett, Washington for several consecutive years in the spring do appear to show a strong site fidelity to this area; but, it is only for the early part of the feeding season, after which they move to other areas yet to be determined (Calambokidis and Quan 1999).

Site fidelity (i.e., returning to the same site year after year to feed) does not appear to be strong in the Pacific coast feeding aggregation; repeat occurrences of whales at certain sites appears to be more related to availability of food (Darling 1998). Individual whales have been observed at particular sites over multiple years, but they have also had within-year and between-year gaps in presence that prevent predicting an animal's duration of stay per season or probability of returning to a site in future years for most areas. Site fidelity does appear to occur with several whales that feed near Whidbey Island in Washington; studies through 1999 indicate they have occurred at this site, and no others, each year from March to May since 1991 (Calambokidis et al. 1999). In other areas, though, considerable interannual variation occurs in the presence of individual whales, as shown from studies in the northern Washington coast area that has been surveyed consistently from 1996-1999. For example, of the 28 individual whales identified in 1997 in northern Washington and southern Vancouver Island, only 16 (57%) were observed the following year in 1998 (Calambokidis et al. 1999). These data indicate that many whales (35-43%) do not return to the same foraging sites in successive years. In 1998, 57 unique whales were identified in the northern Washington/southern Vancouver Island region. Only 32 (56%) of these whales were identified in a previous year, thus indicating that immigration or recruitment of new whales into this local feeding area may be high.

Our knowledge about the whales in the Pacific coast feeding aggregation is complicated by the overlap between the migration period and the period of "summer" feeding. Although the primary migration period is well-defined, discriminating between late northbound migrants and early southbound migrants that pass through this area is difficult, especially since whales are known to feed during the migration. As an example, 17 whales were identified in the Strait of Juan de Fuca

in 1998. Of those, seven whales were first seen before September 1. They had all been seen in a previous year, and they had all been seen in other regions. Of the remaining 10 whales seen for the first time after September 1, none had been seen in a previous year, and only one had been seen in another region during 1998. These 10 whales were either early migrants or part of the west coast Pacific coast feeding aggregation occurring in areas that have not been surveyed.

The total number of gray whales that feed along the Pacific Northwest coast during the summer has not been well documented until recently. During the summer of 1998, the first range-wide photographic identification survey of this feeding aggregation was conducted from northern California to northern Vancouver Island. One hundred and fifty-five unique whales were identified, of which 134 were seen after June 1 in areas other than Puget Sound (Calambokidis et al. 2000a). The number of whales photographed represents a minimum size for the aggregation because it does not incorporate whales in the area that were missed, nor does it include whales that are part of the aggregation that may have spent the summer outside the area that was surveyed. Calambokidis et al. (2000a) developed an estimate for the size of the Pacific coast feeding aggregation (seen after June 1 on the outer coast) using a mark-recapture Petersen estimator, with 1996 and 1997 as initial capture samples and the 1998 survey as a recapture survey. Their estimates were 169 (CV=0.09) and 175 (CV=0.09) whales. Using a log-based confidence interval, this yields N_{min} values (minimum abundance estimates) of 157 and 162 for the purpose of calculating PBRs (Wade and Angliss 1997) for the Pacific coast feeding aggregation. Calambokidis et al. (2000a) considered possible violations of the mark-recapture assumptions and concluded that the estimates were most likely to be biased low.

An abundance estimate for the feeding aggregation by Calambokidis et al. (2000b) using the 1998 and 1999 results yielded higher estimates than using previous years. The mark-recapture estimate of abundance based on 1998 and 1999 samples was 269 whales (CV=0.06). Calambokidis et al. (2000b) also had a separate estimate of 222 whales by excluding the California samples because they appeared different.

The best available scientific information does not indicate that this feeding aggregation constitutes a separate sub-group of the eastern North Pacific population similar to genetically distinct groups of humpback whales that return to specific feeding areas in the North Atlantic (Clapham and Palsboll 1999, Palsboll et al. 1995). In North Atlantic humpback whales, strong maternally directed fidelity to specific feeding areas has been shown to persist on an evolutionary time scale, as reflected in the distribution of mtDNA haplotypes (Palsboll et al. 1995, Larsen et al. 1996). However, such a study cannot be conducted on the gray whale population until tissue samples have been obtained from the full summer range. A preliminary study examined a small number of samples and compared animals from Clayoquot Sound to the larger eastern North Pacific population (Steeves 1998). No significant genetic differences were found, but the study noted the limitation of its small sample size.

Both NMFS and the IWC currently consider the eastern North Pacific gray whale to be a single stock; to date, there has been no evidence to suggest that the Pacific coast feeding aggregation should be treated as a separate stock. Swartz et al. (2000) reported that genetic analyses of biopsy samples

collected from gray whales feeding in the Pacific Northwest by Steeves (1998) indicated that these animals do not form a separate, genetically distinct population from other portions of the eastern North Pacific population. However, it was noted that the sample size used in the analysis was small (18 samples from British Columbia) and may not be representative of animals that typically feed in the Pacific Northwest. Nonetheless, the whales in this Pacific coast feeding aggregation are not a random assortment of the total population and the whales do show some fidelity to feeding off the west coast rather than northern Alaska.

As noted in the report of the IWC Scientific Committee to the Commission (IWC 2000): 1) there are two clearly separate stocks, in the eastern and western North Pacific, with a large distribution gap and no reason to expect significant interchange nowadays; 2) the gray whale's promiscuous breeding behavior leaves little opportunity for evolutionary differences, but there is nevertheless detectable site fidelity at various times of year; 3) some of these animals [Pacific-coast-summering whales] are 'residents' that return annually to the same areas, with some 'residents' using several areas within a single year and others staying in one area; 4) appropriate photo ID data has only been collected from a few areas to date, so the ratio of 'transient' to 'resident' animals is unknown; 5) a small-sample-size genetic study from a single summering area found no evidence of genetic differentiation between local residents and transients; 6) the [Scientific] Committee agreed that there are important issues of management objectives to be addressed, concerning the size of the unit to be conserved and the appropriate level of precaution; and 7) the Committee agreed that there is a need for a better understanding of site fidelity and potential stock substructure in eastern gray whales, to improve advice on management.

4.2.4. Whaling

Eskimos hunted gray whales near the shores of the northern Bering and Chukchi Seas for thousands of years. Natives of the Chukotka Peninsula selected young gray whales and killed them by using toggle-headed harpoons attached to seal and walrus skin floats (Krupnick 1984). Up until 1928, several Indian tribes between the Aleutian Islands and California hunted gray whales as a part of their cultural and religious traditions. These included the Aleuts, Koniag, Chugash, Tlingit, Haida, Tsimshian, Nootka, Makah, Ozette, Quileute, Klallam, and Chumash (O'Leary 1984). They hunted from boats made of skin or wood and used hand-held harpoons, often with poison-enhanced tips. Stranded whales were also utilized by some of these tribes.

In northeastern Asia, aboriginal whaling diminished early in the mid-nineteenth century. This resulted from a decline in the aboriginal populations as well as from changes in cultural traditions following contact with westerners, particularly Yankee whalers. Commercial shore whaling took gray whales along the coast of the California from the mid-1850s to the early 1900s (Sayers 1984). Shore whaling was defined by Scammon (1874) as the pursuit of a whale from a boat launched from the shore. When the whale was captured, it was towed back to shore where it was flensed and its oil and other byproducts were processed for market. The first station was established in Monterey Bay in 1854 and, over the next 45 years, 15 stations were operated at various times from Crescent City, California, to Punta Eugenia, Baja California. The industry was profitable for approximately

40 years but, by the turn of the century, whales had become scarce along the coast, and shore whaling became obsolete.

From 1845 to about 1900, American whalers hunted gray whales on their winter grounds in Baja California, as well as along their coastal migration routes and on their summer grounds in the subarctic (Scammon 1874, Henderson 1984). After whalers discovered the wintering areas in lagoons along the Pacific coast of Baja California, they took whales by the hundreds outside the entrances and within the lagoon interiors (Henderson 1984). The gray whale earned the names of "devil fish" and "hard head" from its habit of attacking whaling skiffs when harpooned. Skiffs were frequently overturned and stoved in, with loss of human life. Thus, the whalers preferred hunting gray whales from shallow waters along the edges of the lagoon channels where they were relatively safe from attacks by injured whales. Because females congregated within the lagoon interiors in winter to rear their calves, these catches comprised mostly females and their calves. This whaling strategy drastically reduced the reproductive capacity of the population. By the turn of the century, whaling for gray whales was no longer commercially viable. Henderson (1984) estimated that between 1845 and 1874 approximately 11,300 gray whales were harvested throughout the eastern North Pacific, including approximately 3,200 from the lagoons and bays of Baja California.

Modern whaling for eastern North Pacific gray whales began around 1914 and was pursued by the United States, Japan, Norway, and the Soviet Union (Reeves 1984). Modern whaling refers to the catching of whales through the use of deck-mounted cannons, explosive grenades, direct fastening to the whales, and diesel-, gas-, or steam-powered boats and ships (Mitchell and Reeves 1983). From 1914-46, an estimated 940 gray whales were taken by factory ships and/or fleet whalers working from the North Pacific to Baja California (Reeves 1984). The catch of gray whales off the Chukotka Peninsula increased in the 1930s after commercial overharvesting caused the decline of the bowhead whale and whalers shifted to gray whales (Yablokov and Bogoslovskaya 1984). From 1933-46, the Soviet whaling fleet took a total of 623 gray whales in the Bering and Chukchi seas (Blokhin 1997b). In 1940, the Japanese factory ship *Tonan Maru* took 58 gray whales in the North Pacific. After 1937, gray whales were protected from commercial whaling by Norway and the United States and, after 1938, they were protected from commercial whaling by Canada.

Commercial whaling for gray whales was banned by the 1946 ICRW. That agreement included provisions for aboriginal harvests and scientific investigations, provisions which continue under IWC management. Between 1948 and 1954, Chukchi subsistence hunters took a total of 182 whales, and from 1956-68, the catches increased to more than 100 animals annually (Zimushko and Ivashin 1980). Between 1959 and 1969, 316 gray whales were killed under Special Permits off central California during the fall southward and spring northward migrations. This take was for scientific investigations to establish the status of the population (Rice and Wolman 1971). From 1967-97, aboriginals harvested an average of 150 gray whales annually for subsistence, during which time the population size increased (Table 1). Almost all of the subsistence hunts were by Russian natives; the only reported take by subsistence hunters elsewhere during the last decade occurred in 1995 when two gray whales were taken by Alaska natives (IWC 1997).

Table 1. Gray whale abundance and harvests				
Year	Population Estimate		Year	Harvest
1967/68	13,012		1967	250
1968/69	12,244		1968	201
1969/70	12,777		1969	214
1970/71	11,170		1970	151
1971/72	9,841		1971	153
1972/73	16,962		1972	182
1973/74	14,817		1973	178
1974/75	13,134		1974	184
1975/76	14,811		1975	171
1976/77	15,950		1976	165
1977/78	17,127		1977	187
1978/79	13,300		1978	184
1979/80	16,581		1979	183
1980/81			1980	181
1981/82			1981	136
1982/83			1982	168
1983/84			1983	171
1984/85	21,942		1984	169
1985/86	20,450		1985	170
1986/87			1986	171
1987/88	21,113		1987	159
1988/89			1988	151
1989/90			1989	180
1990/91			1990	163
1991/92			1991	170
1992/93	17,674		1992	0
1993/94	23,109		1993	0
1994/95			1994	44
1995/96	22,571		1995	85
1996/97			1996	43
1997/98	26,635		1997	79

In 1997, the IWC approved a five-year (1998-2002) aboriginal subsistence quota of 620 gray whales, with an annual cap of 140, based on the aboriginal needs statements from the Russian Federation and

the United States (IWC 1998). The United States and Russia agreed that the quota would be shared, with an average annual harvest of 120 whales by the Russian Chukotka people and four whales by the Makah Tribe (not to exceed 135 whales per year by the Russians and five per year by the Makah Tribe). In 1998, Russian aboriginals harvested 122 gray whales; none was harvested by the Makah Tribe. In 1999, Russian subsistence hunters landed 121 gray whales and struck and lost two whales, while Makah subsistence hunters landed one whale (IWC 2000).

4.2.4.a. Makah Whaling

The Makah Tribal members were well known whalers of the northern Washington coast (Swan 1870, Singh 1966, Taylor 1974, Taylor and Bosch 1979, Reagan 1925, Waterman 1920). Gray whales were undoubtedly one of the primary whales hunted by Makah whalers due to their close proximity to villages and local abundance (Fisken 1980). Humpback whales, though not as readily available, also were heavily hunted by the Makah, as evidenced by the number of faunal remains recovered from the Ozette Village site. Gray whale and humpback whale bones were almost equally represented from Ozette, indicating that humpback whales may have been selected by whalers for their large oil reserves (O'Leary 1984). Some sources suggest that gray whales were not pursued by Makah whalers in the fall during the southward migration due to generally stormy and risky weather, but were taken primarily during the spring when gray whales are moving north (O'Leary 1984). The remains of six young gray whale calves in the faunal remains at Ozette also indicate that these whales were taken when the young were going north for the first time (O'Leary 1984). Other sources indicate that gray whales were taken during the spring, summer, and fall (Renker 1997).

Prior to European contact, the Makah traded whale oil and parts to other tribes along the coast, and subsequently engaged in commercial whaling with both Yankee whalers and Europeans (Swan 1870, Singh 1966, Taylor and Bosch 1979). Swan estimated that, by 1850, the Makah were producing 30,000 gallons of whale oil annually, most of it sold to European vessels. The onslaught of the Yankee whalers and the discovery of the Baja breeding lagoons quickly depleted the gray whale population. The Makah took their last gray whale in the pre-modern era in 1928, according to Rice and Wolman (1971).

In 1995, after the gray whale population had recovered and was delisted under the ESA, the Makah Tribe approached the U.S. Government and expressed an interest in seeking to continue its 1,500 year tradition of hunting gray whales. An account of the joint effort by the Tribe and the U.S. government to obtain a quota at the IWC appears at section 2.3. After issuance of the IWC quota in 1997, the Makah Tribe developed a "Management Plan for Makah Treaty Gray Whale Hunting for the years 1998-2002" (Plan) that stipulated how tribal members would conduct ceremonial and subsistence whaling activities. In accordance with the 1997 agreement between NOAA and the Makah Tribal Council, the Plan contained requirements regarding harvest and strike limits, targeting on migrating whales, inspection and reporting, management, utilization of whale products, and enforcement. In addition, the Plan included requirements regarding issuance of whaling permits, training of whalers, whaling equipment and hunting methods, and penalties for non-compliance. The Plan required use of a canoe, paddlers, and a harpooner to approach and take gray whales to maintain

tribal tradition in hunting gray whales. In accordance with the ICRW, NOAA regulations, and the 1997 agreement between NOAA and the Makah Tribal Council, the Plan strictly prohibited the commercial sale of whale products except for traditional handicraft (including artwork) made from non-edible parts of the whale. The Plan also followed U.S. law by prohibiting international trade of whale products.

To ensure a humane taking of whales, the Plan required that any whale that was harpooned was to be immediately shot with a large caliber rifle. The Tribe decided to use .50 and .577 caliber rifles, based on testing that showed these rifles could be effective in quickly dispatching a gray whale (Ingling 1997, Ingling 1999).

4.2.4.a.1. 1998 Makah Tribe Hunt

Makah tribal whalers conducted a number of practice exercises during 1998. In the fall of 1998, several whaling permits were issued by the Makah Tribal Council, but no actual whaling occurred.

4.2.4.a.2. 1999 Makah Tribe Spring Hunt

The Makah Tribal Council issued the first whaling permit of 1999 on May 10, 1999, based on the recommendation of the Makah Whaling Commission in accordance with the Makah Tribe's Management Plan. This permit was issued during the spring northward migration of gray whales off Washington State. On May 17, the crew struck and landed one gray whale under this permit; no further whaling permits were issued. All whaling was conducted in the ocean area off the Washington coast south of Cape Flattery. The tribal whale hunts occurred on May 10, 11, 15, and 17, all monitored by a NMFS observer and a tribal observer. The whaling canoe approached gray whales on May 10, 15 and 17. Three attempted strikes (harpoon attempt missed) occurred as follows: May 10 at 15:55 Pacific Daylight Time (PDT), when a harpoon attempt missed; May 15 at 11:19 PDT, when a harpoon throw appeared to come into contact with a gray whale, but did not attach since the harpoon line and float came back to the surface immediately with the harpoon head intact; and May 15 at 12:21 PDT, when another harpoon attempt missed. Protest vessels were present during the hunt and disrupted hunting activities on the first day of the hunt.

On May 17, 1999, the fourth day of whaling activity, the crew successfully struck and landed a gray whale. At 06:55 PDT, the gray whale was struck with the harpoon, which remained affixed to the whale as it pulled the harpoon line and floats into the water. The whaling crew in the canoe held onto the harpoon line, while the chaser boat approached the whale to dispatch it with a .577 caliber gun. A total of four shots were fired with the first two shots missing the whale, and the second two shots hitting it in the head area. The last shot left the whale motionless underwater at 07:03 PDT. Two additional harpoons with float lines were also affixed to the whale. Total time from the initial harpoon strike to the last shot that dispatched the whale was eight minutes. After dispatch, the whale was towed to the beach in Neah Bay, and butchering began shortly after tribal ceremonies.

Examination of the whale by NMFS Biologists. The whale taken on May 17, 1999, was a non-

lactating female that measured 30 feet 5 inches (9.27 meters) total length. Fluke width was 7 feet 4 inches (2.2 m). The whale could not be weighed, but based on gray whales taken in the Russian harvest of similar length and condition, it was estimated to be about five to seven metric tons. Age also could not be determined, but based on similar lengths of whales taken in the Russian harvest, it was estimated to be over two years old. An examination of the skull during butchering revealed that the third shot struck the ridge of the skull, shattering it, and proceeded back into the muscle near the left flipper where whalers found the bullet (bullet was intact with no deformation). The fourth shot struck the skull above the occipital condyle and entered the braincase; it likely caused instantaneous loss of consciousness and death due to massive brain trauma.

Utilization of meat. Almost all edible portions of the meat and blubber were removed from the whale by tribal members on May 17, 1999. NMFS biologists collected samples from internal organs after tribal members had removed the meat and brought it home or to the community freezer. Tribal members flensed small portions of meat the next day to prepare the skeleton for a museum display. The meat and blubber were consumed by Makah Tribal members and during tribal ceremonies.

4.2.4.a.3. 1999 Makah Tribe Fall/Winter Hunt

No whaling permits were issued by the Makah Tribal Council during the southward migration in 1999. Tribal whaling families intended to hunt whales during the southward migration in November and December, but weather conditions were not suitable.

4.2.4.a.4. 2000 Makah Tribe Spring Hunt

The 2000 spring hunt commenced on April 17, 2000, and continued through May 29, 2000 (Gearin and Gosho 2000). The Makah Tribal whalers actively hunted gray whales on a total of six days, during which no whales were struck or landed. During the first two days of hunting, activists disrupted the hunting activity. The following five days of hunting were relatively uneventful with respect to protest activity. All whaling occurred in the ocean area south of Cape Flattery. Except for a few approaches near Makah Bay, the vast majority of hunting occurred south of Point of Arches near Father and Son Rocks. Whalers threw harpoons on three occasions, but the harpoons did not attach to a gray whale on any of these attempts. The first two throws appeared to be complete misses. The third throw may have grazed the whale; however, the harpoon did not implant or detach. Most of the whales in the area during the hunt were large single individuals. The whales appeared to be migrating in that the average dive time was about eight minutes, which is four or five minutes longer than for whales that are seen feeding or resting locally. None of the whales exhibited the characteristics of whales in local feeding aggregations (e.g., remaining in the same general area for long periods of time and milling or feeding. The gray whales observed during the hunts were farther offshore than the summer feeding whales and in deeper water (80-100 feet) as compared to summer feeding whales, which are generally in water 30-60 feet deep.

4.2.5. Natural Mortality

Gray whales are heavily infested with ectoparasites and epizoites including the host-specific barnacle, *Cryptolepas rhachianecti*, and three species of whale louse - *Cyamus scammoni*, *C. ceti* and *C. kessleri*. These infestations are favored by the gray whales' habit of swimming slowly through shallow coastal waters rich in nutrients. In contrast, Rice and Wolman (1971) found infrequent infestations of endoparasites and attributed this to the whales' long period of fasting each year.

The most dramatic and perhaps most significant cause of natural mortality among gray whales is predation by killer whales. Although it is difficult to quantify the proportion of the gray whale stock that is killed or approached by killer whales each year, there are many anecdotal reports of such events (Rice and Wolman 1971, Jones and Swartz 1984, Poole 1984, Goley and Straley 1994, George and Suydam 1998). In fact, Corkeron and Connor (1999) suggest that killer whale predation may be the primary motivation for the annual migration of gray whales. This migration covers 8,000 - 10,000 km each way (Rugh et al. 1999a), perhaps the longest migration of any mammalian species. Although humans have had a large impact on the abundance of eastern North Pacific stock of gray whales in the past, it has been severe only in the last two centuries. In contrast, killer whales have likely had a consistent presence throughout much of the evolution of gray whales and may have played a significant role in the evolution of their behavior and biology.

4.2.6. Fishery Interactions

Ferrero et al. (*In prep*.) report on eight different commercial fisheries within the range of the eastern North Pacific gray whale stock that were monitored for incidental take by NMFS observers during the 1990s: Bering Sea (and Aleutian Islands) groundfish trawl, longline and pot fisheries; Gulf of Alaska groundfish trawl, longline and pot fisheries; California/Oregon thresher shark/swordfish drift gillnet fishery; and the Makah Tribal set-net fishery. No gray whale mortalities were observed for any of the Alaska fisheries. One gray whale mortality was observed in the thresher shark/swordfish fishery between 1993 and 1998. Two gray whale mortalities were observed in the Makah Tribal set-net fishery between 1990 and 1998, one in 1990 and one in 1995. One gray whale was entangled in this fishery and released alive in 1996. The mean annual mortality rate from these monitored fisheries was 1.2 (CV=0.85) gray whales per year. Ferrero et al. (*In prep.*) also reported annual fishery mortality data from fisher logbooks (0.5) and from stranding reports (4.2) for a total estimated minimum annual mortality rate in commercial fisheries of 6.0. Although there may be other unreported mortalities in commercial fisheries, Ferrero et al. (*In prep.*) concluded that fishery mortalities are likely below 10% of the PBR for this stock and therefore can be considered to be insignificant and approaching zero mortality and serious injury rate.

4.2.7. Offshore Activities and Ship Strikes

Gray whale reactions to offshore activities have been relatively well studied compared to those of other whales. Studies of short-term behavioral responses to underwater noise associated with aircraft, ships, and seismic explorations indicate a 0.5 probability that whales will respond to continuous broadband noise when sound levels exceed *ca*. 120dB[2] and to intermittent noise when

levels exceed *ca*. 170dB, usually by changing their swimming course to avoid the source. Gray whales "startled" at the sudden onset of noise during playback studies, but demonstrated a flexibility in swimming and calling behavior that may allow them to circumvent increased noise levels. Whales may be "harassed" by noise from large commercial vessels, especially in shipping lanes or near busy ports. Gray whales sometimes change course and alter their swimming speed and respiratory patterns when followed by whale watching boats. Conversely, some whales swim toward small skiffs deployed from whale watching boats in breeding lagoons, seemingly attracted by the noise of idling outboard engines. Reported gray whale reactions to aircraft are varied and seem related to ongoing whale behavior and aircraft altitude. Whale response to research involving tagging and biopsy sampling appears to be short term. Gray whales were seen swimming through surface oil from the *Exxon Valdez* oil spill along the Alaskan coast and showed only partial avoidance to natural oil seeps off the California coast. Laboratory tests suggest that gray whale baleen, and possibly skin, may be resistant to damage by oil, but spilled oil or oil dispersant in a primary feeding area could negatively affect gray whales by contaminating benthic prey. Concern about the cumulative long-term impact of offshore human activities is particularly acute in the Southern California Bight, where many activities are often concurrent.

The nearshore migration route used by gray whales makes ship strikes a potential source of mortality. Ferrero et al. (*In prep.*) reported five gray whale mortalities off California from ship strikes from 1993 to 1995, and one ship strike mortality off Alaska in 1997. Additional mortality from ship strikes probably goes unreported because the carcasses sink at sea or the beached carcasses do not show obvious signs of ship strikes. Therefore, it is not possible to quantify the actual mortality of gray whales from this source, and the annual mortality rate of one to two gray whales per year due to collisions with vessels represents a minimum estimate from this source.

4.2.8. Contaminants

Gray whales are a coastal migratory species that are benthic feeders and have a long period of fasting (or low amount of intake) during their migrations and the winter. The prolonged fasting may alter the disposition of toxic chemicals within the animals. In addition, gray whales have been observed feeding in coastal waters, which may present a risk of exposure to toxic chemicals in some regions. Tilbury et al. (1999) measured concentrations of organochlorines (OCs) and trace elements in tissues and stomach contents of juvenile gray whales taken during a Russian subsistence harvest in the western Bering Sea. Blubber biopsies taken from gray whales off the California and Washington coasts were also analyzed for OCs. Previous measurements of these contaminants were from stranded gray whales. There were no differences in the concentrations (based on wet weight of tissue) of contaminants between female and male animals taken in the subsistence hunt. The lipid content [48 (5) %] of blubber for animals from the Arctic feeding grounds was higher than that in the biopsy samples [9.4 (0.8) %] from free-ranging, apparently healthy whales. Concentrations on a lipid basis of the sum of polychlorinated biphenyls (∑PCBs) in the juvenile stranded whales and the juvenile whales taken in the subsistence hunt were significantly different [19,000 and 680 ng/g lipid weight, respectively]. The mean concentration of the ∑PCBs for the biopsy samples was 2,000 ng/g lipid weight. The authors hypothesized that the higher concentration of ∑PCBs in the stranded

animals may be due to the retention of OCs in blubber during fasting rather than to increased exposure to these contaminants. The concentrations of certain trace elements (e.g., cadmium) in some tissues, such as kidneys, were also elevated in the stranded animals. Moreover, aluminum in stomach contents and tissues of the subsistence whales was high compared to other marine mammal species, which is consistent with the ingestion of sediment during feeding.

Krahn et al. (2000) provided an assessment of lipid and organochlorine contaminant profiles of eastern North Pacific gray whales. They reported that the age- and sex-specific pattern of contaminants indicates that reproductive females transfer their contaminant burdens to their calves. A similar phenomenon has been reported for other marine mammal species. The effect of observed contaminant levels on fetal development and the overall health of the calf has yet to be determined. Blubber samples were compared from four distinct samples: 1) animals from the 1994 subsistence harvest on the feeding grounds in the Russian Arctic (presumably healthy animals); 2) biopsy samples from live animals off the Washington coast in late summer and fall (presumably healthy animals); 3) animals that stranded during the northward migration between 1988 - 1991 (presumably unhealthy animals); and 4) animals that stranded during the northward migration between 1998 - 1999 (presumably unhealthy animals). As expected, reported mean levels of contaminants were higher in samples from the stranded animals compared to samples from the biopsied or harvested animals. Krahn et al. (2000) also noted that higher concentration of contaminants in the stranded animals may be due to the retention of OCs in the blubber as lipid stores are mobilized for energy and total lipid levels decrease.

The samples of blubber (n=38) analyzed from gray whales biopsied off the Washington coast during the late summer and fall had mean lipid values of 10% (Krahn et al. 2000). These whales, which would be considered summer feeding whales in Washington, had lipid levels considerably lower than the 48% mean reported for gray whales sampled during the Russian subsistence harvest, even though the collections occurred during the same general time of year.

Krahn et al. (2000) also determined an index of allowable daily intake (ADI) of whale blubber by human consumers based on wet weight concentrations of contaminants in gray whale blubber from the samples. Based on these calculations, the "safest" samples were the biopsy samples, which had lower concentrations of DDT's, PCB's and hexachlorobenzene (HCB). The ADI of blubber from the biopsy sampled animals was therefore greater than for the stranded whales or from the harvested whales (Krahn et al. 2000).

Tissues were tested from a gray whale caught in a gillnet at Neah Bay in 1995 and from the whale harvested by the Makah Tribe in May 1999 (Ylitalo et al. 1999). The lipid level of the whale harvested by the Makah was 25%; the lipid level of the whale incidentally caught in the gillnet was 6.3%. Total PCB and DDT concentrations were measured for three types of tissue from the two whales: blubber, muscle, and liver. The highest OC concentrations were found in the blubber of the harvested whale and were 1,200 ng/g and 520 ng/g for PCB and DDT respectively (Ylitalo et al. 1999). Much lower concentrations of OC's were found in the liver and muscle tissues. None of the tissues examined had contaminant concentrations that exceeded the U.S. Food and Drug

Administration (FDA) regulatory tolerance limits for human consumption based on fish and shellfish guidelines (Ylitalo et al. 1999).

4.2.9. Activities in the Wintering Areas

At the 52nd meeting of the IWC, Urban (2000) reported the results of a study on the proposed saltworks project in San Ignacio Lagoon, Mexico. In particular, the study evaluated potential impacts on the gray whales that utilize this wintering area for breeding, calving, and calf rearing. According to this study, the salt facility in San Ignacio would not harm gray whales. Nonetheless, the Government of Mexico has decided to leave the San Ignacio landscape unaltered and has suspended the saltworks project.

The growth of gray whale tourism in the North Zone of Bahía Magdalena has led to a proposed Japanese-owned and -financed tourist resort development at Bahía Magdalena (Dedina and Young 1995). Although this represents a potential threat to the whales and their habitat, at this time there are no plans to proceed with this development (Rugh et al. 1999a). Whale watching is allowed in every lagoon in Baja California Sur except in the southern part of Bahía Magdalena.

Since 1997, the Mexican Government has applied whale watching regulations to commercial operators. There are currently four specific whale watching areas in the lagoons where the numbers of boats and methods of approach are regulated. There are no minimum approach distances, but whales cannot be chased.

4.2.10. Stranding Events in 1999 and 2000

A summary of information regarding gray whale strandings in 1999 was reported by Norman et al. (2000) to the IWC in June 2000. They reported that 273 gray whales stranded in 1999 along the west coast of North America from Baja California, Mexico, to Alaska. The IWC Scientific Committee (IWC 2000) noted that "this number is 5-13 times higher than annual counts from 1995-1998. Most stranded whales were reported along remote shorelines of Mexico (n=118; 43%) and Alaska (n=73; 27%) and so were difficult to reach for examination." Further, it was reported to the IWC at the June 2000 meeting that from January 1 to June 10, 2000, 84 gray whales were reported stranded in the United States, while 207 gray whales stranded in the Mexican State of Baja California Sur between December 1999 and March 2000. Finally, the IWC Scientific Committee concluded that "the combination of increases in the number of stranded animals reported in 1999 and 2000, which may indicate an increase in the per capita mortality rate, and decreases in calf production in 1999 and 2000, could have caused an overall decrease in the abundance of this population (IWC 2000). However, without new survey data to directly assess abundance, it is not possible to make conclusions regarding any changes in the status of this stock relative to the last assessment."

4.3. Other Wildlife (marine mammals, seabirds, sea-turtles)

A wide variety of marine mammals, birds, and other marine organisms (including marine turtles and

diverse populations of invertebrates and fish) occur in the Makah U&A. Twenty-nine species of marine mammals are reported to breed, rest within, or migrate offshore of the Olympic Peninsula. Steller sea lions (which are included on the ESA threatened species list) are common in the area. Right, fin, sei, blue, humpback and sperm whales are observed occasionally. Northern sea otters were re-introduced in 1969 and 1970, and have expanded their population and range to include the entire north coast of Washington and into the Straits.

The seabird colonies of Washington's outer coast, mostly breeding on the seastacks and islands of the National Wildlife Refuges, are among the largest in the continental United States. Common murre populations in Washington are of particular concern. A precipitous decline in colony attendance throughout Washington occurred during the 1983 El Nino, principally at the southern colonies around Pt. Grenville, and at Split and Willoughby Rocks, and attendance remained depressed through at least the 1996-breeding season. During this same time period, two major oil spills occurred off the coast of Washington, causing significant mortality in common murres. Common murre colonies on Tatoosh Island, the only stable colony in Washington, have been further impacted by bald eagles and predation by gulls (Parrish 1997). Birds found in the Makah U&A that are listed under the ESA are brown pelican, Aleutian Canada goose, marbled murrelet, and bald eagle.

The high biological productivity of the coastal and offshore waters of northern Washington support a diverse and rich plankton and marine fish populations. These populations attract foraging marine wildlife and valuable fisheries that contribute significantly to the state and tribal economies. The commercially important species of fish include groundfish, shellfish, and five species of salmon. Several salmonid populations are listed under the ESA.

A list of most of the marine wildlife species (marine mammals, birds, turtles) found in this area are in the tables below. The tables include the Federal and state protected status of each species. Detailed descriptions of these species are in NOAA (1993), Barlow et al. (*In press)*, Nysewander et al. (1994), Pacific Seabird Group (1993), Speich and Wahl (1989), Speich et al. (1992), and Wahl et al. (1981).

TABLE 1. MARINE MAMMAL SPECIES OFF NORTHERN WASHINGTON

Group	Common Name	Species	Occurrence	Protective Status
Carnivores	Northern sea otter	*Enhydra lutris*	C	MMPA, WSE
Pinnipeds	California sea lion	*Zalophus californianus*	C	MMPA
	Steller sea lion	*Eumetopias jubatus*	C	MMPA, FT, WST
	Northern fur seal	*Callorhinus ursinus*	C	MMPA
	Pacific harbor seal	*Phoca vitulina*	C	MMPA
	Northern elephant seal	*Mirounga angustirostris*	R	MMPA
	Eastern North Pacific gray whale	*Eschrichtius robustus*	C	MMPA, WSS
	Northern right whale	*Eubalaena glacialis*	A	MMPA, FE, WSE
	Minke whale	*Balaenoptera acutorostrata*	R	MMPA
	Fin whale	*Balaenoptera physalus*	A	MMPA, FE, WSE
	Sei whale	*Balaenoptera borealis*	A	MMPA, FE, WSE
	Blue whale	*Balaenoptera musculus*	A	MMPA, FE, WSE

Cetaceans	Humpback whale	*Megaptera novaeangliae*	R	MMPA, FE, WSE
	Sperm whale	*Physeter macrocephalus*	R	MMPA, FE, WSE
	Pygmy sperm whale	*Kogia breviceps*	A	MMPA
	Stejneger's beaked whale	*Mesoplodon stejnegeri*	A	MMPA
	Hubb's beaked whale	*Mesoplodon carlhubbsi*	A	MMPA
	Cuvier's beaked whale	*Ziphius cavirostris*	A	MMPA
	Baird's beaked whale	*Beradius bairdii*	A	MMPA
	Short-finned pilot whale	*Globicephala macrorhynchus*	A	MMPA
	Risso's dolphin	*Grampus griseus*	A	MMPA
	Killer whale	*Orcinus orca*	R	MMPA, WSC
	False killer whale	*Pseudorca crassidens*	A	MMPA
	Common dolphin	*Delphinus delphis*	A	MMPA
	Northern right whale dolphin	*Lissodelphis borealis*	A	MMPA
	Striped dolphin	*Stenella coeruleoalba*	A	MMPA
	Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	A	MMPA
	Dall's porpoise	*Phocoenoides dalli*	R	MMPA
	Harbor porpoise	*Phocoena phocoena*	C	MMPA, WSC

TABLE 2. MARINE BIRDS OCCURRING OFF NORTHERN WASHINGTON

Common Name	**Scientific Name**	**Protective Status**
LOONS AND GREBES	*GAVIIDAE and PODICIPEDIDAE*	
Common loon	*Gavia immer*	MBTA, WSS
Pacific loon	*Gavia pacifica*	MBTA
Red-throated loon	*Gavia stellata*	MBTA
Horned grebe	*Podiceps auritus*	MBTA
Red-necked grebe	*Podiceps grisegena*	MBTA
Western grebe	*Aechmophorus occidentalis*	MBTA
TUBENOSES	*PROCELLARIIFORMES (Diomedeidae, Procellariidae and Hydrobatidae)*	
Black-footed albatross	*Diomedea nigripes*	MBTA
Laysan albatross	*Diomedea immutabilis*	MBTA
Buller's shearwater	*Puffinus bulleri*	MBTA
Flesh-footed shearwater	*Puffinus carneipes*	MBTA
Pink-footed shearwater	*Puffinus creatopus*	MBTA
Short-tailed shearwater	*Puffinus tenuirostris*	MBTA, FPE, WSC
Sooty shearwater	*Puffinus griseus*	MBTA
Northern fulmar	*Fulmaris glacialis*	MBTA
Fork-tailed storm petrel	*Oceanodroma furcata*	MBTA
Leach's storm petrel	*Oceanodroma leucorhoa*	MBTA
PELICANS and CORMORANTS	*PELECANIDAE and PHALOCROCORACIDAE*	
Brown pelican	*Pelecanus occidentalis*	MBTA, FE, WSE
Brandt's cormorant	*Phalacrocorax penicillatus*	MBTA, WSC
Double-crested cormorant	*Phalacrocorax auritis*	MBTA
Pelagic cormorant	*Phalacrocorax pelagicus*	MBTA
GEESE and DUCKS	*ANATIDAE*	
Aleutian Canada goose	*Branta canadensis leucopareia*	MBTA, FT, WST

Brant	*Branta bernicla*	MBTA
Black scoter	*Melanitta nigra*	MBTA
Surf scoter	*Melanitta perspicillata*	MBTA
White-winged scoter	*Melanitta fusca*	MBTA
Harlequin duck	*Histrionicus histrionicus*	MBTA
Oldsquaw	*Clangula hyemalis*	MBTA
Bufflehead	*Bucephala albeola*	MBTA
Common goldeneye	*Bucephala clangula*	MBTA
Greater scaup	*Aythya marila*	MBTA
Red-breasted merganser	*Mergus serrator*	MBTA
Common merganser	*Mergus merganser*	MBTA
EAGLES, OSPREYS AND FALCONS	*FALCONIFORMES*	
Bald eagle	*Haliaeetus leucocephalus*	MBTA, FT, WST
Osprey	*Pandion haliaetus*	MBTA
Peregrine falcon	*Falco peregrinus*	MBTA, FC, WSE
OYSTERCATCHERS	*HAEMATOPODIDAE*	
Black oystercatcher	*Haematopus bachmani*	MBTA
PLOVERS	*CHARADRIIDAE*	
Killdeer	*Charadrius vociferus*	MBTA
Semipalmated plover	*Charadrius semipalmatus*	MBTA
Snowy plover	*Charadrius alexandrinus*	MBTA, FT, WSE
American golden plover	*Pluvialis dominicus*	MBTA
Black-bellied plover	*Pluvialis squatarola*	MBTA
SANDPIPERS, TURNSTONES, SURFBIRDS AND PHALAROPES	*SCOLOPACIDAE*	
Black turnstone	*Arenaria melanocephala*	MBTA
Ruddy turnstone	*Arenaria interpres*	MBTA
Surfbird	*Aphriza virgata*	MBTA
Marbled godwit	*Limosa fedoa*	MBTA
Greater yellowlegs	*Tringa melanoleuca*	MBTA
Lesser yellowlegs	*Tringa flavipes*	MBTA
Spotted sandpiper	*Actitis macularia*	MBTA
Whimbrel	*Numenius phaeopus*	MBTA
Wandering tattler	*Heteroscelus incanus*	MBTA
Long-billed dowitcher	*Limnodromus scolopaceus*	MBTA
Short-billed dowitcher	*Limnodromus griseus*	MBTA
Rock sandpiper	*Calidris ptilocnemis*	MBTA
Baird's sandpiper	*Calidris bairdii*	MBTA
Dunlin	*Calidris alpina*	MBTA
Least sandpiper	*Calidris minutilla*	MBTA
Sanderling	*Calidris alba*	MBTA
Western sandpiper	*Calidris mauri*	MBTA
Red phalarope	*Phalaropus fulicaria*	MBTA
Northern phalarope	*Lobipes lobatus*	MBTA
JAEGERS and SKUAS	*STERCORARIINAE*	
Long-tailed jaeger	*Stercorarius longicaudus*	MBTA
Parasitic jaeger	*Stercorarius parasiticus*	MBTA
Pomarine jaeger	*Stercorarius pomarinus*	MBTA

South polar skua	*Catharacta mccormicki*	MBTA
GULLS AND TERNS	*LARIDAE*	
Bonaparte's gull	*Larus philadelphia*	MBTA
California gull	*Larus californicus*	MBTA
Glaucous-winged gull	*Larus glaucescens*	MBTA
Heerman's gull	*Larus heermanni*	MBTA
Herring gull	*Larus argentatus*	MBTA
Mew gull	*Larus brachyrhynchos*	MBTA
Ring-billed gull	*Larus delawarensis*	MBTA
Sabine's gull	*Xema sabini*	MBTA
Thayer's gull	*Larus thayeri*	MBTA
Western gull	*Larus occidentalis*	MBTA
Black-legged kittiwake	*Rissa tridactyla*	MBTA
Caspian tern	*Sterna caspia*	MBTA
Common tern	*Sterna hirundo*	MBTA
Forster's tern	*Sterna forsteri*	MBTA
Arctic tern	*Sterna paradisaea*	MBTA
ALCIDS	*ALCIDAE*	
Ancient murrelet	*Synthliboramphus antiquum*	MBTA
Cassin's auklet	*Ptychoramphus aleutica*	MBTA, FC, WSC
Common murre	*Uria aalge*	MBTA, WSC
Marbled murrelet	*Brachyramphus marmoratum*	MBTA, FT, WST
Pigeon guillemot	*Cepphus columba*	MBTA
Rhinoceros auklet	*Cerorhinca monocerata*	MBTA
Tufted puffin	*Lunda cirrhata*	MBTA, FC, WSC
KINGFISHERS and HERONS	*ALCEDINIDAE and ARDEIDAE*	
Belted kingfisher	*Ceryle alcyon*	MBTA
Great blue heron	*Ardea herodias*	MBTA

TABLE 3. SEA TURTLES THAT MAY OCCUR OFF NORTHERN WASHINGTON

Common Name	Species	Occurrence	Protective Status
Leatherback Sea Turtle	*Dermochelys coriacea*	R	FE, WSE
Green Sea Turtle	*Chelonia mydas*	R	FT, WST
Loggerhead Sea Turtle	*Caretta caretta*	R	FT, WST
Pacific Olive Ridley Sea Turtle	*Lepidochelys olivacea*	A	FE

Occurrence
C = Common
R = Rare
A = Accidental

Protective Status:
FE - Federally Endangered under the U.S. Endangered Species Act
FT - Federally Threatened under the U.S. Endangered Species Act
FC - Federal Candidate
FPE - Federal Proposed Endangered, under the Endangered Species Act
FPT - Federal Proposed Threatened, under the Endangered Species Act
MBTA - Migratory Bird Treaty Act
MMPA - U.S. Marine Mammal Protection Act
WSE - Washington State Endangered Species
WST - Washington State Threatened Species
WSS - Washington State Sensitive Species
WSC - Washington State Candidate Species

4.4. Makah Tribe

The Makah Tribe's whaling tradition is summarized in section 2.1. The Tribe's renewed interest in its cultural heritage stemmed in part from a remarkable archeological excavation. During the 1970s, Ozette, a whaling village that had been covered 400 years ago by a mud slide, was uncovered. The artifacts from Ozette testify to the central role of whaling in the Tribe before contact with westerners. The excavation of the village re-awakened the Tribe's interest in, and appreciation for, its heritage, especially for the role that whaling played in its society (Renker 1997).

The gray whale was listed under the ESA at the time the village of Ozette was uncovered. The Makah Tribe waited for the gray whale population to be removed from the list of endangered and threatened wildlife under the ESA before seeking a quota from the U.S. Government to resume ceremonial and subsistence whaling. The Makah request to take up to five gray whales per year was based on the number of traditional whaling villages. The Tribe believes that continuing its whaling tradition will provide important subsistence and ceremonial benefits to the Makah community and will help the Tribe to reaffirm its traditions and cultural identity. The large tribal ceremonies and celebrations involving most members of the Tribe after the successful hunt on May 17, 1999, are indicative of the benefits of whaling to the Makah Tribe.

4.5. Other Tribes

The Makah Tribe is one of four tribes located on the outer coast of Washington State. The other tribes are the Quileute, located at La Push; the Hoh, located at the mouth of the Hoh River; and the Quinault, located between Queets and Moclips. All four tribes are Federally recognized Indian tribes and appear on the Secretary of Interior's List of Indian Entities Recognized and Eligible to Receive Services from the U.S. Bureau of Indian Affairs (65 FR 13299, March 13, 2000), the annual publication that is mandated by Congress in the Federally Recognized Indian Tribe List Act of 1994. In addition, these tribes are signatories to the Stevens treaties, which include the Treaty of Neah Bay and the Treaty of Olympia. All four tribes have reserved treaty rights for hunting and fishing, but only the Makah Tribe has explicit treaty language reserving the right to sealing and whaling.

4.6. Whale Watching Industry

In the Northwest, more than 130 commercial operators advertise whale watching or marine wildlife viewing tours in Oregon, Washington, and British Columbia on the Internet. Whale watching activities are roughly divided into two major areas and target species. In the coastal waters of Washington and Oregon, the primary focus is on seasonally migrating gray whales, while killer whales are the principal target of whale watchers during summer months in the inland waters of Washington and British Columbia, Canada. The most popular and well-known whale watching industry is focused on killer whales in the area of the San Juan Islands in northern Puget Sound. Many charterboat operators also actively promote wildlife and bird watching as "added attractions."

In Washington, gray whale watching trips begin in March during the northward migration and taper

off in May, as many of the charterboat operators shift their offerings to sport fishing during the summer months. Most of the operators that offer gray whale watching trips are concentrated in the port of Westport on the central Washington coast. Some operators advertise trips from the ports of Nahcotta and Sekiu/Neah Bay. Whale watching vessels depart daily in Westport in the spring, whereas in Neah Bay sightseeing and whale watch/wildlife charters are available only by reservation in the summer.

In Neah Bay, several attempts have been made in past years to establish scheduled whale watching excursions on salmon and halibut charter vessels during the spring gray whale migration, but they were not successful. Wildlife or whale watching trips can be arranged directly with charterboat operators in Neah Bay. But, because of the remote location of Neah Bay and unpredictable whale sighting conditions, few whale watching trips occur in northern coastal Washington and the western Strait of Juan de Fuca. For 2000, the charterboat bookings office and the marina operators advised that as many as a dozen charter vessels may have been involved with whale watching and/or nature tours, but no specific records were kept. One employee believed that each vessel may have conducted about one or two such tours during 2000. The charterboat booking office records from May through September indicated that eight whale watching trips were booked, including four in July and four in August, on five different vessels. However, several operators that spent portions of the season at Neah Bay did their own bookings and could have had more trips. Of about 12 charter boats that operated at Neah Bay during 2000, about half were there only during May and June during the halibut season (Big Salmon Charters, pers. comm., Sept. 2000). When the halibut season ended, the vessels returned either to Westport, or at least three vessels traveled to Alaska to conduct fishing charters.

At least 34 companies advertise killer whale watching/wildlife tours in the inland waters of Washington, primarily in the Haro Strait near San Juan Island. Many operators offer tours aboard multi-passenger charter vessels, while a number of operators specialize in guided tours for groups of individuals in single or double kayaks. There are also private charters available aboard sailing yachts and luxury cruisers. Wildlife/sightseeing tours are offered year around, but the main viewing season for killer whales is from May through September. During the summer months, killer whales return to traditional feeding areas with some degree of regularity; operators have established an elaborate whale tracking network that allows them to locate whales along their travel routes and to improve sighting success for whale watching clients. This level of sighting success enables operators to offer several trip options daily throughout the summer. Killer whale tours originate from San Juan and Orcas Islands as well as mainland ports (Port Townsend, Everett, LaConner, Anacortes, Bellingham).

In Oregon, gray whale watching trips begin in early March during the spring or northward migration and continue until May, when recreational fishing charters begin. A few charterboats in central Oregon continue whale watching trips through the summer months and into September, targeting on local feeding gray whales. At least 27 operators advertise whale watching tours originating from ports all along the coast from Brookings to Astoria. Nearly half of these companies are concentrated along the central coast in the ports of Depoe Bay and Newport. Eight flying services in Oregon offer

whale watching sightseeing flights, but the majority of the whale watching operators offer tours aboard multi-passenger charter vessels.

In British Columbia, commercial whale watching is divided between the outer coast of Vancouver Island, where gray whales dominate the offerings, and inside waters where killer whales are the primary attraction. The inside waters are further subdivided into northern and southern areas. The southern area includes the boundary waters between Vancouver Island and the San Juan archipelago. More than 50 companies advertise whale watching/wildlife tours in British Columbia, with a full range of whale watching platforms offered. The dominant whale watching platforms in British Columbia are multi-passenger vessels, including high-speed inflatables and larger charter vessels with enclosed seating, while some companies offer guided kayak tours as well.

On the outer coast of Vancouver Island, whale watching is concentrated in the protected waters of Barkley Sound and Clayoquot Sound, with most operators offering trips originating in the ports of Ucluelet and Tofino. At least 13 companies are advertising trips in these coastal bays. Gray whale watching begins in March with the arrival of the first spring migrants and continues through November with the departure of the southern migrants. During the summer, trips focus on feeding whales that remain in the coastal bays. Transient killer whales are also present in the area during the summer.

About 12 companies advertise killer whale excursions in the inside waters north of Nanaimo, British Columbia. Trips originate from a number of ports including Alert Bay, Cambell River, Prince Rupert and Sayward. The area includes the Robson Bight, where underwater acoustic monitoring of killer whale calls is conducted by the Vancouver Aquarium and the sounds are broadcast to listeners via a local FM radio station. Approximately 20 companies advertise killer whale watching and wildlife tours in the southern inside waters. Most of the operators are based in and around Victoria with access to the Haro Strait and eastern Strait of Juan de Fuca. Some trips are offered from Nanaimo to the north and from mainland Vancouver.

5. ENVIRONMENTAL CONSEQUENCES

5.1. Alternative 1 - Grant Makah Tribe the IWC Quota With Restrictions to Target Hunt on Migrating Whales (similar to the 1999 regime)

Under this alternative, NOAA would grant the Makah Tribe the IWC quota of up to five whales a year for ceremonial and subsistence purposes, with restrictions on the time, place, and/or manner of the hunt similar to those in place during the tribal hunt in 1999. The hunt would be structured with the intent of targeting migrating whales by limiting the area of the hunt to the ocean area of its U&A (outside the Straits of Juan de Fuca westward of a line from Bonilla Point in Canada to Tatoosh Island off northern Washington) and by limiting the timing of the hunt to occur when the northward or southward gray whale migrations are underway.

It is expected that the Makah Tribe would use the methods utilized in 1999, which included pursuit and harpooning from a canoe and immediate dispatch of a harpooned whale with a large caliber rifle discharged from a motorized vessel. The hunt would be restricted to either five gray whales landed or seven whales struck, and the hunt would be terminated either when five gray whales are landed or seven whales are struck, whichever occurs first in a given year. A strike is when the harpoon is thrust into a whale and imbeds in the whale causing serious trauma that can result in death, or when the whale is shot and the bullet enters the body cavity. The utilization of the whale would be limited to ceremonial and subsistence use, not for commercial purposes. In accordance with IWC regulations, takes of a calf or of a female accompanied by a calf (referred to as 'mother-calf pairs') would be prohibited.

The issuance of a quota of five gray whales landed or seven strikes with the restrictions described above would have no adverse effect on the overall gray whale population, which is estimated at more than 26,600 whales. The PBR for the entire stock of eastern North Pacific gray whales is 649 whales for 2000 (Ferrero et al. *In prep*.). A total level of human-caused mortality that is less than PBR is considered sustainable. As described in Section 4.2.1, there are an estimated 83 human-caused mortalities of gray whales per year from the entire eastern North Pacific stock of gray whales (Ferrero et al. *In prep*). Given a PBR of 649 gray whales, an additional take of 566 gray whales per year could occur without the PBR for this stock being exceeded. With the restriction of the quota of five gray whales per year with a maximum of seven strikes per year, the PBR would not be exceeded. Thus, this alternative would have no negative impacts on the gray whale population. This is consistent with advice from the IWC Scientific Committee that there is "no reason to change the advice given previously that a take of up to 482 eastern North Pacific gray whales per year [based on the 1999 PBR] is sustainable, and is likely to allow the population to stabilize above the maximum sustainable yield level" (IWC 2000).

As discussed in Section 4.2.3, both NMFS and the IWC currently consider the eastern North Pacific gray whale to be a single stock. The best available scientific information does not indicate that the Pacific coast feeding aggregation is a biologically distinct group of animals. However, in order to evaluate the potential affects of Makah whaling on the Pacific coast feeding aggregation, this EA takes a very conservative approach and treats the Pacific coast feeding aggregation as a separate management unit so that the effects of takes can be evaluated using the PBR framework. This approach is consistent with that used by Quan (2000). An alternate approach would be to analyze recruitment into the feeding aggregation; but, with the recent information on the expanded range of the Pacific coast feeding aggregation from California to Alaska in areas that have not been routinely surveyed, such analysis would require assumptions on non-surveyed areas resulting in high levels of error; therefore, this approach was not used in this EA. The PBR is defined as the product of the minimum population estimate, one-half the maximum theoretical net productivity rate, and a recovery factor: $PBR = N_{MIN} \times 0.5R_{MAX} \times F_R$ (Wade and Angliss 1997). As described in 4.2.3. of this EA, there are two different abundance estimates for the Pacific coast feeding aggregation: a mark-recapture estimate based on 1988 resights and a more recent estimate based on 1999 resights. There is also a range of recover factors that could be applied. Thus, a range of PBRs for the Pacific coast feeding aggregation was calculated. The low end of the PBR range is an average of 2.08

whales per year calculated based on 1) a conservative approach using the lower range of minimum population estimate (157) described in Section 4.2.3. of this EA; 2) a R_{MAX} of 0.053 for the gray whale population from Ferrero et al. (*In prep.*), and 3) a recovery factor of 0.5 based on conservative approach of treating the feeding aggregation as a separate management unit (Wade and Angliss 1997). The high end of the PBR range is an average of 6.78 whales per year calculated based on 1) a minimum population estimate (269) based on the 1999 resights described in Section 4.2.3. of this EA; 2) a R_{MAX} of 0.053 for the gray whale population from Ferrero et al. (*In prep.*), and 3) a recovery factor of 1.0 based on the feeding aggregation having the same population dynamics as the larger stock.

This analysis assumes that conducting the hunt during the migration effectively removes whales from the entire stock. If whales are taken outside of the primary migration period, they can be presumed to be from the Pacific coast feeding aggregation. Based on an analysis of the timing of migrations past central California and offset to account for travel to and from Washington, the expected period for the migration off Washington is the beginning of December to the beginning of June. This does not mean that migrating whales are never present in October or November off Washington, as they have been reported in some studies (Pike 1962, Darling 1984), but it does mean that whales taken prior to December 1 have a higher probability of being part of the Pacific coast feeding aggregation than those taken later. Thus, if the hunt occurs outside the primary migration period (e.g., in November or June), additional restrictions on the quota and strikes would be necessary to ensure that the PBR for the Pacific coast feeding aggregation is not exceeded. One option for addressing this issue would be to allow a fall hunt to occur only after December 1.

As described in section 4.2.2. of this EA, migrating whales off Washington in June are primarily females with calves that cannot be harvested; thus, those that are not mother-calf pairs have a higher probability of being part of the Pacific coast feeding aggregation. As a result, additional restrictions on the quota and strikes would be necessary to ensure that the PBR for the Pacific coast feeding aggregation is not exceeded. One option for addressing this issue would be to require that the spring hunting season end by May 31.

This analysis assumes the hunt would be limited to the ocean area of its U&A (outside the Straits of Juan de Fuca westward of a line from Bonilla Point in Canada to Tatoosh Island off northern Washington). Restricting the hunt to areas further offshore may increase the likelihood of targeting migrating whales; however, this restriction would present severe safety risks for the Tribe as discussed later in this section.

Segregation by age and sex during the migration suggests that harvesting could have a bias towards certain age and/or sex classes, if removals occurred at specific times and/or within specific areas. The segregation between the first and second phases of northward migrating gray whales indicates that females alternate between two migration timetables, depending on whether they have a calf or were recently impregnated. The consequences of this migratory segregation suggest that, if gray whales were harvested during the early southbound and early northbound portions of the migration, the catches could be composed predominantly of females with near-term fetuses and those that are

were newly pregnant. Such removals could selectively remove the mature breeding females from the population. The preferential killing of breeding females by 19th century whalers within the lagoons was cited as a possible factor in the rapid depletion of this population (Henderson 1984). However, the Makah hunt of only five whales per year, with as many as seven strikes, is not likely to affect the reproductive capacity of the gray whale population.

The potential effects on wildlife of Makah whaling activity, other than on the gray whales targeted for harvest, are limited to the disturbance caused by the Makah whaling vessels, the dispatch of the firearm, and secondary effects from protest, media and other vessels present during the hunt. The rifle is fired downwards into the water, and in very close vicinity to the target gray whale, so no other wildlife species is likely to be affected by the .50 caliber projectile. The noise of the firearm or vessels may disturb wildlife in the immediate vicinity of the whaling activity, possibly causing a startle-fleeing reaction. This is a common reaction of wildlife exposed to vessel noise, fog horns, and other noises that occur in the marine environment and may result in temporary displacement of the birds. The discharge of the rifle will only occur after a gray whale is harpooned and is unlikely to be repeated more than four times in one day (based on the Makah hunt as conducted in 1999) nor more than five days in the year (based on a quota of five), so any effects from startle-fleeing reaction by wildlife is limited both in space (within immediate area of a harpooned whale) and time. Temporary displacement of wildlife due to vessel activity associated with the Makah hunt is not likely to significantly disrupt normal wildlife feeding behavior because the affected wildlife can readily move short distances away from vessels to less disturbed areas and continue feeding. Such temporary displacement in marine waters, especially by feeding seabirds, is a common occurrence wherever vessel activity occurs. Also, since the tribal hunt will occur in a relatively very small areas off the coast and only for short periods of time, the frequency of wildlife disturbances and numbers of animals temporarily displaced by the vessels involved with the whaling activity is expected to be minimal.

Secondary effects of the Makah whaling activity on wildlife also include potential disturbance from media or protest overflights. Sanctuary regulations include a 2000 foot ceiling for aircraft over the Sanctuary which would prevent disturbance from aircraft except when such regulations are violated. Experience from the hunt in 1999 indicates that media craft can and do operate at distances more than 2000 feet above the water and the only problem with aircraft occurred on one day when a seaplane operated by protest groups made several passes over the area of the hunt at less than 2000 feet. Operators of the aircraft were subsequently contacted by the Coast Guard and the activity did not occur again in 1999.

If whaling is conducted in close proximity to rocky outcrops or islands where birds nest, it could have effects on the involved birds. The common murre is a seabird that nests on Tatoosh Island, which is located just offshore of the tip of the coast (Cape Flattery). Common murres also nest on White Rock, located at 48°08'N latitude, which is the at the southern end of the Makah U&A. Although common murre numbers in Washington have declined, the species (which ranges from California to Alaska) is not listed or proposed for listing under the ESA. Makah whaling activities conducted in 1999 and 2000 occurred well offshore and south of Tatoosh Island and north of White

Rock and therefore had no effect on the common murre rookeries. Most vessels avoid close approach to rocky outcrops to ensure vessel safety. During the common murre nesting period (May through September), the Makah whaling activity (other than normal transit through the navigation corridor near Tatoosh Island) should occur no closer than 200 yards of Tatoosh Island and White Rock to avoid any effects on nesting seabirds.

The marbled murrelet is the only seabird off northern Washington that is listed under the ESA; it is listed as a threatened species. The marbled murrelet nests inland in old growth forest as far as 50 miles inland (Hamer and Cummins 1991). The marbled murrelet occupies the nearshore coastal waters and inland bays and feeds in shallow areas (Pacific Seabird Group 1993). The Makah whaling activity is unlikely to affect marbled murrelets because, similar to other wildlife as described above, temporary displacement of marbled murrelets due to vessel activity associated with the Makah hunt is not likely to significantly disrupt normal feeding or resting behavior because murrelets can readily move short distances away from vessels to less disturbed areas and continue feeding.

Other ESA-listed birds that occur off northern Washington are the bald eagle, brown pelican, Aleutian Canada goose, and snowy plover. The snowy plover is a shorebird and the Aleutian Canada goose occurs inland and along the shore; they would not be affected by the whaling activity. The brown pelican may occur off northern Washington coastal waters in the summer, and may be temporarily displaced if it occurs in the area of whaling activity (as described above), but otherwise are not affected. The bald eagle would not be affected by the whaling activity because it forages primarily over land and islands, and are unlikely to be foraging offshore in the area of the whaling activity. Other non-listed birds that may occur in the immediate vicinity of the whaling activity may be temporarily displaced as a result of the noise from the whaling activity (as described above), but would not otherwise be affected.

ESA-listed marine mammals off northern Washington include the large whales and the Steller sea lion. Makah whaling will not affect any ESA-listed whales or non-listed whales (e.g., minke whales) other than gray whales; the hunt will target on gray whales and no other whales will be approached or pursued. Gray whales can be easily identified at the close approach distances necessary for harvest, negating any possibility that another whale species might be accidentally taken. Steller sea lions, California sea lions, and harbor seals hauled-out on nearshore rocky outcrops are unlikely to be affected other than normal startle/fleeing behavior described for wildlife above if the whaling activity occurs in close proximity to rocky outcrops (which is unlikely based on observations of the 1999 Makah hunt). Pinnipeds that may occur in the water in the area of the whaling activity are likely to avoid the immediate area of the hunt. ESA-listed salmonids, which occur below the water's surface, would not be affected by whaling activities.

Whaling within or adjacent to the Sanctuary may adversely affect the public perception of the intent and purposes of this and other federally protected marine sanctuaries, especially if such activities occur in a manner that impacts other Sanctuary resources. Sanctuaries are managed under multiple objectives, including maintaining natural biological communities, enhancing public awareness, and

the wise and sustainable use of the marine environment but the primary objective is resource protection. At the time the Sanctuary was designated, an EIS documented the present and potential uses of the area, including commercial and recreational fishing, research and education, subsistence uses and other commercial, governmental, or recreational uses. The range of allowed and prohibited activities is guided by regulations. The EIS and Sanctuary regulations specifically acknowledged the treaty rights of those tribes whose usual and accustomed areas adjoin the Sanctuary, and in no way sought to interfere with the exercise of those rights as long as they were conducted in compliance with Federal laws. Activities authorized by Federal treaty, including hunting of whales and seals, are allowed. Sanctuary regulations do not prevent the Makah Tribe from whaling within the Sanctuary, but require that conservation objectives for the species and impacts to other Sanctuary resources be addressed.

This alternative would be strongly opposed by the many members of the public and non-governmental organizations who are against the Makah whale hunt. As discussed in Section 4.1.4. of this EA, the Coast Guard has established an RNA to address this issue and to ensure public safety in the vicinity of the Makah whale hunt.

The Makah Tribe is committed to having its whaling crews well prepared prior to issuing a whaling permit; a well-trained whaling crew ensures a safer whaling operation. Restricting the Tribe to whaling in the open ocean and only during the gray whale migration would increase safety risks to tribal whalers and make access to whales more difficult. Tribal efforts to harvest a whale during the fall/winter southward migration would expose tribal whalers to the adverse weather conditions that are common during the fall/winter period off the northern Washington coast. Because of this, this alternative is not the most favorable to the Tribe. The Makah Tribe has expressed concerns that previous season and area restrictions on the hunt made it difficult to conduct subsistence whaling and, in fact, resulted in the inability of the Tribe to conduct subsistence whaling during the fall season. The Tribe now considers any restriction designed to prevent the taking of whales from the Pacific coast feeding aggregation to be inconsistent with the "conservation necessity" standard described in Section 2.5.2, and thus violative of the Treaty of Neah Bay.

NMFS has considered the potential that gray whale tissues might have higher levels of pollutants than would be allowable under standards set by the U.S. Department of Agriculture (USDA) or the FDA. However, biopsy samples from gray whales off Washington have not shown high levels of PCBs and DDTs. This does not eliminate the potential danger to tribal members' health from pollutants due to long-term exposure. Nonetheless, the Tribe is aware of the risks, and information on pollutants has been made available to the Tribe for its use in assessing risks to tribal members.

Makah whaling is unlikely to lead to whaling by other tribes in the United States and Canada. The Makah Tribe is the only U.S. tribe with a treaty that expressly refers to whaling. U.S. support for the Treaty of Neah Bay in no way implies that it would support whaling by other tribes that do not have such a reference in a treaty. No other U.S. tribe has expressed to NMFS any interest in resuming whaling in the five years since the United States first supported the Makah Tribe's interest in resuming whaling. Further, the United States considers that all whaling must be done under the

auspices of the IWC and in accordance with the provisions of that organization. Canada is not a member of the IWC, and the United States opposes any whaling by Canadian natives unless Canada seeks and receives authorization from the IWC.

Makah whaling is unlikely to affect the whale watchers, the whale watching industry or the numbers of gray whales available to be watched. Most whale watching operations in Washington State focus on killer whales in Puget Sound and the eastern portion of the Strait of Juan de Fuca, thus the tribal hunt for gray whales off Neah Bay would have no effect on killer whale watching trips. When gray whales are observed in the area of killer whale watching trips, they are typically individual animals that are in the area for only short periods of time and unlikely to be affected by whaling off the northern coast of Washington. The gray whale watching operations out of Westport, which is on the Pacific coast, are also not likely to be affected. This operation takes place during spring migration, chiefly in March and April. The gray whales are moving northward at the time and will go past Westport before reaching the area of the Makah hunt in northern Washington. Gray whale watching off the northern coast of Washington, near where the whaling would take place, is limited. There are no regularly scheduled whale watching operations, and NOAA is unaware that any are actively being organized. Nonetheless, given the limited geographic area of a hunt and an annual quota of only five whales, it is unlikely that gray whale movements through the area where whale watching may occur would be affected. In regard to whether Makah whaling may affect public participation in whale watching in general, it is unlikely that whaling activity would reduce public participation, in fact it may increase it as it raises public awareness of whales.

It is unlikely that the Makah hunt, which is limited to seven strikes annually, would change the behavior of gray whales, making them more wary of boats or less approachable. While the behavior of individual whales near boats might be affected if they are wounded but not killed by Makah hunting, it is unlikely that this would change the behavior of other gray whales. This population is already hunted by Russian natives each summer in the Bering Sea. The ongoing Russian hunt has not translated into a general avoidance of boats by gray whales. NMFS is unaware of any reason why the much lower level hunt by the Makah Tribe should cause a broader impact on the general behavior of the population than the Russian hunt has caused. Gray whale approach and attempted strikes by Makah whalers also is unlikely to adversely affect gray whales. These whales migrate through waters occupied by vessels and the few instances of approach by the Makah whaling canoe would have no effect on whale behavior. Potential glancing blows from a Makah harpoon (without striking the whale) could occur although unfrequently and are not likely to injure the whales as the harpoon would need to penetrate deep into the skin to cause injury. Attempted harpoon strikes resulting in glancing blows also are unlikely to affect whale behavior based on biopsy darting research whereby most of the darted whales will react to the dart penetrating their skin, but will immediately thereafter proceed with normal swimming and behavior patterns.

It is acknowledged that wounded whales could be dangerous; this is true for any large animal in pain. However, there is no obvious reason why a whale wounded during the Makah hunt would approach or damage uninvolved vessels. The Coast Guard's RNA, which acknowledges the dangers of a struck whale, requires vessels to stay 500 yards away from the Makah whaling operation. In any

case, gray whales are large, wild animals, and persons should exercise caution in approaching any whale, regardless of its condition.

This alternative would send the signal that it is possible to carry on traditional whaling that it is sanctioned by the IWC. While this would be considered a positive aspect by Native American groups, it would be perceived as a strong negative aspect by those who oppose Makah whaling. On a broader scale, official recognition that traditional activities such as whaling are culturally valuable, despite their controversial nature, would be reassuring to Native Americans in general.

5.2. Alternative 2 - Grant Makah Tribe the IWC Quota With Restrictions That Allow a Limited Hunt on the Pacific Coast Feeding Aggregation

Under this alternative, the Tribe would not be restricted to targeting migrating whales (as in Alternative 1). The Tribe would have the flexibility to determine when and where the hunt occurs in the tribal U&A, so long as the hunt does not adversely impact the feeding aggregation of gray whales off Washington. Although the overall annual quota of five whales landed or seven whales struck described in Alternative 1 would be retained, additional restrictions would be established for hunts occurring between June 1 and November 30 or in inside waters to ensure that the PBR for the Pacific coast feeding aggregation is not exceeded. This alternative would allow the Makah Tribe to determine how it wants to conduct a hunt and set hunting seasons in its entire U&A, so long as the overall IWC quota and the PBR for the Pacific coast feeding aggregation are not exceeded and the hunt is humane.

As discussed in Section 4.2.3. of this EA, both NMFS and the IWC consider the eastern North Pacific gray whale to be a single stock. However, as discussed in Section 5.1. of this EA, in order to evaluate the potential affects of Makah whaling on the Pacific coast feeding aggregation, this EA takes a very conservative approach and treats the Pacific coast feeding aggregation as a separate management unit for purposes of analysis with an average PBR ranging from 2.08 to 6.78 whales per year. Thus, removals by Makah whaling would not affect the Pacific coast feeding aggregation if the total take (harvest plus struck and lost) does not exceed the PBR range of 10.40 to 33.9 whales over the five-year period of the IWC quota (an annual average of 2.08 to 6.78 whales).

This alternative is more favorable to the Makah Tribe than Alternative 1 because it provides the Tribe flexibility in determining seasons and allows avoidance of hunting during the southward migration in the winter when personal safety of whalers is at risk. This alternative also acknowledges the Makah Tribe's request to conduct a limited hunt in the summer in the Straits, when weather conditions are not adverse and whales can be accessed nearby. In contrast to Alternative 1, under this alternative, the Tribe would not be restricted in geographic areas, except for the boundaries of its U&A, for harvest of whales from the Pacific coast feeding aggregation. As mentioned under Alternative 1, however, the Tribe considers any restriction on the take of whales from the Pacific coast feeding aggregation to be inconsistent with the "conservation necessity" standard.

In contrast to Alternative 1, this alternative would allow the Makah Tribe to hunt in its entire U&A during any month of the year when gray whales are present. It is likely that the Tribe would conduct limited whaling in the Straits, possibly during its Makah Days celebration in August. However, with the unpredictability of when and where whales may occur during the summer in any given year, it is possible that a summer hunt would occur in the ocean. In some years, the Pacific coast feeding aggregation is primarily off southern Vancouver Island in Canadian waters. In such years, there would be no summer hunt due to inaccessibility to the whales, and the hunt therefore would have to occur during the migration period. In other years, the feeding aggregation is primarily in the ocean, so in these years all whaling would occur in the ocean either during the summer or during the migration period. The Tribe could also hunt on migrating whales in the ocean during the spring, as it has in the past two years. This alternative would also provide the opportunity for the Tribe to hunt in the ocean in September and October, which may be its preference for a fall hunt. In summary, under this alternative, it cannot be assumed that removing the area and season restriction will definitely result in all whaling occurring in the summer or in the Straits.

The potential effects on wildlife of Makah whaling activity, other than on the gray whales targeted for harvest, are limited to the disturbance caused by the Makah whaling vessels, the dispatch of the firearm, and secondary effects from protest, media and other vessels present during the hunt. The rifle is fired downwards into the water, and in very close vicinity to the target gray whale, so no other wildlife species is likely to be affected by the .50 caliber projectile. The noise of the firearm or vessels may disturb wildlife in the immediate vicinity of the whaling activity, possibly causing a startle-fleeing reaction. This is a common reaction of wildlife exposed to vessel noise, fog horns, and other noises that occur in the marine environment and may result in temporary displacement of the birds. The discharge of the rifle will only occur after a gray whale is harpooned and is unlikely to be repeated more than four times in one day (based on the Makah hunt as conducted in 1999) nor more than five days in the year (based on a quota of five), so any effects from startle-fleeing reaction by wildlife is limited both in space (within immediate area of a harpooned whale) and time. Temporary displacement of wildlife due to vessel activity associated with the Makah hunt is not likely to significantly disrupt normal wildlife feeding behavior because the affected wildlife can readily move short distances away from vessels to less disturbed areas and continue feeding. Such temporary displacement in marine waters, especially by feeding seabirds, is a common occurrence wherever vessel activity occurs. Also, since the tribal hunt will occur in a relatively very small areas off the coast and only for short periods of time, the frequency of wildlife disturbances and numbers of animals temporarily displaced by the vessels involved with the whaling activity is expected to be minimal.

Secondary effects of the Makah whaling activity on wildlife also include potential disturbance from media or protest overflights. Sanctuary regulations include a 2000 foot ceiling for aircraft over the Sanctuary which would prevent disturbance from aircraft except when such regulations are violated. Experience from the hunt in 1999 indicates that media craft can and do operate at distances more than 2000 feet above the water and the only problem with aircraft occurred on one day when a seaplane operated by protest groups made several passes over the area of the hunt at less than 2000 feet. Operators of the aircraft were subsequently contacted by the Coast Guard and the activity did

not occur again in 1999.

If whaling is conducted in close proximity to rocky outcrops or islands where birds nest, it could have effects on the involved birds. The common murre is a seabird that nests on Tatoosh Island, which is located just offshore of the tip of the coast (Cape Flattery). Common murres also nest on White Rock, located at 48˚08'N latitude, which is the at the southern end of the Makah U&A. Although common murre numbers in Washington have declined, the species (which ranges from California to Alaska) is not listed or proposed for listing under the ESA. Makah whaling activities conducted in 1999 and 2000 occurred well offshore and south of Tatoosh Island and north of White Rock and therefore had no affect on the common murre rookeries. Most vessels avoid close approach to rocky outcrops to ensure vessel safety. During the common murre nesting period (May through September), the Makah whaling activity (other than normal transit through the navigation corridor near Tatoosh Island) should occur no closer than 200 yards of Tatoosh Island and White Rock to avoid any effects on nesting seabirds.

The marbled murrelet is the only seabird off northern Washington that is listed under the ESA; it is listed as a threatened species. The marbled murrelet nests inland in old growth forest as far as 50 miles inland (Hamer and Cummins 1991). The marbled murrelet occupies the nearshore coastal waters and inland bays and feeds in shallow areas (Pacific Seabird Group 1993). The Makah whaling activity is unlikely to affect marbled murrelets because, similar to other wildlife as described above, temporary displacement of marbled murrelets due to vessel activity associated with the Makah hunt is not likely to significantly disrupt normal feeding or resting behavior because murrelets can readily move short distances away from vessels to less disturbed areas and continue feeding.

Other ESA-listed birds that occur off northern Washington are the bald eagle, brown pelican, Aleutian Canada goose, and snowy plover. The snowy plover is a shorebird and the Aleutian Canada goose occurs inland and along the shore; they would not be affected by the whaling activity. The brown pelican may occur off northern Washington coastal waters in the summer, and may be temporarily displaced if they occur in the area of whaling activity (as described above), but otherwise are not affected. The bald eagle would not be affected by the whaling activity because it forages primarily over land and islands, and are unlikely to be foraging offshore in the area of the whaling activity. Other non-listed birds that may occur in the immediate vicinity of the whaling activity may be temporarily displaced as a result of the noise from the whaling activity (as described above), but would not otherwise be affected.

ESA-listed marine mammals off northern Washington include the large whales and the Steller sea lion. Makah whaling will not affect any ESA-listed whales or non-listed whales (e.g., minke whales) other than gray whales; the hunt will target on gray whales and no other whales will be approached or pursued. Gray whales can be easily identified at the close approach distances necessary for harvest, negating any possibility that another whale species might be accidentally taken. The effects of this alternative on gray whales is the same as those described in Alternative 1. Steller sea lions, California sea lions, and harbor seals hauled-out on nearshore rocky outcrops are unlikely to be

affected other than normal startle/fleeing behavior described for wildlife above if the whaling activity occurs in close proximity to rocky outcrops (which is unlikely based on observations of the 1999 Makah hunt). Pinnipeds that may occur in the water in the area of the whaling activity are likely to avoid the immediate area of the hunt. ESA-listed salmonids, which occur below the water's surface, would not be affected by whaling activities.

Under this alternative, whaling could occur within or outside of the Sanctuary. Effects of whaling on the Sanctuary are described in Alternative 1. The environmental consequences on the Sanctuary could be less than those described under Alternative 1 since it may result in increased hunting effort in the Straits, outside the Sanctuary.

A tribal hunt in the Straits is likely to be more accessible for protest vessels than hunting in the ocean under Alternative 1. The Coast Guard would most likely face greater challenges in enforcing the RNA because of easier public access to the areas where the Makah whale hunt would be occurring and increased public concern over the take of individuals from the Pacific coast feeding aggregation. The Coast Guard's RNA currently extends just east of Neah Bay in the Straits and would need to be modified to extend eastward to the eastern extent of the Makah U&A (Tongue Point) to provide the 500-yard exclusionary zone designed to avoid public safety issues.

Public opposition may be greater to this alternative than Alternative 1 because it allows hunting on the Pacific coast feeding aggregation, which frequent nearshore waters and are more approachable by vessels. Greater opposition could result in more protest involvement with the Makah hunt, especially if the hunt occurs in the Straits during favorable weather (when the hunt is more easily accessed and observed). The Makah hunt could possibly be observed from shore at several sites if it occurs in the Straits.

This alternative would send the signal that it is possible to carry on traditional whaling that is sanctioned by the IWC. Official recognition that traditional activities such as whaling are culturally valuable, despite their controversial nature, will be reassuring to Native Americans in general. It also gives more flexibility to the tribal harvest, while protecting the Pacific coast feeding aggregation from localized depletion.

5.3. Alternative 3 - Grant Makah Tribe the IWC Quota Without Time/Area Restrictions.

Under this alternative, NOAA would grant the Makah Tribe the IWC quota of up to five whales a year for ceremonial and subsistence purposes, as was approved by the IWC, without any Federal restrictions on the time or place of the hunt. This alternative would allow the Makah Tribe to determine when and where to hunt gray whales in its U&A. The hunt would be restricted to either five gray whales landed or seven whales struck, and the hunt would be terminated either when five gray whales are landed or seven whales are struck, whichever occurs first in a given year. The utilization of the whale would be limited to ceremonial and subsistence use, not for commercial purposes.

Under this alternative, the Makah Tribe would be allowed to take up to five whales per year, including animals from the Pacific coast feeding aggregation. There would be no effects on the gray whale population as described in Alternative 1. However, if the Pacific coast feeding aggregation is treated as a separate management unit, then without some type of temporal or further quota restriction, this alternative might exceed the annual average PBR range of 2.08 to 6.78 for the Pacific coast feeding aggregation.

The environmental consequences of this alternative on gray whales and other wildlife are similar to those described in Alternative 2. The environmental consequences of this alternative on the Sanctuary could be less than those described under Alternative 2 since it may result in increased hunting effort in the Straits, outside the Sanctuary.

This alternative would not be acceptable to the many citizens who are opposed to the Makah whale hunt. Since granting the Makah Tribe a quota without restrictions on the area or time of the hunt is more likely to result in the taking of gray whales from the Pacific coast feeding aggregation, this alternative will be especially intolerable to those citizens who are concerned about taking gray whales from the Pacific coast feeding aggregation. This may result in increased protest activity in the area of the Makah hunt, particularly because the hunting area would now be more easily accessible by land.

The Coast Guard's 1999 regulation for an RNA was based on the parameters of the Makah whale hunt at that time. Under this alternative, the Coast Guard would need to alter its regulations to conform with the broader geographic area of the hunt. In addition, the Coast Guard would most likely face greater challenges in enforcing this regulation because of easier public access to the areas where the Makah whale hunt would be occurring, potentially more recreational and commercial vessel traffic, and increased public concern over the take of individuals from the Pacific coast feeding aggregation.

Granting the Makah Tribe a quota at this time would promote cultural diversity and recognize the importance of maintaining traditions for the coherence of Native American groups. Granting the Makah Tribe a quota without restrictions might be considered favorable to the Tribe because it would allow the Tribe to conduct whaling activities throughout its U&A throughout the year, but might be counter to the Tribe's interests by inducing additional public resistance to the hunt.

5.4. Alternative 4 - No Action - Do Not Grant Makah Tribe the IWC Quota

Under this alternative, NOAA would not issue the IWC quota for the subsistence harvest of gray whales to the Makah Tribe. This alternative would be viewed by the Makah as a failure by the U.S. Government to uphold treaty-secured rights of the Makah Tribe. Since no act of Congress has explicitly abrogated the Treaty of Neah Bay, and since there is no conservation-based rationale for denying a quota, a denial opposed by the Tribe would not comport with NOAA's objective to accommodate Federal trust responsibilities and treaty rights to the fullest extent possible. Several scenarios could occur under this option: 1) the Makah Tribe might litigate to force the government

to acknowledge its treaty rights; 2) NOAA could encourage and assist the Tribe in non-lethal whaling ventures such as whale watching or ecotourism; 3) NOAA could compensate the Tribe for its loss; and 4) the Makah Tribe could proceed to hunt gray whales under its treaty right without issuance of a quota.

The no-action alternative would have the worst consequences for the Makah Tribe. A U.S. Government decision not to grant the Makah Tribe a quota would be viewed by the Tribe as a failure to uphold the Treaty of Neah Bay and would almost inevitably lead to litigation. The nature of the suit would depend on the circumstances, and on decisions taken by the Makah Tribe and the U.S. Government. In light of past governmental action, it is understandable why the Makah Tribe would find this alternative unacceptable. In the late 1800s, the U.S. Government sent agricultural tools to the Makah Tribe instead of whaling and fishing implements as promised. Sending these tools was part of a well-meaning but misguided effort to teach the Tribe new skills that would provide a more stable income and subsistence base. The effect was to make it more difficult for the Makah Tribe to maintain its sense of tradition and community.

Encouraging whale watching, unless done with sensitivity to cultural differences, could be similarly counterproductive to the Makah effort to reaffirm its traditions. Although the Tribe does not recognize whale watching as a direct substitute for whaling, it has been receptive to developing its ecotourism potential. NOAA discussed the possibility of developing ecotourism in Neah Bay in lieu of whaling with the Tribal Council and the Makah Whaling Commission in 1997. Tribal representatives advised that this is not a course of action the Tribe would find acceptable. Their concern is that whale watching would alienate the past from the present, imparting a museum-like quality to an activity the Tribe considers a vibrant part of its current culture. While recognizing that ecotourism might be a beneficial activity from an economic point of view and might help the Tribe celebrate its history, the Tribe does not believe whale watching could be a substitute for whaling. The Tribe advised that it preferred an active, participatory continuation of Makah traditions over a preservation of them for their anthropological and educational value.

Compensating the Tribe not to exercise its treaty right has also met resistance in the Tribe with a common sentiment that treaty rights are not for sale. While it may be appropriate for the Tribe to receive compensation for economic harm due to a prohibition of a commercial fishery, in this case the Tribe is requesting a quota for ceremonial and subsistence purposes, something that cannot be compensated with money.

If the Tribe decides to resume whaling without issuance of a quota, the U.S. Government would then need to decide whether to prosecute this activity as a violation of the Whaling Convention Act or any other applicable law. If it did, the Makah Tribe could defend its action on the basis that the rights conferred in the Treaty of Neah Bay are not superseded by that or any other relevant statute. If it chose not to prosecute, the U.S. Government might be challenged by anti-whaling groups, and the same issues might be argued in a different court from a different perspective.

If no action is taken to issue a quota to the Makah Tribe, it is possible that no whales would be

landed or struck and there would be no environmental consequences for the gray whale population. However, the Makah Tribe may exercise its treaty right to harvest gray whales without issuance of a quota. Assuming the Makah Tribe limited its hunt to the same levels as would be authorized by the IWC, the direct environmental consequences of Makah whaling would be the same as for Alternative 3. However, the environmental consequences from secondary effects of protest craft monitoring or attempting to disrupt the hunt may increase.

The lack of whaling under this alternative would have no effect on the Sanctuary, Wildlife Refuge, or wildlife resources in the Makah U&A. If the Makah Tribe decided to harvest whales without issuance of a quota, the environmental consequences are likely the same as those in Alternative 3, assuming the Tribe limits the hunt to the IWC quota.

If whaling does not occur under this alternative, there are no public safety issues for the whalers and others observing or attempting to disrupt the hunt. The Coast Guard's RNA for the Makah whale hunt would not be necessary and could be eliminated. If whaling does occur without issuance of a quota, the Coast Guard could be placed in a difficult position of protecting public safety during a non-sanctioned tribal hunt.

In addition to provoking litigation, the no-action alternative could also provoke confrontation between the Makah Tribe and NOAA. Cooperative research and management efforts between the Tribe and NOAA that benefit marine mammals as well as ESA-listed salmonids could be jeopardized. This alternative could also affect working relationships with other treaty tribes that would view NOAA's action under this alternative as a breach of faith by the U.S. Government in upholding any treaty right. Most Indian tribes throughout the United States would likely view this alternative as insensitivity to the cultural diversity of Native Americans in general.

Denying a quota would be inconsistent with the IWC objective for the management of whale stocks subject to aboriginal subsistence whaling. The IWC objective is "to enable aboriginal people to harvest whales in perpetuity at levels appropriate to their cultural and nutritional requirements" so long as 1) the risks of extinction to individual stocks are not seriously increased by subsistence whaling, 2) the stocks are maintained at or above the level giving the highest net recruitment, and 3) stocks below the level giving the highest net recruitment are moved towards it, so far as the environment permits.

It is difficult to predict the effects that failing to issue the Makah Tribe a quota would have in the IWC proceedings and member countries. Some countries may support this action while others may view it as a unilateral move by the United States contrary to the IWC action.

Whale watching activities for gray whales are not likely to be affected by this alternative as there is no information that would indicate whaling for five gray whales would have any effect on whale watching. If the Makah Tribe decided to harvest whales without issuance of a quota, the direct environmental consequences are likely the same as those in Alternative 3, assuming the Tribe limits the hunt to the IWC quota. However, there may be increased protest vessel activity if the Tribe

hunted whales without a quota. If the U.S. Government provided economic incentives to the Makah Tribe to undertake whale watching, it could place the Tribe in an economic advantage over other whale watching operations in other areas and may affect these other businesses.

This alternative would be supported by citizens opposed to whaling. By taking no action, NOAA may avoid further legal challenges from animal protection groups. But this could be countered by legal challenges by the Makah and other Indian tribes.

6. COORDINATION AND CONSULTATION

Preparation of this draft EA included extensive consultation and coordination with various programs and offices of NOAA, NMFS, NOS, DOI, DOS, and BIA.

7. LIST OF PREPARERS

Carol Bernthal	Olympic Coast National Marine Sanctuary National Ocean Service Port Angeles, WA
Ed Bowlby	Olympic Coast National Marine Sanctuary National Ocean Service Port Angeles, WA
Mary Sue Brancato	Olympic Coast National Marine Sanctuary National Ocean Service Port Angeles, WA
Cathy E. Campbell	Office of Protected Resources National Marine Fisheries Service Silver Spring, MD
Douglas DeMaster	National Marine Mammal Laboratory National Marine Fisheries Service Seattle, WA
Patrick Gearin	National Marine Mammal Laboratory National Marine Fisheries Service Seattle, WA
Margaret F. Hayes	Assistant General Counsel for Fisheries National Oceanic and Atmospheric Administration

Silver Spring, MD

Jeffrey Laake — National Marine Mammal Laboratory
National Marine Fisheries Service
Seattle, WA

David Rugh — National Marine Mammal Laboratory
National Marine Fisheries Service
Seattle, WA

Joe Scordino — Northwest Regional Office
National Marine Fisheries Service
Seattle, WA

8. REFERENCES

Avery, W.E. and C. Hawkinson. 1992. Gray whale feeding in a northern California estuary. Northwest Science 66:199-203.

Berzin, A.A. 1984. Soviet studies of the distribution and numbers of the gray whale in the Bering and Chukchi Seas, from 1968 to 1982. *In:* Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Blokhin, S.A. 1995. Results of research on gray whales caught off the Chukotka Peninsula in 1994. Report to Intl. Whal. Comm., SC/47/AS20.

Blokhin, S.A. 1997a. The results of studies of the American population of gray whales taken in the coastal waters of the Chukotka Peninsula in 1996. Report to Intl. Whal. Comm., SC/49/AS15.

Blokhin, S.A. 1997b. Some aspects of modern whaling of gray whales by natives of Chukotka. Report to Intl. Whal. Comm., SC/49/AS16.

Blokhin, S.A. 1998. To the gray whale (*Eschrichtius robustus*) distribution and abundance near shore of the South-Eastern Chukotka Peninsula. Report to Intl. Whal. Comm., SC/50/AS13.

Blokhin, S.A. 1999. Short results of investigations of gray whales (*Eschrichtius robustus*) of the Eastern Pacific stock in 1998. Report to Intl. Whal. Comm., SC/51/AS21.

Braham, H.W. 1984. Distribution and migration of gray whales in Alaska. *In*: Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). The Gray Whale, *Eschrichtius robustus*. Academic Press Inc. Orlando, Fl.

Butterworth, D.S., J.L. Korrubel and A.E. Punt. 1990. What is needed to make a simple density-dependent response population model consistent with data for the eastern North Pacific gray whales? Report to Intl. Whal. Comm., SC/A90/G10.

Buckland, S.T. and J.M. Breiwick. *In press*. Estimated trends in abundance of eastern Pacific gray whales from shore counts, 1967/68 to 1995/96. J. Cetacean Res. Manage. (Special Issue). (SC/A90/G9).

Buckland, S.T., J.M. Breiwick, K.L. Cattanach and J.L. Laake. 1993. Estimated population size of the California gray whale. Mar. Mammal Sci. 9(3):235-249.

Calambokidis, J., J.D. Darling, V. Deecke, P. Gearin, M. Gosho, W. Megill, C.M. Tombach, D. Goley, C. Toropova and B. Gisborne. 2000a. Range and movements of seasonal resident gray whales from California to southeast Alaska. Cascadia Research Collective, Olympia, WA.

Calambokidis, J., L. Schlender, M. Gosho, P. Gearin, D. Goley and C. Toropova. 2000b. Gray whale photographic identification in 1999: Collaborative research by Cascadia Research, the National Marine Mammal Laboratory, and Humboldt State University. Report prepared for National Marine Mammal Laboratory, Seattle, WA.

Calambokidis, J. and J. Quan. 1999. Photographic identification research on seasonal resident whales in Washington State. Abstract only. *In:* Rugh, D.J., M.M. Muto, S.E. Moore and D.P. DeMaster. Status review of the Eastern North Pacific stock of gray whales. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-103.

Calambokidis, J., J. Quan and L. Schlender. 1999. Gray whale photographic identification in 1998. Report prepared for National Marine Mammal Laboratory, Seattle, WA.

Calambokidis, J., J. Quan and L. Schlender. 1998. Gray whale photographic identification in 1997. Report prepared for National Marine Mammal Laboratory, Seattle, WA.

Calambokidis, J. and J. Quan. 1997. Gray whales in Washington State: Report on research in 1996. Report prepared for National Marine Mammal Laboratory, Seattle, WA.

Calambokidis, J., J.R. Evenson, G.H. Steiger and S.J. Jeffries. 1994. Gray whales of Washington State: Natural history and photographic catalog. Cascadia Research Collective, Olympia, WA.

Clapham, P.J. and L.T. Hatch. 2000. Determining spatial and temporal scales for population management units: lessons from whaling. Report to Intl. Whal. Comm., SC/52/SD2.

Clapham, P.J. and P.J. Palsboll. 1999. Review of studies on the stock identify of the humpback

whale in the North Atlantic. Report to Intl. Whal. Comm., SC/51/RMP22.

Clapham, P.J., S.J. Leatherwood, I. Szczepaniak and R.L. Brownell, Jr. 1997. Catches of humpback and other whales from shore stations at Moss Landing and Trinidad, California, 1919-1926. Marine Mammal Science 13(3):368-394.

Corkeron, P.J. and R.C. Connor. 1999. Why do baleen whales migrate? Marine Mammal Science 15(4):1228-45.

Darling, J.D. 1984. Gray whales off Vancouver Island, British Columbia. *In*: Jones, M.L., S.L. Swartz and S. Leatherwood (eds). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Darling, J.D., K.E. Keogh and T.E. Steeves. 1998. Gray whale (*Eschrichtius robustus*) habitat utilization and prey species off Vancouver Island, B.C. Mar. Mammal Sci. 14(4):692-720.

Dedina, S. and E. Young. 1995. Conservation and development in the gray whale lagoons of Baja California Sur, Mexico. Final report for MMC contract T10155592. NTIS PB96-113154.

Donovan, G.P. 1991. A review of IWC stock boundaries. *In*: Hoelzel, A.R. (ed). Genetic ecology of whales and dolphins. Rep. Intl. Whal. Comm. Special Issue 13.

Fisken, M. 1980. Whale bone studies in Ozette archaeological project. Interim final report, Phase XIII. Washington Archaeological Research Center, Project Report 97. Washington State University, Pullman, WA.

Ferrero, R.C., D.P. DeMaster, P.S. Hill and M.M. Muto. *In prep*. Alaska marine mammal stock assessments 2000. To be published as U.S. Dep. Commer., NOAA Tech. Memo NMFS-AFSC.

Gearin, P.J. and M. Gosho. 2000. Report on whaling activity during the spring 2000 Makah gray whale hunt. NMFS/NWR report.

Gearin, P.J. and D. DeMaster. 1997. Gray whales in Washington. Report to Intl. Whal. Comm., SC/48/AS18.

Gilmore, R.M. 1960. A census of the California gray whale. U.S. Fish and Wildlife Service, Special Scientific Report: Fisheries No. 342. Washington, D.C.

Gilmore, R.M. 1976. Ecology of the gray whales. Environment Southwest, San Diego Society of Natural History, Vol. 472:3-7.

Goley, P.D. and J.M. Straley. 1994. Attack on gray whales (*Eschrichtius robustus*) in Monterey

Bay, California, by killer whales (*Orcinus orca*) previously identified in Glacier Bay, Alaska. Can. J. Zool. 72(8):1528-1530.

Gosho, M.E., P.J. Gearin, J. Calambokidis, K.M. Hughes, L. Cooke and V.E. Cooke. 1999. Gray whales in the waters of northwestern Washington in 1996 and 1997. Report to Intl. Whal. Comm., SC/51/AS9.

Green, G., J. Brueggeman, R. Grotefendt and C. Bowlby. 1995. Offshore distances of gray whales migrating along the Oregon and Washington coasts, 1990. Northwest Science 69:223-227.

Hamer, T. and E. Cummins. 1991. Relationships between forest characteristics and use of inland sites by marbled murrelets in northwestern Washington. Washington Department of Wildlife.

Henderson, D.A. 1984. Nineteenth century gray whaling: grounds, catches, and kills, practices and depletion of the whale population. *In:* Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Herzing, D.L. and B.R. Mate. 1984. Gray whale migrations along the Oregon coast, 1978-81. *In:* Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Hobbs, R.C. and D.J. Rugh. 1999. The abundance of gray whales in the 1997/98 southbound migration in the eastern North Pacific. Report to Intl. Whal. Comm., SC/51/AS10.

Ingling, A.L. 1999. Comparative ballistic efficiency of various large-caliber rifles for use in humane killing of whales. Report to Intl. Whal. Comm., IWC/51/WK14 Appendix.

Ingling, A.L. 1997. Development of techniques incorporating traditional elements to enable the Makah to harvest the gray whale in an efficacious, safe, and humane manner. Report to Intl. Whal. Comm., IWC/49/HK4.

IWC. 1993. Report of the special meeting of the Scientific Committee on the assessment of gray whales. Rep. Intl. Whal. Comm. 43:241-258.

IWC. 1995. Report of the Scientific Committee. Rep. Intl. Whal. Comm. 45:53-95.

IWC. 1996. Report of the Scientific Committee. Rep. Intl. Whal. Comm. 46:51-97.

IWC. 1997. International Whaling Commission Report 1995-96. Rep. Intl. Whal. Comm. 47:1-2.

IWC. 1998. International Whaling Commission Report 1996-97. Rep. Intl. Whal. Comm. 48:1-2.

IWC. 1999. International Whaling Commission Report 1997-98. Annual Report of the International Whaling Commission 1998:1-2.

IWC. 2000. Report of the Scientific Committee. 52nd Meeting of the International Whaling Commission, Adelaide, Australia. IWC/52/4.

Jones, B. 1999. Gray whale observations from Tatoosh Island, Washington, December 1998. Unpublished manuscript on file at the National Marine Mammal Laboratory, Seattle, WA.

Jones, M.L. 1986. Photographic identification study of gray whale reproduction, distribution, and duration of stay in San Ignacio Lagoon, and inter lagoon movements in Baja California. *In*: Abstracts, Sixth Biennial Conference on the Biology of Marine Mammals. Nov. 1985, Vancouver, B.C.

Jones, M.L. and S.L. Swartz. 1984. Demography and phenology of gray whales and evaluation of whale-watching activities in Laguna San Ignacio, Baja California Sur, Mexico. *In*: Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). 1984. The Gray Whale, *Eschrichtius robustus*. Academic Press Inc. Orlando, Fl.

Krahn, M.M., G.M. Ylitalo, R.L. Brownell, Jr., A. Blokhin, D.G. Burrows, K.L. Tilbury, S.E. Moore, T. Rowles and J.E. Stein. 2000. Environmental assessment of eastern North Pacific gray whales (Eschrichtius robustus): Lipid and organochlorine contaminant profiles. Report to Intl. Whal. Comm., SC/52/E1.

Krupnik, I.I. 1984. Gray whales and the aborigines of the Pacific Northwest: the history of aboriginal whaling. *In*: Jones, M.L., S.L. Swartz and S. Leatherwood (*eds.*). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Larsen, A.H., J. Sigurjonsson, N. Oien, G. Vikingsson and P.J. Palsboll. 1996. Population genetic analysis of mitochondrial and nuclear genetic loci in skin biopsies collected from central and northeastern North Atlantic humpback whales (*Megaptera novaeangliae*): population identify and migratory destinations. Proceedings of the Royal Society of London Part B, 263:1611-1618.

LeDuc, R.G., D.W. Weller, A.M. Burdin, J. Hyde, B. Wursig, R.L. Brownell, Jr. and A.E. Dizon. 2000. Genetic differences between western and eastern North Pacific gray whales. Report to Intl. Whal. Comm., SC/52/SD16.

Mallonée, J.S. 1991. Behavior of gray whales (*Eschrichtius robustus*) summering off the northern California coast, from Oatrick's Point to Crescent City. Canadian Journal of Zoology

69:681-690.

Mitchell, E.D. and R.R. Reeves. 1983. Catch history, abundance, and present status of Northwest Atlantic humpback whales. Rep. Intl. Whal. Comm. Special Issue 5:153-212. Cambridge, UK.

Moore, S.E. and J.T. Clarke. *In press*. Potential impact of offshore human activities on gray whales. J. Cetacean Res. Manage. Special Issue.

Murison, L.D., D.J. Murie, K.R. Morin and J. deSilva Curel. 1984. Foraging of the gray whale along the West Coast of Vancouver Island, British Columbia. *In*: Jones, M.L., S.L. Swartz and S. Leatherwood. (*eds*.). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Nerini, M. 1984. A review of gray whale feeding ecology. *In*: Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

NOAA (National Oceanic and Atmospheric Administration). 1993. Olympic Coast National Marine Sanctuary. Final Environmental Impact Statement/Management Plan.

Norman, S.A., M.M. Muto, D.J. Rugh and S.E. Moore. 2000. Gray whale strandings in 1999 and a review of stranding records in 1995-1998. Report to Intl. Whal. Comm., SC/52/AS5.

Nysewander, D., M. Nixon and J. Stein. 1994. Puget Sound ambient monitoring program: progress report of the marine bird, waterfowl, and marine mammal monitoring project, covering July 1992 to March 1994. Prepared for the Washington Dept. of Wildlife and the Puget Sound Water Quality Authority.

Pacific Seabird Group. 1993. White paper on the status of marbled murrelets.

O'Leary, B. 1984. Aboriginal whaling from the Aleutian Islands to Washington State. *In:* Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Oliver, J.S., P.N. Slattery, M.A. Silberstein and E.F. O'Connor. 1983. A comparison of gray whale, Eschrichtius robustus, feeding in the Bering Sea and Baja California. Fishery Bulletin, 81(3):513-522.

Pacific Seabird Group. 1993. White paper on the status of marbled murrelets.

Parrish, J. 1997. Attendance and reproductive success of Tatoosh Island common murres. Final Report 1996. Report submitted to the Tenyo Maru Trustee

Committee.

Patten, D.R. and W.F. Samaras. 1977. Unseasonable occurrences of gray whales. Southern California Academy of Science, 76(3):205-208.

Palsboll, P.J. et al. 1995. Distribution of mtDNA haplotypes in North Atlantic humpback whales: the influence of behavior on population structure. Marine Ecology Progress Series, 116:1-10.

Perez-Cortez, H., J. Urban Ramirez, F. Ollervides, A. Gomez-Gallardo, J.I. Sois and A. Esliman. 2000. Report of the high gray whale mortality in the Baja California peninsula during the 2000 season. Report to Intl. Whal. Comm., SC/52/AS16.

Perryman, W.L., M.A. Donahue, S.B. Reilly and P.C. Perkins. 1999. Annual calf production for the California stock of gray whales 1994-1997 [Preliminary analysis]. Report to Intl. Whal. Comm., SC/49/AS13.

Perryman, W.L., M.A. Donahue, P.C. Perkins and S.B. Reilly. 2000. Annual calf production for the California stock of gray whales and environmental correlates 1994-2000. Report to Intl. Whal. Comm., SC/52/AS18.

Pike, G.C. 1962. Migration and feeding of the gray whale (*Eschrichtius gibbosus*). J. Fish. Res. Bd. Canada, 19:815-838.

Poole, M.M. 1984. Migration corridors of gray whales along the central California coast, 1980-1982. *In*: Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Punt, A.E. and D.S. Butterworth. 1997. An examination of some aspects of the Bayesian approach used to assess eastern North pacific stock of gray whales. Report to Intl. Whal. Comm., SC/49/AS3.

Quan, J. 2000. Summer resident gray whales of Washington State: Policy, biological and management implications of Makah whaling. MS. thesis. School of Marine Affairs, University of Washington. Seattle, WA.

Reagan, A.B. 1925. Whaling of the Olympic Peninsula Indians of Washington. Natural History, Vol. XXV (1).

Reeves, R.R. 1984. Modern commercial pelagic whaling for gray whales. *In*: Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Reilly, S.B. 1984. Assessing gray whale abundance: a review. *In*: Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Reilly, S.B. 1981. Population assessment and population dynamics of the California gray whale, *Eschrichtius robustus*. PhD. Dissertation. University of Washington, Seattle.

Reilly, S.B. 1992. Population biology and status of Eastern Pacific gray whales: Recent developments. *In:* McCullough, D.R. and R.H. Barrett (eds). Wildlife 2001: Populations. Elsevier Applied Science. N.Y.

Renker, A.M. 1997. Whale hunting and the Makah Tribe: A needs statement. Report to Intl. Whal. Comm., IWC/49/AS.

Renker, A.M and E. Gunter. 1990. Makah. *In:* Suttles, W. The handbook of north American Indians. Volume 7. The Northwest Coast. Smithsonian Institution. Wash., D.C.

Rice, D.W. 1986. Gray whale. *In:* Haley, D. (ed). Marine Mammals. Pacific Search Press. Seattle, WA.

Rice, D.W. 1963. Progress report on biological studies of the larger Cetacea in waters off California. Norsk Hvalfangst-Tidende 52:181-187.

Rice, D.W. and A.A. Wolman. 1971. Life history and ecology of the gray whale (*Eschrichtius robustus*). American Society of Mammalogists, Special Publication No. 3.

Rice, D.W., A.A. Wolman, D.E. Withrow and L.A. Fleischer. 1981. Gray whales on the winter grounds in Baja California. Rep. Intl. Whaling Comm. 31:477-493.

Rice, D.W., A.A. Wolman and H.W. Braham. 1984. The gray whale, *Eschrichtius robustus*. Mar. Fish. Rev. 46(4):7-14.

Rugh, D. 1984. Census of gray whales at Unimak Pass, Alaska, November-December 1977-1979. *In*: Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Rugh, D. and M. Fraker. 1981. Gray whale (*Eschrichtius robustus*) sightings in Eastern Beaufort Sea. Arctic 34(2):186-187.

Rugh, D.J., M.M. Muto, S.E. Moore and D.P. DeMaster. 1999a. Status review of the Eastern North Pacific stock of gray whales. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-103.

Rugh, D.J., K.E.W. Shelden and A. Schulman-Janiger. 1999b. Timing of the southbound migration

of gray whales in 1998/99. Report to Intl. Whal. Comm., SC/51/AS11.

Russian Federation. 1997. Feasibility study for the aboriginal gray whaling in 1998-2002. Report to Intl. Whal. Comm., IWC/49/AS2.

Sanchez-Pacheco, J.A., A. Vazquez-Hanckin and R. DeSilva-Davila. *In press.* Gray whale's mid-spring feeding at Bahia de los Angeles, Gulf of California, Mexico. Marine Mammal Science

Sayers, H. 1984. Shore whaling for gray whales along the coast of the California. *In:* Jones, M.L., S.L. Swartz and S. Leatherwood (eds.). The Gray Whale, *Eschrichtius robustus*. Academic Press, Inc. Orlando, Fl.

Scammon, C.M. 1874. The marine mammals of the northwestern coast of North America. John H. Carmany and Co., San Francisco.

Scheffer, V.B. and J.W. Slipp. 1948. The whales and dolphins of Washington State with a key to the cetaceans of the west coast of North America. Am. Midl. Nat. 39:257-337.

Shelden, K.E.W., J.L. Laake, P.J. Gearin, D.J. Rugh and J.M. Waite. 1999. Gray whale aerial surveys off the Washington coast, winter 1998/99. Report to Intl. Whal. Comm., SC/51/AS12.

Shelden, K.E.W., D.J. Rugh, J.L. Laake, J.M. Waite, P.J. Gearin, and T.R. Wahl. 2000. Winter observations of cetaceans off the northern Washington coast. Northwestern Naturalist 81:54-59.

Shelden, K.E.W., D.J. Rugh and S.A. Boeve. 1995. Gray whale calf sightings collected by the National Marine Mammal Laboratory during southbound migrations, 1952-95. Report to Intl. Whal. Comm., SC/47/AS4.

Singh, R.R.P. 1966. Aboriginal economic system of the Olympic Peninsula Indians, Western Washington. Sacramento Anthropological Society Papers. Sacramento State College, Sacramento, Calif.

Speich, S. and T. Wahl. 1989. Catalog of Washington seabird colonies. U.S. Department of Interior, Bio Report 88(6).

Speich, S., T. Wahl and D. Manuwal. 1992. The numbers of marbled murrelets in Washington marine waters. *In:* Status and conservation of marbled murrelets in North America. Western Foundation of Zoology Vol.5 No.1 1992.

Steeves, T.E., J.D. Darling and C.M. Schaeff. 1998. Population structure of gray whales

(*Eschrichtius robustus*) that summer in Clayoquot Sound, British Columbia based on sighting and molecular data. (Abstract only) *In:* Abstracts, The World Marine Mammal Science Conference, Society for Marine Mammalogy, Monaco, 20-24 January, 1998.

Steeves, T.E. 1998. Genetic population structure of gray whales (*Eschrichtius robustus*) that summer in Clayoquot Sound, British Columbia. Master of Science Dissertation. American University, Washington, D.C.

Sumich, J.L. 1984. Gray whales along the Oregon coast in summer, 1977-1980. Murrelet 65:33-40.

Swan, J.G. 1857. The northwest coast or, three years residence in Washington territory. Univ. of Washington Press. Seattle, WA.

Swan, J.G. 1870. The Indians of Cape Flattery at the entrance to the Strait of Fuca, Washington Territory. Smithsonian Contributions to Knowledge No. 220. Smithsonian Institute, Washington D.C.

Swartz, S.L. 1986. Gray whale migratory, social and breeding behavior. *In*: Donovan, G.P. (ed). Behavior of whales in relation to management. Reports of the International Whaling Commission Special Issue 8. Cambridge, UK.

Swartz, S.L. and M.L. Jones. 1984. Mothers and calves, from winters spent among the gray whales of San Ignacio Lagoon. Oceans, 17(2): 11-19.

Swartz, S.L., M.L. Jones, J. Goodyear, D.E. Withrow and R.V. Miller. 1987. Radio-telemetric studies of gray whale migration along the California coast: a preliminary comparison of day and night migration rates. Rep. Intl. Whal. Comm. 37: 295-9.

Swartz, S.L., B.L. Taylor and D. Rugh. 2000. Review of studies on stock identity in the gray whale (*Eschrichtius robustus*). Report to Intl. Whal. Comm., SC/52/SD3.

Taylor, H. and J. Bosch. 1980. Makah whalers. Carnivore Vol. I.

Tilbury, K.L., J.E. Stein, C.A. Krone, G.M. Ylitalo, R.L. Brownell, Jr., M. Gosho, A. Blokhin, J.L. Bolton and D.W. Ernest. 1999. Chemical contaminants in gray whales (*Eschrichtius robustus*) from off their western Bering Sea arctic feeding grounds and the California and Washington coasts. Abstract only. *In:* Rugh, D.J., M.M. Muto, S.E. Moore and D.P. DeMaster. Status review of the Eastern North Pacific stock of gray whales. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-103.

Urban Ramirez, J. 2000. Environmental impact study San Ignacio saltworks project. Report to Intl. Whal. Comm., SC/52/ForInfo23.

Wade, P.R. 1994. Estimates of population parameters for the eastern Pacific gray whale, *Eschrichtius robustus,* using a Bayesian method. Report to Intl. Whal. Comm., SC/46/AS16.

Wade, P.R. and R. Angliss. 1997. Guidelines for assessing marine mammal stocks: report of the GAMMS workshop April 3-5, 1996, Seattle, Washington. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-12.

Wade, P.R. and D.P. DeMaster. 1996. A Bayesian analysis of eastern Pacific gray whale population dynamics. Report to Intl. Whal. Comm., SC/48/AS3.

Wahl, T., S. Speich, D. Manuwal, K. Hirsch and C. Miller. 1981. Marine bird populations of the Strait of Juan de Fuca, Strait of Georgia, and adjacent waters in 1978 and 1979. U.S. Environ. Prot. Agency. Interagency Energy -- Environ. Res. Dev. Prog. Rep. EPA-600/7-81-156, Mar. Ecosystems Anal. Seattle.

Waterman, T.T. 1920. The whaling equipment of the Makah Indians. University of Washington Publications in Anthropology 1 (2). Seattle, WA.

Yablokov, A.V. and L.S. Bogoslovskaya. 1984. A review of Russian research on the biology and commercial whaling of the gray whale. *In:* Jones, M.L., S.L. Swartz and S. Leatherwood (eds). The Gray Whale, *Eschrichtius robustus*. Academic Press Inc. Orlando, Fl.

Ylitalo, G.M., L. Hufnagle, M. Gosho, P. Gearin, M.M. Krahn and J. Stein. 1999. Contaminant analyses of Makah gray whale tissues. Report to NMFS/NWR.

Zemsky, V.A., L.S. Bogoslovskaya, R.G. Borodin and I.V. Smelova. 1999. Whaling of gray whales in the northern part of the Pacific Ocean and needs of the native population of Chukotka for food whale products in 1997-1998. Report to Intl. Whal. Comm., SC/51/AS29.

Zimushko, V.V. and M.V. Ivashin. 1980. Some results of Soviet investigations and whaling of gray whales (*Eschrichtius robustus*, Liljeborg, 1861). Rep. Intl. Whal. Comm. 30:237-246.