APRIL 20, 2006

TO CARLOS GUTIERREZ
U.S. SECRETARY OF COMMERCE
15 AND CONSTITUTION AVENUES N.W.
WASHINGTON, D.C. 20230

PETITION TO LIST THE COOK INLET POPULATION OF BELUGA WHALES *(DELPHINAPTERUS LEUCAS)* AS ENDANGERED UNDER THE FEDERAL ENDANGERED SPECIES ACT

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INTRODUCTION AND EXECUTIVE SUMMARY

The Cook Inlet population of beluga whales was first listed as a possible candidate for listing under the federal Endangered Species Act nearly twenty years ago (53 Fed. Reg. 33516). In response to a listing petition filed with the U.S. Department of Commerce under the Act, in 2000 NOAA Fisheries National Marine Fisheries Service ("NMFS") declined to list the whale under the Act but instead listed the whale as "depleted" under the less protective federal Marine Mammal Protection Act (65 Fed. Reg. 34590). Since 2000, however, the Cook Inlet beluga whale population has shown no signs of a recovery.

The U.S. Marine Mammal Commission "believes that the population is already at risk genetically," that it is "by all conservation standards, already at a dangerously low level," and that it "continues to believe that listing this population under the Endangered Species Act is warranted" (Marine Mammal Commission 2004, at 4, 7). In June 2005 written comments, the Commission recommended to NMFS that it should "promptly" begin a status review under the Endangered Species Act and that it should "proceed directly to publication of a proposed listing rule" (Marine Mammal Commission 2005, at 4 (emphasis added)). The Commission went on to say that "As for the merits of a proposed listing, the Commission believes that the case is clear…. This seems to constitute a compelling case for listing [under the Endangered Species Act]" (Marine Mammal Commission 2005, at 4, 5 (emphasis added)).

The U.S. Marine Mammal Commission does not stand alone among the experts in making this recommendation. The Cook Inlet beluga whale population qualifies for listing as "Endangered" and as "Critically Endangered" under the Red List Criteria of the prestigious International Union for the Conservation of Nature and Natural Resources (Lowry 2006). Listing has been proposed under the "Critically Endangered: C2a(ii)" criterion based on the "fact that the population is continuing to decline even after the only identified cause of the decline (excessive hunting) has been controlled" (Lowry 2006, at 7).

The Cook Inlet beluga whale population is isolated from other beluga whale stocks in Alaska. The population, apparently in decline for many years, experienced a dramatic and precipitous decline in the 1990s, which in 2000 NMFS attributed to over hunting by Alaska Natives. This precipitous decline prompted Alaska Native whale hunter Joel Blatchford, the Alaska Center for the Environment, Alaska Community Action on Toxics, Alaska Wildlife Alliance, Center for Biological Diversity, Center for Marine Conservation, National Audubon Society, and Trustees for Alaska to file a petition to list the Cook Inlet beluga whale population as endangered under the federal Endangered Species Act.

In response to the petition, in May 2000 NMFS listed the whale as depleted under the federal Marine Mammal Protection Act (65 Fed. Reg. 34590). NMFS declined,

however, to list the population as either threatened or endangered under the Endangered Species Act, finding instead that listing under the latter Act was not warranted (65 Fed. Reg. 38778). In declining to list the species under the Endangered Species Act, NMFS predicted that restrictions on Alaska Native hunting would lead to the recovery of the Cook Inlet beluga whale population (NMFS 2003). These restrictions on Native hunting were later imposed by regulation (65 Fed. Reg. 59164).

Contrary to NMFS's expectation that regulatory restrictions on Native hunting would lead to an increase in the size of the Cook Inlet beluga whale population, recovery of the population has not occurred. Indeed, NMFS recently acknowledged that the two critical assumptions that it made in 2000 about subsistence hunting were off base (NMFS 2005a). These assumptions were that over hunting was responsible for the decline in the population and that controlling hunting would prevent any further decline. The assumptions, the Service now admits, are "challenged" by the fact that "Abundance estimates since harvest management began in 1999 have not shown significant growth" (NMFS 2005a, at 87). NMFS further recognizes that "At the time of this writing, there is evidence that one or more of these factors [that require listing under the Endangered Species Act] would apply to this stock" (NMFS 2005a, at 86). Recently, in his recommended decision concerning NMFS's regulation of subsistence harvest, the Administrative Law Judge concluded that "after six years of little or no permitted harvests, there has been no detectable recovery of the stock, and it appears that unidentified factors are causing mortality or acting to depress the population growth." (U.S. Department of Commerce 2006, at 2). See also id. at 11, 16 (concluding that there is a "74 percent chance that the growth rate [of the population] is below 2 percent," there is a "46 percent chance that the growth rate is negative," and the "chances the population will recover or decline below 200 are equally likely").

In 2004 NMFS estimated the Cook Inlet beluga whale population size as "fewer than 370" (NMFS 2005a, at Abstract, 4). In January 2006, NMFS indicated the "latest [2005] abundance estimate is 278 individual beluga whales" and gave a "population estimate [that] holds a 95 percent confidence interval that the true population of whales lies between 194 and 398 whales," an estimate that "falls near the lower limit of expected variability for a stable population" (NMFS 2006). Because the difficulty posed by surveying diving whales in turbid waters, NMFS's population estimate numbers are extrapolations, derived from sightings of far fewer whales (NMFS 2005a, at 4). In any event, NMFS now acknowledges that "the recovery of the CI beluga whale will require decades. During the early phase of recovery this stock will exist at a precarious level of abundance from which further declines may not be recoverable" (NMFS 2005a, at 87 (emphasis added)).

Thus, just as in 1999, today the Cook Inlet beluga whale remains stranded on a dangerous precipice. Its small population size alone puts the Cook Inlet beluga whale at great risk of extinction. Even were the population size somewhat larger, however, the Cook Inlet beluga whale would remain extremely vulnerable to extinction from many other possible stressors. These include, but are not limited to, natural sources of mortality such as strandings, disease, and predation, natural reductions in available

habitat, illegal hunting, anthropogenic noise, various kinds of industrial activities, the construction of human infrastructure (such as docks, roads and the like) in sensitive habitats, toxic contamination from industrial and urban sources, disturbances from vessel traffic, competition for prey from fishing, reduction in the availability of prey species, and other as yet unidentified stressors. The population's special vulnerability to adverse impacts from single events, such as a large stranding or a catastrophic oil spill, and to contagious disease is considerable because "Beluga whales are extremely social animals that typically migrate, hunt, and interact together," and their habit of aggregating in large groups while feeding and traveling increases their vulnerability to damaging single events and contagion (Marine Mammal Commission 2005, at 2).

Congress has granted regulatory jurisdiction under federal law over nearly all marine mammals to the Secretary of Commerce. This petition therefore asks the Secretary to list the Cook Inlet beluga whale population as endangered under the Endangered Species Act. The Act requires that a species or subspecies be listed when it faces the threat of extinction from over-utilization, when existing regulatory mechanism are inadequate to protect the species, when its habitat is threatened, when it is vulnerable to disease or predation, or when there are other natural manmade factors affecting its continued existence. The existence of any one of these factors justifies listing under the Act. Here, more that one factor exists and justifies listing the Cook Inlet beluga whale as endangered under the Act.

In addition to listing under the Endangered Species Act, this petition also asks that the Secretary of Commerce designate critical habitat for the Cook Inlet beluga whale population Under the Act, critical habitat includes those areas that are essential for the health, continued survival, and recovery of the population (16 U.S.C. § 1533(a)(3)(A)).

PETITIONERS

The petitioners are a number of conservation organizations and one individual. Each petitioner seeks the protection of the Cook Inlet beluga whale population from extinction.

Cook Inlet Keeper is a private nonprofit organization dedicated to protecting the vast Cook Inlet watershed and the life it sustains. Since its inception in 1995, Keeper has become a leading advocate for watershed-based protections in the rich but threatened streams, lakes and estuaries of the Cook Inlet watershed. Its contact information is:

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Alaska Center for the Environment is an Alaska non-profit environmental advocacy and education corporation that is dedicated to the conservation of Alaska's ecosystems. ACE has approximately 7,000 members. Its contact information is:

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The National Audubon Society is dedicated to the conservation of Alaska's natural ecosystems focusing on birds, other wildlife, and their habitats for the benefit and enjoyment of current and future generations. It has 2,300 Alaska members and supporters. Audubon members have a strong interest in the conservation of the Cook Inlet beluga whale population and its habitats. Its contact information is:

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Founded in 1982, the North Gulf Oceanic Society is a federally recognized Alaskan non-profit research and education group whose members are active researchers and educators. The Society's focus is on marine bird and marine mammal research, but in recent years it has focused primarily on cetaceans. The Society maintains long-term life history and population studies on both humpback whales and killer whales from Southeast Alaska to the Aleutian Islands, and presents the results and analysis of its work at scientific conferences, in schools, and to various user groups. The Society also trains tour boat operators in proper whale watching techniques, and takes out groups of students to give the students hands on experience in field research. Its contact information is:

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The Alaska Oceans Program is a marine fundraising program of the Alaska Conservation Foundation working in collaboration with multi-stakeholder groups throughout Alaska to protect and restore the amazing diversity of the North Pacific's ocean ecology, including fish, wildlife, and seabirds and their habitat, while providing for sustainable human uses. It works to achieve this through facilitating the Alaska Oceans Network, the Shipping Safety Partnership and the annual Alaska Oceans Festivals. Its contact information is:

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Defenders of Wildlife is a nationally recognized non-profit wildlife conservation organization with over 800,000 members and supporters nationwide, including 2366 members and supporters in Alaska. Defenders is dedicated to the protection of all native wild animals in their natural communities, and focuses its programs on the accelerating rate of extinction of species and the associated loss of biological diversity, and habitat alteration and destruction. It advocates new approaches to wildlife conservation that will help keep species from becoming endangered. Defenders contact information for their marine program office is:

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The Kachemak Bay Conservation Society is an Alaska conservation organization with approximately 130 members. Its mission is to protect the environment of the Kachemak Bay region in Cook Inlet and to encourage sustainable use and stewardship of local natural resources through advocacy, education/information, and collaboration. Its contact information is:

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Alaska Community Action on Toxics is a statewide non-profit public interest environmental health research and advocacy organization dedicated to protecting environmental health and achieving environmental justice. Its mission is to assure justice by advocating for environmental and community health. It works to stop the production, proliferation, and release of toxic chemicals that may harm human health or the environment. It has approximately 600 members, including individuals, Alaska Native tribes, and other organizations. Its contact information is:

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The Center for Biological Diversity is a non-profit corporation with offices in California, Oregon, Arizona and New Mexico. It is actively involved in species and habitat protection issues throughout the United States, including Alaska, as well as internationally. Its members and staff have researched, studied, observed, and sought protection under the Endangered Species Act for many rare and threatened species, including the Cook Inlet beluga whale. Its contact information is:

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Friends of Potter Marsh and the Anchorage Coastal Wildlife Refuge is a non-profit corporation organized under the laws of the State of Alaska. Its mission is to ensure the integrity of the natural resources of Potter Marsh and the Anchorage Coastal Wildlife Refuge and to promote public awareness and conservation action related to the natural resources and values of the marsh and refuge. It has approximately 300 members. Its contact information is:

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The Natural Resources Defense Council ("NRDC") is a non-profit environmental membership organization with more than 650,000 members and more than 600,000 "online activists" throughout the United States. About 1,858 NRDC members and 1,793 NRDC on-line activists live in Alaska. NRDC has long been active in Alaska environmental matters. With its nationwide membership and a staff of lawyers, scientists, and other environmental specialists, it plays a leading role on a diverse range of land and wildlife management and resource development issues throughout the United States. Its contact information is:

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THE PETITION

The Cook Inlet beluga whale population has been in decline since at least the 1970s (Rugh *et al*. 2000), but suffered a dramatic decline in the mid to late 1990s (Hobbs *et al.* 2000). Today there are no reliable signs either that the population is increasing or that it will recover to its historic population level any time in the near future, if ever. It faces many threats that may reduce its current population further and pushing it over the precipice into extinction.

Therefore, pursuant to 5 U.S.C. § 553(e) and 50 C.F.R. part 424.14, petitioners petition the Secretary of Commerce to list the Cook Inlet beluga whale (*Delphinapterus leucas*) as endangered under the ESA, 16 U.S.C. §§ 1531 - 1544.

Pursuant to 50 C.F.R. part 414.12 and 5 U.S.C. § 553, petitioners also request that critical habitat for the Cook Inlet beluga whale be designated concurrently with its listing,

This petition summarizes the natural history of the beluga whale, the information available on the Cook Inlet population of beluga whales, and the current and future threats to the viability of the Cook Inlet beluga whale population and to its habitat.

I. STATUS OF THE COOK INLET BELUGA WHALE POPULATION

A. NATURAL HISTORY

Much of the natural history information about beluga whales in this section I is derived form observations of beluga whales outside Cook Inlet and outside Alaska. The lack of local data and the uncertainty caused by it underscores the potential threats that the Cook Inlet beluga whale population. That beluga whales outside of Cook Inlet and Alaska have withstood environmental stresses may not be predictive of the ability of the Cook Inlet population to do so. This uncertainty should be of significant concern to NMFS and is another reason why any doubts should be resolved in favor of listing the population under the ESA.

1. Description

As whales go, beluga whales are rather small. The maximum recorded weight of an adult male is about 3000 pounds (Beland 1996). The heaviest female weighs about

2000 pounds. Males can reach fifteen feet in length while females are less than fourteen feet long, usually shorter. Neonates (newborns) weigh about 110 pounds and are about five feet long (Beland 1996). Adult beluga whales are easily distinguished from all other marine mammals by their pure white skin, their size, and their lack of a dorsal fin. Neonates are beige-brown to dark brown or grey-brown to dark grey. Juvenile beluga whales generally are grey. Beluga whales become progressively whiter after age five or six and almost all become pure white by age ten. The body of the beluga whale appears large in proportion to the head. The head is broad and rounded, the bulk of it taken up by the forehead. The flippers are broad and paddle-like, the tail flukes notched. The beluga's brain can weigh up to 5.5 pounds (Beland 1996).

2. Feeding

Very little research has been carried out to delineate the food habits of Cook Inlet beluga whales. It is generally assumed that their dietary needs and behaviors are similar to those of beluga whales elsewhere (Hazard 1988, NMFS 1992), but these assumptions need verification by sound scientific research.

Beluga whales in captivity eat the equivalent of 4-7% of their body weight per day (Sergeant 1969). No studies have been done on the fat reserves or the caloric balance at different seasons (Hazard 1988).

Beluga whales feed during the spring and summer in all Alaskan waters where they are common (Hazard 1988; Seaman *et. al*. 1982, 1985; Calkins 1983*a*; Fall *et. al*. 1984). Feeding intensity may vary according to season. Stomach samples collected in spring along the northwest Alaska coast show that beluga whales sometimes feed in the leads (Seaman *et. al.* 1982). However, for whales collected in leads, a greater percentage have empty stomachs in March and April than in June and July. Seaman *et. al.* (1982) suggested that beluga whales may be most likely to feed during spring if their northward movement is prevented by ice.

April through September appears to be a time of intensive feeding for whales which summer south of Bering Strait; July appears to be a time of less intensive feeding north of Bering Strait (Fraker *et. al.* 1979, Seaman *et. al.* 1985). Almost no data exists on winter feeding of beluga whales (Hazard 1988).

More than 100 kinds of organisms have been identified in the diet of beluga whales (Hazard 1988). General prey items in stomachs collected along the northwest coast of Alaska include benthic invertebrates, squid, octopus, semidemersal fish (Arctic cod, saffron cod, herring, whitefish, smelt, and char), and demersal fish (sculpin, suckers, and eelpout). Salmon, eulachon, saffron cod, tomcod, herring, and smelt have been identified as prey items for beluga whales summering south of Bering Strait (Hazard 1988, Calkins 1983*a*, Fall *et. al*. 1984).

Seaman *et. al.* (1982) concluded from examination of stomachs that octopus may be a significant spring food. Shrimp are also eaten. Of fish species consumed in spring

in northern regions, Arctic cod is taken in greatest numbers. Even though cod is the most commonly consumed fish, the whales feed more extensively in spring on invertebrates.

Fish are the dominant food item in coastal areas of Alaska in summer (Lensink 1961, Seaman et. al. 1982). In general, beluga whales seem to feed on whatever fish species are most abundant and easy to catch. Thus, they prey on herring, rainbow smelt, capelin, salmon, char, eulachon, whitefish, saffron cod, and Arctic cod as these become seasonally abundant. Sculpin, flounder, sole, blenny, burbot, lamprey, shrimp, mussels, octopus, and squid also contribute to the summer diet (Fraker *et. al.* 1979; Seaman *et. al.* 1982). In the northern Bering and southern Chukchi seas, saffron cod is the most commonly consumed species.

Dense concentrations of prey appear essential. Lensink (1961) noted that beluga whales fare poorly in Bristol Bay when migratory fish are not available. In addition to following the general movements of prey, beluga whales appear to feed specifically where the prey are most concentrated. For example, the frequency of occurrence of salmon species in beluga stomachs is correlated with the abundance of each species; red salmon predominate in the first 3 weeks of July and other salmon species predominate in late July and August (Hazard 1988).

Lensink (1961) further noted that beluga whales seem to be more successful in obtaining prey in the rivers where prey are concentrated than in the bays where prey are more dispersed. Fried *et. al.* (1979) noted that beluga whales in Bristol Bay feed at the mouth of the Snake River, where salmon runs are smaller than in other rivers in Bristol Bay. However, the mouth of the Snake River is shallower, and hence may concentrate the prey. Thus, topography, season, and prey behavior all influence prey availability.

The occurrence of groups of beluga whales in upper Cook Inlet in summer could reflect feeding on dense prey concentrations of eulachon and salmon in the upper drainages of the inlet. Beginning in May and continuing on through August, all five North Pacific salmon species appear in the areas that beluga whales frequent (NMFS 1992). Salmon probably constitute the majority of the Cook Inlet beluga whale's summer diet, as evidenced by Native hunters finding large numbers of salmon in the stomach of belugas (Huntington 2000).

In January 1986, tags from thirteen salmon were taken from the stomach of an adult male beluga, found dead in the upper Cook Inlet. All the tags had been placed on adult salmon migrating up the Susitna River at mile 20, 22, and 80 (Calkins, 1989). Since whales have not been observed in the upper portions of the Susitna River, it is assumed that the beluga consumed the salmon after the salmon had spawned and subsequently were flushed downstream (NMFS 1992).

Beluga whales are known to exhibit differential food preferences by age and sex. In general, young animals take small prey such as shrimp, and adults take large fish (Hazard, 1988). Presumably, Cook Inlet beluga feeding patterns would be similar (NMFS 1992). Beluga whales in Cook Inlet are known to consume tomcod (Fall et. al.,

1984). Male beluga whales have been found to take larger fish than females (Seaman et. al., 1982). Since food is swallowed whole (Fay, 1971), prey size would be limited by the capacity of the esophagus, but Native hunters have found four foot long king salmon in Cook Inlet beluga whale stomachs (Huntington, 2000).

3. Reproductive parameters

Knowledge of reproductive parameters and rates is vital to understanding the dynamics and status of the Cook Inlet beluga whale population. Very little is presently known about any of the reproductive parameters for the Cook Inlet beluga stock.

a. Calving areas

Calving generally occurs throughout the beluga whale's circumpolar distribution between March and September, with a peak in June and July. In northwest Alaska the first post-parturient female was taken on April 29 and the first full-term fetus was recovered on July 18 (Hazard 1988). Calving peaks from mid-June to late July (Sergeant 1973, Burns and Seaman 1985). Burns and Seaman (1985) stated that influx of animals to near-shore areas in mid-June could bias samples such that the peak in calving occurs earlier than it seems.

Calving occurs in all coastal Alaska waters where beluga whales aggregate in summer. Neonates and after-births are reported from Bristol Bay (Lensink 1961, Frost *et. al.* 1983*a*), Norton Sound, Kotzebue Sound (Seaman *et. al*. 1985) Kasegaluk Lagoon and adjacent marine waters (Burns and Seaman 1985), and the eastern Beaufort Sea (Fraker 1977).

In Cook Inlet, the location of calving areas has not been documented. Calkins (1983a) noted that in upper Cook Inlet neonates were not found in June, but were seen in mid-July. He hypothesized that calving begins between mid-June and mid-July and may occur in the large estuaries of the Upper Inlet. During NMFS aerial surveys in June 1991 no sighting of neonates were made (NMFS 1992). NMFS did observe small, dark beluga calves during the NMFS summer surveys (Rugh *et al*. 1998). It is possible that neonates were present and not observed. According to NMFS, "Alaska Natives report the mouths of the Beluga and Susitna Rivers, as well as Chickaloon Bay and Turnagain Arm are calving areas…. It is likely that these areas are also utilized as nursery areas" (NMFS 2005a, at 14).

Traditional Alaska Native ecological knowledge maintains that belugas calve from April through August and that calving areas include the northern side of Kachemak Bay in April and May, the areas off the mouths of the Beluga and Susitna Rivers in May, and Chickaloon Bay and Turnagain Arm during the summer (Huntington, 2000). Belugas seen with their heads straight up out of the water are thought by Alaska Native hunters to be cows giving birth (Huntington, 2000). Belugas with near-term fetuses have been caught in the Susitna flats in May, and newborns are seen in this area, usually in May although also at other times in the summer (Huntington, 2000). Cows with newborn

calves are sometimes seen in deep water in the upper part of Knik Arm, near Cottonwood Creek, using the sheltered area as a nursery (Huntington, 2000).

Researchers have assumed that most calving takes place in coastal estuary areas (Sergeant and Brodie 1975). At least some calving, however, takes place in colder offshore waters (Fraker 1977, Hazard 1988). Calving sometimes occurs prior to or during the spring migration. Neonate calves are seen in the spring leads during April, May, and sometimes March (Braham *et. al.* 1984), and harvests in the leads along the northwest Alaska coast during this time include female beluga whales in late pregnancy (Burns and Seaman 1985). In general, the calving season seems to be more prolonged in lower latitudes and shorter in high latitudes (NMFS 1992).

The proportion of calves in various aggregations of beluga whales has been determined from aerial surveys and photogrammetry (Hazard 1988). Burns and Seaman (1985) cautioned that such methods may be reasonably accurate during June and July when neonates are small, but are much less accurate by late August when some of the calves seen in groups are yearlings. Additionally, since the young are dark brown or grey, they are more difficult to see than the white adults, adding further bias to surveys (Hobbs *et. al*. 1998).

b. Sex ratio

Although size differences between male and female adult beluga whales are significant (Sergeant 1962, Kleinenberg et. al. 1964, Sergeant and Brodie 1969a, Sergeant 1973, Burns and Seaman 1985), other outward sexual dimorphisms do not readily distinguish males and females in the wild (Hazard 1988). Consequently, sex ratios are determined from specimens. From 533 carcasses taken in Northern Alaska, Burns and Seaman (1985) reported a sex ratio of 1:1 (49.7% females). Subsamples, however, showed large deviations from this ratio. Subsamples throughout the beluga's range show large differences in sex ratio, age composition, and reproductive status (Hazard 1988). Some sex and age segregation is apparent (Gurevich 1980, Burns and Seaman 1985). Large deviations in pod composition pose problems in obtaining unbiased samples; sex ratios in harvest samples are also biased by hunter selectivity (Burns and Seaman 1985). Sex ratios of 1:1 have also been reported for other beluga populations (Sergeant 1973).

c. Age at sexual maturity

The mean age at sexual maturity of northern Alaska beluga whales is slightly younger for females than for males. (Calculations of age are based on the assumption of two growth layers per year in teeth.) Age at sexual maturity in females means the age of initiation of first pregnancy. The age of sexual maturity for females is 4-7 years, with first births at 5-8 years of age (Hazard 1988). Of 22 females from the Alaska coast, 54% conceived at age 4, 41% at age 5, and 5% at age 6 (Burns and Seaman 1985). In a sample of 52 females, all animals up to age 4 were sexually immature (N=28); 33% of the 5-year-olds (N=9) and 94% of the 6-year-olds (N=16) were sexually mature (Hazard

1988). Braham (1980) determined the average age at first pregnancy is 6 years. Males reach sexual maturity at age 7 to 9. (Brodie 1971, Sergeant 1973, and Braham 1984).

The color change to white can be used as a gross index of sexually mature animals in the population (Braham 1984). In this regard, Murray and Fay (1979) calculated a 1:6 ratio for brown and gray (immature) versus white (adult) animals in their count of 150 beluga whales in central Cook Inlet in August 1978. They report that this ratio of 0.14 is not significantly different from that observed in harvest samples from the St. Lawrence River estuary in eastern Canada (Hazard 1988)

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d. Pregnancy rates

A 3-year reproductive cycle or pregnancy interval is most typical in beluga whales examined from northern Alaska (Hazard 1988). Of sexually mature females sampled from harvests along the northwest coast of Alaska, 35% were not pregnant, 35% were newly pregnant, and 30% carried full-term fetuses or had recently given birth (Burns and Seaman 1985). However, high pregnancy rates in 6 to 22 year-old females suggest that some conceive more frequently than once in 3 years (Burns and Seaman 1985). Sergeant (1973) estimated that in eastern Canada 25% of mature females have a reproductive cycle of 2 years and 75% have a cycle of 3 years. An observed pregnancy rate of 0.41 (Sergeant, 1973) or 0.44 (Seaman and Burns, 1981) and a pregnancy rate of 0.33 to 0.38 or one calf every 32 to 37 months (Brodie 1971, Sergeant 1973) was used by Braham (1984) in calculating gross annual recruitment rates.

e. Life-span and reproductive life

Beluga whales are known to live in excess of 30 years, but because of the loss of dental layers in older individuals, aging techniques cannot define maximum longevity (Hazard 1988). Males of 38+ years and females of 35+ years are known (Burns and Seaman 1985). Although the age of last pregnancy has been estimated at about 21 years by Brodie (1991), Burns and Seaman (1985) have evidence that females are reproductively active throughout their adult life. However, the reproductive rate declines markedly in older animals (NMFS 1992).

f. Reproductive rates

The reproductive rate is the fraction of calves produced annually in the total population, without correction for mortality. Estimates are calculated from the percentage of calves seen during surveys and also from the pregnancy rate and the proportion of mature females in the population (Hazard 1988).

Estimates of reproductive rates based upon calf counts range from 0.06 to 0.14 while estimates based upon the annual rate of calf production range from 0.09 to 0.13 (Hazard 1988). There are no valid estimates of net reproductive rates in beluga whale populations because current data do not provide a basis for estimating natural mortality (Hazard 1988).

From a sample of 265 females, Burns and Seaman (1985) estimated the pregnancy rate at 0.33 and the reproductive rate at about 0.11. This matches the reproductive rate estimate of 0.10-0.12 adopted by the International Whaling Commission Subcommittee on Small Cetaceans (Perrin 1982).

Possible sources of error in determining reproductive rates from calf counts include difficulty in seeing smaller, dark colored calves, difficulty in distinguishing calves from yearlings, and possible segregation of population components (Hazard 1988). Sources of error in calculating reproductive rates extrapolated from the proportion of females in the population and reproductive rates of adult females include biases in the sex and age composition of the sample collected, and the difficulty of assessing the reproductive status of adult females (Hazard 1988).

g. Lactation

Duration of lactation has not been clearly defined (NMFS 1992). The total lactation period has been estimated at between one and two years (Brodie 1971, Sergeant 1973) or an average of 23 months (range 18 to 32 months; Braham 1984). Dependent nursing may be considerably shorter than the total nursing period, with calves taking some prey after the first 12 to 18 months (Burns and Seaman, 1985). Females are capable of becoming pregnant again while still lactating. Sergeant (1973) estimated that 25% of females successfully breed during lactation, presumably about 10 months after giving birth.

h. Gestation

Gestation is estimated to last 14-15 months. This estimate is from measurements of fetuses and neonates from Cumberland Sound and Hudson Bay (Brodie 1971, Sergeant 1973). Assuming a 14.5 month gestation period, and knowing that the peak of births is from mid-June to mid-July, mating should peak in Cook Inlet in April. However, specimen analyses and observations of behavior from other areas during spring suggest that most mating takes place before April (Hazard 1988).

Of 13 newly pregnant females collected from late April and early May harvests by Burns and Seaman (1985), 9 had fully developed corpora lutea, 2 showed signs of recent or imminent ovulation, and 2 had embryos. No females obtained in June and July showed signs of recent ovulation. Of the 34 sexually mature males, only 2 (both taken in mid-June) were in breeding condition. The other 32 males (including 14 obtained in April and May) were in early to mid-spermatogenic retrogression (Burns and Seaman 1985). Thus, although a small proportion of beluga whales may be in breeding condition in and after late April, the majority appear to breed earlier (Hazard 1988).

This timing discrepancy could only be explained if peak calving occurs earlier than believed, if the gestation period is longer than 14.5 months, or if delayed implantation occurs (Burns and Seaman, 1985).

4. Natural mortality

Data on the natural mortality rates of beluga whales is extremely limited (Hazard 1988, NMFS 1992). Estimates of natural mortality rates of beluga whales range from 0.045 to slightly in excess of 0.10. Hazard (1988) considers the high end of this estimate to be too high, given that (1) recruitment appears to be in the range of 0.09 to 0.12; (2) beluga whales have been harvested for food for centuries, in some areas without notable declines; and (3) in some populations there are substantial losses due to ice entrapment. It seems unlikely that populations could have sustained harvesting and ice-entrapment with such a narrow margin between natural morality and recruitment rates (Hazard 1988).

From life tables of beluga whales killed in Alaska waters, Burns and Seaman (1985) calculated an annual mortality rate of 0.094. This mortality, however, reflects both natural and human-caused mortality.

It is unclear whether natural mortality is the same for both sexes. Life tables derived from data on beluga whales killed in Alaska waters indicated to Burns and Seaman (1985) that mortality of older males is higher than that of older females. Sergeant (1973), however, concluded that mortality rates are equivalent for males and females because of the 1:1 sex ratio found in adult beluga whales. Limited data are available on neonatal mortality rates of beluga whales. Sergeant (1973) suggested a mortality rate of 0.095 for beluga whales in the first year of life. Frost *et. al.* (1983*b*) reported that, in Bristol Bay, 7 of 21 beach-cast carcasses were those of neonates.

Causes of natural mortality among beluga populations include entrapment in ice, strandings, disease and predation by killer whales (*Orcinus orca)* and polar bears (*Ursus maritimus)*. There are killer whales but no polar bears in the Cook Inlet area.

Numerous incidents of entrapment have been described for more northern populations of beluga (Hazard 1988). However, there is little or no data on the overall mortality thus caused (Hazard 1988). Hazard (1988) describes several incidents in which hundreds, and in one case thousands of beluga whales were trapped by sea ice. Such large scale entrapment incidents are probably not likely to occur in Cook Inlet.

A more significant possible source of natural mortality in Cook Inlet is death by stranding. The extreme daily tidal fluctuations in upper Cook Inlet (up to 36 feet) often result in individuals or groups of beluga becoming stranded on mud flats. While beluga whales are often observed escaping unscathed with the next high tide, no estimates of this potentially high source of mortality have been made. In June 1996, 63 animals were stranded in the Susitna Delta. Several dead beluga whales were seen in the area shortly thereafter (Rugh *et al*. 1998). In 2003 NMFS estimated that over 500 belugas have stranded in upper Cook Inlet since 1988, with most mass strandings occurring in Turnagain Arm (Shelden 2003), and the *Draft Conservation Plan* updated this number, indicating that "more than 640 beluga whales have stranded … in upper Cook Inlet since

1988" (NMFS 2005a, at 27 (footnote omitted)). Additional information about stranding incidents is discussed in Section II below.

Killer whales also prey on beluga whales (Tomilin 1957, Burns and Seaman 1985, Lowry *et al*. 1987). Sergeant and Brodie (1969*b*) speculated that the current range of beluga whales may have evolved partly to avoid killer whale predation. Killer whales are known inhabitants of Cook Inlet. Killer whales inhabit lower Cook Inlet and are occasionally found in the turbid waters of the upper Inlet. On May 15, 1991, six killer whales were stranded during a low tide in the vicinity of a pod of beluga whales. After refloating, their heading coincided with the location of beluga whales at the mouth of Turnagain Arm, Cook Inlet (NMFS 1992). Lowry *et al*. (1987) describe predation of killer whales on beluga whales in Bristol Bay, in environmental circumstances similar to upper Cook Inlet. Shelden *et al*. (2003) describe killer whale predation of Cook Inlet beluga whales, estimating that at least one beluga was killed per year by killer whales between the 1985-2002.

Although parasites and their associated lesions have been described (Tomilin 1957, Hazard 1988), their role in beluga whale mortality is not known. Of nine beluga whales collected from the Churchill area of Hudson Bay, Canada, eight were heavily infested with *Pharurus pallasii*, a parasite of the hearing organs (Hazard 1988). The presence of *P. pallasii* in the cerebrospinal fluid suggests that infestation could produce erratic behavior, due to changes in spinal fluid pressure. Parasites are not known to directly cause death in beluga whales in Alaska (Hazard 1988).

B. DISTRIBUTION

1. Current Distribution

NMFS currently recognizes five distinct populations, or stocks, of beluga whales in Alaska: 1) Cook Inlet, 2) Bristol Bay, 3) Norton Sound, 4) Eastern Chukchi Sea, and 5) Beaufort Sea (Hill & DeMaster 1998). These stocks are based upon discrete summering areas. It is generally assumed that the four stocks other than the Cook Inlet stock over-winter in the Bering Sea (Sheldon 1994).

The Cook Inlet population of beluga whales is thought to inhabit the Inlet year round (Hazard 1988). Sightings from 1976 to 1979 indicated that beluga whales inhabit Cook Inlet during all seasons (Calkins 1983b). Recent survey efforts have also confirmed the year round presence of the species in the inlet (Rugh *et al.* 1998, Hanson and Hubbard 1998).

NMFS has conducted aerial surveys for beluga whales in Cook Inlet since 1993. Through these surveys, beluga whales were found with some consistency in several areas (Rugh *et al*. 1998). Almost every summer a large concentration of whales (up to 300) was found in the Susitna Delta, primarily near the mouth of the Susitna River. Concentrations were also found at Knik Arm. Smaller groups were regularly found in Chickaloon Bay between the Chickaloon River and Point Possession. Small groups were

also found near Turnagain Arm, Kachemak Bay, Redoubt Bay, and Trading Bay (Rugh *et al*. 1998). Eighty-two percent of the whales seen in the Susitna Delta and sixty-one percent of the whales seen elsewhere in the upper inlet were in large groups. Conversely, none of the groups seen in lower Cook Inlet were large (Rugh *et al*. 1998).

2. Factors Affecting Distribution

Lowry (1985) listed several factors that influence seasonal distribution of beluga whales: (1) access to air (regarding extent of ice cover); (2) water quality and characteristics; (3) access to food; and (4) freedom from excessive predation and other disturbance factors.

Access to air as a function of sea ice (factor 1) is not an immediate determinant in beluga distribution in June and July. Although there are variable amounts of sea ice in upper Cook Inlet in the winter, during the NMFS surveys, ice was not present (Rugh *et al.* 1998). In winter, beluga whales may retreat from dense ice by moving south to the lower parts of the Inlet (Calkins 1989). Sightings, however, have been made in the upper Inlet even with considerable amount of ice (Rugh *et al.* 1998).

Natural water quality (factor 2) in Cook Inlet is strongly influenced by glacial silt that discolors the water of the upper Inlet to the point of it rendering it opaque. At low tide, this siltation may extend south to the mouth of the lower Inlet. Beluga whales have developed a tolerance to opaque water with varying salinity. Normal water quality parameters would probably have only an indirect influence on whale distribution in Cook Inlet by affecting the distribution of their prey (Rugh *et al.* 1998), but increasing siltation in Cook Inlet from glacier melt caused by global warming could alter habitat and prey availability.

Access to food (factor 3) may be the overriding element in beluga distribution in Cook Inlet in the summer. Whale concentrations at river mouths can best be explained as an efficient way for the whales to feed; these coastal concentrations apparently last from mid-May to mid-June or later and are very likely associated with the migration of anadromous fish, particularly eulachon (*Thaleichthys pacificus*) and salmon (*Oncorhynchus spp.*) (Calkins 1983a).

Freedom from excessive predation and other disturbances (factor 4) may be important factors influencing beluga distribution in Cook Inlet. There is a great risk of stranding due to Cook Inlet's extreme tidal fluctuations (Rugh *et al*. 1997). Killer whales have been observed in upper Cook Inlet occasionally, sometimes in the vicinity of beluga strandings, but it is unknown how much their activities affect beluga whale distribution.

Reproductive condition is an additional factor potentially affecting beluga whale distribution. Although small, dark beluga calves have been observed during the NMFS summer surveys in Cook Inlet, there was no apparent pattern indicating specific calving areas or seasons (Rugh *et al*. 1998).

3. Changes in Distribution

The concentrations of beluga whales observed in upper Cook Inlet during the summers of 1993 to 1997 were similar to reports from previous studies such as Calkins (1983a) (Rugh *et al*. 1998).

Significantly, however, very few sightings were made in lower Cook Inlet compared to previous reports (Rugh *et al*. 1998). Numerous other marine mammals were seen during the 1993-1997 surveys, indicating that visibility was not a problem (Rugh *et al.* 1998). During vessel operations conducted in offshore waters of Cook Inlet in June and July 1974-79, 50% of the 642 recorded beluga whales were in the lower Inlet. In the 1980's, 35% of 495 recorded beluga whales were in the lower Inlet. These numbers contrast sharply with the 0-4% of the recent sightings occurring in the lower Inlet (Rugh *et al*. 1998). This large decline is likely to be an underestimate as earlier studies were probably biased towards more sightings in the upper Inlet (Rugh *et al*. 1998). Calkins (1983b) indicated that beluga whales were "seen throughout the year in the central and lower inlet, with heaviest use occurring in the central area." Others reported seeing hundreds of beluga whales continuously throughout Cook Inlet in the 1970's and 1980's, where few are now found (Rugh *et al*. 1998). The differences between reports from the 1970's and 1980's relative to the 1993-97 sightings suggest that the summer distribution of beluga whales has changed.

Changes may have also occurred with beluga distribution in the upper Inlet as well. Some of Calkins' June 1974-79 sightings and most of his July sightings were well offshore. NMFS data from June and July 1974-75 also show all but a few of the sightings were offshore (Rugh *et al*. 1998). In contrast, the 1993-97 surveys did not find any beluga whales in the center of the Inlet in spite of excellent viewing conditions and extensive offshore search efforts. Virtually all of the 1993-97 sightings were within the 10 fathom line, whereas most of the reported sightings in the 1970's were beyond this depth (Rugh *et al.* 1998).

By autumn, beluga whales begin dispersing out of the upper Inlet (Hazard 1988). During the 1993-97 NMFS surveys, 98-99% of the beluga whales sighted were in the upper Inlet. By September this number had dropped to 77%. The dispersal of beluga whales to other parts of Cook Inlet in the autumn is confirmed by sightings of concentrations of 150 beluga whales in the central part of the Inlet in August 1978 (Murray and Fay 1979). Similarly, aerial counts made between September 10-30 in 1994-96 in Tuxedni Bay revealed 160-200 whales (Bennett 1996). Tuxedni Bay is considered a concentration area for beluga whales, based on 11 years of observations by seasonal coastal rangers working for the National Park Service (Bennett 1996). Bennett observed small numbers (up to 38) daily in Tuxedni Bay in June and July 1992, but no whales were seen during his surveys from May 1 to late-August 1994-96 (Bennett 1996). This is further indication that beluga sightings in lower Cook Inlet have become much rarer (Rugh *et al.* 1998).

While beluga whales are now rarely seen in the summer in lower Cook Inlet, recent winter surveys found beluga whales concentrated in the middle portion of the Inlet near Kalgin Island in February and March (Hanson and Hubbard 1998). These results suggest that the Cook Inlet population may largely remain in the Inlet year round.

There have been several sightings of beluga whales in the Gulf of Alaska outside of Cook Inlet. However, considering the amount of effort expended by aerial surveys and extensive vessel operations in the Gulf of Alaska, the number of recent sightings remains small (Rugh *et al.* 1998). Most of these sightings were of small groups. The only exception was in Prince William Sound where 200 beluga whales were observed in July 1983 (Calkins 1983a) following a particularly strong El Niño event (Rugh *et al.* 1998).

In Yakutat Bay, local fishermen reported seeing 10-20 beluga whales in the 1970s (Morris *et al*. 1983). This report was corroborated by Calkins' sighting of 26 beluga whales in late May 1976 (Calkins 1983). More recently, ten whales were seen in Yakutat Bay during winter surveys in 1997 (Hanson and Hubbard 1998). However, in the past two decades, beluga whale sightings in Yakutat Bay have been scarce, and generally fewer than twelve whales have been reported at a time (Rugh *et al.* 1998). Beluga whales sighted in Yakutat Bay are considered to be occasional visitors from Cook Inlet (Calkins 1983a). Whether the belugas using Cook Inlet and those belugas sighted in Yakutat Bay comprise the same population is unknown at this time.

The scarcity of beluga sightings outside of Cook Inlet in recent surveys contrasts with how Murray and Fay (1979) described this population as ranging along the northern Gulf of Alaska. There was even a sighting as far south as Puget Sound, Washington, in 1940 (Hazard 1988). There appears to be a reduction in beluga whales outside Cook Inlet (Rugh *et al.* 1998).

In summary, in recent years there has been a reduction in offshore sightings in upper Cook Inlet, a reduction in sightings in lower Cook Inlet, and a reduction in incidental sightings in the Gulf of Alaska (Rugh *et al.* 1998), all signifying a substantial contraction in the distribution of the Cook Inlet beluga whale population.

C. POPULATION ABUNDANCE ESTIMATE

The Cook Inlet population of beluga whales has always been the smallest and hence most vulnerable population of beluga whales in Alaska. NMFS indicated in 2000 that "No other population of marine mammals is as small as the CI beluga stock and is not listed under the ESDA" (65 Fed. Reg. at 38779). Survey data showed that the stock declined markedly in the 1990s (Hobbs *et al.* 1998), and nearly a decade ago NMFS acknowledged that this rapid decline had occurred, stating that "The index count from 1998 survey was the lowest reported to date and demonstrates a downward trend that has been ongoing for the last 4 years" (63 Fed. Reg. 64229).

Early estimates of the beluga population in Cook Inlet have ranged widely (NMFS 1992, Hazard 1988). Klinkhart (1966) estimated the number to be between 300

and 400. Braham (1984) gave an abundance estimate of between 600 and 1000. Neither provided a rationale or methodology for coming up with the given estimate. NMFS reports historical abundances of Cook Inlet beluga whales of up to 2000 animals and believes thee to have been 1000 to 1300 whales in the early to mid-1980s (65 Fed. Reg. at 38779, DeMaster *et al.* 2000).

The waters of upper Cook Inlet are extremely turbid, rendering any beluga below the surface essentially invisible to aerial surveyors (Hazard 1988). These survey conditions require the use of a correction factor to account for submerged whales. None of these early surveys used a consistent methodology to account for the difficult survey conditions in the Inlet.

Since 1993, NMFS has conducted summer aerial surveys in Cook Inlet in an effort to determine the actual size of the beluga population and document any population trends (Hobbs *et al.* 1998). NMFS applied a correction factor to the raw counts to develop an abundance estimate. The estimates from 1994 to 2004 are as follows:

1994	653
1995	491
1996	594
1997	440
1998	347
1999	367
2000	435
2001	386
2002	313
2003	357
2004	366

(Hobbs *et al.* 1998, NMFS 2005a, at 4). As indicated in the Introduction above, NMFS asserts that the "2005 abundance estimate … [is] 278 belugas" and that the "population estimate holds a 95 percent confidence interval that the true population of whales lies between 194 and 398 whales" (NMFS 2006). (NMFS previously recognized the substantial uncertainties in its older estimates, with the coefficient of variation ranging from ±14% to ±44% (65 Fed. Reg. at 38779).) A review of the uncorrected median counts (actual number of whales seen) for the years 1994-1998 shows the steady decline in the population through the 1990s (Hobbs *et al.* 1998).

The actual count of only 194 beluga whales seen during the 1998 surveys is in stark contrast to the 479 beluga whales seen by Calkins (1983a) on a single day in August, 1979. Although no abundance estimates have been made based on Calkins' sightings, applying the overall correction factor of 1.8 developed by Rugh *et al.* (1998) to the 479 whales seen in 1979, gives an estimate of 862 whales. This is significantly more than the estimate of 347 beluga whales surviving in the Inlet in 1998, before the 1999 petition to list under the ESA was filed, or the 2004 and 2005 estimates.

In the Draft 1998 Marine Mammal Stock Assessments for Alaska, Hill and DeMaster (1998) provided an estimate of the current population of Cook Inlet beluga whales to be 834 whales. NMFS acknowledged that this estimate was too high (64 Fed. Reg. 8323, at 8324). The Alaska Regional Scientific Review Group recommended that a population estimate of 347, as determined by the 1998 surveys, be used in the 1999 Stock Assessment Reports published by NMFS (Alaska Regional Scientific Review Group 1999).

Thus, at the time the 1999 petition to list was filed, the best current estimate for the number of beluga whales comprising the Cook Inlet population was 347 (Hobbs *et al.* 1998). This was substantially fewer whales than previous surveys detected, was indicative of an alarming decline in the population, and supported the determination that listing under the ESA is warranted. More recently, in its *Draft Conservation* Plan, NMFS indicated that "recent abundance data indicate a 75 percent probability the stock is recovering at a rate less than 2 percent …. Confidence limits … do not allow for a precise determination as to whether this stock is increasing. In fact, there is a small probability the stock may be increasing" (NMFS 2005a, at 5 (citation and Figure omitted)). NMFS further acknowledged, however, that "Abundance estimates since harvest management began in 1999 have not shown significant growth, challenging" the assumption that controlling Native subsistence harvest would lead to the whale's population recovery (NMFS 2005a, at 87).

Indeed, using NMFS's own data Lowry (2006) concluded that the "probability is 99% that R_{max} [the underlying rate of increase] for the Cook Inlet beluga whale population is less than the expected average normal value, and the probability is 93% that R_{max} is actually negative for this population over the period covered by the data (1994-2005)" (id. at 3).

II. CRITERIA FOR ENDANGERED SPECIES ACT LISTING.

A. The Cook Inlet Population of Beluga Whales is a "Species" Under the ESA.

The ESA provides for the listing of all species warranting the protections afforded by the Act. The term "species" is defined broadly in 16 U.S.C. § 1532 (16) to include "any subspecies of fish or wildlife or plants and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature."

As explained above, the Cook Inlet beluga whales population is very small, geographically isolated, genetically differentiated, and faces the imminent threat of extinction. As such, it is a "species" under the ESA and qualifies for listing, and it must be afforded the protections mandated by the Act.

In its June 2000 not warranted decision, NMFS found that the Cook Inlet beluga whale qualifies as a distinct population segment under the three element test of the USFWS and NMFSs' joint listing policy (65 Fed. Reg. at 38780). NMFS stated that, "Murray and Fay (1979) suggested that this stock has been isolated for several thousand

years, an idea which has since been corroborated by genetic data (O'Corry-Crowe *et al.* 1997)" (NMFS 2003, at 2). The current petitioners therefore trust that NMFS will not revisit its determination that the Cook Inlet beluga whale population satisfies the three element test and qualifies as a distinct population segment. Nonetheless, the following discussion concerning the species issue is provided for informational purposes.

1. Distinct population segment

NMFS and the U.S. Fish and Wildlife Service ("USFWS") have published a policy to define a "distinct population segment" for the purposes of listing, delisting, and reclassifying species under the ESA (61 Fed. Reg. 4722). Under this policy, a population must be found to be both "discrete" and "significant" before its can be considered for listing under the Act.

a. Discreteness

Under the joint NMFS/ FWS policy, a population segment of a vertebrate species is considered discrete if it satisfies either one of the following conditions:

1.) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological or behavioral factors.

2.) It is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4 of the ESA.

(61 Fed. Reg. 4722).

The Cook Inlet population of beluga whales meets the first criteria for "discreteness."

Evidence indicates that Cook Inlet beluga whales are both genetically and geographically isolated from other populations of beluga whales (Sergeant and Brodie 1969, Fay 1978, Perrin, 1980, Harrison and Hall 1978; Rugh *et al*. 1998, Hobbs and Waite 1998). The lack of sightings along the southern side of the Alaska Peninsula, along the Aleutian chain in spite of extensive survey efforts, indicate the Cook Inlet stock is isolated from stocks in the Bering Sea and is not widely dispersed (Rugh *et al.* 1998). Cook Inlet beluga whales are "markedly separated" from the Bering Sea populations, and utilize distinctly separate summer areas (Frost and Lowry 1990). As previously established, their distribution in the winter appears to be separate as well (Hill and DeMaster 1998, Calkins 1983a). In 1980, the International Whaling Commission Subcommittee on Small Cetaceans recognized eight beluga wintering areas, and Cook Inlet was one of them (Hazard 1988). The presence of beluga whales in Cook Inlet year round, and the relative inter-annual consistency of the population estimates from this area

(notwithstanding the downward trend) support the theory that beluga whales in the Cook Inlet and those to the north do not intermix.

More than twenty years ago, Harrison and Hall (1978) stated that the "Gulf of Alaska population [i.e., Cook Inlet] has been considered to be geographically isolated and therefore genetically distinct from the Bering Sea population, and we have no evidence to the contrary after fairly intensive surveys south of the Alaska Peninsula extending from Kodiak Island west to the Aleutian Islands". Recently, the Cook Inlet population's range has apparently retracted (Rugh *et al*. 1998; 63 Fed. Reg. 64229), further separating the population from other beluga whale populations and further reducing the possibility that mixing could occur between populations, even if the Alaska peninsula was not considered an effective barrier to genetic exchange (O'Corry-Crowe *et al.* 1997).

This isolation has been confirmed by studies of mitochondrial DNA characteristics which compared Cook Inlet beluga whales with western Alaska stocks, and showed that "Cook Inlet is the most genetically distinct of all geographical subpopulations with respect to mtDNA" (O'Corry-Crowe *et al.* 1997; Hobbs and Waite 1998; Rugh *et al*. 1998). The Draft 1998 stock assessment (Hill and DeMaster 1998) states that preliminary mitochondrial DNA analyses of more than 70 samples from Cook Inlet beluga whales indicate statistically distinct differences among summering areas with the differences being much greater for Cook Inlet beluga whales (Hill and DeMaster 1998, O'Corry-Crowe, et. al. 1997). Together this data is an indication that the Alaska peninsula is an effective barrier to genetic exchange (O'Corry-Crowe *et al.* 1997).

b. Significance

According to the listing policy, once a population is established as discrete, its biological and ecological significance should then be considered. This consideration may include, but is not limited to, the following:

> 1.) Persistence of the discrete population segment in an ecological setting unusual or unique to this taxon.
>
> 2.) Evidence that loss of the discrete population would result in a significant gap in the range of a taxon.
>
> 3.) Evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historical range.
>
> 4.) Evidence that the discrete population segment differs markedly from other populations.

(61 Fed. Reg. 4722).

The Cook Inlet population of beluga whales meets three of these criteria for "significance": (1) it is a discrete population in a unique ecological setting; (2) loss of Cook Inlet beluga whales would result in a significant gap in the range of beluga whales; and (3) Cook Inlet beluga whales differ markedly from other populations of beluga whales.

i. Cook Inlet beluga whales are a discrete population in a unique ecological setting.

The population of Cook Inlet beluga whales is the only Alaskan population that is fully sub-arctic and is the only population occurring south of the Alaska Peninsula in the Gulf of Alaska. The population is also "unusual" or "unique" in that its ecological setting includes the waters adjoining the most urban environment in Alaska, that of Anchorage.

One of the purposes of the ESA is to "provide a means whereby the ecosystems upon which endangered species depend may be conserved." Consistent with this purpose, the USFWS has instituted an ecosystem approach to wildlife management. As part of this effort, USFWS has defined 52 ecosystems nationwide, with seven in Alaska. The nearshore areas of Cook Inlet frequented by this beluga population and the surrounding terrestrial areas are within a separate ecosystem as defined by USFWS from that of any other population of beluga whales in Alaska. As such, the role of the Cook Inlet population of beluga whales as an important upper trophic level predator in this ecosystem adds to its "significance" under the ESA.

ii. Loss of Cook Inlet beluga whales would result in a significant gap in the range of beluga whales.

A loss of the Cook Inlet beluga whale population would create a significant gap in the range of the taxon as it would eliminate a significant portion of beluga whales in the most accessible viewing location in Alaska. As discussed above, it would eliminate beluga whales from a distinct separate ecosystem, in a distinct part of their range. The loss of this stock of animals would represent a significant gap in the southern range of the taxon, as this is the only segment of beluga whales that appears to range in any portion of the Gulf of Alaska.

iii. Cook Inlet beluga whales differ markedly from other populations of beluga whales.

There is a distinct genetic difference between the Cook Inlet population and that of other beluga populations (O'Corry-Crowe,] *et. al.* 1997). Mitochondrial DNA analyses has determined that the Cook Inlet population is the most genetically distinct of all the Alaska populations (O'Corry-Crowe *et al*. 1997). This is consistent with earlier studies based upon examination of cranial characteristics which suggested that morphological differentiation may have taken place (Hazard 1988).

c. Cook Inlet beluga whales comprise a “stock” under the MMPA.

The Cook Inlet population of beluga whales is classified as a “stock” under the Marine Mammal Protection Act ("MMPA") (Hill and DeMaster 1998, 65 Fed. Reg. at 34590-91). While the analysis of whether a given marine mammal population is a separate “stock” differs somewhat from that of the NMFS/ USFWS listing policy, the finding that a population is a separate stock greatly supports a finding that the population is a listable entity under the ESA.

NMFS follows the phylogeographic approach of Dizon *et al.* (1992) in classifying stocks. This approach involves an analysis of, (1) distributional data, (2) population response data, (3) phenotypic data, and (4) genotypic data. The Cook Inlet population of beluga whales satisfies all of these criteria to be considered a stock.

First, the distributional data shows that Cook Inlet beluga whales utilize distinctly separate summer and winter areas from those of other populations (Rugh *et al.* 1998, Hanson and Hubbard 1998). The absence of sightings along the Aleutian chain despite intensive survey efforts demonstrates that the Cook Inlet population is not likely to intermix with the Bering Sea populations (Rugh *et al.* 1998).

The population meets the second criterion also, as the documented decline of the Cook Inlet population is occurring independently from that of any other population. Repopulation of Cook Inlet from the Bering Sea would be unlikely (O'Corry-Crowe *et al*. 1997).

The third criterion is satisfied by the observed differences in cranial morphology (Hazard 1988), and the fourth criterion is met by the distinctiveness in mitochondrial DNA observed by O'Corry-Crowe, *et al.* (1997).

In sum, the Cook Inlet population of beluga whales is a distinct vertebrate population segment of the species. The Cook Inlet beluga whale therefore is eligible for consideration for listing under the ESA as it is both “discrete” and “significant.” Finally, NMFS itself has acknowledged that the "Cook Inlet belugas make up a small, geographically isolate remnant population" (63 Fed. Reg. at 64229).

As described below, the Cook Inlet beluga whale's current status mandates that it be listed as endangered under the ESA.

B. THE COOK INLET POPULATION OF BELUGA WHALES IS ENDANGERED UNDER THE ESA.

NMFS is required to determine, based solely on the basis of the "best scientific and commercial data" available, whether a species is endangered or threatened because of any of the following factors: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) over-utilization for commercial, recreational, scientific or educational purposes; (3) disease or predation; (4) the inadequacy of existing

regulatory mechanisms; or (5) other natural or manmade factors affecting its continued existence (16 U.S.C. § 1533(a)(1) and 1533(b)(1)(A)). The test, however, is not whether one or more of these factors initially caused the threat or endangerment to the species. Instead, the test is whether the existence of any one or more of these factors puts the species at risk, even if the factor[s] did not cause the threat or endangerment.

NMFS has acknowledged that "At the time of this writing, there is evidence that one or more of these [statutory] factors would apply to this stock" (NMFS 2005a, at 86). Petitioners agree. They believe that all five of the statutory factors may have influenced the precipitous decline of the Cook Inlet beluga whale population. More importantly, the existence of any one of these factors may prevent its recovery.

The easiest factor to quantify, and the most immediate threat to the Cook Inlet beluga whale's population, was the high harvest occurring under the Native take exemption of the MMPA (6 U.S.C. § 1371(b)). Since 1999, NMFS has tightly regulated this harvest. While regulatory mechanisms may provide adequate regulatory oversight for this harvest, to date this tightened oversight has not lead to the recovery of the population, contrary to NMFS' s previous assumptions (NMFS 2005a, at 87).

NMFS also identifies "several indices which should be considered . . . in determining the status of these whales under the ESA" (NMFS 2005a, at 87). These include "1) an Allee effect, 2) inbreeding depression, 3) loss of genetic variability, 4) vulnerability to environmental perturbations due to reduced range, 5) vulnerability to environmental perturbations due to reduced population size, and 6) vulnerability to demographic stochasticity due to reduced population size" (NMFS 2005a, at 87).

As described below, the foregoing factors and other unidentified factors are likely contributing to the Cook Inlet beluga whale population's inability to grow at a healthy rate, and may impede its recovery. The population remains small, vulnerable and isolated. It is in dire need of the additional protections that listing under the ESA would provide.

1. Inadequacy of existing regulatory mechanisms - 16 U.S.C. § 1533(a)(1)(D).

There are currently no regulatory mechanisms which adequately address the dire situation of the Cook Inlet beluga whale.

The only federal law which currently has been used to apply any protection to Cook Inlet beluga whales is the MMPA. The MMPA has proven ineffective in protecting this population, resulting in its current endangered status. NMFS has so far not exercised the regulatory authority granted to the Secretary of Commerce in Sections 112(a)-(e) of the MMPA (16 U.S.C. § 1382). Sections 112(a)-(e) give the Secretary of Commerce substantial authority to protect the CI beluga through consultation requirements with other federal agencies and through the adoption of regulatory measures These powers

have not been used, according to NMFS, only because they "are largely untested" (NMFS 2005a, at 56n.10).

In declining to list the Cook Inlet beluga whale under the ESA in 2000, NMFS relied upon the depletion designation in the MMPA and on the unsubstantiated assumption that "controlling the [Alaska Native subsistence] harvest may be an effective mechanism to promote recovery of the stock" (65 Fed. Reg. at 38779). The Cook Inlet beluga whale population has since shown no definite signs of recovery despite severe restrictions on Native hunting in some years and a complete prohibition on hunting in the last few years.

NMFS also indicated in its not warranted decision that "Also as noted in other sections of this document, existing regulatory mechanism are believed adequate to address future economic development in the area" (65 Fed. Reg at 38782). But the only category of "future economic development in the area" that NMFS discusses is tourism, devoting two short paragraphs to it (65 Fed. Reg. at 38788). NMFS equates tourism to "wildlife viewing," and NMFS states only that "Should whale watching operations develop in CI, NMFS plans to monitor them" (65 Fed. Reg. at 38788). There is no discussion of how whale watching operations might impact the whale or how they might be regulated if they did.

In any event, besides tourism there are may other "future economic development[s] in the area" that could adversely impact the Cook Inlet beluga whale. The MMPA's depletion designation is insufficient to control these developments. This is obviously true given that, as NMFS has indicated, the Secretary of Commerce has no appetite for even attempting to use the regulatory powers granted by Section 112(a)-(e) of the MMPA. Those future economic developments include, among others:

- The proposed Knik Arm bridge and causeway, now in the process of National Environmental Policy Act ("NEPA") review
- The expansion of the Port of Anchorage, also in the NEPA and permitting process - see the Port of Anchorage's website at http://www.muni.org/port/index.cfm
- Proposed alterations of the Ship Creek area in Anchorage to facilitate tourism, including removal of the existing dam on Ship Creek
- Further development the Matanuska Susitna Borough's Port MacKensie
- The Matanuska Susitna Borough's proposal for Knik Arm ferry service to and from Anchorage
- Oil and gas lease sales, and the exploration and development activities that may flow from lease sales[*]

[*] The Alaska Department of Natural Resources has held an annual Cook Inlet Areawide Oil and Gas Lease Sale since 1999, and will do so through 2009 for tracts within upper Cook Inlet (NMFS 2005a, at 41). The U.S. Department of the Interior Minerals Management Service conducted a federal oil and gas lease sale largely within lower Cook Inlet in May 2004, while admitting that "Beluga whales occur within the sale area, but there is little information on seasonal presence, movements or habitat use" (NMFS 2005a, at 41).

These economic developments will also cause other activities that will adversely impact the Cook Inlet beluga whale. For example, Anchorage's port expansion project will result in more shipping traffic in Cook Inlet and especially in the Knik Arm, increasing the potential for collision with belugas, increasing marine noise that will adversely impact their feeding, and potentially causing other adverse impacts to the Cook Inlet beluga whale.

What follows is a more detailed discussion of the existing regulatory authorities and entities that are on their face insufficient to protect Cook Inlet beluga whale population and enable its recovery.

a. MMPA

The MMPA is inadequate to protect the Cook Inlet population of beluga whales.

i. Prohibition on commercial harvest and wasteful take of whales

The MMPA protects all marine mammals from commercial hunting and from wasteful take (16 U.S.C. 1371(a) and (b)). These provisions apply to the Alaska Native harvest of beluga whales. Using its authority under the MMPA, NMFS has taken action to regulate the Native harvest (65 Fed. Reg. 59164) (Oct. 4, 2000), NMFS 2003) at 2-5 (describing actions to restrict hunting)). However, the Native take provision of the MMPA allows the commercial sale of edible portions of whales taken primarily for subsistence (16 U.S.C. 1371(b)). This makes it impossible for NMFS to stop the commercial aspects of any permitted beluga whale hunt using either of these prohibitions.

ii. Co-management

Under the MMPA, as amended by Public Law 106-31,[†] NMFS can and did pursue a co-management agreement with the Alaska Native tribes and hunters in the Cook Inlet region (16 U.S.C. § 1388). Such agreements allow NMFS to work with tribal entities to set harvest limits and to determine methods of harvest. These agreements can be pursued and implemented in addition to either a "depleted" or "endangered" listing. However, such an agreement provides no *additional* legal authority to NMFS to prosecute violations of the MMPA. Even with a co-management agreement in place, neither NMFS nor the co-management body can enforce its recommendations if hunters choose not to comply.

[†] Public Law 106-31 mandated that

> Nothwithstanding any other provision of law, the taking of a Cook Inlet beluga whale under the exemption provided in section 101(b) of the marine Mammal Protection Act (16 U.S.C. 1371(a)) between the date enactment of this Act and October 1, 2000, shall be considered a violation of such Act unless such taking occurs pursuant to a cooperative agreement between the National Marine Fisheries Service and affected Alaska Native organizations.

The Alaska Native hunting of Cook Inlet beluga whales presents unique problems for NMFS as compared to other Native harvests of marine mammals in Alaska. Cook Inlet is accessible to many urban and rural areas, and includes seven recognized tribal entities. The Cook Inlet region includes nine federally-recognized Alaska Native tribal governments. Both Native Alaskans belonging to Cook Inlet tribes and Native Alaskans from other regions of the state participate in beluga whale hunting in Cook Inlet. Native Alaskan hunters from other regions are deemed "guest hunters" by the Cook Inlet tribes.

Any subsistence harvest must be regulated in such a way that all Native hunters participating in the hunt from around the state comply with the regulations. The tribes, however, have inadequate enforcement authority, and in any event neither the tribes nor NMFS has enough resources to provide adequate monitoring and regulatory presence in an area the size of Cook Inlet. Because of the unique nature of the Cook Inlet hunt, even with a co-management agreement in place tribal entities and Native hunters still will need the enforcement provisions of an ESA listing as well as NMFS's active participation in enforcing those provisions in order to ensure that all hunters comply with the agreement.

In summary, notwithstanding the usefulness and importance of co-management agreements with Alaska Native hunters, ultimately only an ESA listing will provide adequate protection for the Cook Inlet beluga whale.

iii. Depleted status

As noted above, NMFS used its authority under the MMPA (16 U.S.C. § 1362(1) to declare the Cook Inlet population of beluga whales as "depleted" (65 Fed Reg. 34590). A depleted finding allowed NMFS to initiate a rulemaking to limit the otherwise lawful Alaska Native subsistence hunt of beluga in Cook Inlet. However, standing alone the depleted finding did not adequately address the severe problems facing the Cook Inlet beluga population. In part this is due to the fact that the criteria for a finding of depleted are different than the criteria for listing under the ESA. In any event, Congress intended protections under the ESA to be applied in conjunction with protections under the MMPA, as a species found to be "threatened" or "endangered" under the ESA is automatically listed as "depleted" under the MMPA (16 U.S.C. § 1362(1)(C)).

A "depleted" population is defined as being "below its optimum sustainable population," and optimal sustainable population is defined as "the number of animals which will result in the maximum productivity of the population of the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element" (16 U.S.C. §1362(1) and (9)). A depleted finding, then, is based solely upon population figures. The ESA listing criteria includes additional factors relating to such things as range reduction and habitat destruction (both relevant to the Cook Inlet beluga, see below) (16 U.S.C. § 1533(a)(1)). The Cook Inlet beluga population also clearly falls within the definition of an "endangered species" under the ESA.

Most importantly, a depleted listing under the MMPA does not provide the Cook Inlet beluga the additional protections provided by the ESA. These protections include the prohibition against adverse modification of its critical habitat, and the requirements for consultation and affirmative conservation efforts dictated by Section 7 of the ESA. The designation and protection of critical habitat --- such as essential fish habitats --- can, however, serve as an important tool in the efforts to protect the Cook Inlet beluga whale population.

Because the Cook Inlet beluga population has reached such low numbers, faces numerous threats in addition to hunting, and is in such a perilous state, it requires the full protection of the ESA to ensure its survival and recovery.

b. International Whaling Commission

The International Whaling Commission is an international body formed by the International Convention for the Regulation of Whaling. In 1982 the IWC passed a ban on commercial whaling, but provided an exception for aboriginal whaling. Moreover, the IWC has no authority to manage or regulate hunting of Cook Inlet beluga whales because the IWC currently lacks authority to regulate small cetaceans, which includes beluga whales. The subcommittee on small cetacean and the Scientific Committee of the IWC may review information on Cook Inlet beluga whales and on the level of subsistence harvest, but the IWC has no authority to take any action. All that the IWC can do is what it already has done, express concern that the previously authorized level of take was unsustainable and must be reduced (IWC 1995, IWC 1997).

c. Alaska-based formal and informal regulation

i. Alaska Beluga Whale Committee

The Alaska and Inuvialuit Beluga Whale Committee was formed in 1989 and originally included representatives from Cook Inlet. In 1994 it became the Alaska Beluga Whale Commission (AIBWC 1994, at 4.). ABWC has played an advisory role in the debate over how to manage Cook Inlet beluga whales.

ABWC undertook the examination of the Cook Inlet beluga whale harvest issue in November, 1992 (AIBWC minutes, November, 1992, at 8). In 1996 ABWC noted that the Indigenous People's Council for Marine Mammals passed a resolution urging NMFS to move forward with co-management and appropriate funds for the process (ABWC Meeting Minutes 1996, at 3.). In 1995 and 1996 ABWC urged CIMMC to take action to end the commercial sale of muktuk in Anchorage.

ABWC had no authority to effect change in Anchorage or in the Cook Inlet watershed and stated that "NMFS must deal directly with CIMMC [Cook Inlet Marine Mammal Council] regarding its concern over the Cook Inlet Harvest" (ABWC 1998). The ABWC lacks the regulatory authority and power to protect the Cook Inlet beluga whale population.

ii. CIMMC

The Cook Inlet Marine Mammal Council ("CIMMC") was formed in April of 1994 by the Anchorage area marine mammal hunters. CIMMC was chartered by several of the Cook Inlet tribes and eventual by the Cook Inlet Treaty Tribes to represent their interests in marine mammal regulatory issues.

CIMMC withdrew from formal participation in ABWC following the December 1996 meeting (ABWC Comments to NMFS 1999, at 2).

CIMMC and NMFS began discussions about a co-management agreement in November 1994 (CIMMC 1994). In 1996 CIMMC recognized that the co-management process was delayed because of the need for extensive deliberation to develop a position fully supported by all its members (CIMMC 1996). CIMMC recognized that commercial harvest was taking place in Cook Inlet and asked NMFS for help since it had no authority over hunters from northwestern Alaska. NMFS informed CIMMC there was little that it could do to help (NMFS 1997).

CIMMC tried since before 1997 to stop the commercial sale of muktuk on its own (CIMMC 1997). An April 1997 CIMMC Resolution established a quota of three whales per whaling captain, limits on commercial sale, retention of all muktuk and 60% of meat from each whale, and registration of non-Anchorage area hunters. These measures were not implemented because on its own, CIMMC lacked sufficient enforcement authority and resources to implement them.

Since then, in 1999 NMFS and CIMMC have entered into co-management agreements governing the subsistence harvest of Cook Inlet beluga whales. However, a co-management agreement with NMFS can address only the regulation of the subsistence harvest. It cannot address the other factors that endanger influence the Cook Inlet beluga whale population and influence its recovery.

iii. Alaska Regional Scientific Review Group

The Alaska Regional Scientific Review Group ("AKSRG") is an advisory body to NMFS. In May 1997 it asked NMFS to continue funding population surveys and studies of subsistence harvest of Cook Inlet beluga whales. The AKSRG considered “Cook Inlet belugas to be one of the most pressing conservation problems facing Alaskan marine mammal stocks at the present time” (AKSRG 1997). The ARSRG urged NMFS to place a very high priority on implementing a co-management agreement for the Cook Inlet beluga whales.

The AKSRG has also recognized that other factors such as pollution, disturbance and commercial fishing may be adversely impacting Cook Inlet beluga whales. However, AKSRG has no authority to regulate the subsistence harvest of Cook Inlet beluga whales or for that matter any other activity that impacts beluga whales. AKSRG can do no more

than offer advice in support of any regulatory efforts undertaken by other entities with enforcement powers.

iv. State of Alaska

The State of Alaska has no express authority to manage beluga whales or the Alaska Native hunting of beluga whales. Indeed, the State of Alaska has demonstrated its reluctance to provide discretionary protection for beluga whales. NMFS and conservation organizations requested tract deletion from the Cook Inlet Areawide Oil and Gas Sale specifically to protect areas where the remaining Cook Inlet beluga whales congregate, including the mouth of the Susitna River. The State ignored those requests and denied all administrative appeals of that action on February 19, 1999. The Commissioner of the State of Alaska Department of Fish and Game also declined a petition to list the Cook Inlet beluga whale as endangered under the Alaska Endangered Species Act. This decision was upheld by the Alaska Supreme Court (Alaska Center for the Environment v. Rue, 95 P.3d 924 (Alaska 2004)). The State of Alaska Department of Fish & Game has put the Cook Inlet beluga whales on an internal agency list called "Species of Special Concern," but no specific authority or protection is provided by this informal designation.

v. The Municipality of Anchorage and the Matanuska-Susitna and Kenai Peninsula Boroughs

Anchorage is the largest city in Alaska, home to more than half of Alaska's human population. It sits at the head of Cook Inlet. Its location provides an unusual opportunity to view whales in an urban/industrial area. During the summer months, when the Cook Inlet beluga whale population was more plentiful, both residents and tourists gathered to watch Cook Inlet beluga whales from the Tony Knowles Coastal Trail, which runs along the shore of Turnagain Arm in upper Cook Inlet. This has become a rare occurrence, however, and sightings of beluga whale population are now largely confined to the Seward Highway along Turnagain Arm.

Be that as it may, the Municipality of Anchorage has not intentionally taken any action to protect the Cook Inlet beluga whale population or its habitat, through the exercise of its land use powers, control of the operations at the Port of Anchorage, protection of habitat that the beluga whale needs and uses and which lies within the Municipality, or otherwise. To the contrary, the Municipality has in the past opposed listing the Cook Inlet beluga whale under the ESA. It intervened as a defendant in a federal court lawsuit that sought to overturn NMFS's not warranted decision (Cook Inlet Beluga Whale v. Daley, 156 F.Supp.2d 16 (D. D.C. 2001)).

The west side of Knik Arm and its headwaters is within the jurisdiction of another state municipality, the Matanuska-Susitna Borough. It also contains habitat for the Cook Inlet beluga whale and its prey species. Similarly, the Kenai Peninsula Borough's boundaries encompass the lands and waters of lower Cook Inlet. This includes extensive habitat for the Cook Inlet beluga whale and its prey species. Like the Municipality of

Anchorage, both boroughs intervened as defendants in Cook Inlet Beluga Whale v. Daley and opposed listing the whale under the ESA. Like the Municipality of Anchorage, neither borough has taken any specifically targeted action to protect the Cook Inlet beluga whale or its habitat, through the exercise of land use powers, control of the boroughs' waterways, or otherwise.

Recently the Municipality of Anchorage has proposed a massive expansion of its port, which abuts habitat that the Cook Inlet beluga whale routinely uses. This expansion threatens essential fish habitat upon which the Cook Inlet beluga whale depends, and may seriously and adversely affect Cook Inlet fisheries. As pointed out above, port-related activities already may have caused extensive siltation in Knik Arm (Campbell 2005), and this may adversely affect the whale. The Matanuska-Susitna Borough also recently completed construction of a new port (Port McKensie) across Knik Arm from the Port of Anchorage, and as activity increases at Port McKensie its operations also may adversely affect the Cook Inlet beluga population, its prey species, and the habitats upon which it depends for recovery and survival. Any possible future expansion of the Ports of Anchorage and McKenzie also pose additional threats.

In sum, even if their legislative and administrative powers had the same reach as the ESA, the local governments cannot be depended upon to take actions to protect the Cook Inlet beluga whale.

2. Present or threatened destruction, modification or curtailment of habitat or range - 16 U.S.C. § 1533(a)(1)(A)

Multiple events or actions adversely affecting the Cook Inlet beluga whale population, its habitat, or range threaten it with extinction.

a. Shrinkage of historic range

As described in detail above, the current distribution of the Cook Inlet population of beluga whales is severely reduced from its historic distribution. Murray and Fay (1979) described this population as ranging all along the northern Gulf of Alaska. All current descriptions of the Cook Inlet population's range limit its presence almost exclusively to Cook Inlet, and within Cook Inlet almost exclusively to *upper* Cook Inlet. NMFS has hypothesized, without supporting data, that "This shrinking distribution is probably a function of a reduced population with the remaining whales using the best habitat that offers abundant food, the best calving areas and the best escape from predation" (NMFS 2005a, at 11). See also NMFS (2003) at 23-26. Without supporting data it is not possible to know if the shrinking distribution is due to either a shrinking population, or because reduced habitat availability (such as in river mouths that are now the location of substantial vessel traffic and noise) is a factor causing the decline in the population, or a combination of factors.

Rugh *et al.* (1998) summarized the distribution data for the population and concluded that, in recent years, there has been a reduction in offshore sightings in upper

Cook Inlet, a reduction in sightings in lower Cook Inlet, and a reduction in incidental sightings in the Gulf of Alaska. From the reduction in sightings of the species outside of the near shore areas of upper Cook Inlet, it is clear that the range of the species has been severely curtailed. In fact, this is directly implied in NMFS's discussion elsewhere of the distribution of the current population (NMFS 2003, at 23-26, NMFS 2005a, at 13-15).

b. Other current and future threats to habitat

Current threats to beluga whale habitat include both habitat loss from development, and habitat loss through displacement from conflict with other human-caused activities. NMFS acknowledged seven years ago that "Because Cook Inlet belugas are geographically isolated, perturbations that are humanly-induced could have a dramatic effect on the population" (63 Fed. Reg. at 64229). It then pointed out that "summer concentrations of this beluga population are exposed to the largest industrialized coastal area and to the largest human component in Alaska" (63 Fed. Reg. at 64229).

Industrial, commercial and residential developments and associated activities and human population increases all result in degradation of the available habitat for Cook Inlet beluga whale prey species and of the marine environment upon which Cook Inlet beluga whales depend. Industrial activities, such as port usage, oil industry related activities (e.g., drilling, seismic testing), onshore and offshore municipal and industrial pollution discharges, U.S. Army Corps of Engineer port-related dredging activities in Cook Inlet, and vessel traffic all result in the diminishment of available habitat for Cook Inlet beluga whales.

i. Oil and gas industry activities

Oil exploration, leasing and development currently pose a threat to the marine environment beluga whales depend on. Oil development causes direct impacts to habitat, such as oil spills, which could devastate Cook Inlet beluga whales. Oil development also causes longer term degradation of habitat through development of upland sites and degradation of water quality. These impacts can adversely affect both beluga whales and the species they prey upon.

Cook Inlet has experienced extensive oil and gas development since the discovery of the Swanson River field on the Kenai Peninsula in 1957. The impacts from these activities to beluga whales include pollutant discharges from platforms and vessels, seismic testing activity associated with exploration, well blowouts and oil spills, physical obstructions to migration and feeding, and increased development. NMFS recognizes that these activities could adversely impact the whale. See, e.g., NMFS 2005, at 40 (remarking that "geophysical seismic . . . has the potential to harass or harm marine mammals, including beluga whales."), at 41-42 (discussing possible adverse impacts from oil spills). See also National Research Council 2005, at 24 ("Playback of sounds associated with oil-industry activities indicated a clear relationship between the received-

sound pressure level and the probability that migrating gray whales will deviate from their migration path.")

As of 1999, the Cook Inlet area had 237 producing oil wells and three land-based treatment facilities (61 Fed. Reg. at 66089). These facilities discharge 5 billion gallons of "produced water" annually (61 Fed. Reg. at 66,097 col. 2). Produced water is extracted together with recoverable petroleum product and contains a number of toxic pollutants, including benzene, ethylbenzene, naphthalene, toluene, and phenol (61 Fed. Reg. at 66,097 col. 2).

The oil and gas platforms in Cook Inlet discharge "drilling fluids" or "drilling muds" when wells are drilled. As of 1999, drilling fluid discharges into Cook Inlet were approximately three million gallons each year (61 Fed. Reg. at 66093). Drilling fluids contain many of the same toxic organic compounds that are found in produced water, as well as toxic heavy metals such as chromium, copper, lead, nickel, selenium, and silver. All of these pollutants are known to cause significant adverse effects to marine biota, including genetic mutation, disease and death (61 Fed. Reg. at 66112).

Cook Inlet also hosts many oil industry processing facilities. In Nikiski, on the eastern shore of Cook Inlet there are three production plants. There is a Tesoro refinery, a Phillips Marathon plant that liquefies natural gas, and an ammonia and urea plant. There is a fourth facility, owned by Chevron and closed in 1991, where groundwater contamination is still undergoing remediation. On the west side of Cook Inlet there is a Trading Bay treatment facility and the Drift River storage facility. The Drift River terminal lies near the foot of Redoubt Volcano and was threatened by mudslides during the volcano's 1989-90 eruption. In 1993 the Unocal and Tesoro facilities discharged 5.1 million pounds of toxic pollutants (nitrogen compounds, sulfuric acid and metals) into Cook Inlet (State of the Inlet, 1997, at 22).

In its Final Best Interest Finding for its April 1999 oil and gas lease sale, the State of Alaska acknowledged that Cook Inlet beluga whales are at risk from oil spill impacts (State of Alaska 1999, at 6-32). While some of the sensitive areas were deleted from the 1999 and subsequent State of Alaska lease sales because of a court injunction against the State of Alaska, not all sensitive areas identified as potentially important beluga whale concentration areas were deleted. Consequently, oil industry activities with respect to leases sold in the past and as a consequence of future area wide oil and gas lease sales are likely to cause disruptions to beluga whales and their habitat in Cook Inlet.

In addition to new oil and gas exploration and development, aging fields continue to pose a significant threat from oil spills to beluga whales. On January 6, 1999, an aging Unocal oil pipeline in the Swanson River ruptured and spilled at least 57,000 gallons on the Kenai National Wildlife Refuge. One similar oil spill in the upper Cook Inlet during the month of June could impact the entire remaining Cook Inlet beluga whale population as the whales concentrate in river mouths from late May through June (Morris, 1988).

Tanker traffic in Cook Inlet continues to pose a threat of chronic and potentially catastrophic oil spills which could impact beluga whales. In the winter of 1999, severe temperatures and ice conditions caused two spills from vessels traveling in Cook Inlet (Cook Inlet Keeper Letter to Coast Guard, February 8, 1999). In February 2006 the T/V Seabulk Pride, with nearly 5 million gallons of oil on board, ran aground in hazardous ice conditions at Nikiski. Cook Inlet has suffered major tanker oil spills in the past, e.g., T/V Glacier Bay oil spill. Large spills pose the risk of extinction to belugas because they are social mammals which congregate in large groups and, as explained above, are consequently more susceptible to damage from single events.

ii. Water contamination

In addition to the oil and gas industry, Cook Inlet is subject to many other sources of contamination, including urban and agricultural run-off, industrial and military activity, and wastewater from the cities and towns around Cook Inlet that degrade beluga whale habitat.

A total of ten communities discharge treated municipal waste into Cook Inlet (65 Fed. Reg. 38778). In addition to these ten, the Soldotna Wastewater Facility discharges into the Kenai River under an individual NPDES permit; the Kenai River empties into Cook Inlet. Five of these eleven facilities use primary treatment only (Municipality of Anchorage, Port Graham, English Bay, Seldovia and Tyonek), while six others use secondary or tertiary treatment (Eagle River, Girdwood, Homer, Kenai, Palmer, and Soldotna). These facilities discharge approximately 42 million gallons per day of treated municipal wastewater into the Inlet or its tributaries. NMFS acknowledges that "the additional suspended load from wastewater and the impacts of minimally treated wastewater on the beluga whales is unknown" (NMFS 2005a, at v).

The Municipality of Anchorage is the largest city in Alaska and its waste water discharges affect water quality in Cook Inlet. Anchorage's current Municipal Separate Storm Water (MS4) permit, issued pursuant to the Clean Water Act, will not protect water quality standards for various toxic pollutants (State of Alaska Department of Environmental Conservation, Letter to EPA, 1998). In past years the Municipality of Anchorage requested less stringent water quality criteria for heavy metals and other pollutants in Upper Cook Inlet (State of Alaska Department of Environmental Conservation, Fact Sheet). Anchorage’s publicly owned treatment works at Point Woronzof provides only primary treatment of Anchorage's domestic and industrial waste streams before these streams are discharged into Cook Inlet. The average daily flow through the facility from 2000 to present has ranged from a low of 27.862 million gallons per day (mgd) in 2001 to 29.599 mgd for the first four months of 2005 (USEPA 2005a).

In 1996 the seven facilities discharging wastewater into the Cook Inlet under individual NPDES permits were permitted to discharge up to 49.20 million gallons of wastewater per day (Minerals Management Service 2003, at Table III.A-5). These same facilities are now permitted to discharge 65.08 million gallons per day (USEPA 2005b).

Urban, agricultural and industrial runoff also enters Cook Inlet from all of the population centers on Cook Inlet. Wasilla, Palmer, Kenai, Soldotna, Sterling and Homer all have significant human populations and associated pollution problems. The cumulative impacts of these pollution sources likely adversely affect Cook Inlet beluga whales now, but at the very least certainly pose a long term threat to a population already under environmental stress.

There are numerous solid waste facilities, toxics sites, Superfund sites and federal hazardous waste sites spread throughout Cook Inlet (The State of the Inlet, 1997, at 23). In 1998 the Army Corps of Engineers permitted the siting of a jet fuel pipeline from the Port of Anchorage to the Anchorage Airport through the mudflats of Turnagain Arm. The inevitable spills from this pipeline would likely effect beluga whales, which sometimes feed in close proximity to these mudflats.

Fort Richardson and Elmendorf Air Force Base are both located on the north side of Anchorage in Cook Inlet. They have long histories of using petroleum and chemical products and discharging industrial wastes, and as military properties they have been exempt from certain environmental laws and reporting requirements. Both Fort Richardson and Elmendorf contain Superfund sites. The Eagle River Flats area at Fort Richardson are badly contaminated with white phosphorus (from artillery shell residue), which has caused die-offs of thousands of waterfowl. There are thousands of unexploded ordnance rounds and other munitions throughout the Eagle River flats.

Elmendorf Air Force Base is on the National Priorities List for cleanup under Superfund. The Alaska Department of Environmental Conservation contaminated sites database lists 42 separate sites at Fort Richardson and 71 at Elmendorf Airforce Base. (The State of the Inlet, 1997, at 23). There is a third Superfund site at Ship Creek, also in upper Cook Inlet.

The potential for significant impacts to the Cook Inlet beluga whale population and its habitat from human induced contaminants is an obvious cause for concern. Examples from Canada demonstrate how toxics can accumulate within beluga tissue and disrupt the populations. In the St. Lawrence River estuary beluga population, PCB levels up to 200 parts per billion were detected in beluga blubber (Morris 1988). Similarly, in Hudson Bay, Canada, mercury levels in excess of 0.5 ppm have been found in the species (Sergeant and Brodie 1975). This exceeds levels allowed for human consumption and resulted in a closure of Hudson Bay's commercial whale fishery (Morris 1988). It is believed that metabolism of PCB's by marine mammals is slower than for terrestrial mammals, and consequently the toxicological effects may be more pronounce and long-term (Morris 1988). Moreover, PCB's are readily transferred though lactation, leaving each generation of beluga whales with a higher base concentration of the chemicals than the previous generation (Beland 1996).

The example of the crash of the St. Lawrence River estuary beluga population in Canada demonstrates how toxics can prevent an already depleted population from ever recovering. Belend (1996) provides an extensive account of the collapse of the St

Lawrence beluga population. The beluga population there was estimated to be between 5,000 and 10,000 at the turn of the century. By 1979 the population had been reduced by hunting and other human impacts to about 500 whales. The whales were given official protection by the Canadian government in 1979. In the two decades since, the population has shown no signs of recovery. Numerous whales have been found washed ashore, covered with lesions and tumors. Necropsies revealed a high incidence of various chronic health problems such as immunosuppression, reproductive impairment, endocrine dysfunction, and gastric ulcers. Necropsies have also revealed high concentrations of PCB's, DDT and other industrial pollutants. The St. Lawrence beluga has the highest incidence of cancer of any marine mammal. Chemical pollution is identified by Beland as the most likely cause of the high rates of mortality and reproductive failure for the population.

The Cook Inlet population of beluga whales is smaller than the St. Lawrence population. Native hunters have reported that some beluga whales they harvested in Cook Inlet were so sick that they would not keep them. Some hunters believe that pollution is causing illnesses in some of the whales.

The cumulative effects of all of these sources of contamination is not known, but is likely to be harmful to water quality in the Cook Inlet beluga whale's habitat. In turn, activities in Cook Inlet which have the potential of increasing the Cook Inlet beluga whale population's chronic exposure to toxic contaminants may prevent it from ever recovering. While a recent study did not find high levels of contaminants in Cook Inlet beluga whales, the study cautioned that "very little is known about the role that multiple stressors play in the health of individual animals and populations. Biotoxins, bacterial or viral infections, physical stresses in the environment, parasites, periodic limitations in food, or stress from being hunted in combination with accumulation of toxic chemicals may further compromise animal health. The interaction of such stressors on a declining population, such as the Cook Inlet beluga whales, and the resulting effects on population recruitment should be a major avenue for future research and evaluation" (Becker *et al*. 2001, at 48).

iii. Vessel traffic

Beluga whales are affected by the noise from vessel traffic. Both the amount and frequency of noise as well as the level of vessel traffic are important. As vessel traffic increases, so do the potential impacts to beluga whales, particularly if vessel traffic makes otherwise beluga whales avoid using otherwise good habitat for them.

1.) Noise

In its June 2000 not warranted decision, NMFS rejected the possibility that human caused noise could be adversely affecting the Cook Inlet beluga whale population, adopting the posture that since beluga whales are present in areas subject to noise, then they must have become habituated to existing noise levels and no harm flows from this noise (65 Fed. Reg. at 38787-88). This assumption is unwarranted; it is not based on

any data. And it ignores the precarious status of the Cook Inlet beluga whale population. Indeed, the National Research Council of the National Academies recently stated:

> What little we know about behavioral response of marine mammals to anthropogenic noise highlights the importance of context, including the demographic status of the animals receiving the sound; the characteristics, location, and movement of the sound source; and the location of the animals. The history of the animals is also important; prior exposure to the source could have resulted in habituation or sensitization. Context includes population status and ecosystem changes; responses that would be insignificant in a population near its carrying capacity can become significant in populations that are depleted or that are encountering multiple stressors, such as El Niño.

National Academies Press 2005, at x (emphasis added); see also id. at 40 ("Behavioral responses on individual and population scales, may differ between a stable population near environmental carrying capacity and a severely depleted population.").

The July 2003 *Subsistence Harvest Management of Cook Inlet Beluga Whales Final Environmental Impact Statement* is at least much more equivocal than the not warranted decision with respect to noise impacts. It acknowledges that "upper Cook Inlet is one of the most industrialized regions of Alaska. As such, noise levels may be high. To what extent, if any, noise production in the CI areas has had an effect on the current distribution or trends of these animals is not clear. The effects of the municipal industrial and recreational activities in Upper Cook Inlet are of concern to the management of this stock of whales" (NMFS 2003, at v). The *Draft Conservation Plan* further asserts that Cook Inlet beluga whales may be tolerant of loud noise levels, "although it is also possible that in order to feed, the whales are tolerating noise which would other wise disturb them," and that "ambient underwater sound levels [were] lowest at two locations which are highly used by beluga whales, the mouth of the Susitna River and east Knik Arm, near Birchwood" (NMFS 2005, at 40). The evidence therefore suggests that beluga whales avoid noise when they can, but no evidence indicates that their habituation to noise means that no harm is occurring. Tolerating noise in order to feed does not mean that the situation for the whales is healthy, either in the short or long term.

Cook Inlet contains an abundance of noise arising from oil platforms, shipping and tanker traffic, aircraft, commercial and sport fishing, and recreational boating. "Beluga whales … have strong and prolonged behavioral responses to icebreakers 50 km way under some circumstances" (National Research Council of the National Academies 2005, at 14 (citations omitted)). See also National Research Council of the National Academies 2005, at 77 (citations omitted)("One of the most pronounced behavioral responses of a marine mammal to noise involves the response of beluga whales to icebreakers in the Arctic. Beluga whales may respond to an icebreaker at many tens of kilometers.") NMFS has acknowledged that "the beluga whale can be very sensitive to disturbance, and we have often observed pronounced avoidance to small boats operating near Anchorage. Any activity that might disturb or cause these whales to abandon important feeding or calving areas could have adverse and significant consequences"

(NMFS letter to State of Alaska Division of Oil and Gas 1998). Researchers have reported that beluga whales react to noise by temporarily avoiding areas with sudden noise changes (Morris 1988, Hazard 1988, McCarty 1981, Stewart *et. al* 1983). Native hunters from other areas of Alaska have reported that beluga whales are disturbed by small airplanes flying low over areas of Kotzebue Sound. Comments presented to AIBWC indicate that acoustics studies have shown that beluga whales are more sensitive to noise than bowhead whales (ABWC Minutes 1994, at 3). See also the discussion of noise impacts in NMFS 2005, at 38-40.

NMFS has identified numerous "anthropogenic sounds" that Cook Inlet beluga whales already must compete with, and has identified other reasonably foreseeable projects that will produce noise that could adversely impact belugas. NMFS acknowledges that "displacement from sensitive feeding or calving habitats [caused by noise] could be very harmful to the recovery of this stock" (NMFS 2005a, at 39-40). In the Anchorage area alone, future projects include the expansion of the Port of Anchorage, a new marine ferry to cross Knik Arm, and the proposed Knik Arm bridge and causeway, all mentioned above (NMFSa 2005, at 38-39). NMFS recently commented on the proposed expansion of the Port of Anchorage and stated that "The proposed construction activity has the potential to introduce significant noise in the water column which would be detected by these animals and may cause adverse behavior reactions and/or injury, depending upon the extent of exposure and level of noise" (NMFS 2005b, at 2).

These noise effects pose the risk of displacement and harm to Cook Inlet beluga whales, further endangering their recovery. Indeed, in its not warranted decision NMFS acknowledged that the whale has a variable response to noise, and that this could be because the whales were not disturbed, were habituated to noise, or "continue to use some [noisy] areas for feeding and traveling because these areas are critical to their survival" (65 Fed. Reg. at 38788). NMFS further acknowledged that "To what extent, if any, noise in the Cook Inlet area has hand an effect on the current distribution or trends of these animals is not clear," but that "over the long-term, disturbance from noise, if it keeps belugas from foraging sites, could have an effect which would be expressed as a lower productivity rate due to low level, or chronic, stress symptoms that would inhibit successful foraging" (65 Fed. Reg. at 38788). NMFS then asserted that "no indication exists that this is happening" (65 Fed. Reg. at 38788). This is not true. The Cook Inlet beluga whale no longer visits many riverine and other areas. NMFS's *Draft Conservation Plan* itself indicates that "beluga whales today are relatively rarely seen at the mouth of the Kenai River, despite high salmon escapements (returns) to this river" and despite reports of Alaska Natives seeing as many as fifty whales up the Kenai River in the past (NMFS 2005a, at 31, and at 11). See also NMFS 2005a, at 14-16 (identifying some other areas in Cook Inlet no longer used by beluga whales). This is strong evidence that something is adversely impacting the population, and vessel traffic and noise clearly may be a seasonal factor in some areas.

2.) Increases in vessel traffic

Vessel traffic is dispersed throughout Cook Inlet. The industrial production plants at Nikiski, Trading Bay and Drift River all have vessel traffic associated with them. Recreational, commercial, and scientific vessels also travel throughout the Inlet. Recently the Matanuska-Susitna Borough completed construction of and began operations of an industrial port at Point Mackenzie on Knik Arm that is likely to increase commercial vessel traffic in Upper Cook Inlet generally and on Knik Arm specifically.

Vessel traffic has continued to increase in Cook Inlet since the opening of the Port of Anchorage in 1961. Freight deliveries to the Port of Anchorage began in earnest in the mid-1960's following the 1964 Good Friday Earthquake. General cargo tonnage through the Port of Anchorage increased from 398,000 tons in 1970 to 1.2 million tons in 1980. This number had increased to 2.7 million tons by 1994. Approximately 40 percent of this traffic is petroleum traffic (USACOE 1996, at 36).

3.) Dredging

The Corps of Engineers authorized dredging in Cook Inlet in 1999. Maintenance dredging is anticipated every 5 years, at approximately 397,600 cubic meters of fill material (USACOE 1996, at EA-1). Dredged material will be disposed of at a site near Fire Island. Dredging uses diesel engine powered cranes and tug boats. The Environmental Assessment for the 1999 project indicates that beluga whales would be deterred from visiting the immediate area of dredging activity (USACOE 1996, at EA-11).

From May 15 to November 1, 2004, more than 2 million cubic yards of sediment were dredged in the navigational channel of Knik Arm for access to the Port of Anchorage, a huge increase from the average amount of 250,000 cubic yards per year dredged in the 1980s and 1990s (Campbell 2005). According to consultants to the U.S. Army Corps of Engineers, "Construction at the ports of Anchorage and McKenzie could be contributing to disruptions in water flows and may be creating more gyres, a sort of water vortex. Naturally occurring gyres may also be an issue …. The problem is likely to get worse …. Past spikes in sediment coincided with past port construction projects" (Campbell 2005).

4) Small boat traffic

The use of personal watercraft (jetskis and jetboats) also has been on the rise in Cook Inlet. It is unknown the extent of the impacts these boats are having on Cook Inlet beluga whales, but it is clear that these boats have a high potential to cause disruptions in the mouths of rivers and shallow areas where beluga whales congregate during the summer. Similarly, it is clear that other small recreational or commercial vessels may adversely impact the whale's pattern of activity and thus its distribution.

In its June 2000 not warranted decision, NMFS acknowledged that beluga whales respond differently to vessels that "move slowly and are not heading toward them," but avoid "approaching skiffs powered by outboard motors, particularly during summer and

fall. Many researchers report that beluga whales flee from fast and erratically moving small boats" (65 Fed. Reg. at 38788). Thus, small boat traffic, now completely unregulated in Cook Inlet, may add to the risks faced by the Cook Inlet beluga whale population.

iv. Fisheries

Fishing poses at least three habitat-related risks to Cook Inlet beluga whales: incidental mortality from entanglement in fishing gear, redistribution of beluga whales from favorable habitat, and indirect threats from fishery management decisions that adversely affect the abundance and availability of Cook Inlet beluga whale prey species.

1.) Incidental mortality

The draft stock assessment (Hill and DeMaster 1998) notes that fisheries related mortality is unknown. Logbook self-reports from 1990-1996 indicate no interactions although mortalities have been estimated to occur in the past at a level of 3-6 animals per year (Burns and Seaman 1986). More recently, in July 1989 single belugas became entangled in nets near Fire Island; entanglements also occurred near the Susitna River in July 1990, and in the Kenai area in August 1996 (LGL Alaska Research Associates, Inc. 2005, at 2-10).

Because Credle *et al*. 1993 found that self-reports are likely negatively biased, it is reasonable to assume that some incidental morality may be occurring as a result of fishery operations by the 1,200 actively permitted vessels operating gillnets in this area. If it is continuing at previous levels, this fisheries-related mortality could be over 100% of the likely PBR of 2.7.

Gillnet fisheries in Cook Inlet and other portions of the range of this stock are not subject to observer coverage (Hill and DeMaster, 1998).

2.) Redistribution

Fishing vessels, both sport and commercial, may traverse and/or occupy areas that Cook Inlet beluga whale use for food forage or use coming and going to areas traditionally used as habitat by the whale. For example, as noted above it is well known that Cook Inlet beluga whale used to seasonally occur in the Kenai and other Cook Inlet rivers in summer months, presumably searching for migrating salmonoid species. These sightings apparently no longer occur, probably due to the significant amount of activity, including vessel traffic, in the areas which did not occur in the 1960 and 1970s, when the population of beluga whales was much higher.

3.) Prey availability

In its June 2000 not warranted decision, NMFS argued that the population of Cook Inlet beluga whales were not food stressed, based on evidence that calf survival had

not decreased and sexual maturity had not been delayed (65 Fed. Reg. at 38789). In the *Draft Conservation Plan*, in contrast, NMFS acknowledges that "Dense concentrations of prey appear essential to beluga whale feeding behavior" and that the disappearance of whales from some traditional feeding areas in Cook Inlet like the "rivers where prey were concentrated than in bays where prey are dispersed," may be due in part to the reduction in the occurrences of dense concentrations of prey, in turn due to either natural causes or competition from commercial and sport fisheries (NMFSa 2005, at 13). Whatever the reason, the decline in prey availability is an obvious factor that may explain the decline in the Cook Inlet beluga whale population. The decline in prey availability --- either because the whale is crowded out of foraging habitat by vessel traffic, noise, or other causes, or because a normal prey population is smaller for some reason --- will endanger the Cook Inlet beluga whale population's recovery. Fishing pressures have already led the State of Alaska Board of Fisheries to the close the Cook Inlet tanner crab (1995 and 1996), shrimp (1986), Kachemak Bay tanner crab (1995) fisheries.

The large aggregations of beluga whales in upper Cook Inlet in summer likely reflect feeding on the surviving dense prey concentrations of eulachon and salmon in the upper drainages of the inlet, where on-the-water sport and commercial fishing is largely absent.

Beginning in May and continuing through August, all five North Pacific salmon species appear in the areas that beluga whales frequent (NMFS 1992). Beluga whales in Cook Inlet are known to consume salmon and tomcod (Fall *et. al*. 1984). Adult and juvenile salmon have been found in the stomachs of landed Cook Inlet beluga whales by whale hunters as well (Personal comm., Joel Blatchford, local hunter).

Salmon population estimates for Upper Cook inlet in recent years suggested a trend of decline (Anchorage Daily News 1999). A number of Cook Inlet streams, particularly in the Matanuska-Susitna valley, have in the past experienced low or reduced salmon runs in the last decade, with ongoing debate among commercial and sport fishing groups about the causes (Anchorage Daily News 1999). Given the evidence of salmon as an important food source for the Cook Inlet beluga whales, and the documented concentration of the whales in upper Cook Inlet where the Mat-Su streams drain in, there may be a relationship between fluctuating and declining salmon runs and the decline of the beluga population.

In its June 2000 not warranted decision, NMFS seemed to dispute the contention that oft fluctuating salmon runs were in decline, but concluded that "The available information does not provide a clear quantitative assessment on trends of fish stocks in CI" (65 Fed. Reg. at 38789). Making a concession of even greater relevance, the *Draft Conservation Plan* indicates that "Whether the [salmon] escapement into these rivers, having passed the gauntlet of the commercial fisheries, is sufficient for the well being of the CI beluga whales is unknown. The amount of fish required to sustain this population is unknown" (NMFS 2005a, at 31). It further indicates that "beluga whales today are relatively rarely seen at the mouth of the Kenai River, despite high salmon escapements (returns) to this river," and that this may imply that "CI beluga whales cannot simply go

where the fish are, but may be at least partially dependent on a few select feeding habitats" (NMFS 2005a, at 31). Thus, even if the State of Alaska meets its fisheries escapement goals --- as NMFS previously contended the State has, on average, done so --- that may not be sufficient to ensure that the Cook Inlet beluga whale population has available to it an adequate amount of prey to sustain its current size and to allow for recovery to its historic levels.

In its June 2000 not warranted decision, NMFS indicated that "Other prey species [such as herring and eulachon] may be important to CI beluga whale, but there are little quantitative data to evaluate stock abundance and trends" (65 Fed. Reg. at 38789). As noted above, it then concluded that "The available information does not provide a clear quantitative assessment on trends of fish stocks in CI" (65 Fed. Reg. at 38789).

This past January 2005, however, the Alaska Board of Fisheries created a "new commercial smelt fishery in Northern Cook Inlet with dip nets as legal gear … [with a] 100-ton harvest cap" (State of Alaska Board of Fisheries 2005). The Board asserted that "Hooligan and smelt stocks are abundant throughout Upper Cook Inlet" (State of Alaska Board of Fisheries 2005). This action flies in the face of NMFS's statement, quoted above, that there is little quantitative information available to evaluate stock abundance and trends of beluga prey species besides salmon (65 Fed. Reg. 38789). The Board of Fisheries's decision will undoubtedly increase the accumulating stresses on the Cook Inlet beluga whale population.

Finally, since the range of the Cook Inlet beluga whale is vastly reduced to the upper Cook Inlet, there are undoubtedly important prey species, e.g., octopus, no longer available to the beluga whale because these species do not occupy the upper Inlet. This can only add to the food stresses the population may face.

v. Upland habitat loss

Beluga whales depend on the health of anadromous fish runs in Cook Inlet. These runs are threatened by continued development, and by the loss of upland habitat in Cook Inlet that is important for the health of anadromous streams.

Within the Municipality of Anchorage, which has a large number of anadromous water bodies that drain into upper Cook Inlet, nearly 10,000 acres of wetlands were filled within the municipality between 1950 and 1990 (Municipality of Anchorage 1996, at 4). (Statistics for wetland fills in Anchorage since then, and in other local communities, are not publicly available.) Wetlands abutting anadromous water bodies are obviously important for the health of those water bodies and for the health of the marine and fresh water fish species that use them.

In addition to the human population growth that directly and indirectly impacts available upland habitat, there is logging on federal, state and private timber lands that are part of the Cook Inlet watershed. Logging and other upland habitat loss throughout Cook Inlet may indirectly impact beluga whales through the loss of fish habitat.

vi. Food Stress

Prey food resources are probably the most important feature of marine habitat for the Cook Inlet beluga whale population. To the extent that a shifting or declining prey abundance is affecting beluga whales, it is a habitat impact as well as a direct impact, and therefore it must be taken into account in evaluating the statutory factor in 16 U.S.C. § 1533(a)(1)(A).

3. Disease or predation - 16 U.S.C. § 1533(a)(1)(C)

a. Disease

The susceptibility of beluga whales to disease is discussed in the section on Natural Mortality. Very little is known on the subject of disease specific to the Cook Inlet population. Known parasites of beluga whales include nematodes in the respiratory organs, ears, circulatory system, intestines, and urogenital system (Morris 1988). Trematodes are found in the intestine as are cestodes and acanthocephalans (Morris 1988). Morris (1988) indicated helminths are a potential source of beluga mortality.

Numerous anecdotal accounts from Native hunters have described increased findings of lesions and tumors on Cook Inlet beluga whales (Blatchford, per. comm.). Whether these are caused by pathogens or environmental contaminants is uncertain at this time.

The *Draft Conservation Plan* indicates that "disease is not known to be a factor in the decline of the CI beluga whale" (NMFS 2005a, at 86). For the purposes of an ESA listing petition decision, however, the issue is not whether disease caused the decline. The issue is whether the beluga is now endangered or threatened because of disease, or for some other reason listed under 16 U.S.C. § 1533(a)(1)(C).

With respect to the risk from disease, the *Draft Conservation Plan* states: "[Due] to the small size of this stock and their gregarious social nature, introduction of a highly virulent and transmissible pathogen has the potential to catastrophically affect their long term viability" (NMFS 2005a, at 86). Thus, the risk of disease decimating the population satisfies the statutory factor and therefore requires that the whale be listed under the ESA.

b. Natural Predation

The only natural predator of the Cook Inlet beluga whales is the killer whale (*Orcinus orca*). The potential impacts of killer whale predation on beluga whales are discussed in the section on Natural Mortality. NMFS admits that the potential for significant impacts on the Cook Inlet beluga population by killer whales cannot be ruled out, stating: "Predation by killer whales has been documented within this stock, and may occur at levels which are significant in terms of recovery" (NMFS 2005a, at 86). Changes in traditional prey availability, resulting from disruptions to the food chain,

possibly brought about by over fishing and climate change, has purportedly led killer whales off the Aleutian Islands to consume large numbers of sea otters. This has resulted in a collapse of the otter population in the area. A similar risk may be posed for Cook Inlet beluga whale, perhaps especially vulnerable to predation due to their social nature and habit of forming large aggregations.

In its June 2000 not warranted decision, NMFS asserted that "assessing the impact of predation by killer whales of CI beluga whales is difficult" (65 Fed. Reg. at 38781). NMFS further acknowledged that "The loss of a few beluga whales could impede recovery, as suggested by petitioners" (65 Fed. Reg. at 38781). It then dismissed this risk, however, because the "literature and stranding records indicated that natural mortality in the CI beluga whale population does not exceed levels normal for other small cetacean populations" (65 Fed. Reg. at 38781). This is, of course, beside the point. The "normal level" of predation may pose the risk of endangerment to the small population that now exists, and that is all the statute requires for listing to be mandated under the ESA. Shelden *et al.* (2003) indicate that there is killer whale predation of Cook Inlet beluga whales, and this poses a significant risk given the small population size. Indeed, killer whale predation may lead to catastrophic strandings of beluga whales, particularly in areas like the Turnagain Arm where beluga whale strandings apparently not due to predation already commonly occur.

Furthermore, there is some speculation that marine mammal (transient) killer whales have switched to sea otters because of reductions in the populations of their normal prey, seals and sea lions. Sea lion and harbor seal populations in and adjacent to Cook Inlet have declined significantly, making the possibility of prey switching by killer whales a justifiable concern and increasing the threat to the Cook Inlet beluga whale population from predation.

Given the small size of the Cook Inlet population of beluga whales, and the fact that they concentrate seasonally, even a small increase in predation could result in a population decline or impede recovery.

c. Human Predation

The primary source of direct human-caused mortality for Cook Inlet beluga whales is hunting. Hunting is discussed in more detail section II-B detail above.

4. Other natural or manmade factors affecting its continued existence - 16 U.S.C. § 1533(a)(1)(E)

The Cook Inlet beluga whale population is very small and geographically isolated. These two factors, in combination with the whale's tendency to aggregate socially and their site fidelity (Rugh *et al.* 1998), leave the population vulnerable to numerous anthropogenic environmental hazards, some of which were discussed above and which deserve further mention here under this statutory factor.

a. Human population growth and associated development in, and uses, of Cook Inlet

Cook Inlet is adjacent to the home of approximately 60% of the human population of Alaska and encompasses many communities. Between 1960 and 1990 Anchorage's population increased by 173% (143,505 new residents). The 2004 population of the Municipality of Anchorage was 272,687, and increase of nearly 12,000 since 2000 and nearly 50,000 since 1990 (U.S. Census Bureau 2005). Other communities in the Cook Inlet area have grown apace. Industrial uses continue to grow, as does demand for land development. Development around Cook Inlet is resulting in increased pollution, siltation and degradation of fish habitat and water quality, which threatens beluga whales. As discussed above in the sections on contamination, increasing human population means more pollution of all kinds entering Cook Inlet. This in turn increases the potentiality, if not the actuality, of adverse impacts from pollution on the health of marine mammals and their prey which feed in Cook Inlet.

The increased population has meant a huge increase in shipping traffic in Cook Inlet. According to the Municipality of Anchorage, the Port of Anchorage's annual commodity tonnage increase from 3,088,269 in 1996 to 4,628,009 in 2004 (Port of Anchorage 2005). The Port of Anchorage began operations in 1961 with only 38,000 tons (U.S. Department of Transportation 2005, at 1-6). In 2003, there were 492 ship visits to the POA, or approximately 9.46 ship visits per week (U.S. Department of Transportation 2005, at 1-10). August, the most active month of 2003, there were 75 visits to the POA. During January, the least active month, the POA received 23 visits (U.S. Department of Transportation 2005, at 1-10). The Port is exceeding the projected tonnage growth rate of 2.5% per year predicted for it in 1999, and is currently 18% over "sustainable practical capacity" (U.S. Department of Transportation 2005, at 1-15).

b. Climate Change

There is widespread acceptance within the scientific community that global climate change is occurring as a result of human consumption of fossil fuels. In December, 1997, the U.S. signed an international treaty at Kyoto which included commitments to stabilize greenhouse gas emissions at 1990 levels, but the Bush Administration has declined to seek its ratification and the high rate of U.S. emissions of greenhouse gases continues.

Alaska and the western Arctic are already experiencing warming at a rate three times higher than the global average, resulting in melting permafrost and glaciers and changes in the extent of sea ice. Between 1968 and 1990 Alaska warmed by as much as 5ºF on average, 8ºF in winter, and during that period there has been an accompanying "extensive melting of glaciers, thawing of permafrost, and reduction of sea-ice" (University of Alaska Fairbanks 1999, at 7). As discussed above, the U.S. Army Corps of Engineers has already noted a remarkable increase in siltation in the upper Cook Inlet (probably due to glacier melt) requiring more dredging than ever before in order to keep the Port of Anchorage open to shipping. In fact, Alaska's marine ecosystems, and

fisheries, are particularly vulnerable to the immediate impacts from temperature variations caused by global warming (University of Alaska Fairbanks 1999, at 27-28; see also National Geographic 1999, at 108).

Thus, temperature changes caused by global warming are likely affecting Cook Inlet's habitat and species, including beluga whales. In its June 2000 not warranted decision, however, NMFS did not discuss the potential adverse impacts from climate change in Alaska on the Cook Inlet beluga whale population, its habitat, or its prey (65 Fed. Reg. 38778).

c. Stochastic (Random) Events

The most generous and optimistic estimate of the remaining number of Cook Inlet beluga whales is a number well below 400. This low population number of isolated individuals causes Cook Inlet beluga whales to be much more vulnerable to all natural sources of mortality, such as disease, predation, and stranding, and to human caused sources as well.

In its June 2000 not warranted decision, NMFS took the position that stochastic (random) events, even when accompanied by hunting, were unlikely to endanger the Cook Inlet beluga whale in the near future (65 Fed. Reg. at 38782-83). NMFS persists in this view in the *Draft Conservation Plan* (NMFS 2005a, at iii, 2). The Marine Mammal Commission, however, recently remarked that " 'a vertebrate population with an effective population size … of less than 500 that was subject to catastrophic population crashes should be considered endangered" (Marine Mammal Commission 2004, at 4 (internal citation omitted)). The Marine Mammal Commission's expert advisor on the Cook Inlet beluga whale, Dr. Daniel Goodman, has further remarked that "Time is of the essence in population recovery, because harmful genetic effects accrue at low population sizes, the population will be vulnerable to random environmental disturbances that raise the probability of extinction at low population sizes, and while the population is at low population sizes it may not be functioning in its usual role in the ecosystem, contrary to the declared policy of the Marine Mammal Protection Act, and with possible adverse consequences for the prospects of recovery" (Goodman Declaration 2004, at 3 (emphasis added)). Dr. Goodman also estimated that the "growth capacity [of the Cook Inlet stock] is a little less than half a percent per year" (Goodman Declaration of 2004, at 4). Dr. Goodman and others recently reiterated their concerns about the status of the Cook Inlet beluga whale population (Lowry 2006). Given that the population is, at worst, either declining or, at best, not growing and with little capacity for growth, any stochastic removals from the population make recovery much less likely.

Strandings are one such stochastic event. The *Draft Conservation Plan* indicates that "more than 640 beluga whales have stranded … in upper Cook Inlet since 1988" (NMFS 2005a, at 27 (footnote omitted)). (As previously noted, in 2003 NMFS estimated that over 500 belugas have stranded in upper Cook Inlet since 1988, with most mass strandings occurring in Turnagain Arm (Shelden 2003).) In 1987 four whales stranded in Turnagain Arm probably did not survive the event (Anchorage Daily News 1987). In

October of 1988 27 beluga whales stranded on the mudflats in Anchorage (Anchorage Daily News 1988). In 1992 federal biologists documented that a stranded whale died near Kenai (Anchroage Daily News 1992). In 1994 there was a stranding of approximately 190 beluga whales in upper Cook Inlet (Anchorage Daily News 1994). In 1996 another large stranding of approximately 100 beluga whales occurred in the middle of Turnagain Arm in upper Cook Inlet (Anchorage Daily News 1996). Another stranding event involving 70 whales left five dead in August 1999 (NMFS 2005a, at 27). While many whales that were stranded may have survived, it is possible that under certain conditions the stranding of a large group of whales could kill most or all of them.

A random catastrophic event like a large stranding could cause the Cook Inlet beluga whale population to drop further, below a level at which its recovery becomes improbable if not impossible.

d. Risk of small population size.

The consideration by NMFS of factors affecting extinction risk for the Cook Inlet beluga whale population under the ESA dismisses, without adequate justification or explanation, some of the central principles of conservation biology. NMFS has asserted that "[n]o other population of marine mammals is as small as the CI beluga stock and is not listed under the ESA. Although NMFS is concerned with the low abundance of the stock, abundance alone does not necessarily mean that the stock is in danger of extinction" (65 Fed. Reg. at 38779 (emphasis added)). The underlined statement is erroneous, and seriously misrepresents the consensus of the scientific literature.

General agreement exists among conservation biologists that small population size *per se* constitutes an important risk of extinction. The risks posed by small population size alone are discussed in Shaffer (1981), Gilpin and Soule (1986); Goodman (1987), Lande (1988, 1993, 1995, 1998), Courchamp *et al.* (1999), numerous other articles, and cited in the Declaration of Russell S. Lande, Ph.D filed in Cook Inlet Beluga Whale v. Daley, Case No. 1:00CV01017-JR (March 16, 2001), all standard texts in conservation biology. None of these papers or texts were either cited or discussed in NMFS's determination that listing of the Cook Inlet beluga whale is not warranted.

As noted above, in the *Draft Conservation Plan*, NMFS identifies "several indices which should be considered . . . in determining the status of these whales under the ESA" including "1) an Allee effect, 2) inbreeding depression, 3) loss of genetic variability, 4) vulnerability to environmental perturbations due to reduced range, 5) vulnerability to environmental perturbations due to reduced population size, and 6) vulnerability to demographic stochasticity due to reduced population size" (NMFS 2005a, at 87). All these indices point to the need for listing under the ESA.

Allee effects refers to diminished reproductive and survival rates due to the failure of normal cooperative interactions in small populations (Lande 1993, Lande 1998a). These types of interactions include group foraging, group defense against predators, and

the social facilitation of reproduction. For instance, as population size diminishes, it may become more difficult for individuals to find mates.

Inbreeding depression occurs when matings between relatives in small populations cause recessive deleterious mutations to become homozygous. This reduces the fitness of inbred individuals, which is why most animal species avoid matings between relatives. (Lande 1993, Lande 1998a).

Random changes in gene frequencies (random genetic drift) in small populations tend to reduces genetic variability in the population as a whole. This reduced genetic variability diminishes the capability of a population to adapt by Darwinian evolution to changing environmental conditions. Furthermore, the fixation of new deleterious mutations can occur when mildly deleterious mutations become fixed by random genetic drift. This fixation can gradually erode the fitness of small or moderate-sized populations. (Lande 1998b).

Demographic stochasticity refers to chance events of individual mortality and reproduction, which cause fluctuations in population size and growth rate. These fluctuations become increasing important in smaller populations, whereas in large populations chance individual events tend to cancel or average out - a fact on which life insurance companies depend. Random fluctuations in population growth rate can by chance drive a small population to extinction. (Lande 1993, Lande 1998a).

Environmental stochasticity refers to random temporal changes in survival and reproductive rates that affect all individuals in a population in the same or similar fashion. Environmental stochasticity can reduce a large population to small size and can drive a small population to extinction. Unpredictable, catastrophic mortality events, such as may be caused by a major oil spill, a disease epidemic, or stranding and death of a large number of whales (mentioned above) serve as examples. Small and/or localized populations may be especially vulnerable to such events because a significant proportion of the population could be eliminated in a short time. More moderate levels of environmental stochasticity continually affect all wild populations, regardless of abundance, as environmental conditions including weather and food availability change from year to year. (Lande 1993, Lande 1998a).

NMFS acknowledged the recommendation of the U.S. Marine Mammal Commission that the agency should include an analysis as to whether a listing is warranted because of risks posed by stochastic events (65 Fed. Reg. at 38782). NMFS, however, discounts the possible risks of extinction from stochastic events affecting the Cook Inlet beluga whale population by citing results from computer simulations of whale population dynamics by Breiwick and DeMaster (1999) (65 Fed. Reg. at 38782). NMFS concludes that "[t]he results of the simulations indicate that CI beluga whales are not in danger of extinction or likely to become endangered in the foreseeable future due to stochastic events" (65 Fed. Reg. at 38782-83). This statement is erroneous for three reasons.

First, as clearly stated by Breiwick and DeMaster, the models do not include possible Allee effects or density dependence (reduction of population growth rate as the population approaches its carrying capacity) (Breiwick and DeMaster 1999). They also do not include inbreeding depression. Each of these factors would increase the risk of extinction.

Second, the life history assumed in the model is "typical of a large baleen whale" rather than beluga whales, which are much smaller and have substantially shorter average life spans and generation times (Breiwick and DeMaster 1999). Therefore, the model is not based on the best available scientific data for the Cook Inlet beluga whale population as is required by 16 U.S.C. § 1533(b)(1)(A).

Third, what NMFS referred to in its June 2000 not warranted decision as "environmental stochasticity" (65 Fed. Reg. at 38782), and the authors call "a simple form of environmental stochasticity" (Breiwick and DeMaster 1999, at 1) in the model was not actually stochastic but rather a series of deterministic events, occurring regularly every 10 years, each of which decreased the population size by 10% in some simulations and by 20% in other simulations. This deterministic pattern (which in the long term is nearly equivalent to an additional 1% or 2% annual harvest respectively [cf. Fig. 3 and Fig. 4 of Breiwick and DeMaster 1999]) does not produce a realistic pattern of population fluctuations and poses a much smaller risk to population viability than true environmental stochasticity, precisely because it is not stochastic, i.e., it excludes a chance series of bad years in a short time span. Furthermore, the possibility of a single catastrophic event with a large effect (greater than 50% decline) was not included in the model. The simulations are therefore not realistic because they do not consider true environmental stochasticity and are not based on the best available scientific information for beluga whales. Thus, the simulations do not support NMFS's conclusion.

NMFS also emphasized the magnitude of population decline to the exclusion of absolute numbers by comparing the Cook Inlet beluga whale population with the Guadalupe fur seal population, which was listed by NMFS as threatened under the ESA when that population numbered between 1200 and 1500 individuals (65 Fed. Reg. at 38780). NMFS contrasted the reduction of the Guadalupe fur seal population to about 6% of its historical levels at the time of listing in 1985 with the recent reduction of the Cook Inlet beluga whale population to about 25% to 35% of its historical abundance. This line of reasoning is erroneous because consideration of the magnitude of a decline should not preclude consideration of the absolute population size that remains afterwards. Declines are important because of the possibility that they might continue, and absolute numbers are important because small population size itself constitutes an important risk to extinction, as already indicated. The International Union for the Conservation of Nature and Natural Resources ("IUCN") criteria (discussed below) therefore include consideration of both population declines (in terms of magnitude and timespan) and absolute numbers. Any rational consideration of extinction risks must include both of these factors. The failure of NMFS to consider small population size as a significant risk of extinction indicates that it did not employ the best available scientific information in its June 2000 not warranted decision.

The IUCN developed a set of objective, population-based criteria that are used to classify the extinction risk of species around the world (IUCN 2000). These Red List criteria are used to compile Red Lists of threatened and endangered species by country or region. IUCN Red Lists are widely regarded as objective, authoritative indications of which species are most in need of conservation by the countries where these species occur. The IUCN Red List criteria were also used as a model for establishing listing criteria for threatened and endangered species under the Convention on International Trade in Endangered Species to which over 100 countries, including the United States, are signatories. The IUCN Red List criteria represent a distillation of the best available scientific knowledge on what constitutes a taxon (a species or population) that is at serious risk of extinction.

The Red List criteria have three different categories indicating serious risk of extinction for a taxon in the foreseeable future: Critically Endangered, Endangered, and Vulnerable (IUCN 2000). Within each of these three categories, there are five different criteria (A-E for each). The criteria concern different factors that independently indicate a risk of extinction. For example, criterion A concerns the magnitude of population reduction, criterion B concerns limited area of occurrence, criterion C deals with a combination of population size and continuing decline, criterion D is based on population size alone, and criterion E is based on quantitative population viability analysis ("PVA"). A PVA typically involves a stochastic demographic model calculating the probability of extinction of a taxon within a specified time. To be classified in a certain category, it is not necessary that a taxon satisfies each of the five different criteria. Rather, if any of the five criteria are met for a given category, then the taxon is listed under that category (IUCN 2000).

In its June 2004 not warranted decision NMFS stated that "[u]nder the IUCN criteria, CI beluga would qualify as 'endangered' only if the decline were continuing" (65 Fed. Reg. at 38779). This statement is erroneous. Although the statement is correct with respect to IUCN criterion C, which requires a continuing decline, it is incorrect with respect to other IUCN criteria which are relevant to this population. For example, under the IUCN category Endangered, criterion A1b specifies "Population reduction in the form of either of the following: 1. An observed, estimated, inferred or suspected reduction of at least 50% over the last 10 years or three generations, whichever is longer, based on (and specifying) any of the following: . . . (b) an index of abundance appropriate for the taxon …." (IUCN 2000, at 10). According to NMFS data cited previously, there has been more than a 50% decline in estimated numbers of Cook Inlet beluga whales within less than 20 years. The demographic generation time of Alaskan beluga whales is 10 years or more, hence three generations is at least 30 years. Thus if the Cook Inlet beluga whale population experienced a decline of at least 50% within the last 30 years, it would qualify as Endangered under IUCN criterion A1b. As indicated above, the available evidence strongly supports this conclusion (Lowry 2006).

The Cook Inlet beluga whale population also would be listed as Vulnerable under IUCN criterion C1 based on its current small size alone: "Population very small or

restricted in the form of either of the following: 1. Population estimated to number less than 1000 mature individuals ….” (IUCN 2000, at 11). This criterion was developed because of the risks of extinction caused by or associated with small population size per se. These risks apply whether the population has been artificially or naturally reduced to small numbers, or whether the population usually occurs naturally in small numbers, contrary to statements made by NMFS quoted above.

In summary, NMFS's previous rejection of the IUCN criteria as relevant to the question of whether the Cook Inlet beluga whale population is threatened or endangered constitutes a rejection of the best available science on this issue, in violation of the ESA.

The Cook Inlet beluga population is now sufficiently small and restricted in area such that it faces considerable risks of extinction due to a variety of potentially important factors of which NMFS admits science is largely ignorant. Several of these factors are discussed by NMFS in its June 2000 not warranted decision, including predation by killer whales, strandings, impacts from oil exploration, production, and development, incidental take in commercial fisheries, ship strikes, and noise (65 Fed. Reg. at 38780-89).

NMFS acknowledged that for most of these factors, data are either limited or nonexistent. (65 Fed. Reg. at 38780-89). Despite inadequate data, NMFS concluded that each of these factors did not likely contribute to the decline and is not likely to have a significant impact on recovery of the Cook Inlet beluga whale population. These conclusions, based on inadequate data, are not founded on scientific reasoning, because lack of adequate quantitative data on any particular risk factor should not be interpreted as lack of a significant impact by that factor on the population. This applies especially where limited data suggest that a risk factor may have been a problem in the past, or could potentially constitute a problem in the future. Until adequate data are collected on these factors, it is not scientific for NMFS to conclude that none of these factors contributes significantly to a risk of extinction or could significantly impair recovery.

NMFS also failed to seriously consider the possible cumulative impacts of the various artificial and natural factors affecting the risk of extinction of the Cook Inlet beluga population. NMFS analyzed each factor largely or completely separated from other factors. It did not consider possible synergistic interactions among factors or the potential importance of their collective effects. For example, in the opening section on Recent Conservation Actions in its June 2000 not warranted decision, NMFS states that “the harvest was believed to be the most important factor linked to decline of the stock” (65 Fed. Reg. at 38778). On the next page this changes to “the harvest … was the only factor found to be directly linked to the decline" (65 Fed. Reg. at 38779). This single factor approach is reiterated immediately prior to the final Determination, “… subsistence harvest is the only factor that can account for the observed decline" (65 Fed. Reg. at 38789). NMFS did not consider that the cumulative effects of all other risk factors may have contributed to the decline, or could impede recovery. Because NMFS did not have adequate data on the level of subsistence harvest or any other risk factor over the past 20 years, it is impossible to conclude that the subsistence harvest is the only factor either that contributed significantly to the decline or that could significantly impede recovery.

NMFS's June 2000 not warranted decision consistently downplayed and underestimated the remaining extinction risks to the Cook Inlet beluga population. It overstated the evidence that recovery is occurring based on population survey data since the cessation of harvest after 1998. The 1998 estimate was 347 individuals ± 29% and the 1999 estimate was 357 individuals with no uncertainty level indicated (65 Fed. Reg. at 38780). As the last seven years of data now prove, the 1998-99 data did not support NMFS's unsubstantiated assertion, not backed up by any data, that abundance estimates back then were preliminary evidence that the Cook Inlet beluga whale population was increasing (65 Fed. Reg. at 38779). NMFS also suggested in June 2000 that "Results after 3-5 years of controlling the harvest would provide more conclusive evidence of recovery" (65 Fed. Reg. at 38779). Consistent with that prediction, the last six years of results do provide conclusive evidence, but it is conclusive evidence that recovery has not begun, as well as that the MMPA depletion designation and the controlling of the subsistence harvest have been insufficient to trigger recovery.

In the end, even if an initial trend toward recovery of the Cook Inlet beluga whale population could be demonstrated in several more years, it would not nullify the assessment of potential extinction risks that already exist from the population's small size. The slow maximum rate of population growth means that even under the best of conditions, many years will be required for recovery of the population. During that lengthy time period, the population will remain vulnerable to extinction from stochastic events as well as from other causes, and therefore must be protected by listing under the ESA.

III. DESIGNATION OF CRITICAL HABITAT - 16 U.S.C. § 1533(a)(3)(A).

As argued above, the habitat of the Cook Inlet beluga whale continues to be degraded by a variety of development activities resulting from rapidly expanding human populations in the region. Commercial and industrial developments, water pollution, and marine transportation increase the risk to Cook Inlet beluga whales through loss of habitat, loss of prey and potential direct mortality from contact with oil spills and collisions with vessels. Seasonal and temporal displacements occur from vessel traffic, oil exploration activity, construction activity, and dredging in Cook Inlet.

Therefore, petitioners request the designation of critical habitat, pursuant to 16 U.S.C. § 1533(a)(3)(A), for the Cook Inlet beluga whale population at the same time that it is listed under the ESA. NMFS has already begun the identification of *some* of the habitat that is important to the current population (see, e.g., NMFS 2005a, at 13-17). There is no reason why this process cannot be expanded and concluded with the prompt designation of critical habitat. Critical habitat should as a minimum include all areas where Cook Inlet beluga whales have routinely occurred in recent years, including those areas in the lower inlet. Failure to include the entire inlet within the examination for critical habitat would be imprudent because as the Cook Inlet beluga whale population recovers, it is likely to resume using habitat that was used historically throughout the entire inlet.

CONCLUSION

Based on the information presented above, it is clear that Cook Inlet beluga whale population is in danger of extinction throughout its range and, therefore, is endangered as that term is defined in 16 U.S.C. § 1532(6). Petitioners, therefore, respectfully request that the Secretary of Commerce take immediate regulatory action to list the Cook Inlet beluga whale population under the ESA and to designate critical habitat for it.

BIBLIOGRAPHY OF LITERATURE CITED

I. MEETING MINUTES, LETTERS, PUBLICATIONS, STUDIES, NEWSPAPER ARTICLES, AND OTHER MATERIALS.

Alaska and Inuvialuit Beluga Whale Commission ("ABWC"). 1992. Meeting minutes, November 1992.

ABWC. 1994. Meeting minutes of November 1994.

ABWC. 1995. Meeting minutes of November 1995.

ABWC. 1996. Meeting minutes of December 1996.

ABWC. 1998. Meeting minutes of November 16-17, 1998, Anchorage, Alaska.

ABWC. 1998. Letter to NMFS, June 10, 1998.

ABWC, 1999. Comments of the Alaska Beluga Whale Committee on the Status of Cook Inlet Beluga Whales. Federal Register Notice Vol. 63 No. 223, page 64229.

Alaska Regional Scientific Review Group. 1999. Letter to Rolland Schmitten, NMFS, January 8, 1999.

Anchorage Daily News. 1987. *Experts uncertain if Beluga Whales Survived Stranding* (August 26).

Anchorage Daily News. 1988. *Belugas Year Round Inhabitants of Cook Inlet* (November 3).

Anchorage Daily News. 1992. *(Stranded Beluga Whale Dies Despite Rescue Effort*, (October 9).

Anchorage Daily News. 1994. *190 Belugas Stranded on Tidal Flats* (June 15).

Anchorage Daily News. 1996. *Belugas Struggle to Stay Alive* (August 29).

Anchorage Daily News. 1999. S*almon Managers Must Cut Commercial Priority* February 12).

Barlow, J., S.L. Swartz, TC Eagle, PR Wade, 1995. U.S. Marine Mammal stock assessments: guidelines for preparation, background and a summary of the 1995 assessments. U.S. Department of Comm., NOAA Tech Memo, NMFS-OPR-6 73 pp.

Becker, Paul R., Pugh, Rebecca S., Schantz, Michele M. *et al.*, Mahoney, Barbara A. 2001. NISTIR 6702 Persistent Chlorinated Compounds and Elements in Tissues of Cook Inlet Beluga Whales, *Delphinapterus leucas*, Banked by the Alaska Marine Mammal Tissue Archival Project. U. S. Department of Comm., National Institute of Standards and Technology.

Beland, P., 1996. Beluga, a farewell to whales. Lyons & Burford, Publishers. New York.

Braham, H.W., 1984. Review of reproduction in the white whale, Delphinapterus leucas, narwhal, Monodon monoceros, and Irrawaddy dolphin, Orcaella brevirostris, with comments on stock assessment. Rep. Int. Whal. Comm. Spec. Issue 6:81-89.

Braham, H.M., B.D. Krogman, and G. Carroll. 1984. Bowhead whale and white whale migration, distribution, and abundance in the Bering, Chukchi and Beaufort seas, 1975-1978. NOAA Tech. Rep. NMFS SSRF-778.

Breiwick, J.M., DeMaster, D.P. 1999. Exploratory Type 3 Fishery Simulations. National Marine Mammal Laboratory. SC/51/AWMPS, 9 pp.

Brodie, P. F. 1971. A reconsideration of aspects of growth, reproduction, and behavior of the white whale with reference to the Cumberland Sound, Baffin Island, population. J. Fish. Res. Bd. Can. 28:1309-1318.

Burns, J.J., and G.A. Seaman. 1985. Investigations of belukha whales in coastal waters of western and northern Alaska: II. Biology and ecology. Final rep. Prepared for U.S. Dep. Commer., NOAA, Natl. Ocean Serv., Anchorage, AK, contract NA81RAC00049. Alaska Dep. Fish and Game, Fairbanks.

Burns, J.J. and G.A. Seaman. 1986. Investigations of belukha whales in coastal waters of western and northern Alaska. II Biology and ecology. U.S. Dep. Com. NOAA/OSCEAP Final Rep. 56. (1988): 221-357

Calkins, D.G. 1983a. Susitna hydroelectric project phase II 1982 annual report: big game studies. Vol. IX, belukha whale. Alaska Dep. Fish and Game, Anchorage.

Calkins, D.G. 1983b. Marine Mammals of lower Cook Inlet and the potential for impact from outer continental shelf oil and gas exploration, development and transport. U.S. Dep. Comm., NOAA , OSCEAP Final Rep. 20: 171-265.

Calkins, D.G. 1989. Proceedings; Gulf of Alaska, Cook Inlet, and North Aleutian Basin Information Update Meeting. U.S. Dep. Commer., NOAA, OCSEAP, OCS Study; MMS 89-0041. Status of Belukha Whales in Cook Inlet. 15: 109-112.

Campbell, M. 2005. *Influx of silt in inlet drives increase in dredging, costs*, Alaska Journal of Commerce (June 19).

CIMMC. 1994. Action Items, November 11, 1994.

CIMMC. 1996. Letter to NMFS's Steve Zimmerman, September 1996.

CIMMC. 1997. Fax from NMFS's Doug DeMaster, May 9, 1997.

Cook Inlet Keeper. 1999. Letter to Coast Guard, February 8.

Credle, VR, DP Demaster, MM Merklein, MB Hanson, WA Karp, and SM Fitzgerald (eds) 1994 NMFS Observer Programs: minutes and recommendations from a workshop held in Galveston, Texas, November 10-11, 1993. US Dep.Comm. NOAA Tech Memo. NMFS-OPR-94 96 pp.

DeMaster, D.P. 1995. Minutes from the 16-17 February 1995 meeting of the Alaska Scientific Review Group. Anchorage, Alaska. 22 pp. (available upon request- D.P. DeMaster, National Marine Mammal Laboratory, 7600 Sand Point Way, NE, Seattle, WA 98115).

Dizon, A. E., C. Lockyer, W. F. Perrin, D. P. DeMaster, and J. Sisson. 1992. Rethinking the stock concept: a phylogeographic approach. Conserv. Biol. 6:24-36.

Fall, J.A., D.J. Foster, and R.T. Stanek. 1984. The use of fish and wildlife resources in Tyonek, Alaska. Alaska Dep. Fish and Game, Div. Subsistence, Anchorage, Tech. Rep. Ser. 105.

Fay, F.H. 1971. Belukha, Arctic white whales. Pages 23-27 in A. Seed, ed. Toothed whales in the eastern North Pacific and Arctic waters. Pacific Search Press, Seattle, Wash.

Fay, F.H. 1978. Belukha whale. pp. 132-137 in D. Haley (ed.) Marine Mammals of the Eastern North Pacific and Arctic Waters. Pacific Search Press. Seattle, WA.

Finley, K. J. 1982. The estuarine habitat of the beluga or white whale, Delphinapterus leucas. Cetus 4:4-5.

Fraker, M.A. 1979. Spring migration of bowhead whales (Balaena mysticetus) and white whale (Delphinapterus leucas) in the Beaufort Sea. Can. Fish. Mar. Serv. Tech. Rep. 859.

Fraker, M.A. 1977. The 1976 white whale monitoring program, Mackenzie Estuary, N.W.T. Rep. Prepared for Imperial Oil Ltd., Calgary, Alberta. F.F. Slaney & Co., Ltd., Vancouver, B.C.

Fraker, M.A., C.D. Gordon, J.W. McDonald, J.K. B. Ford, and G. Cambers. 1979. White whale (Delphinapterus leucas) distribution and abundance and the relationship to

physical and chemical characteristics of the Mackenzie Estuary. Can. Fish. Mar. Serv. Tech. Rep. 863.

Frost, K.J., L.F. Lowry, and J.J. Burns. 1983*a*. Distribution of marine mammals in the coastal zone of the Bering Sea during summer and autumn. U.S. Dep. Commer., NOAA, OCSEAP Final Rep. 20:365-562.

Frost, K.J., L.F. Lowry, and J..J. Burns. 1983*b*. Distribution of marine mammals in the coastal zone of the eastern Chukchi Sea during summer and autumn. U.S. Dep. Commer., NOAA, OCSEAP Final Rep. 20:563-650.

Frost, K. J., and L. F. Lowry. 1990. Distribution, abundance, and movements of beluga whales, Delphinapterus leucas, in coastal waters of western Alaska. Pp. 39-57, In T.G. Smith, D.J. St. Aubin, and J.R. Geraci (eds.), Advances in research on the beluga whale, Delphinapterus leucas. Can. Bull. Fish. Aquat. Sci. 224.

Frost, K. J., and L. F. Lowry. 1995. Radio tag based correction factors for use in beluga whale population estimates. Working paper for Alaska Beluga Whale Committee Scientific Workshop, Anchorage, AK, 5-7 April 1995. 12 pp.
Frost, K. J., and R. Suydam. 1995. Harvests of beluga whales, Delphinapterus leucas, in Alaska, 1987-1994. Working paper for Alaska Beluga Whale Committee Scientific Workshop, Anchorage, AK, 5-7 April 1995. 14 pp.

Goodman Declaration. July 15, 2004. Declaration of Daniel Goodman filed *In the Matter of Proposed Regulations Governing the Taking of the Cook Inlet, Alaska, Stock of Beluga Whales by Alaska Natives,* Docket No. 000922272-0272-01.

Gurevich, V. S. 1980. Worldwide distribution and migration patters of the white whale (beluga), Delphinapterus leucas. Rep. Int. Whaling Commn. 30:465-480.

Hanson, D.J. and J.D. Hubbard. 1998. Distribution and Abundance of Cook Inlet Beluga Whales (Delphinapterus leucas) in Winter Draft Final Report. Minerals Management Service, Alaska OCS Region, Anchorage, AK.

Harrison, C.S. and J.D. Hall. 1978. Alaskan Distribution of the Beluga Whale, *Delphinapterus leucas*. Can. Field Nat. 92 (3): 235-241.

Hazard, K. 1988. Beluga Whale (*Delphinapterus leucas*). In Lentfer, J.W. (ed) Selected Marine Mammals of Alaska: Species Accounts with Research and Management Recommendations. Marine Mammal Commission, Washington DC. pp. 195-235.

Hill, P.S. and D. P. DeMaster, 1998. Draft Alaska Marine Mammal Stock Assessments 1998. NMFS/NMML Seattle Washington.

Hobbs, R.C. and J.M. Waite, 1998. Group Size Estimates of Beluga Whales in Cook Inlet, Alaska from Aerial Video Recordings. NOAA/NMML unpublished study dated December 7, 1998.

Hobbs, R. C., D. J. Rugh, and D. P. DeMaster. 1998. Abundance of beluga whales in Cook Inlet, Alaska, 1994-1998. National Marine Mammal Lab/NOAA. Draft report dated 17 November 1998.

Hobbs, R. C., D. J. Rugh, and D. P. DeMaster. 2000. Abundance of beluga whales, *Deliphinapterus luecas* in Cook Inlet, Alaska, 1994-2000. Marine Fisheries Review 62: 37-45.

Huntington, H. P. 2000. Traditional Knowledge of the Ecology of Belugas, *Deliphinapterus luecas* in Cook Inlet, Alaska. Marine Fisheries Review 62: 134-40.

International Union for the Conservation of Nature and Natural Resources ("IUCN"). 2000. The 2000 IUCN Red List of Threatened Species - 1994 Categories & Criteria.

International Whaling Commission, 1996. Forty-Sixth Report of the International Whaling Commission. Cambridge. 160-180.

International Whaling Commission, 1995. Forty-Fifth Report of the International Whaling Commission. Cambridge. 165-186.

Klinkhart, E.G. 1966. The beluga whale in Alaska. Alaska Dep. Fish and Game, Juneau, Fed. Aid Wildl. Restor. Proj. Rep. Vol. VII, Proj. W-6-R and W-14-R.

Lande, R. 1993. Risks of Population Extinction from Demographic and Environmental Stochasticity and Random Catastrophes. The American Naturalist Vol. 142, No. 6 (December).

Lande, R. 1998a. Demographic Stochasticy and Allee effect on a scale with isotropic noise. OIKOS 83: 353-358 (Copenhagen).

Lande, R. 1998b. Genetics and Demography in Biological Conservation. Science, Volume 241, pp. 1455-1460 (Sept. 16).

LeBoeuf, N. (ed) 1998. Marine Mammal Protection Act of 1972 Annual Report January 1, 1997 to December 31, 1997. NOAA-OPR. p.113.

Lensink, C.J. 1961. Status report: beluga studies. Alaska Dep. Fish and Game, Juneau.

LGL Alaska Research Associates, Inc. and HDR Alaska, Inc. 2005. Baseline Studies of Beluga Whale Habitat Use in Knik Arm, Upper Cook Inlet, Alaska: July through December, 2004 Final Progress Report.

Lowry, L. F. 1985. The belukha whale (Delphinapterus leucas). Pp. 3-13, In J.J. Burns, K.J. Frost, and L.F. Lowry (eds.), Marine mammals species accounts. Alaska Dep. Fish and Game, Game Tech. Bull. 7.

Lowry, L.F., R.R. Nelson, and K.J. Frost, 1987, Observations of killer whales, Orcinus orca, in western Alaska: sightings strandings and predation on other marine mammals, Canadian Field Naturalist 10:6-12.

Lowry, L.F., O'Corry-Crowe, G., and Goodman, D. In press (2006) *Delphinapterus leucas* (Cook Inlet population). In: IUCN 2006. *2006 IUCN Red List of Threatened Species.*

Marine Mammal Commission. February 2004. Letter from Commission Executive Director David Cottingham to National Marine Fisheries Service's Administrator, Alaska Region, James D. Balsiger.

Marine Mammal Commission. June 2005. Letter from Commission Executive Director David Cottingham to National Marine Fisheries Service's Administrator, Assistant Regional Administrator for Protected Resources Kaja Brix.

McCarty, S. 1981. Survey of effects of outer continental shelf platforms on cetacean behavior. Appendix C, Vol II in R.S. Gales, ed. Effects of noise of offshore oil and gas operations on marine mamals. An introductory assessment. Naval Oceans Systems Center, San Diego, CA, Tech. Rep. 844:C1-C31.

Murray, N.K., and F.H. Fay. 1979. The white whales or belukhas, Delphinapterus leucas, of Cook Inlet, Alaska. Draft prepared for June 1979 meeting of the Sub-committee on Small Cetaceans of the Scientific Committee of the Int. Whaling Comm., University of Alaska Fairbanks.

Minerals Management Service, U.S. Department of the Interior. 2003. Cook Inlet Planning Area Oil and Gas Lease Sales 191 and 199 Environmental Impact Statement (Final), Table III.A-5 Municipal Wastewater Discharges into Cook Inlet, available at http://www.mms.gov/alaska/ref/EIS%20EA/FEIS/CI%20EIS%20Intro.pdf (last visited July 19, 2005).
Muncipality of Anchorage. 1996. Department of Community Planning and Development, *Wetlands - Anchorage Wetlands Management Plan* (April).

National Geographic. 1999. *In the Wake of the Spill* (March).

National Marine Fisheries Service ("NMFS"), U.S. Department of Commerce. In prep. Guidelines for Estimating Potential Biological Removals. U.S. Dep. Commer., NOAA Tech. Rep.

NMFS. 1992. Status Report on Cook Inlet Belugas (Delphinapterus leucas). Prepared by the Alaska Region National Marine Fisheries Service, Anchorage Field Office, 222 West Seventh Avenue, #43, Anchorage, AK 99513-7577.

NMFS. 1997. Memorandum from NMFS's Steven Pennoyer to Lisa Lindeman, February 3.

NMFS. 1998. Letter to Jim Hanson, State of Alaska Division of Oil and Gas, June 8.

NMFS. July 2003. Subsistence Harvest Management of Cook Inlet Beluga Whales Final Environmental Impact Statement. Prepared by the Alaska Region National Marine Fisheries Service, Anchorage Field Office, 222 West Seventh Avenue, #43, Anchorage, AK 99513-7577.

NMFS. 2005a. Draft Conservation Plan for the Cook Inlet Beluga Whale (Delphinapterus leucas). Prepared by the Alaska Region National Marine Fisheries Service, Anchorage Field Office, 222 West Seventh Avenue, #43, Anchorage, AK 99513-7577.

NMFS. 2005b. Letter to U.S. Army Corps of Engineers Colonel Timothy J. Gallagher, USACOE, from James W. Balsinger, NMFS, Re Anchorage Marine Terminal Redevelopment Environmental Assessment, June 1.

NMFS. 2006. News Release, NOAA Fisheries, National Marine Fisheries Service Alaska Region (Jan. 20, 2006). Available at http://www.fakr.noaa.gov/newsreleases/belugaestimae012006.htm (last visited Jan. 23, 2006).

National Research Council of the National Academies, Committee on Characterizing Biologically Significant Marine Mammal Behavior, Ocean Studies Board, Division on Earth and Life Studies. 2005. Marine Mammal Populations and Ocean Noise - Determining When Noise Causes Biologically Significant Effects (National Academies Press).

O'Corry-Crowe, G. M., R. S. Suydam, A. Rosenberg, K. J. Frost, and A. E. Dizon. 1997 Phylogeography, population structure and dispersal patterns of the beluga whale *Delphinapterus leucas* in the western Nearctic revealed by mitochondrial DNA. Molecular Ecology 6:955-970.

Perrin, W.F. (Ed). 1980. Report of the Sub-committee on Small Cetaceans. Rep. Int. Whaling Commission. 30: 111-128.

Perrin, W.F. (Ed). 1982. Report of the Sub-committee on Small Cetaceans. Rep. Int. Whaling Comm. 32: 113-125.

Port of Anchorage. 2005. Data available at
http://www.muni.org/iceimages/port/2005TenYearTonnage.pdf.

Reeves, R. R. 1990. An overview of the distribution, exploitation and conservation status of belugas, worldwide. Pp. 47-58, In J. Prescott and M. Gauquelin (eds.), For the future of the beluga: Proceedings of the International Forum for the Future of the Beluga. Univ. Quebec Press, Canada.

Rugh, J.F., K.E.W. Shelden and B.A. Mahoney. 1998. Distribution of beluga whales in Cook Inlet, Alaska during June and July, 1993-1998. In review Fish. Bulletin 12/98.

Sargeant, D.E. 1962. The biology and hunting of beluga or white whales in the Canadian Arctic. Fish. Res. Board Can. Arctic Unit, Montreal, Quebec, Circ. 8.

Sargeant, D.E. 1973. Biology of white whales (Delphinapterus leucas) in western Hudson Bay. J. Fish. Res. Board Can. 30: 1065-1090.

Sargeant, D.E. and P.F. Brodie. 1969*a*. Body Size in white whales, *Delphinapterus leucas*. J. Fish.Res. Bd.Can. 26(10): 2561-2580.

Sargeant, D.E. and P.F. Brodie. 1969*b*. Tagging white whales in the Canadian Arctic. J. Fish. Res. Board can. 25:2201-2205.

Sargeant, D.E., and P.F. Brodie. 1975. Identity, abundance, and present status of populations of white whales , Delphinapterus leucas, in North America. J. Fish. Res. Board Can. 32:1047-1054.

Seaman, G.A., and J.J. Burns. 1981. Preliminary results of recent studies of belukhas in Alaskan waters. Rep. Int. Whaling Comm. 31: 567-574.

Seaman, G.A., K.J. Frost, and L.F. Lowry. 1985. Distribution, abundance, and movements of belukha whales in western and northern Alaska. Draft final rep. Prepared for U.S. Dep. Commer., NOAA, Natl. Ocean Serv., Anchorage, Alaska. Alaska Dep. Fish and Game, Fairbanks.

Seaman, G.A., L.F. Lowry, and K.J. Frost. 1982. Foods of belukha whales (Delphinapterus leucas) in western Alaska. Cetology 44:1-19.

Shelden, K. E. W. 1994. Beluga whales (Delphinapterus leucas) in Cook Inlet - A review. Appendix In Withrow, D. E., K. E. W. Shelden, and D. J. Rugh. Beluga whale (Delphinapterus leucas) distribution and abundance in Cook Inlet, summer 1993. Annual report to the MMPA Assessment Program, Office of Protected Resources, NMFS, NOAA, 1335 East-West
Highway, Silver Spring, MD 20910.

Shelden, K.E.W., Rugh, David J., Mahone, Barbar A., Dahlheim, Marilyn E., Killer Whale Predation on Belugas in Cook Inlet, Alaska: Implications for a Depleted Popualtion. 2003. Marine Mammal Science 19(3): 529-544.

Smith, D.J. St.Aubin, and J.R. Geraci (eds) Advances in research of the beluga whale, *Delphinapterus leucas*. Can. Bull. Fish, Aquat. Sci. 224.

Stanek, R. T. 1994. The subsistence use of beluga whale in Cook Inlet by Alaska Natives, 1993. Draft Final Rep. Study No. 50ABNF200055, submitted to NMFS by Alaska Dep. Fish and Game, Juneau, AK. 24 pp.

State of Alaska Department of Environmental Conservation. 1998. Letter from Robert Dolan, ADEC, to Robert Robichaud, EPA, July 14.

State of Alaska Department of Environmental Conservation, Fact Sheet. Available at http://www.state.ak.us/local/akpages/ENV.CONSERV/dec_cal.htm#wqs.

State of Alaska. 1999. Department of Natural Resources Final Best Interest Finding, Cook Inlet Areawide Oil and Gas Lease Sale, January 20, Vol. 1.

State of Alaska, Board of Fisheries. 2005. Summary of Actions, Alaska Board of Fisheries, Upper Cook Inlet Finfish, January 17 - 29, Proposal No. 134.

Tomilin, A.G. 1957. Cetacea. In V.G. Heptner, ed. Mammals of the U.S.S.R. and adjacent countries (Translated 1967).

University of Alaska Fairbanks, Center for Global Climate Change and Arctic System Research. 1999. *The Potential Consequences of Climate Variability and Change - Alaska* (December). Available at http://www.besis.uaf.edu/regional-report/regional-report.html.

U.S. Army Corps of Engineers ("USACOE"). 1996. *Deep Draft Navigation Interim Feasibility Report and Environmental Assessment* (April).

U.S. Census Bureau. 2005. Anchorage data available at http://factfinder.census.gov/servlet/SAFFPopulation?_event=ChangeGeoContext&geo_id=05000US02020&_geoContext=&_street=&_county=anchorage&_cityTown=anchorage&_state=04000US02&_zip=&_lang=en&_sse=on&ActiveGeoDiv=&_useEV=&pctxt=fph&pgsl=010.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 2006. In the matter of Proposed Regulation Governing the taking of Cook Inlet, Alaska, Beluga Whales by Alaska Natives, Docket No. 000922272-0272-01, Recommended Decision, November 8, 2005, 71 Fed. Reg. 8268 (Feb. 16, 2006). Available at http://www.fakr.noaa.gov/proptected resources/whales/beluga.htm (last visited Mar. 14, 2006).

U.S. Department of Transportation, MARAD. 2005. *Port of Anchorage Marine Terminal Development Final Environmental Impact* Assessment. Available at http://www.muni.org/port/MarineTerminal.cfm.

U.S. Environmental Protection Agency ("USEPA"). 2005a. Available at http://oaspub.epa.gov/enviro/pcs_det_reports.pcs_tst?npdesid=AK0022551&npvalue=1&npvalue=2&
npvalue=3&npvalue=4&npvalue=5&npvalue=6&rvalue=14&npvalue=7&npvalue=8&npvalue=10&npvalue=11&npvalue=12.

USEPA. 2005b. Available at http://yosemite.epa.gov/r10/water.nsf/NPDES+Permits/CurrentAK822#Permittee.

Waples, R. 1991, Pacific Salmon, *Oncorhynchus* spp., and the Definition of "Species" under the Endangered Species Act. Marine Fisheries Review 53(3) 11-22.

II. FEDERAL REGISTER NOTICES.

53 Fed. Reg. 33516 (Aug. 13, 1988) (designating the Cook Inlet beluga whale as possible candidate for listing under the ESA).

61 Fed. Reg. 4722 (Feb. 7, 1996) (joint listing policy).

63 Fed. Reg. 64228 (Nov. 19, 1998) (notice of intent to conduct status review of Cook Inlet beluga whale population under MMPA and ESA).

65 Fed. Reg. 34590 (May 31, 2000) (listing the Cook Inlet beluga whale as depleted under the federal Marine Mammal Protection Act).

65 Fed. Reg. 38778 (June 22, 2000) (decision that the listing of the Cook Inlet beluga whale under the Cook Inlet beluga whale was not warranted).

65 Fed. Reg. 59164 (Oct. 4, 2000) (decision imposing restrictions on Alaska Native subsistence hunting of Cook Inlet beluga whales).

III. STATUTES AND REGULATIONS.

Statutes.

5 U.S.C. § 553.

16 U.S.C. § 1531 *et seq*.

Regulations.

50 C.F.R. § 414.12

50 C.F.R. part 424.14

IV.COURT CASES.

Alaska Center for the Environment v. Rue, 95 P.3d 924 (Alaska 2004).

Cook Inlet Beluga Whale v. Daley, 156 F.Supp.2d 16 (D. D.C. 2001).