EXECUTIVE SUMMARY

Beluga whales in Cook Inlet have experienced a rapid decline in at least the last four years. Fewer than 350 whales remain from a population that may have once been over a thousand. The Cook Inlet population of beluga whales is isolated from all other beluga whale stocks in Alaska. Its small population size, and its seasonal aggregations near Anchorage make it extremely vulnerable to continued hunting, impacts from oil and gas industry activities, conflicts with fishing, toxic contamination from industrial and urban sources, disturbances from vessel traffic and natural sources of mortality such as killer whale predation and strandings. The most immediate cause of the beluga whale decline is overhunting by Alaska Natives.

The individual petitioner, Joel Blatchford, is a Native Alaskan beluga whale hunter who has stopped hunting because of the serious decline in the Cook Inlet population. The remaining petitioners are conservation organizations who share an interest in protecting the Cook Inlet beluga whale from extinction.

This petition asks the National Marine Fisheries Service, which has jurisdiction over marine mammals, to list Cook Inlet beluga whales as endangered under the federal Endangered Species Act. The ESA requires that a population be listed as endangered when it faces the threat of extinction from overutilization, when existing regulatory mechanism are inadequate, when its habitat is threatened, when it is vulnerable to disease or predation and when there are other manmade factors affecting its continued existence. Each of these factors is affecting Cook Inlet beluga whales.

Petitioners are requesting critical habitat designation for Cook Inlet beluga whales in conjunction with a request for listing under the ESA. A species' critical habitat includes those areas which are essential for the health, continued survival, and recovery of the population. Petitioners also request that NMFS take immediate action to implement emergency regulations to regulate hunting to protect Cook Inlet beluga whales. Such regulation is need until the population decline is halted and reversed, and until regulations have been developed in conjunction with the Native community to limit the subsistence harvest and promote the conservation of beluga whales. Unless immediate action is taken, the unregulated harvest of Cook Inlet beluga whales will continue throughout the 1999 hunting season, bringing the species ever closer to the brink of extinction.

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The above-listed petitioners formally request that the National Marine Fisheries Service (NMFS) list the Cook Inlet population of the beluga whale (*Delphinapterus leucas*) as endangered under the federal Endangered Species Act, 16 U.S.C. §§ 1531 - 1544. This petition is filed under 5 U.S.C. § 553(e) and 50 C.F.R. part 424.14. Petitioners' also request that Cook Inlet beluga whale critical habitat be designated concurrent with its listing, pursuant to 50 CFR part 414.12 and 5 U.S.C. § 553.

NMFS has jurisdiction over this petition. This petition sets in motion a specific process, placing definite response requirements on NMFS.

The individual petitioner is an Inupiat Eskimo, living in Anchorage, who has hunted beluga whales in Cook Inlet since 1970. He stopped hunting whales several years ago because of his concern over the continued survival of beluga whales in Cook Inlet. The organizational petitioners are all conservation organizations with an interest in protecting the Cook Inlet population of beluga whales.

Table of Contents

I. STATUS OF THE COOK INLET BELUGA

The population of Cook Inlet beluga whale is in decline. This petition summarizes the natural history of the beluga whale, the population information available on the Cook Inlet population of beluga whales and the threats to Cook Inlet beluga whales and their habitat. Petitioners are seeking listing of beluga whales under the federal Endangered Species Act, and request immediate action by NMFS to regulate beluga whale hunting in Cook Inlet this year.

A. NATURAL HISTORY

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 paddlelike, the tailflukes 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).

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. Beluga whales display a very clustered distribution, forming aggregations numbering into the hundreds. 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 large aggregations of beluga whales in upper Cook Inlet in summer could reflect feeding on dense prey concentrations of eulachon 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).

Beluga whales in Cook Inlet are known to consume salmon and tomcod (Fall et. al., 1984). 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). It is assumed that the beluga consumed the salmon after they spawned and subsequently were flushed downstream since whales have not been observed in the upper portions of the Susitna River (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). 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. Presumably, Cook Inlet beluga feeding patterns would be similar (NMFS 1992).

3. Reproductive Parameters

Knowledge of reproductive parameters and rates is vital to understanding the dynamics and status of the 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.

Researchers have assumed that most calving takes place in coastal estuary areas (Sergeant and Brodie 1975). However, some calving, at least, 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 calves are as long as 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 ration 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; 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, 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, and predation by killer whales (*Orcinus orca)* and polar bears (*Ursus maritimus)*. In Cook Inlet, polar bear predation is, of course, not an issue.

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). Additional stranding incidents are discussed at Section II.B.5.f.

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.

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 1983*b)*. 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 consistent 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).

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. Water quality would probably have only an indirect influence on whale distribution in Cook Inlet by affecting the distribution of their prey (Rugh et al. 1998).

Access to food (factor 3) may be the overriding element in beluga distribution in 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 were observed during the NMFS summer surveys, 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 in Tuxedni Bay revealed 160-200 whales between September 10-30 in 1994-96 (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 the lower Inlet have become much more rare (Rugh et al. 1998).

While beluga whales are now rarely seen in the summer in the lower 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 1970's (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).

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).

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. Recent survey data has shown that it has declined markedly in the past five years (Hobbs et al 1998). NMFS has acknowledged this decline. 63 Fed. Reg. 64229 ("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.")

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.

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.

From 1993 to 1998, 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 1998 are as follows:

1994	653
1995	491
1996	594
1997	440
1998	347

(Hobbs et al 1998). The 1998 count is obviously far below the 1994 count.

A review of the uncorrected median counts (actual number of whales seen) for the same years show the same alarming trend:

1994	270
1995	324
1996	361
1997	263
1998	194

(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 best current estimate of 347 beluga whales surviving in the Inlet in 1998, and indicates a sharp downward trend.

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. In the Notice of Availability of Final Stock Assessment Reports published in the Federal Register on February 19, 1999, NMFS acknowledged that this estimate was too high (64 Fed. Reg. 8323, 8324). The Alaska Regional Scientific Review Group has recommended that a population estimate of 347, as determined by the 1998 surveys, be used in the 1999 Stock Assessment Reports published by NMFS. AKSRG letter to Rolland Schmitten, NMFS, January 8, 1999.

The best current estimate for the number of beluga whales comprising the Cook Inlet population is 347 (Hobbs et al 1998). This is substantially fewer whales than previous surveys have detected. It is indicative of an alarming decline in the population

and supports the determination that listing under the ESA is warranted.

II. CRITERIA FOR ENDANGERED SPECIES ACT LISTING

A. THE COOK INLET POPULATION OF BELUGA WHALES IS A "SPECIES" UNDER THE ESA.

The Cook Inlet population of beluga whales is a small, geographically isolated and genetically differentiated population facing the imminent threat of extinction. As such, it is a "species" under the ESA and qualifies for an emergency listing to afford it the protections of the Act.

The ESA provides for the listing of all species warranting the protections afforded by the Act. The term "species" is defined broadly under the act 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." 16 U.S.C. § 1532 (16).

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 (February 7, 1996). 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 8 beluga wintering areas, 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 20 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; and 63 Fed. Reg. 64229), further indicating that little or no mixing occurs between the populations.

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; G. M. 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 subarctic and is the only population occurring south of the Alaska Peninsula, in the Gulf of Alaska. It 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, 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 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). 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 a four part 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 criteria 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 criteria is satisfied by the observed differences in cranial morphology (Hazard 1988) , and the fourth criteria 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. It is eligible for consideration for listing under the ESA as it is both "discrete" and "significant." As described below, its current status mandates that it be listed as endangered under the Act on an emergency basis.

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) overutilization 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).

Petitioners believe that all five of these factors are influencing the precipitous decline of the Cook Inlet beluga whale population. The easiest factor to quantify, and the most immediate threat to its extinction is the high harvest occurring under the Native take exemption of the Marine Mammal Protection Act. 16 U.S.C. § 1371(b). All existing regulatory mechanisms have proven ineffective in regulating this harvest. As described below, there are many other impacts to Cook Inlet beluga whales that are likely also contributing to its decline and may impede its recovery. The population is small, vulnerable and isolated. It is in dire need of the additional protections that only listing under the ESA can provide.

1. OVERUTILIZATION FOR COMMERCIAL, RECREATIONAL, SCIENTIFIC OR EDUCATIONAL PURPOSES

It is undisputed that overutilization of beluga whales is occurring.[1] NMFS has noted that "the current level of human caused mortality is not sustainable." (Hill and DeMaster, 1998) In 1997, NMFS estimated that the sustainable harvest, or the Potential Biological Removal (PBR) of beluga whales was 15 animals per year.[2] In 1998 the NMFS draft Stock Assessment Reports estimated PBR to be 14, based on a population estimate between 712 and 834. The most recent estimates indicate that there are 347 beluga whales in Cook Inlet (Rugh et al, 1998). Recent reports indicate that, at a minimum, 70 beluga whales are killed each year as a result of the Native harvest.

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[1] Many of the subsistence killed whales are actually being killed for commercial purposes. Petitioners realize that this criteria focuses on commercial use of a species. However, it is impossible to distinquish between whales killed primarily for subsistence and whales killed as part of the subsistence hunt. Both forms of mortality are relevant in considering listing, and have to be discussed together, either here or under human predation below.

[2] "Potential biological removal level" is the maximum number of whales, not including natural mortalities, that may be removed from the population while allowing that stock to reach its optimum sustainable population. 16 U.S.C. § 1362(20). PBR is the product of the minimum population estimate, one-half of the maximum theoretical or estimated net productivity rate of the stock at a small population size, and a recovery factor between .1 and 1.0. 16 U.S.C. § 1362(20)(A)-(C). "Optimum sustainable population" is the number of animals that will result in the maximum productivity of the population. 16 U.S.C. § 1326(8). "Net productivity rate" is the annual per capita rate of increase in a stock from births minus deaths. 16 U.S.C. § 1326(26). "Minimum population estimate" is the number of animals based on the best available scientific information and that provides reasonable assurance that the stock size is equal to or greater than the estimate. 16 U.S.C. § 1326(27).

PBR was originally designed for calculating incidental take levels for commercial fisheries, but has been applied to determine allowable harvest levels.

a. Potential Biological Removal

The current take greatly exceeds the PBR level published by NMFS. As explained below, this PBR is in all likelihood far to high to allow recovery of the population.

The PBR level for the Cook Inlet population of beluga whales is calculated in the draft stock assessment as 14 animals--based on use of an N_{min} of 712 multiplied by a default R_{max} of 0.02 and a recovery factor of 1.0.

A recovery factor of 1.0 violates the PBR guidelines (Barlow et. al. 1995) which specified deviating from a default of 0.5 to 1.0 only when there is a CV of less than 0.8 for abundance estimates and less than 0.3 for mortality estimates and the stock is believed to be stable. It is uncertain whether the CV of the estimate of abundance is less than 0.8. However, it is unlikely that the CV for the mortality estimate is less than 0.3.

Regarding the abundance estimate, the draft stock assessment states that a CV of 0.19 is used, "pending the development of a CV for this approach", which would indicate that the CV is actually unknown. The CV's presented in Hobbs et. al. (1998) (see Table 1) are highly variable, further calling into question the confidence in any of the available CV's.

The CV for the mortality estimate also does not meet the criteria for using a 1.0 recovery factor. The mortality estimates for fisheries is stated to be zero, based solely on fishery self-reporting, which is known to be an under-reporting (Credle et al., 1994), thus no accurate CV is possible based upon this estimate. Native subsistence harvest estimates also have no associated CV.

Finally, use of a 1.0 recovery factor is based on the belief that the stock is stable—the data clearly indicate this is not the case. The stock assessment states that the lower counts in the most recent estimate "may be a cause for concern." The Federal Register notice states that the stock "demonstrates a downward trend." 63 Fed. Reg. 64229. Thus, by NMFS's own standards, the PBR is incorrect and is overly optimistic and inappropriately high. The PBR should be lower, based on the facts that the stock cannot be determined to be stable and the CVs for the abundance and mortality estimates do not appear to meet NMFS' own tests for sufficiency.

Using a recovery factor of 0.5, which is typically used for stocks of unknown status, and the most recent population estimates, would yield a PBR of approximately 3.5. The recent recommendation of the AKSRG support using a recovery factor of .5 and lowering the PBR in the 1999 Stock Assessment Reports.

The PBR is the number by which we gauge the likely impact of anthropogenic removals. As discussed below, no matter whether the PBR is 3.5 or 7 or 14, it has been dramatically exceeded for a number of years.

b. Extent of the Hunting

Rugh et al (1998) have stated that "the geographic isolation of [Cook Inlet beluga whales], in combination with their tendency towards site fidelity, makes them vulnerable to impacts from large or persistent harvest takes, and anthropogenic environmental hazards." There is a directed hunt of beluga whales from the Cook Inlet population that endangers this species. Data submitted to NMFS by Cook Inlet Marine Management Council indicates that 65 whales were reported retrieved, sunk or struck and lost (i.e. killed) in 1995. The Draft Stock Assessment (Hill and DeMaster, 1998) states that "during 1996, 98-147 whales were estimated to have been taken from this stock." The Draft Stock Assessment also states that the Cook Inlet Marine Mammal Council (CIMMC) estimates 123 animals were killed in 1996 (Hill and DeMaster, 1998). NMFS estimates that, based on currently available data, the estimated annual level of total human-caused mortality is 71 beluga whales (Hill and DeMaster, 1998). Furthermore, NMFS currently estimates an average subsistence kill of 87 whales for 1995-97.

It is likely that these estimates are an underestimate of the number taken, since all subsistence hunters do not participate in CIMMC, or fall within the jurisdiction of its tribal representation. CIMMC reports indicate that struck and lost statistics are probably higher for each crew than they have reported. In 1996, CIMMC estimates the CIMMC hunters landed 49 whales, and estimates the total mortality at up to 147 whales from CIMMC hunters alone. Other crews were observed whaling that probably caused the death of additional beluga whales.

There are several measures by which we can measure the severity of impacts to the population. First, the average annual mortality level exceeds the PBR of 14 animals for this population. The beluga population in Cook Inlet cannot be sustained by annual recruitment given that the best information indicates that the take is at least ***five times greater*** than PBR--what the population can sustain.. Cook Inlet beluga whales, like most marine mammal populations, reproduce slowly—with females having only one calf every three years. (Hill and DeMaster 1998).

Second, if we use the estimate of the CIMMC of 123 animals killed in 1996, this equals 21% of the 1996 estimate (594) and 35% of the 1998 best estimate of the population (347). Even if we used the 1994 to 1996 data that yielded an estimate of abundance of 579 animals, this mortality is 21% of that estimate. If we use the 1994 to 1998 data that produce an average estimate of abundance of 505 animals, this mortality is still 24% of that estimate, and 28% of the minimum estimate of the population (442) (the estimate used in calculating PBR) . The mortality estimate of 123 is ***over 7 times the PBR of 14***. If we calculate a more realistic estimate of PBR using an N_{min} 442 and a recovery factor of 0.5, the PBR becomes 4, resulting in an ***estimated mortality is almost 31 times greater than the sustainable removal***.

The current level of harvest is clearly not sustainable. Even using a more conservative estimate of the total hunt, such as the average estimate of 71 animals taken per year, results in a loss of 12, 14, or 16% of the population each year (depending on

whether the 1994-1997, 1994-1998 estimate, or the minimum estimate, respectively, is used in the calculation). The picture is far more bleak if the 1998 estimate of 347 animals is used. In that case the mortality estimate of 123 whales killed per year, or the average annual mortality estimate of 71, represent 35% and 20% respectively of the 1998 population estimate. The MMPA states that the PBR is the "maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population." 16 U.S.C. § 1362(20). Removing between 20 to 35% of a population annually is likely to result in the extirpation of the population within a matter of a few years. The level of Alaska Native hunting is endangering the survival of the Cook Inlet population of beluga whales.

In 1998 NMFS received a report from one boat that 20 whales were struck during a two day period in early June. This take from a single boat is far above the sustainable harvest level. The total take in 1998 is estimated to be 78. Most of these estimates are derived from information gathered from the hunters that are participating in CIMMC. It does not account for hunters visiting from outside of the Cook Inlet area, who hunt beluga whales in Cook Inlet.

There are several reasons for the unsustainable hunting level. ADF&G personnel have estimated that there are 35-50 active beluga whale hunting households in the Cook Inlet Region (AIBWC Minutes, November 1994, p.6). There are also hunters from outside of Anchorage who do not participate in CIMMC and do not report their hunting activity to CIMMC or NMFS. There are also hunters engaging in what is essentially a commercial harvest, selling beluga muktuk in Anchorage. Each of the factors contributes to the high number of whales killed.

c. Commercial Harvest

Many beluga whales are hunted in Cook Inlet for the economic rewards of selling the beluga whale meat and muktuk. The MMPA currently allows sale of edible parts of beluga whales if the animal is killed "primarily" for subsistence and the take is not "wasteful." This has created a situation where a small number of hunters are participating in what is essentially a commercial whaling venture.

The sale of the edible parts of marine mammals (in this case muktuk) by Alaska Natives to other Alaska Natives is apparently legal under the MMPA. The problem is that, in this case, the lines between commercial sale and subsistence use are not clearly delineated. The ESA defines the term subsistence to: "includes selling any edible portion of fish or wildlife in native villages and towns in Alaska for native consumption within native villages or towns." 16 U.S.C. §1539 (e)(3). Since Anchorage is considered by NMFS to be a native village under the ESA and the MMPA, it is legal to sell muktuk.

One beluga whale can be sold for approximately $1,200 (Joel Blatchford, personal communication). NMFS has stated, "Beluga whale products are being sold in Anchorage at a significant cash value. As a result, a few hunters are taking a large

number of animals out of Cook Inlet for sale" (LeBoeuf, 1998). The known harvest of beluga whales is all occurring under the "native take exemption" of the MMPA. However, as discussed above, a large part of it is for commercial, rather than strictly subsistence, purposes.

Cook Inlet beluga whales concentrate at predictable times in predictable areas easily accessible from Anchorage, making it possible for harvests to remain high even as the population declines to very low levels. With as many as 50 local hunters and an unknown number of nonlocal hunters, it is clear that over-hunting is occurring and could alone lead to the extirpation of Cook Inlet beluga whales. A single whaling crew could take the entire sustainable harvest of this population in one day.

Enforcement of the prohibition on commercial whaling is virtually impossible under the current regulatory scheme. Only ESA listing and regulations promulgated in accordance with the listing can effectively regulate the harvest.

2. INADEQUACY OF EXISTING REGULATORY MECHANISMS

There are currently no regulatory mechanisms which adequately address the problem facing Cook Inlet beluga whales. The only federal law which applies to protection to Cook Inlet beluga whales is the Marine Mammal Protection Act (MMPA). The MMPA has proved ineffective in protecting this population, resulting in its current endangered status. The Cook Inlet Marine Mammal Council (CIMMC), which has been given authority by the Cook Inlet Treaty Tribes to regulate the hunting of beluga whales has also been unable to implement any effective conservation measures. All other regulatory bodies lack the necessary authority to take action to protect beluga whales.

a. MMPA

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

i.) Prohibition on Commercial Harvest and Wasteful Take

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. 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 the current beluga whale hunt using either of these prohibitions.

ii) Comanagement

Under the MMPA, NMFS can pursue a comanagement agreement with the tribes in the Cook Inlet region. 16 U.S.C. § 1388. Such an agreement allows NMFS to work

with tribal entities to set harvest limits and to determine methods of harvest. Such an agreement 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 comanagement agreement in place, neither NMFS nor the comanagement body can enforce its recommendations if hunters choose not to comply.

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. Native Alaskans from other regions of the state also participate in beluga whale hunting in Cook Inlet. Any subsistence hunt must be regulated in such a way that all native hunters participating in the hunt comply with the regulations.

Furthermore, the tribes have few resources to provide a monitoring and regulatory presence in an area the size of Cook Inlet. Because of the unique nature of the Cook Inlet hunt, even if a comanagement agreement is put in place, CIMMC will need the enforcement provisions of an ESA listing as well as NMFS's active participation in enforcing those provisions to ensure hunter compliance with the agreement.

By at least 1996, NMFS was aware that the 1995 subsistence hunt was far above sustainable levels. From at least this time, NMFS has sought to implement a comanagement agreement with CIMMC (March 5, 1996 Memorandum for the Record, written by Steve Zimmerman). In 1997 NMFS wrote to the Alaska Regional Scientific Review Group (AKSRG) that "development of a comanagement agreement for Cook Inlet has been our highest MMPA Section 119 priority." (Letter from NMFS to AKSRG, May 26, 1997). Despite the concerns of NMFS and the AKSRG, and the efforts of both the Alaska Beluga Whale Committee (ABWC) and the CIMMC, no comanagement agreement currently exists

In summary, a comanagement agreement currently provides no protection to the species as one does not exist. If and when such an agreement is put in place, it will still not regulate non-local hunters or restrict the sale of muktuk in Anchorage. As such, a comanagement agreement is unlikely to reduce the Native hunt to sustainable levels. Only through listing the Cook Inlet population under the ESA can NMFS intervene to ensure complete compliance with agreed upon harvest limits, improve the monitoring of the harvest, and eliminate the commercial sale of muktuk.

iii.) Marking, Tagging and Reporting

Section 109(i) of the MMPA provides NMFS the authority to implement regulations to require marking, tagging and reporting of beluga whales harvested in Cook Inlet. Despite the knowledge of an unsustainable harvest in Cook Inlet, and recommendations by the AKSRG that regulations be implemented, NMFS has yet to implement such regulations. However, even if a marking, tagging and reporting system is successfully implemented it will not solve the overharvest problem, it will simply

provide the information needed to determine how many beluga whales are killed during the hunt.

iv.) Depleted Status

NMFS has the authority under the MMPA to declare the Cook Inlet population of beluga whales as "depleted". 16 U.S.C. § 1362(1). A depleted finding would allow NMFS to initiate a rulemaking to limit the otherwise lawful subsistence hunt of beluga in Cook Inlet. However, a depleted finding alone will not adequately address the severe problems facing the Cook Inlet beluga population. Moreover, the criteria for a finding of depleted are different than the criteria for listing under the ESA. Additionally, 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 made 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 clearly falls within the definition of an "endangered species" under the ESA.

Most immediately, NMFS has the authority under the emergency listing provisions of the ESA, 16 U.S.C. § 1533(b)(7), to take immediate action to protect the species. A finding of "depleted" requires a formal rulemaking which is unlikely to be in place to effect this season's hunt. 16 U.S.C. § §1383(a)(3)(f).

Finally, a depleted listing under the MMPA would not provide the Cook Inlet beluga the additional protections provided by the ESA, such as 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 Cook Inlet beluga population has reached such low numbers, faces numerous threats in addition to hunting, and is in such a perilous state that it requires the full weight 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 current level of take is 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 Minutes, November, 1994, p. 4.). The ABWC currently does not include any representatives from Cook Inlet or CIMMC. ABWC is opposed to the commercial sale of beluga whale muktuk, but has no authority to effect change in Anchorage or the Cook Inlet watershed (Letter from ABWC to NMFS, June 10, 1998 ("NMFS must deal directly with CIMMC regarding its concern over the Cook Inlet Harvest")).

ABWC undertook the examination of the Cook Inlet beluga whale harvest issue in November, 1992 (AIBWC minutes, November, 1992, p. 8.). In 1996 ABWC noted that the Indigenous People's Council for Marine Mammals passed a resolution urging NMFS to move forward with comanagement and appropriate funds for the process (12/96 ABWC Meeting Minutes, p. 3.). In 1995 and 1996 ABWC urged CIMMC to take action to end the commercial sale of muktuk in Anchorage. CIMMC withdrew from formal participation in ABWC following the December 1996 meeting (ABWC Comments to NMFS, January 4, 1999, p. 2.). ABWC noted that as of its November 1998 meeting that commercial hunting has continued "unabated." (Id. at p.3.).

ABWC continues to play an advisory role in the debate over how to manage Cook Inlet beluga whales and regulate the subsistence harvest, but it has no regulatory authority over Cook Inlet beluga whales. The Chair of ABWC has noted that the past history of CIMMC has prevented implementation of a comanagement agreement. While the new leadership at CIMMC has taken steps to solve the Cook Inlet beluga whale overharvest problem "[m]uch more work has to be done to provide the marriage of tribal involvement with hunter involvement in the Cook Inlet harvest of belugas . . . we are a long way from comanagement." (Letter from ABWC to NMFS, May 27, 1998). ABWC has asked NMFS to take action before the 1999 hunting season.

ii.) CIMMC

The Cook Inlet Marine Mammal Council was formed in April of 1994. A comanagement agreement between CIMMC and NMFS has been in discussion since at least November of 1994. (CIMMC Action Items, November 11, 1994). Because of the diversity of hunters in Cook Inlet, CIMMC has not been able to represent all Cook Inlet beluga whale hunters. (11/95 ABWC Meeting Minutes, p. 4.)

In 1996 CIMMC recognized that the comanagement process was delayed because of the need for extensive deliberation to develop a position fully supported by all its members. (Letter to Steve Zimmerman from CIMMC, September 22, 1996). In 1997 CIMMC and NMFS had a draft comanagement agreement in circulation. This plan has not been implemented. 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. (Memorandum from Steven Pennoyer to Lisa Lindeman, February 3, 1997).

CIMMC has tried since at least 1997 to stop the commercial sale of muktuk on its own. (Fax to CIMMC from Doug DeMaster, May 9, 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 have not been implemented.

Immediate protective action is required until such time as the Cook Inlet beluga whale population has recovered and CIMMC has successfully implemented a comanagement agreement. Furthermore, a comanagement agreement can address only the regulation of the subsistence harvest. It cannot address the other factors that influence the recovery of the Cook Inlet beluga whale population.

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." (Letter from AKSRG to Steve Pennoyer, May 13, 1997). The ARSRG urged NMFS to place a very high priority on implementing a co-management agreement for the Cook Inlet beluga whales.

In 1998, AKSRG again voiced concern to CIMMC that overharvest was occurring and that immediate action was required. (AKSRG Letter to CIMMC, July 27, 1998). AKSRG noted that, if the population was at 800, the potential biological removal for Cook Inlet beluga whales was probably 16. The AKSRG has also recognized that other factors such as pollution, disturbance and commercial fishing may be 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 in any regulatory efforts by either CIMMC or NMFS.

iv). State of Alaska

The State of Alaska has no 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 recently 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.

Cook Inlet beluga whales are listed as a "Species of Special Concern" under the State Endangered Species Act. However, no specific authority or protection is provided by this state designation.

v). The Municipality of Anchorage

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, both residents and tourists gather to watch Cook Inlet beluga whales from the Tony Knowles Coastal Trail, which runs along the shore of Turnagain Arm in upper Cook Inlet.

3. PRESENT OR THREATENED DESTRUCTION, MODIFICATION OR CURTAILMENT OF HABITAT OR RANGE.

a. Shrinkage of historic range

As described in detail in Section I.B above, the current distribution of the Cook Inlet population of beluga whales is reduced from historic levels. Murray and Fay (1979) described this population as ranging all along the northern Gulf of Alaska. All current descriptions of the species' range largely limit its presence to Cook Inlet. 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 nearshore areas of upper Cook Inlet, it can be inferred that the range of the species has been curtailed.

b. Current threats

Current threats to beluga whale habitat include both habitat loss from development, and habitat loss through displacement from conflict with other activities. Oil development, logging, and human population increases all degrade the available habitat for Cook Inlet beluga whale prey species and the marine environment Cook Inlet beluga whales depend on. Oil exploration activities such as seismic testing, dredging activities, and vessel traffic all result in loss of access to habitat for Cook Inlet beluga whales.

i. Oil development 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 effect both beluga whales and the fish 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 activity associated with exploration, well blowouts and oil spills, physical obstructions to migration and feeding, and increased development.

Cook Inlet currently has 237 producing oil wells and three land-based treatment facilities. 61 Fed. Reg. 66086, 66089. Annually, these facilities discharge 5 billion gallons of "produced water." Id. 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. Id.

The oil and gas platforms in Cook Inlet discharge "drilling fluids" or "drilling muds" when wells are drilled. Drilling fluid discharges into Cook Inlet are approximately three million gallons each year. Id. 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. Id. 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 a Unocal 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, p. 22).

The State intends to offer the remaining unleased areas of Cook Inlet for lease on April 21, 1999. In its Final Best Interest Finding on the lease sale, the state has acknowledged that beluga whales are at risk from oil spill impacts. (Final Best Interest Finding, Cook Inlet Areawide Oil and Gas Lease Sale, January 20, 1999, Vol. 1, p. 6-32). Currently the lease sale includes the areas in and around the mouths of rivers in Upper Cook Inlet, identified as important beluga whale concentration areas.

The State declined to implement any tract deletions in areas of beluga whale concentration from the upcoming Cook Inlet Areawide Oil and Gas Lease sale as requested by NMFS. The upcoming areawide oil and gas lease sale is likely to cause disruptions to beluga whales in upper Cook Inlet.

In addition to increased 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 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 oil spills which could impact beluga whales. This winter alone, severe temperatures and ice conditions caused two spills from vessels traveling in Cook Inlet. (Cook Inlet Keeper Letter to Coast Guard, February 8, 1999).

ii. Contamination

In addition to oil and its byproducts, Cook Inlet is subject to many sources of contamination from its human population, including urban and agricultural run-off, industrial and military activity, and wastewater from the cities and towns around the inlet.

Anchorage is the largest city in Alaska and effects 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 (Letter from Robert Dolan, ADEC, to Robert Robichaud, EPA, July 14, 1998). Anchorage has also requested less stringent water quality criteria for heavy metals and other pollutants in Upper Cook Inlet. (See ADEC Fact Sheet at http://www.state.ak.us/local/akpages/ENV.CONSERV/dec_cal.htm#wqs). Anchorage's publicly owned treatment works at Pt. Woronzof provides only primary treatment. There are six other EPA-permitted publicly owned treatment works in Cook Inlet. These facilities discharge approximately 42 million gallons per day of treated municipal wastewater into the Inlet or its tributaries.

Urban, agricultural and industrial runoff also enters Cook Inlet from all of the other 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 beluga whales.

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, p. 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 industrial use involving petroleum and chemical products and 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, p. 23). There is a third Superfund site at Ship Creek, also in upper Cook Inlet.

Municipality of Anchorage does not provide any protection for the Cook Inlet population of beluga whales. Anchorage's wastewater treatment facility discharges primary treated sewage into 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. The Municipality of Anchorage has requested less stringent water quality criteria for heavy metals and other pollutants in Upper Cook Inlet. All of these actions contribute to the degradation of the marine environment upon which Cook Inlet beluga whales depend.

The potential for significant impacts to the Cook Inlet beluga population from human induced contaminants is 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 5000 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 already smaller than the St. Lawrence population. Already, Native hunters have reported that some beluga whales in Cook Inlet are so sick that they will not keep them. They believe that pollution is causing the conditions in some of the whales. Activities in Cook Inlet which have the potential of increasing the population's exposure to toxic contaminants may prevent it from ever recovering.

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.

iii. Vessel Traffic

Beluga whales are affected by vessel traffic. Both the amount and frequency of noise, and the level of vessel traffic are important. As vessel traffic increases, so do the impacts to beluga whales.

1.) Noise

Cook Inlet contains an abundance of noise from oil platforms, shipping and tanker traffic, aircraft, commercial fishing, hunting, and recreational boating. NMFS has stated 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 Jim Hanson, Alaska Division of Oil and Gas, June 8, 1998).

Other 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. (AIBWC Minutes, January 11, 1994, p. 3).

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 associated vessel traffic. Recreational and scientific vessels also travel throughout the Inlet. The only quantifiable source of vessel traffic is that to and from the Port of Anchorage. Vessel traffic has continued to increase since the opening of the Port 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. (Deep Draft Navigation Interim Feasibility Report and Environmental Assessment, U.S. Army Corps of Engineers, April 1996, p. 36).

The U.S. Army Corps of Engineers has signed a contract that will allow the dredging of upper Cook Inlet in the summer of 1999. The Corps plans to maintain a deep water channel for ease of access to the Port of Anchorage by large cargo vessels. The dredging project will last three months using a mechanical clamshell dredge which would deposit the dredged material onto a dump-scow barge. (Deep Draft Navigation Interim Feasibility Report and Environmental Assessment, U.S. Army Corps of Engineers, April 1996, p. EA-1). Approximately 848,600 cubic meters of sand, gravel and boulders would be deposited at a site near Fire Island. (*Id*. at EA-10). The solicitation, offer and award indicates that the dredged quantities will be 1,000,000 cubic meters. Three barge loading and dumping trips would be required every day for the three month period. (*Id*. at EA-10). Maintenance dredging is anticipated every 5 years, at approximately 397,600 cubic meters of fill material. (*Id*. at EA-1). Dredged material will be disposed of at a site near Fire Island.

The dredging project will use diesel engine powered cranes and tug boats. The Environmental Assessment of the project indicates that beluga whales would be deterred from the immediate area. (*Id*. at EA-11).

The use of personal watercraft (a.k.a. jetskis and jetboats) has also 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.

iv. Fisheries

Fishing poses at least two risks to Cook Inlet beluga whales: incidental mortality from entanglement in fishing gear, and indirect threats from fishery management decisions which effect the abundance and availability of 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 moralities have been estimated to occur in the past at a level of 3-6 animals per year (Burns and Seaman 1986). Because Credle et al (op cit.) 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.) Prey availability

The large aggregations of beluga whales in upper Cook Inlet in summer likely reflect feeding on dense prey concentrations of eulachon and salmon in the upper drainages of the inlet. 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 communication, Joel Blatchford, local hunter). Salmon population estimates for Upper Cook inlet in recent years suggest a trend of decline. (S*almon Managers Must Cut Commercial Priority*, Anchorage Daily News, February 12, 1999). A number of Cook Inlet streams, particularly in the Matanuska-Susitna valley, have experienced low or reduced salmon runs in the last decade, with ongoing debate among commercial and sportfishing groups about the causes. Id. Given the evidence of salmon as a food source for the Cook Inlet beluga whales, and the documented concentration of the whales in the upper Inlet where the Mat-Su streams drain in, there may be a relationship between declining salmon runs and the decline of the beluga population.

v. Upland habitat loss

Beluga whales depend on the anadromous fish runs in Cook Inlet. These runs are threatened by continued development and loss of upland habitat in Cook Inlet. In addition to the human population growth that 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 resources are the most important feature of marine habitat. To the extent that prey abundance is affecting beluga whales, it is a habitat impact as well as a direct impact.

4. DISEASE AND PREDATION

a. Disease

The susceptibility of beluga whales to disease is discussed in the section on Natural Mortality. See Section I.A.5. Very little is known on this subject 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.

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 is discussed in the section on Natural Mortality. See Section I.A.5. The potential for significant impacts on the Cook Inlet beluga population by killer whales cannot be ruled out. Changes in traditional prey availability, resulting from disruptions to the food chain, possibly brought about by overfishing and climate change, has 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. 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 human caused mortality for Cook Inlet beluga whales is hunting by Alaska Natives. The hunt is discussed in detail in Section II.B.1. Hunters may kill a fourth of the remaining Cook Inlet beluga whale population this year if emergency action is not taken.

5. OTHER NATURAL OR ANTHROPOGENIC FACTORS

The Cook Inlet beluga whale population is declining and geographically isolated. These factors, in combination with their tendency toward site fidelity, makes them vulnerable to numerous anthropogenic environmental hazards (Rugh et al. 1998).

a.) Human population growth

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). Other communities in the Cook Inlet area have grown even more. 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. Increasing human population means more pollution of all kinds entering Cook Inlet.

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.

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. Alaska has warmed by as much as five degrees in the past 30 years. (*In the Wake of the Spill*, National Geographic, March 1999, p. 108). These temperature changes are likely affecting Cook Inlet fish runs and consequently beluga whales and their main predator, killer whales.

c.) Stochastic Events

Cook Inlet beluga whales are already estimated to be below 350 individuals. 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. For example, in 1994 there was a stranding of approximately 190 beluga whales in upper Cook Inlet. (*190 Belugas Stranded on Tidal Flats*, Anchorage Daily News, June 15, 1994). While most of these whales probably survived the stranding, it is possible that a large stranding could occur that would kill most or all of the remaining beluga whales. In 1996 another large stranding of approximately 100 beluga whales occurred in the middle of Turnagain Arm in upper Cook Inlet. *(Belugas Struggle to Stay Alive*, Anchorage Daily News, August 29, 1996). In October of 1988 27 beluga whales stranded themselves on the mudflats in Anchorage. (*Belugas Year Round Inhabitants of Cook Inlet*, Anchorage Daily News, November 3, 1988).

Beluga whales do not always survive strandings. In 1987 four whales stranded in Turnagain Arm probably did not survive the event. *(Experts uncertain if Beluga Whales Survived Stranding*, Anchorage Daily News, August 26, 1987). In 1992 federal biologists documented that a stranded whale died near Kenai. *(Stranded Beluga Whale Dies Despite Rescue Effort*, Anchorage Daily News, October 9, 1992).

A catastrophic event like a large stranding, or a shift in predation patterns for killer whales, could cause the Cook Inlet beluga whale population to drop below a level from which it could ever recover.

III. CRITICAL HABITAT

Petitioners request the designation of critical habitat for Cook Inlet beluga whales concurrent with its listing. 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. Oil development, 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. Seasonal and temporal displacements occur from vessel traffic, oil exploration activity and dredging in Cook Inlet.

Cook Inlet beluga whales have already abandoned or been displaced from the lower parts of Cook Inlet. Critical habitat should include all areas where Cook Inlet beluga whales have occurred in recent years, including the lower inlet. Failure to include the entire inlet would be imprudent because as the Cook Inlet beluga whale population recovers, it is likely to resume using the entire inlet.

IV. EMERGENCY LISTING

Petitioners request that NMFS use its authority pursuant to Section 4(b)(7) of the Endangered Species Act (ESA), 16 U.S.C. § 1533(b)(7), and 5 U.S.C. § 533(e) to designate immediately the Cook Inlet population of beluga whales as endangered and to initiate a rulemaking to make that emergency designation permanent. The available information indicates that the Cook Inlet population of beluga is in precipitous decline due to an unrestricted take of at least 70 whales a year from a population of only 347 individuals. This decline in the population and the level of take constitutes an emergency posing a significant risk to the well-being of this species. Immediate action to protect this population is necessary.

V. PETITION FOR ADMINISTRATIVE RULEMAKING

Simultaneously with an emergency listing, petitioners request that NMFS use its authority under Section 10(e)(4), 16 U.S.C. § 1539(e)(4) of the ESA to prescribe regulations governing subsistence take of this species. Any notice and hearings which may be required to precede the promulgation of such regulations should be expedited.

Furthermore, in accordance with the rulemaking procedures of the Administrative Procedure Act, 5 U.S.C. § 553(d)(3), the need to provide immediate protection to Cook Inlet beluga whales constitutes good cause for dispensing with the usual 30 day period between publication and the effective date of regulations governing subsistence take.

VI. CONCLUSION

Based on the information presented above, it is clear that Cook Inlet beluga whales are in danger of extinction throughout their range and, therefore, are endangered within the meaning of the ESA, 16 U.S.C. § 1532(6). Moreover, the situation in Cook Inlet is so severe that petitioners urge NMFS to list Cook Inlet beluga whales immediately on an emergency basis, pursuant to ESA Section 4(b)(7), 16 U.S.C. § 1533(b)(7) and to adopt regulations as soon as possible to control the hunt of Cook Inlet beluga whales this year. Failure to act prior to this year's hunting season could result in a substantial and potentially irreversible decline in this already endangered population.

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