Chapter 1
Current Population Status of the Cook Inlet Stock of Beluga Whale

The Status Review and 2007 proposed rule accurately summarize some of the available scientific information for the Cook Inlet stock of beluga whale. Relative to some marine mammal species in the Gulf of Alaska and Bering Sea region, the amount of information on the biology and ecology available for this stock of beluga whales is more limited. For the purpose of making a decision on whether the Cook Inlet stock of beluga whales should be listed as endangered with extinction, the pertinent available information acquired by the National Marine Fisheries Service (Service) on the population and its various parameters was accurately summarized. However, numerous calculations and conclusions need reconsideration based on additional information, inconsistency with established policy and rules, and the fact that the Service's conclusions are not consistent with information presented in the Status Review, proposed rule, and other available information.

Background

On July 13, 2000, the Alaska Department of Fish and Game (Department) denied an October 18, 1999, petition to list the Cook Inlet beluga as endangered under the State of Alaska (State) endangered species statutes. The Department's denial was upheld by the Alaska Supreme Court. In the 2000 denial of the petition, the Department laid out the following important historical information concerning the management and status of the Cook Inlet stock of beluga whales.

In the 1970s and 1980s beluga whales were seen during summer over a wide area in the upper and middle inlet, while in the 1990s they were seen in a smaller part of the upper inlet. The Department considered such a reduction of their range to be consistent with the reduced population size in the 1990s. Based on general biological characteristics of beluga populations, the Department determined the sustainable harvest level is likely 2 percent per year, or 7 animals from a population of 350, but the Department's estimate of population abundance indicated the population had declined over the previous 6-year period by 45 percent (approximately 7.5 percent per year) and the Service had estimated the average kill during 1995-1997 at 87 per year. (These estimates vary from one federal register publication and Status Review to another between 2000 and 2007, but are within a relatively constant range.)

At the time of the 1999 petition under State law, the Department was actively involved in monitoring the Cook Inlet stock of beluga whales because State laws require that all populations be managed on a sustained yield basis. However, the State's ability to manage the harvest of the population had been preempted by federal law, the Marine Mammal Protection Act (MMPA). Had the Service not agreed in 2000 with the State's petition to list the stock as depleted under the MMPA and adopt regulations to restrict subsistence harvest, the State was prepared to pursue actions to protect the Cook Inlet stock. Recognizing that the Service had taken action, the State concluded that the population was not threatened with extinction. The Service concluded that the 1999 population estimate, following the hunting moratorium in 1998, gave a preliminary indication that the population was in recovery (65 FR 38788-790 (2000)). The Department's view was more conservative than the Service's, but it agreed that efforts to limit harvest would

eventually result in population recovery since no other factors were individually or collectively affecting the health of the population. The Department concluded that the population would be likely to recover slowly, hunting would have to be limited for a long time, and the population managed conservatively.

The State had previously acted to place much of the important beluga habitat within Cook Inlet in protected status, including several state game refuges and critical habitat areas. (See Chapter 3) Recent actions by the Alaska Department of Natural Resources had maintained protection of important habitat by removing it from lease and sale offerings, even though there was no evidence of any habitat decline or habitat-related cause for the population decline. Among other purposes, the habitat protection measures were anticipated to aid in beluga population recovery once the unsustainable harvest was stopped. Those habitat protection measures remain in effect today along with additional regulatory measures subsequently adopted.

2007 Proposal Contradicts 2000 Finding that a Listing is Unwarranted

The 2007 proposed rule (19855) to reverse the 2000 determination, that an Endangered Species Act (ESA) listing was not warranted, is based in part on the following (quoted):

> *The 2000 determination that ESA listing was not warranted was premised on at least two findings that justify further review. First, the only factor then known to be responsible for the decline in beluga abundance was subsistence harvest. Second, the 2000 Status Review used simulation modeling efforts that demonstrated this DPS is not likely to decline further if the harvest was reduced and an annual increase of 2 to 6 percent were assumed. Abundance estimates since harvest management began in 1999 have declined at an average rate of 4.1 percent per year, challenging the original findings.*
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> *In addition, the International Union for the Conservation of Nature and Natural Resources (IUCN) assessed the status of the Cook Inlet beluga whale in 2005 (Lowry et al, 2006). The IUCN determined that this population had a 71 percent probability of having a negative growth rate (in 2005) and met its criteria for critically endangered status.*

We offer the following regarding these considerations.

First, nothing in the biological or physical environment has changed since 2000 regarding the five factors or "threats" under ESA that would justify a change to the previous conclusion that unsustainable harvest was the only factor responsible for the decline in beluga abundance. The status of these five factors is discussed in Chapter 2, and our review concludes that an ESA listing is still unwarranted based on those factors individually and cumulatively.

Second, both the 2000 and current abundance estimates and calculations of decline and reproductive rates contain a number of assumptions that need correction, which we discuss below. The impacts of the significantly disproportionate harvest of reproductive adults prior to 1999 were not previously recognized. As a result, the original assumption that an increase would be evident in increased abundance estimates within a year of restricting harvest was flawed.

Growth within the population could not reasonably be expected until the breeding age component of the population stabilized, and this stabilization could not be expected for 5 to 7 years after unsustainable hunting ended. These issues are further discussed later in this chapter.

Third, the IUCN is a United Nations established organization to evaluate worldwide populations and is composed of selected scientists who generate assessments using criteria for certain status rankings that are not comparable to the ESA determinations. Because the IUCN calculations are based on different factors and are not subject to the agency scientific criteria for decisions required to be used in ESA, the IUCN assessment is a concern but has no bearing on an ESA listing decision. The June 22, 2000, determination clearly recognized the inappropriateness of using the IUCN assessment (38779): "

> *Although the IUCN criteria are appropriate to identify species that may need conservation measures, they do not include the full range of factors that are included in the ESA; therefore, they are not appropriate for a determination of the status of a stock under the ESA.*

In preparing this 2007 proposed rule, the Service considered its update of the earlier Status Review and the 2006 petition to list under ESA. The "Summary" in the proposed rule (19854) concluded "*the Cook Inlet beluga whale constitutes a distinct population segment (DPS) that is in danger of extinction throughout its range*" based on the findings from the November 2006 Status Review and consideration of the ESA factors affecting this species. The State provides information and analyses that were not considered by the Service in reaching this conclusion. Although the November 2006 Status Review overall provides a fairly comprehensive review of information on the Cook Inlet stock of beluga whales, the 2007 proposed rule reflects omissions, errors, and unsubstantiated interpretations. We note that some include incorrect facts or unresolved comments that were provided by the State and public on the earlier draft Status Review and draft conservation plan.

The State concludes that, upon review of these comments, the Service must determine that no information on the population status has been acquired subsequent to the June 22, 2000, determination to justify a change in the Service's previous decision that an ESA listing is not warranted at this time. The 2000 assumptions for predicting a recovery were too optimistic (discussed below), but the conclusion of the 2000 rule was sound.

The 2007 proposed rule and its underlying Status Review discuss and request comments on the following topics:

1. Scientific and Commercial Information Regarding Population Abundance and Trends
2. Population Modeling
3. "Species" Identification under ESA as a Distinct Population Segment
4. Geographic Range of the Species
5. Extinction Risk Analysis

In the remainder of this chapter, the State provides additional information and analyses regarding the above topics:

1. Scientific and Commercial Information Regarding Population Abundance and Trends

According to the 2007 proposed rule (19855), "*comprehensive, systematic aerial surveys on beluga whales in Cook Inlet began in 1993.*" Also, according to the proposed rule (19856) the population estimates prior to 1994 (i.e., 1979 and 1993) are unreliable because of "*differences in survey methods and analytical techniques prior to the 1994 survey.*" Based on the 1994-1998 surveys, the 2007 rule (19855) concludes: "*These surveys documented a decline in abundance of nearly 50 percent between 1994 and 1998, from an estimate of 652 whales to 347 whales (Hobbs et al., 2000).*" The latter estimated decline in abundance is the "*best available scientific and commercial information*" for that period of time. However, the 2007 proposed rule and the 2006 Status Review use three calculations in the analyses of Cook Inlet stock of beluga whales that need adjustments prior to being relied upon for the 2007 decision concerning the Cook Inlet beluga whale population status.

A. One of the calculations that needs correction involves inappropriate use of the 1979 estimate to establish carrying capacity, which used in the proposed rule (19856): "*indicates a 77 percent decline in 27 years, but with unspecified confidence.*"

While we appreciate the qualification that the estimate has "unspecified confidence," we suggest the use of the 1979 figure should not be relied upon and is misleading in depicting trends. Elsewhere the 2007 proposed rule (19855) confirms that there was no reliable abundance survey conducted prior to 1994.

One estimate of historical abundance is based on: "*Portions of Cook Inlet surveyed during 1979 resulted in an abundance estimate of 1,293 beluga whales (Calkins, 1989)*. The 1979 beluga estimate (often rounded to 1300) should not be used for purposes of establishing either Cook Inlet carrying capacity or an assessment of trends of the Cook Inlet stock of beluga whales. The May 31, 2000, final rule (34596-34597), which determined the stock is depleted under MMPA, provided extensive discussion on a proposed range of figures (653-1300) that could all be deemed at that time to be the best available scientific information upon which to establish the historic abundance and carrying capacity, depending upon correction factors. For example, Calkins (1984) proposed using a correction factor of 2.7 for the 1979 count, which was the correction factor developed for beluga surveys in Bristol Bay where water, weather, and physical features differ from that in Cook Inlet.

While all of the figures and information from long-time residents and State surveys used to project historical abundance do provide valuable snippets of information, none are reliable estimates of carrying capacity because other factors, e.g., habitat, prey abundance, and predation, are not similarly analyzed for reliable historic information. Depending upon one's assumptions, carrying capacity was probably under 1000 for most years, but it could have just as easily been well over 1300 in other years. Even if the Cook Inlet population was 1300 in the late 1970s, that number may greatly exceed today's carrying capacity. Information available through NOAA involvement in assessing other populations throughout the south central and western coast of

Alaska indicate significant changes in water temperature, marine mammals, and prey populations occurred during this same period in the late 1970s. Likewise, fisheries management by the State beginning in the 1960s stabilized fish returns so there were less cyclic highs and lows which may be related to historical accounts of beluga population oscillations.

Population modeling that uses the 1979 estimate to establish historic abundance and set a carrying capacity ("K") for Cook Inlet should not be viewed as the "*best available scientific and commercial information.*" The underlying counts of 200-500 beluga whales conducted by the Department can be cautiously compared to others from the 1960s through the early 1980s (May 31, 2000 rule, p. 34596) in order to evaluate trends. The Department estimated the carrying capacity to be less than 1,000 during that time period. Better estimates of carrying capacity need to be calculated based on an ever-growing set of available data for the Cook Inlet area. This includes recognition that the carrying capacity of Cook Inlet may vary seasonally and may include areas outside of Cook Inlet as the population increases.

The uncertainty of the single data point from 1979 and other back-calculated estimates is reflected in the April 6, 2004, final rule (17978) decision by the Administrative Law Judge, derived during considerations by the Assistant Administrator in hearings on Alaska Native take that established the carrying capacity as follows:

> *(2) Carrying Capacity. Based on the evidence adduced at the hearing, NMFS would need a number of years of annual abundance estimates to accurately determine the carrying capacity of CI beluga whales with any reliable degree of certainty. However, NMFS believes the estimate of carrying capacity presented in the EIS is reasonable for interim management purposes.*

Those management purposes after the moratorium and depleted listing under MMPA were to regulate subsistence harvests that slowed, but did not preclude, recovery of the population to reach a desired population level. **The carrying capacity calculation served that purpose but is a misleading data point for demonstrating statistical trends, such as the"*77 percent decline*" stated in the proposed rule.**

B. Another calculation that needs reconsideration involves the assumption that the surveys in 1994-1998 can be treated equally in making population estimates as the surveys conducted after the moratorium on hunting.

Although the 1994-1998 estimates of abundance were sufficient to demonstrate a significant decline, the subsequent estimates would not be expected to reveal a rebound during the first generation after the moratorium. The increase in hunting in the early 1990s primarily targeted large (older) white (reproductively mature) adults that are easy to see from shore and boats. The surveys conducted in the first years after the moratorium, which also primarily count white, reproductively mature whales, count a disproportionately smaller part of the population because of the difficulty seeing the younger whales that also have higher mortality. After the moratorium, the harder to see dark or grey immature whales made up a greater portion of the significantly reduced population for several years. **Some adjustments may have been made to calculations of count estimates and several runs of the models attempted to speculate what**

this proportion of immature whales might be, but these adjustments are based on varying assumptions with no means to verify the resulting estimates.

C. Another calculation that needs correction involves the reliance on the 2000 Status Review's expected growth rate increase of 2 to 6 percent beginning in 1999.

A determination of which year's population estimates will be used as a starting point to calculate trends of the population after the legislated hunting moratorium on May 21, 1999, is a particularly important and largely overlooked consideration. According to the final May 2000 rule issuing the depleted finding (34592), the Status Review "*clearly shows that the harvest from 1994 through 1998, the period when reliable abundance estimates were available, was sufficient to account for the decline.*" The State concurred with this conclusion reached through cooperative assessments begun in 1998. In fact, based on these cooperative assessments, the State petitioned the Service on January 21, 1999, to designate this stock as depleted under the Marine Mammal Protection Act.

As described in "B" above, the surveys conducted in the first years after the moratorium counted a disproportionately smaller part of the population because of the difficulty seeing the younger whales and their lower survival. After approximately 50 percent of the estimated population was killed in 4 years and the majority of those were reproductive adults, the younger generation should not have been expected to be reflected in count estimates in the first few years after the moratorium. Although the proposed rule (19855) explains a number of factors that were considered and modeled in the 2006 Status Review, it was too optimistic to calculate the recovery would have been expected as early as 1999. **In fact, given that the moratorium took effect in 1999 and the previous four years' calves likely had a low survival rate, an expected growth rate increase might not even be expected for one full generation. This is consistent with the result of Litzky (2001) indicating that it would take 5 to 7 years to begin recovery.**

Based on the calculation problems discussed in "B" and "C" above and the lower survival of young whales considered in the various modeling exercises, we should not have expected to see a recovery reflected in increased counts until approximately 2005 (6^{th} year after the moratorium). The anticipated recovery will be evident if continued increases in the count estimates occur in successive years beginning in 2005, not beginning in 1999. Therefore, the abundance estimates and regression analysis used in the Status Review and public presentations during the comment period inappropriately demonstrate a decline (4.1%) because the calculation starts with 1999 and does not account for the high likelihood of undercounting immature and hard to count whales, which experience lower survival rates than adults, for a generation before reproductively mature whales begin to make up an increasing portion of the population.

Additional Rate of Growth Consideration

The April 6, 2004, final rule (17978), which adopted the recommendations of the Administrative Law Judge regarding establishing harvest quotas for Native Alaskans, provided specific guidance to the Service in evaluating the rate of growth of the population, as follows:

> *(3) Intrinsic Rate of Growth (Rmax). Rmax is the maximum net productivity rate of CI beluga whales on an annual basis. Rmax is derived by subtracting natural mortality from the gross annual reproduction rate. NMFS determined that 4 percent, amounting to 10 to 12 marine mammals added to the population on an annual basis, is reasonable for cetacean populations similar in size to the CI beluga whales. However, Rmax for CI beluga whales will be reassessed as new data become available.*

The Service's calculation of a 4 percent rate of growth exceeds the Department's conservative estimate of 2 percent rate of growth. However, the Service negotiated a harvest that more closely approximates 1/2 percent per year. If one to two beluga whales were harvested by Native Alaskans annually (5 were harvested over the past 8 years) and predation totaled the predicted one beluga per year (projected in the 2007 proposed rule), the population would slowly recover as predicted by the Department. But this recovery for the first generation after the moratorium would not be at the 2 to 6 percent predicted by the 2000 Status Review, reflected in the 2000 rule, and assumed for the modeling.

2. Population Modeling

The methodology used to estimate abundance and trend in the Status Review is well-thought out and rigorous, but a number of adjustments are needed in the assumptions for the models. The population viability analysis (PVA) approach used by Hobbs et al. is sophisticated, but highly parameterized. As such, the authors were forced to borrow several data inputs from adjacent beluga populations, which is a common modeling practice but is not Cook Inlet data. The models assumed the harvest was targeted at adults only and they accounted for lags in maturation time by using an age-structured model. The authors reference Litzky (2001), whose results indicate that the adult to juvenile ratio takes 5-7 years to recover.

The bottom line is that the structure and incorporation of uncertainty of modeling was adequate, but the assumptions used and interpretations made relative to the timing of recovery are not, for the following reasons:

- Used insufficient time during the recovery period (1999+) to assess the true trajectory of the population
- Risk of extinction in the near term (50 years) for all reasonable models was zero, indicating high uncertainty in the trajectory of the population
- Listing decision is missing an assessment of the risk of making a determination that listing is not warranted at this time; a new petition could be filed or the Service could initiate its own review in a few years when more reliable information about the recovery trajectory, based on current survey techniques, is available

The model incorporates a time lag between the reduction in mature animals in the population during the period of high harvest (1994-1998) and the potential recovery of the population from these removals. However, the assessment of extinction risk does not take into account the possibility that the time period after harvest was virtually eliminated (1999-2006) was insufficient to detect the end of the lag period (or conversely the beginning of the recovery

period). Specifically, the Status Review indicates that a recovery of 2% to 6% per year was anticipated during 1999-2005 as a result of curtailed hunting. Given the population dynamics of belugas and the modeling work done in the Status Review, we disagree that an increase in abundance of 2% to 6% during 1999-2005 would be anticipated even if the population was recovering from the harvests of 1994-1998.

The period of hunting removed a significant number of mature animals from the population that likely limited recruitment in succeeding years. It also may have resulted in loss of calves up to 14 months of age whose mothers were killed. **It is more likely and is demonstrated in one of the papers cited in the Status Review (Litzky, 2001) that we might first observe a consistent recovery in the proportion of mature belugas by 2004 (Fig 2.8 of Litzky 2001) and that the cumulative probability of observing recovery increases to >80% by 2007-2009 (Fig 2.9 of Litzky 2001)**. A recovery in the proportion of mature belugas would be a portent of recovery, with recovery of abundance coming later as recruitment increases.

The aforementioned observations combined with the outcomes of models of extinction risk in the Status Review indicate that a determination is premature. We suggest that a sensitivity analysis and risk assessment be made that weighs acting on listing now against the additional risk to the population by waiting for maturity and abundance data in the next 2-3 years that could significantly change the outcome of the risk of extinction analysis. **There is some indication from the Status Review that waiting a few years for these additional data will not increase risk of extinction because the estimated risk for the most plausible models was zero (0) at 50 years** (Table 6 of the Status Review).

3. "Species" Identification under ESA as a Distinct Population Segment within All or a Significant Portion of its Range

Approximately 100,000 beluga whales inhabit the waters off the Alaska coast. They are separated into five mostly distinct populations or stocks based on summering areas. All of these populations are classified as *Delphinapterus leucas*. No subspecies designations have ever been published.

Molecular genetics studies have shown Cook Inlet stock of beluga whales have different mitochondrial DNA (mtDNA) haplotype frequencies than the other four beluga stocks identified in Alaska. However, mtDNA haplotype frequency differences indicate limited gene flow for females only. Even though the Cook Inlet stock of beluga whales appears to be spatially isolated from other stocks, this is not really known because tagging studies are very limited and seasonal ranges and movements are not well characterized.

Male mediated gene flow in beluga whales demonstrates substantial exchange among stocks once thought to be discrete based solely upon mtDNA data (Brown Gladden et al. 1999).

2000 rule: DPS justification

Under the federal Endangered Species Act of 1973, "species" was originally defined to include "*any subspecies of fish or wildlife or plants and any other group of fish or wildlife of the same*

species or smaller taxa in common spatial arrangement that interbreed when mature." Amendments in 1978 resulted in the language in which a "species" was defined 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*" (emphasis added). Based on the 1978 amendment, the Service and the Fish and Wildlife Service developed a policy regarding the recognition of a distinct population segment under the federal ESA. The Cook Inlet stock of beluga whale was designated a Distinct Population Segment (DPS) by the Service in 2000, based on the joint Service and Fish and Wildlife Service policy that was in effect at that time, which considered three elements: (1) population discreteness, (2) population significance, and (3) conservation status of the population. Subsequent to 2000, the criteria for federal designation of a DPS have evolved due to court decisions, several solicitor interpretations and policy revisions, largely resulting from guidance in recent court decisions.

The Service's determination that an ESA listing was unwarranted in 2000 included a justification for their opinion that the Cook Inlet stock of beluga whales should be considered a DPS, citing O'Corry-Crowe at al. (1997). This position is echoed in the 2006 Status Review and other publications without further analysis or applying current standards and policies.

Scientific problems with the 2000 DPS finding

Because mtDNA only reflects female ancestry and gene flow, it is not the best marker to quantify gene flow and exchange of individuals among populations over time. Nuclear markers (e.g., allozymes, microsatellites, minisatellites, SNPs, etc.) are bi-parentally inherited and offer a more complete picture of gene flow among populations over generational time scales. Numerous publications document that matriarchal lineages identified with mtDNA mask population connectivity (male gene flow). In species that exhibit strong female philopatry, male-mediated gene flow is arguably the most important factor in maintaining genetic continuity among populations.

The Service has conducted numerous status reviews of other candidate species that incorporated evidence from nuclear DNA studies; absence of nuclear DNA data is a fatal flaw in the status review of beluga whales. However, even if further analysis of nuclear DNR data show allele frequency differences, this would not necessarily mean the Cook Inlet stock is a DPS because criteria to designate DPS are subjective.

The State shares trust responsibility with the Service for the sustainability of beluga whales in Alaska. During the public comment period, the Department requested the original genetic data used for the various genetic interpretations contained in the 2006 Status Review upon which the 2007 proposed rule is based. To date, that information has not been provided. Additional comment will be provided based on any additional analyses derived once those data are provided by the Service. We also understand that the Service has acquired additional information from nuclear DNA studies that was not discussed in the Status Review or proposed rule, which we will also address when the data are available.

Current DPS standards

Based on the recent Court of Appeals decision regarding application of the joint Service and Fish and Wildlife Service DPS policy to the Washington gray squirrel, Northwest Ecosystem Alliance

v. U.S., 475 F.3d 1136 (9th Cir. 2007) and the March 16, 2007, Interior Solicitor guidance on the meaning of "*In danger of extinction throughout all or a significant portion of its range"* (although not the same agency, federal interpretation of the same law should be consistent), two separate standards must be met to be considered a DPS: 1) discreteness, and 2) significance. Geographic isolation can, by itself, satisfy the discreteness factor, but it does not resolve the significance factor.

Significance of the population segment to the species to which it belongs offers considerable room for debate and involves a number of non-exclusive factors. Loss of a geographically isolated peripheral population of a species, "*even where it would result in a serious reduction in the range of the species*," may not be "*of biological and ecological significance to the taxon as a whole*." 475 F.3d at 1146-49. Similarly, even clear genetic differences between populations may not be significant where genetic makeup does not differ "*markedly*" from that in other populations. 475 F.3d at 1149-50. Congress directed (SR 151, 96th Congress, 1st session) that the authority to list DPS is to be used "*sparingly*" while encouraging the conservation of genetic diversity.

The National Marine Fisheries Service and U.S. Fish and Wildlife Service will consider available scientific evidence of the discrete population segment's importance to the taxon to which it belongs. This consideration may include, but is not limited to, the following:

A. Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon,
B. Evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon,
C. 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 historic range, or
D. Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

Both agencies also argue that, because precise circumstances are likely to vary considerably from case to case, it is not possible to describe prospectively all the classes of information that might bear on the biological and ecological importance of a discrete population segment.

The Cook Inlet stock of beluga whales is relatively isolated, does not markedly differ from other belugas more abundant elsewhere, and is likely a remnant stock on the southern edge of its range. As such, the stock is not critical to the survival of the species and, contrary to opinions expressed in Service documents, does not occur in an ecologically unusual or unique setting compared to the other estuarine and bay habitat occupied by the other stocks along the Alaskan coast during summer. Consequently, we conclude that the loss of the population would not result in a "significant gap" in the range of the taxon. Clearly, Cook Inlet is not a "significant portion of the range" for the beluga whale, based on the March 16, 2007, Solicitor guidance.

We detect a disturbing trend of preferential designation of DPS for ESA listings in Alaska. The eastern and western Alaska stocks of Steller sea lion, the western Alaska stock of sea otter, and

now the Cook Inlet stock of beluga whale have all had DPS designated and are either listed or proposed for listing under ESA. In each case, genetic distinctness is claimed in the proposed rules without acknowledgement that this is subjective. Because geographic separation (without genetic differentiation) may be sufficient to designate DPS, this may seem like an academic argument, but it is not. The subjective declaration of genetic distinctness should be openly acknowledged to meet the standard of presentation of the best science in ESA considerations.

4. Geographic Range of the Species

The May 31, 2000, rule (34597) identified the range of this stock, as follows:

> *§216.15* ***Depleted Species***
>
> *(g) Cook Inlet, Alaska, stock of beluga whales (Delphinapterus leucas). The stock includes all beluga whales occurring in waters of the Gulf of Alaska north of 58^{o} North latitude including, but not limited to, Cook Inlet, Kamishak Bay, Chinitna Bay, Tuxedni Bay, Prince William Sound, Yakutat Bay, Shelikof Strait, and off Kodiak Island and freshwater tributaries to these waters.*

We understand that the Service may change this definition in the final rule. The sources cited in this proposed rule reference numerous mixed claims of geographic range of this stock. The 2007 proposed rule states (19856) the Service intends to exclude the Yakutat pod even though it is related to the Cook Inlet stock. While we believe that these belugas have the potential to contribute to the Cook Inlet stock, we agree that, if a decision to list is made at this time, based on available information it would be inappropriate to include this widely dispersed pod or any others that periodically are observed outside of Cook Inlet in the listing. One viewpoint is that the Cook Inlet population is a remnant or widely-dispersed population separated from the other Alaska stocks as the ice retreated. Others theorize that the Alaska beluga stocks winter together, and the Cook Inlet beluga whales could travel that far because publications indicate beluga travel many hundreds of miles. The current lack of observation in lower Cook Inlet may be a factor of less traffic in winter compared to summer. These questions need to be addressed through further research and monitoring. The 2007 proposed rule (19857) concludes that the proposed ESA listing only applies to beluga whales found in Cook Inlet and not those found outside of the Inlet in the Gulf of Alaska. There is no discussion of how a listing will affect Section 7 consultation requirements when the population expands and theoretically increases dispersals and movements throughout the Gulf coastline.

5. Extinction Risk Analysis

A Population Viability Analysis (PVA) conducted by the Service indicates a “high probability” (26%) of extinction in 100 years, based on ‘behavior’ of a population of less than 500 whales. A separate analysis by Dan Goodman for the Marine Mammal Commission indicates that for 1999-2005, the probability that the population is declining is 71.2% and the estimated rate of decline is 3.74%. We suggest that both of these analyses of probability are based on assumptions that need

revision to reflect 2007 data and to eliminate the 1999 and 2000 data, when the population was declining directly due to the overharvest effects on calf survival.

We have a number of general comments regarding the modeling aspects of the PVA and the related information in the Status Review.

- A detailed discussion of the assumptions used in developing and conducting the modeling, including justification of the assumptions, the ramifications of the assumptions with respect to the results, and the consequences of violating the assumptions is needed, including a sensitivity analysis. In particular, the catastrophic loss assumption is excessively high, with no basis in historical evidence, and that estimate alone significantly influences the extinction risk analysis. The modeling includes uncertainty in the inputs, which provides the numerous population trajectories. If the uncertainty around each input was modeled correctly, then a sensitivity analysis is superfluous. A list of inputs and their respective modeled distributions are needed in order to assess this need.

- The analyses provide good documentation of the behavior of the models, but how well these results imitate the dynamics of the Cook Inlet stock of beluga whales, especially in the distant future, might be a function of the assumptions associated with the models.

- A very clear discussion of these assumptions would be invaluable in assessing how reasonably the simulations approximate reality.

- The Status Review does not adequately address the potential impact of an age distribution skewed toward juveniles as a result of the high mortality of adults from the 1994-1998 subsistence harvest. The modeling work addresses this issue in part, but the proposed rule does not explain it. The population assessment's attempt to estimate age distribution from images obtained on the videos during surveys, in which young whales are hard to see.

- The risk analysis in the 2006 Status Review (and Goodman's review[1] of 1999-2005) is based on a population trajectory determined from the abundance data. However, the abundance data from 1999-2005 would be expected to indicate a negative population trajectory because the population would still be recovering from high harvests of mature animals during 1994-1998. Population modeling in the Status Review and a review of recovery timing by Litzky (2001) indicate that the beluga population would not show the first signs of recovery (i.e., an increase in the proportion of mature animals in the

[1] Dan Goodman submitted an updated review on July 27, 2007, which reiterates that the population is declining and adds that more years of data (2003-2006) have reduced the uncertainty about the decline. However, Goodman also attempts a simple count-based PVA on the adult data and deaths due to hunting without considering the age structure of the population and the lag between adulthood and subsequent recruitment. This is not a defensible analysis and is probably why the Service uses a more complex demographic model in the Status Review. Goodman's 2007 paper also has an error in the abundance table (Table A1. 1999 datum should be 367, not 967). The Goodman review also ignores the question of how much change in adult abundance in the near term (next 2-3 years) is necessary to change the outlook from a decline to an increase in the rate of change.

> population) until at least 2004 and the probability of observing an increase in the proportion of mature animals would not exceed 80% until sometime between 2007 and 2009. A recovery in the proportion of mature belugas would be a portent of recovery, with increases in abundance coming later as recruitment increases.

We suggest that a sensitivity analysis and risk assessment be made that weighs the risk of making a determination that listing is not warranted at this time, recognizing that better data regarding population abundance and trajectory will be available within a few years and that a new petition for listing could be submitted, or the Service could reinitiate review on its own initiative at that time. Maturity and abundance data that will be available in the next three to five years could significantly change the outcome of any risk of extinction analysis. There is some indication from the Status Review that waiting a few years for these additional data will not increase risk of extinction because the estimated risk for the most plausible models was zero (0) at 50 years (Table 6 of the Status Review).