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ENVIRONMENTAL BASELINE DOCUMENT
2004 through 2008

CHAPTER 45.
THREATENED AND ENDANGERED SPECIES AND SPECIES OF CONSERVATION CONCERN
Cook Inlet Drainages

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ACRONYMS AND ABBREVIATIONS

ADF&G	Alaska Department of Fish and Game
AKNHP	Alaska Natural Heritage Program
ASG	Alaska Shorebird Group
BBS	(North American) Breeding Bird Survey
BLM	Bureau of Land Management (U.S. Department of Interior)
BPIFWG	Boreal Partners in Flight Working Group
CFR	Code of Federal Regulations
ESA	Endangered Species Act of 1973
FR	Federal Register
MMPA	Marine Mammal Protection Act of 1972
NAWCP	North American Waterbird Conservation Plan
NMFS	National Marine Fisheries Service
PIF	Partners in Flight
USFWS	U.S. Fish and Wildlife Service

45. THREATENED AND ENDANGERED SPECIES AND SPECIES OF CONSERVATION CONCERN

45.1 INTRODUCTION

Information on threatened and endangered bird and mammal species listed under the U.S. Endangered Species Act (ESA), and other vertebrate species of conservation concern that have been found or are likely to occur in Pebble Project study areas in the Cook Inlet region (see Section 45.3) is presented in this chapter. This information is drawn from a review of wildlife survey work conducted in these study areas from 2004 to 2008 and from a review of the scientific literature. Additionally, an analysis of the potential for a set of rare vascular plant species (tracked by the Alaska Natural Heritage Program [AKNHP]) to occur in the Cook Inlet drainages region is presented. For vertebrate animals, this information is intended to summarize what is currently known about the conservation status of these species. Other high-profile, large terrestrial mammal species (bears [*Ursus* spp.] and moose [*Alces alces*]), which are of concern for subsistence, sport hunting, and ecological reasons, but currently are not of conservation concern in this part of Alaska, are not discussed. The occurrence of large terrestrial mammals in the Cook Inlet drainages region is discussed in Chapter 41, Section 41.2. Similarly, another high-priority, and federally protected species (Bald Eagle [*Haliaeetus leucocephalus*]), is not discussed here because Bald Eagles are abundant in Alaska and are not considered of conservation concern. The occurrence of Bald Eagles in the Cook Inlet drainages region is discussed in Chapter 41, Section 41.3. Details on the field surveys and specific survey results for the bird and mammal species of conservation concern recorded in terrestrial and freshwater habitats in the Cook Inlet drainages region and in marine habitats the Cook Inlet marine study area can be found in Chapter 41: Sections 41.3 (raptors), 41.4 (waterbirds), and 41.5 (landbirds and shorebirds); and in Chapter 44 (marine wildlife). For vascular plants, no specific surveys for rare species have been conducted in the Cook Inlet drainages region.

45.2 STUDY OBJECTIVES

This chapter largely represents a review of existing information. For plants, the objective was to determine which rare vascular taxa have a reasonable probability of occurring in the Cook Inlet drainages region, based on known ranges of the plants, their habitat associations, and the habitats available in the region. For vertebrate animals, the objective was to briefly summarize occurrence and conservation-status information for the threatened and endangered species and species of conservation concern found or likely to occur in Pebble Project study areas in the Cook Inlet region.

45.3 STUDY AREA

The study area for this work encompasses both terrestrial/freshwater and marine habitats. For this chapter, the terrestrial and freshwater portion of the area evaluated for vertebrate species encompasses all the study areas used during field surveys for wildlife within the Cook Inlet drainages region from 2004 to 2006. Different specific study areas were used for field surveys depending on the focus of the surveys. The wildlife study areas used are described in Chapter 41: for terrestrial mammals in Section 41.2, for

raptors in Section 41.3, for waterbirds in Section 41.4, and for breeding landbirds and shorebirds in Section 41.5. These study areas all encompass streams and rivers and lakes that flow eastward and eventually drain into Cook Inlet. For simplicity, in this report, these study areas are collectively referred to as the Cook Inlet drainages study areas. The marine portion of the area evaluated for vertebrate species occurs in the Cook Inlet marine study area, which encompasses all supratidal and intertidal areas, and all marine waters in Iliamna and Iniskin bays, the nearby offshore islands, and the adjacent open coastline; survey data from 2004 to 2008 were evaluated for this study area (see Chapter 44).

For the evaluation of the potential occurrence of rare vascular plants, the study area used encompassed all plant habitats within a radius of 161 kilometers (100 miles) from the midpoint between the Pebble Deposit and the coastline of Cook Inlet at Iniskin Bay (see Section 45.6.1).

45.4 PREVIOUS STUDIES

A large number of biological studies have been conducted within a broad region surrounding the Cook Inlet drainages and Cook Inlet marine study areas and provide information on the bird and mammal species of conservation concern discussed in this chapter. This information (too lengthy to discuss here) can be found in Chapter 41 in the sections for raptors (41.3), waterbirds (41.4), and landbirds and shorebirds (41.5), and in Chapter 44 (marine wildlife).

45.5 SCOPE OF WORK

Charles T. Schick, Robert H. Day, Wendy A. Davis, and Brian E. Lawhead of ABR, Inc., Anchorage and Fairbanks, Alaska conducted this study. This work included the following activities:

- A survey of existing information on distribution and habitat associations to determine which of the rarer vascular plant species in Alaska have the potential to occur the Cook Inlet drainages study areas.
- A review of Pebble Project field survey data to determine the presence or absence of vertebrate animal species of conservation concern in the Cook Inlet drainages and Cook Inlet marine study areas.
- A literature review to determine the conservation status of the vertebrate animal species recorded or expected to occur in the Cook Inlet drainages and Cook Inlet marine study areas.

45.6 METHODS

45.6.1 VASCULAR PLANTS

To compile a list of rare vascular plants that have a reasonable potential to occur within the Cook Inlet drainages study areas, researchers first submitted a formal data request to the AKNHP. The AKNHP maintains a database with collection-locality and habitat information for the rare and endemic plants that occur in Alaska. These rare plants are noted on the AKNHP *Vascular Plant Tracking List*, which included 363 plant taxa at the time of this rare plant assessment (AKNHP, 2006a). Each of the 363 taxa is assigned a global and state rarity ranking, which is derived from information prepared by the Conservation of

Arctic Flora and Fauna (CAFF) program and a network of other worldwide conservation programs. The definitions of the rarity rankings used are presented in Table 45-1.

In the data request to the AKNHP, researchers requested information only on the rarer taxa, those with state ranks of S1, S2, S1S2, or S2S3 (the S1 and S1S2 ranks are listed as critically imperiled and the S2 and S2S3 ranks are listed as imperiled; Table 45-1). A broad search area for records of rare plants was defined for the data request, using a radius of 161 kilometers (100 miles) from the midpoint between the Pebble Deposit and the coastline of Cook Inlet at Iniskin Bay. This search area encompassed the three Pebble Project study areas in which wildlife habitat mapping studies in terrestrial and freshwater habitats were conducted (the mine study area; the transportation-corridor, Bristol Bay drainages study area; and the Cook Inlet drainages study area; see Chapter 16 [Sections 16.1 and 16.6] and Chapter 41 [Section 41.1]). This search area was large enough to include portions of both Lake Clark and Katmai national parks and preserves, plus a small portion of the Kenai Peninsula on the eastern side of Cook Inlet (Figure 45-1). Researchers specifically asked for a listing of all the rarer vascular plant taxa with known collection localities within this search area (these taxa were considered to have some potential of occurring in the Cook Inlet drainages study areas). The habitats in which these taxa typically occur (Table 45-2) were compared with the habitats that actually are available in the Cook Inlet drainages study areas to assess more accurately the potential for these species to occur in the study areas.

45.6.2 VERTEBRATE ANIMALS

Methods to determine which threatened and endangered species and species of conservation concern occur in the Cook Inlet drainages and Cook Inlet marine study areas involved two activities: a review of field survey data and a literature review. The field surveys were part of the wildlife survey program for the Pebble Project (Chapter 41: raptors, waterbirds, shorebirds, and landbirds; and Chapter 44: marine wildlife). The literature review was used to summarize information on which species are of concern and why each species is considered threatened or endangered or of conservation concern.

Researchers compiled lists of bird, mammal, and amphibian species that were recorded or are expected to occur in the study areas, which fall into one of two levels of conservation concern:

- Within the higher level of concern category are the following:
  - Species that are protected by the U.S Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS) as threatened or endangered under the ESA (USFWS, 2010; NMFS, 2010a) and/or are listed by the Alaska Department of Fish and Game (ADF&G) as endangered in the State of Alaska (ADF&G, 2010).
  - Marine mammal species for which large population declines are known and which are listed as “depleted stocks” by NMFS (NMFS, 2010b).
- Within the lower level of concern category are species considered of conservation concern by federal and state management agencies, conservation organizations, and working-groups (see below). Because of the jurisdiction of U.S. management agencies over the proposed development, the conservation-status lists of only U.S. federal and state agencies and organizations were considered in this study.

To determine which bird species occurring in the Cook Inlet drainages and Cook Inlet marine study areas currently are listed as of conservation concern, researchers consulted 10 bird-conservation lists from various federal- and state-level organizations that directly address the conservation concerns for Alaskan birds. In general, the goal in preparing these lists is not to identify those species that already are treated formally by the USFWS under the ESA, rather it is to identify species that currently may be common but for which there are concerns about the long-term viability of their populations (see below). The bird-conservation lists reviewed were those that considered Alaskan birds specifically and were published as of 2010: USFWS's *Birds of Conservation Concern* (USFWS, 2008); Bureau of Land Management's *Special Status Species List for Alaska* (BLM, 2005); U.S. Forest Service's *Alaska Region Sensitive Species List* (Goldstein et al., 2009), Alaska Department of Fish and Game's *Species of Special Concern* (ADF&G, 1998) and *Comprehensive Wildlife Conservation Strategy* (ADF&G, 2006), Alaska Natural Heritage Program's *Vertebrate Species Tracking List* (AKNHP, 2008), Audubon Alaska's *Watchlist 2010* (Kirchoff and Padula, 2010), Waterbird Conservation for the America's *North American Waterbird Conservation Plan* (Kushlan et al. 2002 and 2006), Alaska Shorebird Group's *Conservation Plan for Alaska Shorebirds* (ASG, 2008), and Boreal Partners in Flight Working Group's *Landbird Conservation Plan for Alaska Biogeographic Regions* (BPIFWG, 1999).

The 10 conservation lists reviewed here variously considered several criteria related to population persistence in Alaska that included information on population trend, population size, known threats during the breeding and nonbreeding seasons, and range size and dispersion both during breeding and nonbreeding. On some lists (e.g., ADF&G, 2006), additional species-selection criteria were used that included information on known health concerns, the incidence of mortality, endemism (to Alaska), sensitivity to disturbance, the lack of information on population status, questionable taxonomy, representativeness (for habitat use), and international importance for monitoring. Some listing groups similarly considered monitoring concerns, both globally and in the state, when selecting species (BPIFWG, 1999) and others considered specialized habitat requirements (BLM, 2005). Of the 10 lists reviewed, seven address waterfowl, eight address waterbirds (loons and grebes in this study), eight address seabirds (cormorants and alcids in this study), seven address raptors, eight address shorebirds, and eight address landbirds. On some of these lists, species were quantitatively ranked and categorized by conservation class (e.g., high, moderate, or low concern), while on other lists, a single category of conservation concern was used. Alaska stewardship or monitoring concerns also were considered on some lists for those cases in which a large proportion of the global population of the species resides in Alaska. For this study, in an attempt to identify those species for which there is genuine conservation concern, as opposed to stewardship concern or moderate or low conservation concern, researchers selected species of conservation concern using two criteria:

- First, the species had to be listed in the highest conservation category(ies), if applicable, within the classification system used (species of moderate or low concern were not considered). On those lists in which a single conservation class was used, however, all species of conservation concern occurring in the study areas were considered.
- Second, the species had to be listed as of conservation concern on at least two of the lists that considered the various species groups addressed in this study (waterfowl, waterbirds, raptors, shorebirds, and landbirds). This criterion helped to eliminate species of moderate or low concern that only occur on a single bird-conservation list.

Additional research reports were reviewed for each bird species of conservation concern recorded in the Cook Inlet drainages and Cook Inlet marine study areas to provide background ecological information on the reasons for conservation concern (see Section 45.7.2).

In contrast to birds, only five conservation lists directly address lower-level conservation concerns for Alaskan mammals (i.e., outside of threatened and endangered species and those marine mammal populations listed as depleted under the Marine Mammal Protection Act [MMPA]). In addition, only four of those five lists address the conservation concerns for terrestrial mammals and only two lists address terrestrial small mammals. The five conservation lists reviewed for mammals were those prepared by NMFS (2010b) for marine mammals, and those prepared by BLM (2005), ADF&G (1998; 2006), and AKNHP (2008) for marine and terrestrial mammals. Only ADF&G (2006) and AKNHP (2008) address the conservation status of terrestrial small mammals in Alaska. Because fewer lists are available, especially for terrestrial small mammals, the protocol for selecting mammal species of conservation concern was relaxed so that, if a species occurred on any conservation list, it was included here as a species of conservation concern.

Conservation concerns for amphibians were addressed on only two conservation lists (ADF&G, 2006; AKNHP, 2008), each of which was reviewed for this study. The single species of amphibian that occurs in Alaska north of the southeastern panhandle (wood frog [*Rana sylvatica*]) was listed as of conservation concern on one of these lists (ADF&G, 2006) and was included here as a species of conservation concern.

45.7 RESULTS

45.7.1 VASCULAR PLANTS

Only one vascular plant species in Alaska, *Polystichum aleuticum*, is federally listed as threatened or endangered; this species is restricted to two islands (Adak and Atka) in the central Aleutian Island chain (USFWS, 2010).

Seventeen vascular plant taxa with S1, S2, S1S2, or S2S3 state-rank categories were found to have collection records occurring within the 161-kilometer-radius search area used in this study (Table 45-2) and were considered to have some potential to occur within the Cook Inlet drainages study areas. In addition, 14 of these 17 taxa have known ranges that overlap with the 161-kilometer-radius search area (Hultén, 1968; Welsh, 1974; Lipkin and Murray, 1997; Anderson, 2005; Ada Hayden Herbarium, 2006; Carlson et al., 2006; FNA, 2006; WANHP, 2006). One species, *Ceratophyllum demersum*, has a known range that overlaps with the 161-kilometer-radius search area only at its edges. The two remaining species, *Catabrosa aquatica* and *Smelowskia pyriformis*, have known ranges that come close to the edge of the 100-mile-radius search area but without direct overlap. These three species were included because it was thought by researchers at the AKNHP that the ranges of these species could be larger than currently known.

If the specific microenvironments in which these 17 rare plant taxa typically are found are not present, the potential for these plants to become established in the Cook Inlet drainages study areas would be low. The Cook Inlet drainages study areas, however, encompass a variety of plant habitats, including saline-influenced (supratidal) coastal meadows; lowland scrub and graminoid-dominated wetlands; extensive tall scrub and open mixed forests in upland, lowland, and riverine areas; and well-drained alpine dwarf scrub

and alpine barrens. This range of habitats includes all the habitats listed in Table 45-2 for the 17 rare taxa, and it is known, or reasonable to expect, that the specific microenvironments important for each plant taxa also are present within these habitats. This analysis suggests that, based on available habitats, all of the 17 rare taxa listed in Table 45-2 have some potential to occur in the Cook Inlet drainages study areas.

Of these 17 rare taxa, six are listed as critically imperiled in Alaska (S1 or S1S2 ranks; Table 45-2). All of these six taxa, however, are ranked as secure globally; they are considered S1 or S1S2 primarily because there are few collection records and/or small populations of these species in Alaska (see Table 45-1). The remaining 11 taxa are listed as imperiled in Alaska (S2 or S2S3 ranks). Among these 11 taxa, three species (*Botrychium alaskense*, *Primula tschuktschorum*, and *Smelowskia pyriformis*) also are listed as globally imperiled (G2 or G2G3 ranks) primarily because there are few collection records and/or small populations of these species worldwide. All three of these species are endemic to Alaska (Lipkin and Murray, 1997; Ada Hayden Herbarium, 2006; Carlson, 2006).

45.7.2 VERTEBRATE ANIMALS

No birds known to occur in the Cook Inlet drainages study areas are listed as endangered, threatened, proposed, or candidate species under the ESA, and none are listed as endangered species by the State of Alaska.

In the Cook Inlet marine study area, however, one waterfowl species (Steller’s Eider) is listed as threatened and one seabird (Kittlitz's Murrelet) is classified as a candidate species under the ESA (Kittlitz's Murrelets were not recorded but likely occur in the study area; see Chapter 44). In addition to Steller’s Eider and Kittlitz's Murrelet, 24 other bird species that were recorded or are likely to occur in the Cook Inlet study areas currently are considered of conservation concern for southwestern Alaska by at least two statewide or national groups that address bird conservation issues in Alaska (Table 45-3). The entire group of 26 bird species is composed of seven species of waterfowl, two waterbirds, two raptors, seven shorebirds, four seabirds, and four passerines.

In the Cook Inlet drainages study areas, none of the terrestrial mammals known or expected to occur are listed as endangered or threatened, or as proposed or candidate species under the ESA, and none are listed as endangered species by the State of Alaska. Similarly, none of the terrestrial large mammals that occur in the study areas currently are considered of conservation concern. Various species or subspecies of medium-sized furbearers and small mammals in south-central and southwestern Alaska have been identified as of conservation concern (ADF&G, 2006; AKNHP 2008), but nearly all of those taxa are insular populations or mainland populations with similarly restricted ranges that do not occur in the Cook Inlet drainages study areas. Only one small mammal species of conservation concern, the Alaska tiny shrew, may occur in the region (Table 45-4). The lynx is listed as a sensitive species by BLM (2005), presumably because of concern about its status as a threatened species under the ESA in the Lower 48 states (65 FR 16051) and because of concern about the potential for population declines occurring in Alaska. Population declines in Alaska, however, beyond the natural cyclical fluctuations with prey numbers, are not known for this species and the ADF&G has implemented more restrictive trapping seasons in the state with the goal of avoiding the over-trapping that led to population declines in the lower 48 (Stephenson, 2008). Currently, lynx are widespread in appropriate habitats in Alaska (MacDonald and Cook, 2009), and are not listed as of conservation concern by other state organizations that considered

furbearers (ADF&G, 2006; AKNHP, 2008). Hence, lynx were not considered of conservation concern in this study.

For marine mammals in the Cook Inlet marine study area, two species (Steller's sea lion and beluga) are listed as endangered and one species (northern sea otter) is listed as threatened under the ESA (Table 45-4). No marine mammals listed as endangered by the State of Alaska were recorded in the Cook Inlet marine study area. Two marine mammal species (harbor seal, and gray whale) that are known to occur in the Cook Inlet marine study area currently are considered of conservation concern for Alaska (Table 45-4).

A single amphibian species of conservation concern, the wood frog, is expected to occur in the Cook Inlet drainages study areas.

45.7.2.1 THREATENED AND CANDIDATE BIRD SPECIES

Steller's Eider

Steller's Eiders were recorded regularly in the Cook Inlet marine study area during winter and early spring, where they primarily occur in offshore waters in the middle portions of Iniskin and Iliamna bays and occasionally in nearshore waters (Chapter 44).

In 1990, the USFWS was petitioned to list Steller's Eiders as endangered under the ESA; however, USFWS determined in 1992 that the species deserved listing, but that higher priorities prevented listing at that time. The petition was examined again in 1993, when it was ruled that the entire species did not deserve listing, but that the Alaska-breeding population did. Although population trends of the Alaskan and Russian–Pacific breeding populations (i.e., Alaska and Russia from the Khatanga River eastward, respectively), which mix as wintering birds in southern Alaska, showed unclear patterns as a whole, it was clear that the species essentially had disappeared as a breeding bird from the Yukon-Kuskokwim Delta by that time (Kertell, 1991). The Alaska-breeding population of Steller's Eiders finally was listed as threatened in 1997 (62 FR 31748). The Alaska-breeding population was listed because of the contraction in the species' breeding range in Alaska and the resulting increased vulnerability of the remaining breeding population to extirpation (Quakenbush et al., 2002; USFWS, 2002). Today, the species nests on the Yukon-Kuskokwim Delta only very rarely, and the primary breeding population in Alaska is in what is called the "Barrow triangle," a triangular-shaped piece of the North Slope from Barrow south to 70° 50' N latitude, or approximately the area encompassing Wainwright, Barrow, and Cape Halkett (Quakenbush et al., 2002). Birds that breed in the Barrow area winter in an unknown location and have been recorded as migrants during fall staging in both Izembek and Nelson lagoons on the lower Alaska Peninsula (Fredrickson, 2001; Rothe, pers. comm., 2006). Critical habitat for Steller's Eiders was designated in 2001 (66 FR 8850) and includes breeding and staging areas in the Yukon-Kuskokwim Delta region and molting/staging areas on the northern coast of the Alaska Peninsula; no critical habitat for this species was designated in Cook Inlet. A final recovery plan for Steller's Eiders was published in 2002 (USFWS, 2002).

Kittlitz's Murrelet

Researchers did not definitively record Kittlitz's Murrelets on any surveys in the Cook Inlet marine or Cook Inlet drainages study areas. However, one unidentified *Brachyramphus* murrelet recorded on a

Cook Inlet marine survey in 2004 may have been this species. Kittlitz's Murrelets were not expected in most of the terrestrial habitats in the Cook Inlet drainages study areas. The species may nest at higher elevations on scree slopes and in partially barren fell-field habitats, but it is unlikely to occur at lower elevations. The lack of records of Kittlitz's Murrelets in the Cook Inlet marine study area is surprising because, along the Alaska Peninsula, the species typically occurs in protected bays that are near potential nesting areas (often in scree and barren habitats near glaciers; Day et al., 1999), which occur in this area. In addition, these birds prefer to forage in turbid water of glacial origin (Day et al., 2003), and there is much of this type of foraging habitat in the Cook Inlet marine study area. Hence, there are several potential high-elevation nesting areas for this species near the marine survey area, and the entire area potentially is suitable for foraging. In Iliamna Bay, these potential nesting areas include several unnamed glaciers between the Williams River and Cottonwood Bay. In Iniskin Bay, potential nesting areas include Roscoe Glacier on Roscoe Peak, several unnamed glaciers on and near Sugarloaf Mountain, and two unnamed glaciers that drain into the head of the Iniskin River.

The USFWS was petitioned in 2001 to list the Kittlitz's Murrelet as endangered under the ESA; the justification for this petition was that the species was threatened by climate change, oil spills, vessel traffic, dramatic population declines, and reproductive failures. The USFWS reviewed this petition and concluded in 2004 that causes of the declines were not well known, but included habitat loss or degradation, increased mortality, low recruitment, glacial retreat, and oceanic regime shifts. They then concluded that existing regulatory mechanisms appeared at that time to be inadequate to reduce these threats and stop population declines. Kittlitz's Murrelet remains as a candidate species (USFWS, 2010) at the time of this writing and is considered a species of conservation concern by seven of the eight U.S. management agencies or organizations that addressed seabirds in their conservation-status lists (Table 45-3), primarily because of concerns about the small population size, declining population trends, effects of climate change, and disturbance in summer foraging areas.

45.7.2.2 THREATENED AND ENDANGERED MARINE MAMMAL SPECIES

Steller's Sea Lion

Steller's sea lions were recorded in the Cook Inlet marine study area in small numbers from spring to fall and occurred most often on islands at the mouth of Iniskin Bay and in the open bight between Iliamna and Iniskin bays (Chapter 44).

After a dramatic population decline in the late 1970s and 1980s (Merrick et al., 1987), the Steller's sea lion was listed by NMFS as a threatened species under the ESA in 1990 (55 FR 12645). Critical habitat was designated within 20 nautical miles of rookeries and haulouts in 1993 (58 FR 45269); no critical habitat, however, was designated in lower Cook Inlet in the vicinity of Iniskin and Iliamna bays (50 CFR 226.202). In 1997, the Alaska population of Steller's sea lion was classified into two distinct population segments (DPSs)—one east and one west of 144°W longitude (near Cape Suckling); the western stock was listed as endangered, whereas the eastern stock retained its threatened status (62 FR 24345). Sea lions using the Cook Inlet marine study area belong to the endangered western DPS, which formerly represented approximately 75 percent of the total world population of the species, but which has declined to a fraction of that. The western DPS was estimated to number approximately 45,000 animals in Alaska in 2005 after increasing at an average rate of 3 percent annually from 2000 through 2004, the first increase recorded for this stock since the 1970s (NMFS, 2008a; Angliss and Allen, 2009). The recovery plan for this species (NMFS, 1992) recently was revised (NMFS, 2008a).

Beluga

Belugas (also called belukha or white whale) have been recorded rarely in the Cook Inlet marine study area, with the most recent observations in 2007 and 2008 occurring in the fall months; some earlier observations, from 1978 to 2002, occurred during spring and early summer (Chapter 44).

Following a gradual population decline from the 1970s and a sharp decline (50 percent) during 1994 through 1998, the Cook Inlet population of belugas became the focus of a status review by NMFS in 1998 (63 FR 64228; Moore and DeMaster, 2000). As a result of the population decline, which NMFS concluded was caused by overharvest, the population was proposed for designation as a depleted stock under the MMPA in October 1999 (64 FR 56298). The Cook Inlet beluga population, which is isolated geographically and genetically from the four other Alaska populations (O'Corry-Crowe et al., 1997), was formally determined by NMFS to be a DPS in June 2000 (65 FR 34590), but a listing under the ESA was considered unwarranted at that time (65 FR 38778). Six years later, however, because the population had not shown signs of recovery, a second status review was initiated in March 2006 (71 FR 14836). As a result of that status review, NMFS issued a final listing rule in October 2008 (73 FR 62919) to list the Cook Inlet DPS as endangered. The Cook Inlet DPS has been the focus of two environmental impact statements evaluating restrictions on subsistence harvest (NMFS, 2003, 2008b) and a conservation plan, the final version of which was released in October 2008 (NMFS, 2008c). The 2009 population estimate for the Cook Inlet beluga population was 321 animals (NMFS, 2009).

A proposed rule designating 7,809 square kilometers of Cook Inlet waters as critical habitat for belugas was published in December 2009 (74 FR 63080). Five primary constituent elements (PCEs) are considered to be essential for conservation of the Cook Inlet DPS:

- Intertidal and subtidal waters up to 9.1 meters deep (below the mean lower low water datum) and within 8 kilometers of high- and medium-flow-accumulation streams hosting spawning runs of anadromous fish species.
- The presence of nine species of fish constituting primary prey.
- Absence of toxins and other harmful agents.
- Unrestricted passage within and between critical habitat areas.
- Absence of in-water noise levels known to cause abandonment of habitat.

Two areas of critical habitat were proposed, each containing multiple PCEs: Area 1, consisting of upper Cook Inlet waters north of a line between Threemile Creek on the west and Point Possession on the east, containing habitats important for calving, foraging, molting, and escape from predators, where the greatest numbers of belugas concentrate from spring through fall; and Area 2, waters located south of that line (middle and lower Cook Inlet) containing habitats used in a less-concentrated fashion for transit and foraging, mainly during the fall and winter months. The proposed Areas 1 and 2 correspond to the Type I and Type II habitats, respectively, delineated in the final conservation plan (NMFS, 2008c). All proposed critical habitat within the Cook Inlet marine study area is in critical habitat Area 2 (Figure 45-2); in that area, all waters within 2 nautical miles of the mean higher high water datum have been proposed as critical habitat.

Sea Otter

Sea otters were recorded in the Cook Inlet marine study area primarily during winter with only scattered individuals recorded during the spring and summer; they occurred broadly throughout the study area, but most otters were found outside Iniskin and Iliamna bays, in offshore habitats and among the islands at the mouths of the bays (Chapter 44).

Because of concern about its steadily declining size (Estes et al., 2005; Burn and Doroff, 2005), the southwestern Alaska population of the the sea otter subspecies known as the northern sea otter (*Enhydra lutris* ssp. *kenyoni*) was designated as a candidate species for listing under the ESA in 2000 (65 FR 67343). In 2005, the "southwest Alaska DPS" was listed as threatened (70 FR 46366). The USFWS background report supporting that listing provided a summary of the biological information on the southwestern Alaska population of northern sea otter, the range of which reaches its northeastern extent in the Kamishak Bay region of Cook Inlet (including the Cook Inlet marine study area). A recovery team was established and a recovery plan for the southwest Alaska DPS of the northern sea otter has been released (USFWS, 2005).

Designation of critical habitat for the southwest Alaska DPS was proposed by USFWS in December 2008 (73 FR 76454), and the final rule was published in October 2009 (74 FR 51988). USFWS identified the following PCEs of critical habitat as being important for the conservation of the DPS:

- Shallow, rocky areas in waters less than 2 meters deep, where marine predators such as killer whales are less likely to forage.
- Nearshore waters within 100 meters of the mean high-tide line, which may provide protection or escape from predators.
- Kelp forests in waters less than 20 meters deep, which also provide protection from predators.
- Prey resources within the preceding three types of habitats.

The Cook Inlet marine study area is located within designated critical habitat for northern sea otters (Figure 45-2); the greatest proportion of the critical habitat area within the Cook Inlet marine study area and vicinity is composed of waters within the 20-meter isobath (depth contour).

45.7.2.3 BIRD SPECIES OF CONSERVATION CONCERN

Trumpeter Swan

Trumpeter Swans were recorded rarely both in the Cook Inlet drainages study area for waterbirds, where one nest was found (Chapter 41, Section 41.4), and in the Cook Inlet marine study area (one bird in flight) (Chapter 44). The species is considered a locally common resident and breeder in freshwater areas in the northern Gulf of Alaska (Isleib and Kessel, 1973). Trumpeter Swan populations had declined dramatically by the early 1900s, largely due to over-harvesting, but have since rebounded because of conservation efforts (Mitchell and Eichholz, 2010). Both Trumpeter and Tundra swan populations in Alaska have increased substantially since 1965 (Conant and Groves, 2005). Current conservation concern for Trumpeter Swans is based on the species' sensitivity to disturbance (Henson and Grant, 1991) and contaminants in aquatic environments, and its vulnerability to habitat loss, especially on the wintering grounds along the northern Pacific coast of North America and in interior regions in the western U.S.

states (Mitchell and Eichholz, 2010; NAS, 2010). Trumpeter Swans were listed as a species of conservation concern by two of the seven U.S. management agencies or organizations that considered waterfowl in their conservation-status lists (Table 45-3).

King Eider

King Eiders were recorded only in the Cook Inlet marine study area, where they were found to be rare, occurring only during the winter months (Chapter 44). This species is a winter visitor to the northern Gulf of Alaska, where it is considered rare (Isleib and Kessel, 1973). King Eiders are considered of conservation concern primarily because substantial declines (56 percent) between 1976 and 1996 were indicated in survey data for spring migrants enroute to the North Slope and Canada (Suydam, 2000). Breeding populations in the western Canadian Arctic declined over a similar period (Dickson, 1995). An analysis of recent survey data from 1993 to 2009 indicates that breeding populations on the North Slope of Alaska are increasing (Larned et al. 2010). The species also is vulnerable to noise disturbance and oil spills and other contaminants in marine waters (Suydam, 2000; AKNHP, 2006b). King Eiders were listed as a species of conservation concern by four of the seven U.S. management agencies or organizations that considered waterfowl in their conservation-status lists (Table 45-3).

Common Eider

Common Eiders were recorded only in the Cook Inlet marine study area (Chapter 44). They were found to be uncommon as a nonbreeding species during all seasons in the study area, but were more abundant during the spring and summer; Common Eiders historically nested in the Iniskin Islands area. This eider species is considered a rare visitor to the northern Gulf of Alaska, although it is known to breed in lower Cook Inlet (Isleib and Kessel, 1973). The Common Eider is considered a species of conservation concern primarily because declines of up to 4.5 percent annually occurred in breeding populations in western Alaska and the North Slope between 1976 and 1994 (USFWS, 1999); in recent analyses of survey data from 1998 to 2008, breeding numbers appear to be increasing on the North Slope (Dau and Larned, 2008). The species also is vulnerable to habitat loss and contamination in marine waters (ADF&G, 2006). Common Eiders (all subspecies or the *v-nigrum* subspecies only) were listed as a species of conservation concern by three of the seven U.S. management agencies or organizations that considered waterfowl in their conservation-status lists (Table 45-3).

Surf Scoter

Surf Scoters were recorded only in the Cook Inlet marine study area, where nonbreeding birds were found to be abundant during all seasons (Chapter 44). The species is a resident of the northern Gulf of Alaska, where it is considered abundant as a nonbreeder but extremely rare as a breeding bird (Isleib and Kessel, 1973). Surf Scoters are of conservation concern primarily because the breeding population in Alaska declined between 1957 and 1992 (Henny et al., 1995). A decline of up to possibly 2 percent annually since 1950 has been documented, although numbers may have increased since 1980 (USFWS, 1999). There also are concerns about the species' vulnerability to oil spills in marine waters during the nonbreeding season and to mineral and oil development activities, both onshore and offshore (ADF&G, 2006). Surf Scoters were listed as a species of conservation concern by two of the seven U.S. management agencies or organizations that considered waterfowl in their conservation-status lists (Table 45-3).

Black Scoter

Black Scoters were recorded only in the Cook Inlet marine study area, where nonbreeding birds were found to be common during all seasons (Chapter 44). The species is a resident of the northern Gulf of Alaska and is categorized as an uncommon summer visitor, a fairly common migrant, and a common winter visitor (Isleib and Kessel, 1973). The Black Scoter is considered a species of conservation concern primarily because of declines in breeding populations (2 percent annually) in western Alaska from 1977 to 1998 (USFWS, 1999). Declines in breeding populations in that area apparently are continuing (Kirchoff and Padula, 2010). The species also is vulnerable to oil spills during the marine phase of its annual cycle and to other contaminants (ADF&G, 2006). Black Scoters were listed as a species of conservation concern by four of the seven of the U.S. management agencies or organizations that considered waterfowl in their conservation-status lists (Table 45-3).

Long-tailed Duck

Long-tailed Ducks were recorded only in the Cook Inlet marine study area, where nonbreeding birds were found to be common during spring, fall, and winter; they were rare during the summer months (Chapter 44). The species is a resident of the northern Gulf of Alaska, where it is categorized as an uncommon summer visitor, a common migrant, and a common winter visitor (Isleib and Kessel, 1973). The Long-tailed Duck is considered a species of conservation concern primarily because of the large population declines (75 percent) that occurred in Alaska since 1977 (USFWS, 1999); south of the Brooks Range in 1999, a decline of 51 percent in breeding populations was found compared to the long-term average from 1975 to 1998 (Conant et al., 1999). Analyses of data from various surveys in recent years indicate that numbers may have stabilized or increased slightly in several areas of the state, but population levels remain below historical averages (AKNHP, 2006c). The species also is vulnerable to habitat alterations, hunting pressure, and to oil spills and other contaminants during the marine phase of its annual cycle (AKNHP, 2006c). Long-tailed Ducks were listed as a species of conservation concern by two of the seven U.S. management agencies or organizations that considered waterfowl in their conservation-status lists (Table 45-3).

Red-throated Loon

Red-throated Loons were recorded only in the Cook Inlet marine study area, where they were found to be rare during the spring and summer (Chapter 44). The species is a resident of the northern Gulf of Alaska and is categorized as a locally common breeder, a common migrant, and an uncommon to common winter visitor (Isleib and Kessel, 1973). The Red-throated Loon is considered a species of conservation concern primarily because populations in western Alaska south of the Brooks Range declined by 53 percent between 1977 and 1993 (Groves et al. 1996). Populations in that area currently appear to be increasing (Mallek and Groves, 2009). The species also is vulnerable to habitat loss, disturbance and predation (including human harvest) during breeding, fishing-related bycatch, and to oil spills and other contaminants in marine waters (AKNHP, 2004a). Red-throated Loons were listed as a species of conservation concern by five of the eight U.S. management agencies or organizations that considered waterbirds in their conservation-status lists (Table 45-3).

Horned Grebe

Horned Grebes were recorded only in the Cook Inlet marine study area, where they were found to be rare, occurring primarily during spring and only once during winter (Chapter 44). The species is a resident of the northern Gulf of Alaska and is categorized as an uncommon local breeder and summer visitor, a common migrant, and a fairly common winter visitor (Isleib and Kessel, 1973). The Horned Grebe is considered a species of conservation concern primarily because it is now rare or absent from most of its previous breeding range in eastern North America (Stedman, 2000) and because statistically significant population declines (3.5 percent per year) between 1966 and 2005 have been found in analyses of North American Breeding Bird Survey (BBS) data (Sauer et al. 2006). The rate of population decline in North America in recent decades (1980 to 2005) has increased, but sample sizes from Alaska are too small for adequate determination of trends (Sauer et al. 2006). The species also is vulnerable to habitat loss and alteration, (especially of lakes on the breeding grounds), oil spills and contaminants, fishing-related bycatch, and increased disturbance and predation associated with development (Stedman, 2000; ADF&G, 2006). Horned Grebes were listed as a species of conservation concern by three of the eight U.S. management agencies or organizations that considered waterbirds in their conservation-status lists (Table 45-3).

Red-faced Cormorant

Red-faced Cormorants were recorded only in the Cook Inlet marine study area, where they were found to be uncommon during spring and summer (Chapter 44). The species was not recorded in the northern Gulf of Alaska prior to 1969, but subsequently the species expanded its range eastward rapidly to become common in the northern Gulf (Isleib and Kessel, 1973); now, however, Red-faced Cormorants are rare in the northern Gulf of Alaska (Robert Day, personal observation), suggesting that the species' primary range has retracted westward again. The Red-faced Cormorant is considered a species of conservation concern primarily because populations across the species' range and in Alaska are declining (Causey, 2002; Dragoo et al., 2003; AKNHP, 2005a), and because the total world population is small and the species occupies a restricted range (coastal regions in southeastern Russia to south-central Alaska). The species also is vulnerable to oil spills and marine contamination, fishing by-catch, alterations of marine habitats, and predation (including human harvest) and disturbance during breeding (AKNHP, 2005a; ADF&G, 2006). Red-faced Cormorants were listed as a species of conservation concern by five of the eight U.S. management agencies or organizations that considered seabirds in their conservation-status lists (Table 45-3).

Pelagic Cormorant

Pelagic Cormorants were recorded only in the Cook Inlet marine study area, where they were found to be common during all seasons; they were more abundant, however, during spring and summer (Chapter 44). The species is a resident of the northern Gulf of Alaska, where it is considered abundant (Isleib and Kessel, 1973); it is the most abundant cormorant seen throughout this region (Robert Day, personal observation). The Pelagic Cormorant is considered a species of conservation concern because of apparent population declines and known population threats during both the breeding and nonbreeding seasons (Kushlan et al., 2002; USFWS, 2008). The species is vulnerable to disturbance and predation during nesting and roosting, fishing by-catch, and to oil spills and marine contamination (Hobson, 1997). Pelagic Cormorants were listed as a species of conservation concern by two of the eight U.S. management agencies or organizations that considered seabirds in their conservation-status lists (Table 45-3).

Golden Eagle

Golden Eagles were recorded both in the Cook Inlet drainages study area for raptors, where one occupied nest was located in 2004 and two occupied nests were found in 2005 (Chapter 41, Section 41.3), and in the Cook Inlet marine study area, where only three observations of single birds were recorded (Chapter 44). The species is considered rare along the northern Gulf Coast of Alaska, and although they will use maritime-influenced habitats, they breed more commonly in mountainous areas inland from the coast (Isleib and Kessel, 1973). The Golden Eagle is considered a species of conservation concern primarily because declines in breeding populations in the western U.S. have been observed; populations in Denali National Park are stable, but trends in the rest of Alaska are unknown (Kochert et al., 2002). In addition to the uncertainty regarding population trends in the state, there is concern about the uncertainty of the presumed small population size in Alaska and about habitat loss on the wintering grounds in the central and western states (ADF&G, 2006). Golden Eagles were listed as a species of conservation concern by two of the seven U.S. management agencies or organizations that considered raptors in their conservation-status lists (Table 45-3).

Peregrine Falcon

Peregrine Falcons were recorded both in the Cook Inlet drainages study area for raptors, where a single nest was occupied in 2004 and 2005 (Chapter 41, Section 41.3), and in the Cook Inlet marine study area, where only three observations of single birds were recorded (Chapter 44). Based on range alone, the Peregrine Falcon subspecies breeding in the Cook Inlet drainages region is expected to be the coastal *pealei* race, but the nesting birds observed showed light-colored plumage, suggesting they may be intergrades between the coastal *pealei* and inland *anatum* birds (Ritchie, pers. comm., 2006). Peregrine Falcons are considered rare residents along the northern Gulf Coast of Alaska, where they nest both in coastal and inland areas (Isleib and Kessel, 1973). Although the species has been delisted from endangered status under the ESA (USFWS, 2010), the Peregrine Falcon is considered a species of conservation concern because of small population sizes, both worldwide and in Alaska (where probably less than 2,000 birds breed), and because of continuing threats from contaminants acquired outside of Alaska by migrant prey species (ADF&G, 2006). Peregrine Falcons were listed as a species of conservation concern by three of the seven U.S. management agencies or organizations that considered raptors in their conservation-status lists (Table 45-3).

Black Oystercatcher

Black Oystercatchers were recorded only in the Cook Inlet marine study area, where they were found to be common, occurring primarily during spring and summer; far fewer birds were observed in the fall and the species was rare in winter (Chapter 44). The species is considered a fairly common resident in the northern Gulf of Alaska (Isleib and Kessel, 1973). There is concern about the small world population of this species (estimated at less than 11,000 birds) and its limited breeding range—more than 50 percent of all Black Oystercatchers breed only in Alaska (ASG, 2008), and up to 48 percent of all oystercatchers breeding in the northern Gulf of Alaska breed only in one place, Middleton Island south of Prince William Sound (Gill et al., 2004). Black Oystercatchers use a very restricted set of habitats (coastal rocky shorelines and cobble beaches) and are vulnerable to impacts from oil spills, natural predators (both avian and mammalian), and increasingly, human disturbance, especially during nesting and brood-rearing (Andres, 1997; Poe, 2003; ASG, 2008). Black Oystercatchers have strong fidelity to breeding areas, a low reproductive rate, and heavy offspring mortality, which makes them vulnerable to local impacts (Andres,

1997 and 1998). Without disturbance, however, increases in local population numbers can occur (Murphy and Mabee, 2000; Gill et al., 2004). Black Oystercatchers were listed as a species of conservation concern by six of the eight U.S. management agencies or organizations that considered shorebirds in their conservation-status lists (Table 45-3).

Marbled Godwit

Marbled Godwits were recorded only in the Cook Inlet marine study area, where they were observed very rarely (nine birds were observed once during the spring migration in 2006; Chapter 44). The species is extremely rare in Alaska, with only a small population of the relict Beringian subspecies (*beringiae*) migrating through the northern Gulf of Alaska on its way to and from breeding grounds in the Ugashik Bay area on the northern Alaska Peninsula (Gibson and Kessel, 1989). In the upper Cook Inlet area, Marbled Godwits only occur during spring migration (Gill and Tibbitts, 1999). The total population of the *beringiae* subspecies, which is geographically disjunct from the breeding population of the nominate race in the northern Great Plains of North America, is believed to be very small and is estimated at approximately 2,000 birds (ASG, 2008). There is concern about this subspecies because of the very small total world population (populations of only a few other shorebird species are smaller, and most of those are protected under the ESA) and because of its limited nesting distribution, both of which make the world population highly vulnerable (ASG, 2008). In addition, there is concern about the loss of wetland habitats used during migration and on the wintering grounds, which are presumed to be on the Pacific coast in the southern U.S. and Mexico, where other populations of Marbled Godwits winter. This subspecies of the Marbled Godwit was listed as of conservation concern by six of the eight U.S. management agencies or organizations that considered shorebirds in their conservation-status lists (Table 45-3).

Black Turnstone

Black Turnstones were recorded only in the Cook Inlet marine study area, where they were found to be common during spring migration (Chapter 44). The species is resident in the northern Gulf of Alaska and occasionally becomes locally abundant in some locations along the outer coast during spring migration (Isleib and Kessel, 1973). In the upper Cook Inlet area, Black Turnstones only occur during spring migration (Gill and Tibbitts, 1999). The species is of conservation concern because the entire world population (approximately 95,000 birds) nests only in Alaska—primarily in vegetated intertidal habitats along the outer Yukon-Kuskokwim Delta (Handel and Gill, 1992)—thus making it susceptible to habitat loss from global sea-level rise resulting from global warming (ASG, 2008). In addition, a high percentage of the world population traditionally concentrated in Prince William Sound, Alaska (Montague Island) to feed on herring spawn during spring migration, and such concentrations of birds are highly susceptible to the effects of oil spills (Norton et al., 1990; Bishop and Green, 2001; ASG, 2008). There also are concerns about habitat loss and marine pollution during migration and on the wintering grounds along the Pacific coast from southern Alaska to northern Mexico. Black Turnstones were listed as a species of conservation concern by three of the eight U.S. management agencies or organizations that considered shorebirds in their conservation-status lists (Table 45-3).

Surfbird

Surfbirds were recorded only in the Cook Inlet marine study area, where they were found to be uncommon, occurring only during spring migration in one year (Chapter 44). Surfbirds are resident in the

northern Gulf of Alaska, and the resident birds are joined during spring migration by large flocks from wintering areas farther south; in spring they occur primarily with Black Turnstones and Rock Sandpipers (Isleib and Kessel, 1973). In the upper Cook Inlet area, the species only occurs during spring migration (Gill and Tibbitts, 1999). The Surfbird is considered a species of conservation concern because of a suspected population decline (based on Christmas Bird Count data; Senner and McCaffery, 1997), a fairly low worldwide population (approximately 70,000 birds), and a restricted breeding distribution (primarily Alaska and sparingly into the Yukon Territory; ASG; 2008). Over 75 percent of the world population of Surfbirds breeds in Alaska (ASG, 2008). Surfbirds also traditionally congregated in large numbers at spring-migration stopover sites, traditionally on Montague Island in Prince William Sound, Alaska, making them vulnerable to impacts from oil spills (Norton et al., 1990; Bishop and Green, 2001; ASG, 2008). Threats from habitat loss and marine pollution during the nonbreeding seasons also are of concern because the species migrates and overwinters in intertidal habitats, typically rocky shorelines in south-coastal Alaska and along the western coasts of North, Central, and South America. Surfbirds were listed as a species of conservation concern by three of the eight U.S. management agencies or organizations that considered shorebirds in their conservation-status lists (Table 45-3).

Rock Sandpiper

Rock Sandpipers were recorded only in the Cook Inlet marine study area, where they were found to be common in winter but relatively uncommon during spring migration (Chapter 44). The species was considered a common migrant and winter visitor to the northern Gulf of Alaska by Isleib and Kessel (1973). It is now known, however, that nearly the entire population of the nominate *ptilocnemis* race of Rock Sandpiper overwinters in Cook Inlet (Gill and Tibbitts, 1999). Although this species often winters on rocky shores and reefs, it may move onto mud flats within protected bays during the coldest part of the winter (Isleib and Kessel, 1973) and does so regularly in upper Cook Inlet (Gill and Tibbitts, 1999). The *ptilocnemis* subspecies is of conservation concern because the world population is small (less than 20,000 birds) and virtually all those birds overwinter in Cook Inlet; hence, they are highly vulnerable to oil spills, the effects of which can be exacerbated during winter at high latitudes (Gill and Tibbitts, 1999; ASG, 2008). This subspecies also is of concern because it breeds only on Bering Sea islands, where degradation of nesting habitat by grazing reindeer has occurred (ASG, 2008). Rock Sandpipers (all subspecies occurring in Alaska or the subspecies *ptilocnemis* only) were listed as of conservation concern by five of the eight U.S. management agencies or organizations that considered shorebirds in their conservation-status lists (Table 45-3).

Dunlin

Dunlin were recorded only in the Cook Inlet marine study area, where they were found to be abundant during spring migration (Chapter 44). The species is an abundant migrant in the northern Gulf of Alaska, where they migrate in large numbers with Western Sandpipers (Isleib and Kessel, 1973). In the upper Cook Inlet area, Dunlin occur during both spring and fall migration, but they are far more abundant in spring (Gill and Tibbitts, 1999). Both subspecies of Dunlin that migrate and breed in Alaska (*pacifica* and *arcticola*) are considered of conservation concern because they have limited breeding ranges completely or largely restricted to Alaska, and because population declines have been documented (for *arcticola*) or are probable (for *pacifica*) (ASG, 2008). In addition, there are concerns about the large-scale loss of wintering habitat for *pacifica* on the Pacific coast of North America, and especially for *arcticola* on the Asian Pacific coast, and about threats from oil spills during migration and on the wintering grounds

(ASG, 2008). Dunlin (both Alaskan subspecies or *arcticola* only) were listed as of conservation concern by three of the eight U.S. management agencies or organizations that considered shorebirds in their conservation-status lists (Table 45-3).

Short-billed Dowitcher

Short-billed Dowitchers were recorded only once in the Cook Inlet drainages study area for landbirds and shorebirds (Chapter 41, Section 41.5) and may have been observed in the Cook Inlet marine study area as well (a very few unidentified dowitchers were recorded there during spring migration; Chapter 44). The species is an abundant migrant and locally common breeder in the northern Gulf of Alaska (Isleib and Kessel, 1973). In the upper Cook Inlet area, Short-billed Dowitchers occur during spring and fall migration and during the summer, but they are most abundant in spring (Gill and Tibbitts, 1999). The Short-billed Dowitcher is considered a species of conservation concern because significant population declines in the central Canadian subspecies (*griseus*) have been documented and because declines also likely have occurred in the eastern Canadian subspecies (*hendersoni*) (Donaldson et al. 2000; Brown et al., 2001; Jehl et al., 2001). Data for the Alaska subspecies (*caurinus*) are insufficient to conduct a formal population-trend analysis, but declining numbers on nonbreeding surveys have researchers concerned that populations of this subspecies also may have declined over the past decade (ASG, 2008). The world population of the *caurinus* subspecies is thought to be fairly low, estimated at approximately 75,000 birds (Morrison et al., 2006), all of which breed in Alaska. Habitat loss on the wintering grounds, which are south of Alaska on the Pacific and Atlantic Coasts of North, Central, and South America, and especially at migration stopover sites, also is of concern (Brown et al., 2001). Short-billed Dowitchers were listed as a species of conservation concern by three of the eight U.S. management agencies or organizations that considered shorebirds in their conservation-status lists (Table 45-3).

Marbled Murrelet

Marbled Murrelets were recorded only in the Cook Inlet marine study area, where they were found to be uncommon to rare, occurring primarily in spring, summer, and early winter; they were not observed in late winter (Chapter 44). The species is an abundant resident in the northern Gulf of Alaska, although it is rare in winter (Isleib and Kessel, 1973; Day, 2006). Marbled Murrelets are considered a species of conservation concern because of documented population declines in the Pacific Northwest and Alaska, a limited breeding distribution (coastal forests), threats from the loss of old-growth forests, shifts in populations of marine prey species, disturbance and contamination in marine habitats, and mortality from incidental bycatch in gillnet fisheries (Kushlan et al., 2002; ADF&G, 2006; Kirchoff and Padula, 2010). Marbled Murrelet populations in the Pacific Northwest are listed as threatened under the ESA, and Canadian populations have a similar level of protection. Marbled Murrelets were listed as a species of conservation concern by six of the eight U.S. management agencies or organizations that considered seabirds in their conservation-status lists (Table 45-3).

Olive-sided Flycatcher

Olive-sided Flycatchers were recorded only in the Cook Inlet drainages study area for landbirds and shorebirds, where they were found to be uncommon during the breeding season, primarily due to a paucity of forested habitat (Chapter 41, Sections 41.1 and 41.5). The species was considered “probably rare” in the northern Gulf of Alaska by Isleib and Kessel (1973). An analysis of BBS data for Olive-sided Flycatchers showed a statistically significant decline of 3.5 percent per year between 1966 and 2005 in

breeding populations across the U.S. and Canada (Sauer et al., 2006), suggesting that the worldwide population may have declined by as much as 70 percent over that period. In Alaska, breeding populations declined 1.5 percent per year between 1966 and 2005, although the declines were not statistically significant (Sauer et al., 2006). Population threats on the breeding grounds include forest-clearing, forest-thinning, and forest-fire-suppression activities (Altman and Sallabanks, 2000). Habitat alteration in the Cook Inlet area of Alaska, the region of the state with the greatest rate of human development, is of concern (BPIFWG, 1999). Most mortality in this species, however, is suspected to occur on the wintering grounds (BPIFWG, 1999; Altman and Sallabanks, 2000). Olive-sided flycatchers winter in Central America and most extensively in South America, where intensive tropical deforestation is suspected to be the primary factor driving the population declines. This species is considered highly vulnerable to the effects of deforestation during winter because of its preference for undisturbed tropical broadleaf forest (Petit et al., 1995). Olive-sided Flycatchers were listed as a species of conservation concern by six of the eight U.S. management agencies or organizations that considered landbirds in their conservation-status lists (Table 45-3).

Gray-cheeked Thrush

Gray-cheeked Thrushes were recorded only in the Cook Inlet drainages study area for landbirds and shorebirds, where they were found to be common and widespread during the breeding season (Chapter 41, Section 41.5). The species was considered a local breeder and rare migrant in the northern Gulf of Alaska by Isleib and Kessel (1973). The Gray-cheeked Thrush is of conservation concern because an analysis of BBS data suggests that declines in breeding populations in eastern North America occurred from 1978 to 1988 (Sauer and Droege, 1992). An analysis of BBS data over a longer time-period (for Canada only, where this species is more common) shows a statistically significant population decline of 8.8 percent per year from 1967 to 2000, although these results apply only to a small portion of the breeding range (Dunn, 2005). Similar population-trend data for Alaska are not available (Sauer et al., 2006), but an analysis of 12 years of banding data (1991 to 2003) during spring migration in Fairbanks shows a substantial decline in captures of this species (Hannah, 2003). On its tropical wintering grounds (largely South America east of the Andes), this species is considered vulnerable to deforestation of broadleaf forests (Petit, 1993). Because Gray-cheeked Thrushes breed primarily in remote and undisturbed boreal forests and in arctic environments where population threats are minimal, it is possible that declines in breeding populations may be driven primarily by the effects of tropical deforestation on the wintering grounds. Nevertheless, there are concerns that breeding populations in Alaska should be maintained because a large percentage of the species' global breeding range is concentrated in Alaska (BPIFWG, 1999). Gray-cheeked Thrushes were listed as a species of conservation concern by three of the eight U.S. management agencies or organizations that considered landbirds in their conservation-status lists (Table 45-3).

Varied Thrush

Varied Thrushes were recorded only in the Cook Inlet drainages study area for landbirds and shorebirds, where they were found to be uncommon during the breeding season, primarily due to a paucity of forested habitat (Chapter 41, Sections 41.1 and 41.5). The species was considered an abundant breeder and migrant in the northern Gulf of Alaska by Isleib and Kessel (1973). The Varied Thrush is considered vulnerable to forestry management practices that result in the removal of forests or alterations in forest structure because its primary habitat is mature coniferous forests on the North American west coast and in

Alaska (BPIFWG, 1999; ADF&G, 2006). In analyses of BBS data, populations in western North America were found to increase between 1966 and 1979, but then showed statistically significant declines of 1.0 percent per year from 1980 to 2005 (Sauer et al., 2006). No significant population changes were detected in Alaskan populations over these same time periods (Sauer et al., 2006). The primary concern for this species in Alaska is focused on monitoring and maintaining breeding populations in the state (BPIFWG, 1999; ADF&G, 2006). A few Varied Thrushes winter in south-central Alaska coastal forests, but most winter in coastal forests in southeastern Alaska, British Columbia, and in coastal and inland forests in several western, lower 48 states, where they also are considered vulnerable to forestry management activities that result in the removal of forests or alterations in forest structure (George, 2000). Varied Thrushes were listed as a species of conservation concern by three of the eight U.S. management agencies or organizations that considered landbirds in their conservation-status lists (Table 45-3).

Blackpoll Warbler

Blackpoll Warblers were recorded only in the Cook Inlet drainages study area for landbirds and shorebirds, where they were found to be uncommon during the breeding season, primarily due to a paucity of forest and riparian scrub habitats (Chapter 41, Sections 41.1 and 41.5). The species was considered a rare local breeder in the northern Gulf of Alaska by Isleib and Kessel (1973). An analysis of BBS data for Blackpoll Warblers shows a statistically significant decline in breeding populations across North America of 9.6 percent per year between 1980 and 2005, after increases were recorded from 1966 to 1979 (Sauer et al., 2006). An analysis of data from Alaska also indicated a statistically significant decline in breeding populations (2.9 percent per year) between 1980 and 2005 (Sauer et al., 2006). On the wintering grounds in South America, the species is considered highly vulnerable to the removal of tropical forests (Petit, 1993; Petit et al., 1995), and there are suggestions that heavy mortality can occur during transoceanic fall-migration flights because of tropical storms (Butler, 2000). Because Blackpoll Warblers in Alaska breed largely in remote and undisturbed boreal forest regions (areas with relatively few population threats), the implication is that declines in breeding populations in the state may be primarily driven by the combined effects of mortality during migration and tropical deforestation on the wintering grounds. Timber-harvest activities in boreal forest regions in Canada have been shown to negatively affect Blackpoll Warbler breeding populations at a local scale (Darveau, 1995). The primary conservation concern in Alaska is that breeding populations should be maintained because a large percentage of the species' global breeding range is concentrated in Alaska (BPIFWG, 1999). Blackpoll Warblers were listed as a species of conservation concern by five of the eight U.S. management agencies or organizations that considered landbirds in their conservation-status lists (Table 45-3).

45.7.2.4 MAMMAL SPECIES OF CONSERVATION CONCERN

Alaska Tiny Shrew

This species, the smallest mammal in North America, was discovered in the University of Alaska Museum collection by a visiting Russian mammalogist. It was first thought to be a Palearctic species, *Sorex minutissimus* (Dokuchaev, 1994), but after further study, was described as a new species (*S. yukonicus*; Dokuchaev, 1997), which had been captured at three locations in interior Alaska. The AKNHP (2004b) originally classified it as unranked in the state (SNR, status not yet assessed), as well as unrankable globally (GU), presumably because so little information was available. More recently (AKNHP, 2008) it was classified as vulnerable (S3) in the state, presumably due to its apparent rarity and uncertain conservation status. The latter ranking warrants further scrutiny, however, in view of the

species' cryptic nature, the possibility of misidentification, the difficulty of capture, and the shrew's widespread distribution, as documented by further inventory work in various parts of the state in the decade since the species was described (it had been captured in at least 20 locations in interior, western, and northern Alaska by 2004). The species has been captured in Lake Clark National Park and Preserve (Cook and MacDonald, 2004a), is suspected to occur in the Iliamna area (Jacobsen, 2004), and is considered a possibility in Katmai National Park and Preserve, especially in the forested northern portion of the park (Cook and MacDonald, 2004b), although none were trapped in either location. Thus, it may occur in the Cook Inlet drainages study areas. Shrews generally were under-represented in older studies that sampled with snap-traps and are much more reliably sampled using pitfall traps. Even so, the detectability of this shrew is low due to its small size and a suspected ability to escape from metal-cone pitfall traps; plastic pitfalls are more effective at capturing it (Jarrell, pers. comm., 2003). The Alaska tiny shrew was listed as of conservation concern by one of the two state organizations that considered terrestrial small mammals in their conservation-status lists (Table 45-4).

Harbor Seal

Harbor seals were recorded in the Cook Inlet marine study area during all seasons and were the most abundant marine mammals encountered during the marine wildlife surveys (Chapter 44). As with other marine mammals, harbor seals are protected under the MMPA. Although populations in Alaska are not considered to be depleted (NFMS, 2010b), some populations in the Gulf of Alaska and Prince William Sound experienced significant declines during the 1980s and 1990s (Pitcher, 1990; Boveng et al., 2003; Angliss and Outlaw, 2007). Those declines presumably led to designation of the harbor seal as a species of special concern by the State of Alaska (ADF&G, 1998) and its inclusion on BLM's sensitive species list (BLM, 2005). Recent genetic research on harbor seals indicates that more population stocks exist in Alaska than the three formerly designated, and identifies a need for better differentiation of stocks for management purposes (O'Corry-Crowe et al., 2003). The harbor seal population in the Kodiak area increased since the early 1990s, while the population in Prince William Sound decreased (Small et al., 2003; Angliss and Outlaw, 2007). The population in Kamishak Bay (including the Cook Inlet marine study area) appears to be a different stock than the Kodiak population (O'Corry-Crowe et al., 2003), although movements of tagged seals between the two areas have been recorded (Boveng et al., 2005). Harbor seals were listed as of conservation concern by two of the five U.S. management agencies or organizations that considered marine mammals in their conservation-status lists (Table 45-4).

Gray Whale

A single gray whale was recorded in the Cook Inlet marine study area in summer 2004 (Chapter 44). Gray whales migrate through the northern Gulf of Alaska in both spring and fall while on migration between winter calving grounds off of Baja California, Mexico, and summer feeding grounds in the Bering and Chukchi seas. The species formerly was classified as endangered under the ESA because of large population declines, but its population has recovered completely; therefore, it now is classified as a delisted species under the ESA (USFWS, 2006; NMFS, 2007a). Gray whales were listed as of conservation concern by two of the five U.S. management agencies or organizations that considered marine mammals in their conservation-status lists (Table 45-4).

45.7.2.5 AMPHIBIAN SPECIES OF CONSERVATION CONCERN

Wood Frog

A single species of amphibian, the wood frog, occurs in Alaska north of the southeastern panhandle of the state (Hodge, 1976). Wood frogs are known to breed in freshwater ponds and lakes in the region of the Pebble Deposit (Chapter 16, Section 16.12), and although such habitats are limited in the Cook Inlet drainages study areas, the species is expected to occur in similar habitats there, perhaps in low numbers. In more developed areas of eastern Cook Inlet, the wood frog recently was found to be abundant and widespread (Gotthardt, 2004). Nevertheless, the species is of conservation concern in Alaska, as are amphibians worldwide, because of widespread declines in all groups of amphibians (McCallum, 2007). The causes of these population declines are believed to be various and, in addition to habitat destruction, potentially include waterborne contaminants, increases in surface-water acidity from industrial activities, epidemic fungal infections, increases in ultraviolet radiation from ozone layer depletion, and indirect impacts from global warming (Blaustein and Wake, 1990; Wyman, 1990; Daszak et al., 2003; Dohm et al., 2005; Bancroft et al., 2007; Whitfield et al., 2007).

In Alaska, there are concerns that many historically used breeding sites in south-central Alaska have been abandoned (AKNHP, 2005b; ADF&G, 2006). Developmental abnormalities also have been reported in frogs from the Kenai National Wildlife Refuge (Trust and Tangermann, 2002). On the two conservation-status lists reviewed that specifically considered Alaskan amphibians, the wood frog is listed as a priority species for conservation by ADF&G (2006), but as secure, both globally and in the state, by the AKNHP (2008).

45.8 SUMMARY

Based on data collected as of 2006, it was determined that 17 rare vascular plant taxa with the rarer state rankings (S1, S2, S1S2, or S2S3) have the potential to occur Cook Inlet drainages study areas. This conclusion is based on the existence of known collections of these taxa within a broad region surrounding and including the study areas and the availability of suitable habitats in the study areas. Six of these taxa are listed as critically imperiled in Alaska (S1 or S1S2 ranks) because few populations and/or few individual plants have been recorded in the state. The remaining 11 taxa are listed as imperiled in Alaska (S2 or S2S3 ranks).

In the Cook Inlet drainages and Cook Inlet marine study areas combined, 26 bird species that were recorded or are likely to occur are listed as of conservation concern for Alaska by at least two statewide or national groups that address bird conservation issues in the state. Of these 26 species, one (Steller's Eider) is protected by the USFWS as a threatened species under the ESA, and one (Kittlitz's Murrelet) is classified as a candidate species under the ESA (this species was not recorded in the study areas, but almost certainly occurs there).

In the Cook Inlet marine study area, five species of marine mammals that to be considered of conservation concern were recorded. The western population of Steller's sea lion and Cook Inlet population of beluga are protected as endangered species under the ESA, the southwestern Alaska population of northern sea otter is protected as a threatened species under the ESA, the gray whale has been delisted as an endangered species under the ESA, and the harbor seal is listed a species of conservation concern.

One terrestrial small mammal of conservation concern, the Alaska tiny shrew, may occur in the Cook Inlet drainages study areas. The occurrence of this species in the study areas has not been confirmed.

A single amphibian species of conservation concern, the wood frog, is expected to occur in the Cook Inlet drainages study areas, but its presence there has not been confirmed.

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TABLES

TABLE 45-1
Definitions of Vascular Plant Rarity Rankings Used by the Alaska Natural Heritage Program[a]

Rarity Ranking	Definition
Global Ranks[b]	
G1	Critically imperiled globally because of extreme rarity (5 or fewer occurrences, or very few remaining individuals) or because of biological and /or ecological factors making it especially vulnerable to extinction.
G2	Imperiled globally because of rarity (6 to 20 occurrences) or because of biological and/or ecological factors making it vulnerable to extinction throughout its range.
G3	Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (21 to 100 occurrences).
G4	Widespread and apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5	Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
T#	Global rank of the described subspecies or variety.
G#G#	Global rank of species uncertain, best described as a range between the two ranks.
G#Q	Indicates some uncertainty about taxonomic status that might affect global rank.
State Ranks[c]	
S1	Critically imperiled in state because of extreme rarity (5 or fewer occurrences, or very few remaining individuals) or because of biological and/or ecological factors making it especially vulnerable to extirpation from the state.
S2	Imperiled in state because of rarity (6 to 20 occurrences) or because of biological and/or ecological factors making it vulnerable to extirpation from the state.
S3	Rare or uncommon in the state (21 to 100 occurrences).
S4	Widespread and apparently secure in state, though it may be quite rare in parts of its range, especially at the periphery.
S5	Demonstrably secure in state, though it may be quite rare in parts of its range, especially at the periphery.
S#S#	State rank of species uncertain, best described as a range between the two ranks.
S#Q	Indicates some uncertainty about taxonomic status that might affect state rank.

Notes:

a. From Lipkin and Murray (1997).

b. Global ranks based on the worldwide status of the taxon assigned by The Nature Conservancy and an international network of natural heritage programs and conservation data centers.

c. State ranks based on the status of the taxon within Alaska assigned by the Alaska Natural Heritage Program.

TABLE 45-2
Rare Vascular Plant Taxa Listed by the Alaska Natural Heritage Program as Imperiled or Critically Imperiled as of 2006[a] for which Collection Localities Occur within a 161-kilometer Radius of the Midpoint between the Pebble Deposit and Iniskin Bay at Cook Inlet

Scientific Name	Range Overlap	Habitats	Global Rarity Ranking	State Rarity Ranking
Arabis lemmonii	Range and search area overlap	Alpine meadows and talus at ~2,000 meters elevation (Welsh, 1974; Hultén, 1968)	G5	S1
Catabrosa aquatica[b]	Range and search area may overlap but no known collections from Hultén (1968) occur within the search area	Wet places, marshes, shallow ponds and lakes (Welsh, 1974; Hultén, 1968)	G5	S1
Ceratophyllum demersum	Search area at the edge of known range	Springs, streams, and ponds where water is not stagnant (FNA, 2006)	G5	S1
Eleocharis quinqueflora	Range and search area overlap	Swamps, fens, wet meadows, hot springs, muskegs (FNA, 2006; Welsh, 1974; Hultén 1968)	G5	S1
Myriophyllum farwellii	Range and search area overlap	Ponds and small lakes (USDA, NRCS, 2008)	G5	S1
Geum aleppicum var. strictum	Range and search area overlap	Meadows, open woods and thickets (Hultén, 1968)	G5T5	S1S2
Botrycium virginianum	Range and search area overlap	Open woods and meadows, with preference for calcareous soils (Hultén, 1968)	G5	S2
Draba lonchocarpa var. vestita	Range and search area overlap	Arctic and alpine tundra and heathlands (Welsh, 1974)	G5T3	S2?[c]
Eriophorum viridicarinatum	Range and search area overlap	Marshes, meadows, bogs, fens, wet woods (FNA, 2006; Welsh, 1974; Hultén, 1968)	G5	S2
Potentilla drummondii	Range and search area overlap	Forest openings, meadows, and high ridges, middle to high elevations in the mountains (USDA, NRCS, 2008)	G5	S2
Smelowskia pyriformis[b]	Collections restricted to Alaska Range and the Kuskokwim mountains (Lipkin and Murray, 1997)	Steep, unstable alpine screes from ~600 to 1,700 meters elevation (Lipkin and Murray, 1997)	G2	S2
Botrychium alaskense	Range and search area overlap	Naturally and artificially disturbed meadows, roadsides, and riverbars. At higher elevations, in riverine meadows, sandy fields, and lightly vegetated scree slopes (Ada Hayden Herbarium, 2006)	G2G3	S2S3
Botrychium multifidum	Range and search area overlap	Moist to wet sandy meadows and woods (Anderson, 2005)	G5	S2S3
Carex heleonastes	Range and search area overlap	Peat bogs, swamps, muskegs, bogs, and seeps (Welsh, 1974;	G4	S2S3

Scientific Name	Range Overlap	Habitats	Global Rarity Ranking	State Rarity Ranking
		Hultén, 1968)		
Eleocharis kamtschatica	Range and search area overlap	Brackish marshes, meadows, ponds, tidal flats, and saline meadows in coastal habitats (FNA, 2006; Welsh, 1974; Hultén, 1968)	G4	S2S3
Primula tschuktschorum	Range and search area overlap	Saturated to moist soils and open microsites such as frost boils (Carlson et al., 2006).	G2G3	S2S3
Saxifraga adscendens ssp. oregonensis	Range and search area overlap	Rock crevices, sandy places, glacial moraines (Welsh, 1974; Hultén, 1968)	G5T4T5	S2S3

Notes:

a. Listings from AKNHP (2006a).

b. These species have collection localities close to the edge of 100-mile-radius search area, but without direct overlap.

c. Question mark indicates the rarity ranking is unclear because insufficient data were available to support firm conclusions.

TABLE 45-3
Threatened Bird Species Listed Under the Endangered Species Act (ESA), Candidate Species, and Bird Species of Conservation Concern[a] Recorded in the Cook Inlet Drainages and/or Cook Inlet Marine Study Areas, 2004–2008, and Listing Status by Agency or Conservation Organization

Species	USFWS[b]	BLM[c]	USFS[d]	ADF&G[e]	Audubon Alaska[f]	AKNHP[g]	NAWCP[h]	ASG[i]	BPIF[j]
Threatened and Candidate Species									
Steller's Eider (*Polysticta stelleri*; Alaska breeding population)	ESA threatened species	—[k]	—	Species of special concern	Declining or depressed population	Imperiled species	—	—	—
Kittlitz's Murrelet (*Brachyramphus brevirostris*)[l]	ESA candidate species	Sensitive species	Sensitive species	Featured species for conservation	Declining or depressed population	Imperiled species	Species of high concern	—	—
Species of Conservation Concern									
Trumpeter Swan (*Cygnus buccinator*)	—	Sensitive species	—	—	—	Vulnerable species	—	—	—
King Eider (*Somateria spectabilis*)	—	Sensitive species	—	Featured species for conservation	Declining or depressed population	Vulnerable species	—	—	—
Common Eider (*Somateria mollissima*)	—	—	—	Featured species for conservation (subspecies *v-nigrum*)	Declining or depressed population (subspecies *v-nigrum*)	Vulnerable species	—	—	—
Surf Scoter (*Melanitta perspicillata)*	—	Sensitive species	—	Featured species for conservation	—	—	—		—
Black Scoter (*Melanitta americana*)	—	Sensitive species	—	Featured species for conservation	Declining or depressed population	Vulnerable species	—	—	—
Long-tailed Duck (*Clangula hyemalis*)	—	Sensitive species	—	Featured species for conservation	—	—	—	—	—

Species	USFWS[b]	BLM[c]	USFS[d]	ADF&G[e]	Audubon Alaska[f]	AKNHP[g]	NAWCP[h]	ASG[i]	BPIF[j]
Red-throated Loon (*Gavia stellata*)	Species of conservation concern	Sensitive species	—	Featured species for conservation	Declining or depressed population	—	Species of high concern	—	—
Horned Grebe (*Podiceps auritus*)	Species of conservation concern	—	—	Featured species for conservation	—	—	Species of high concern	—	—
Red-faced Cormorant (*Phalacrocorax urile*)	Species of conservation concern	—	—	Featured species for conservation	Declining or depressed population	Vulnerable species	Species of high concern	—	—
Pelagic Cormorant (*Phalacrocorax pelagicus*)	Species of conservation concern	—	—	—	—	—	Species of high concern	—	—
Golden Eagle (*Aquila chrysaetos*)	—	—	—	Featured species for conservation	—	Vulnerable species	—	—	—
Peregrine Falcon (*Falco pereginus* ssp. *pealei*)[m]	Species of conservation concern	—	—	Featured species for conservation	—	Imperiled/ vulnerable species	—	—	—
Black Oystercatcher (*Haematopus bachmani*)	Species of conservation concern	—	Sensitive species	Featured species for conservation	Vulnerable population	Imperiled/ vulnerable species	—	Species of high concern	—
Marbled Godwit (*Limosa fedoa* ssp. *beringiae*)	Species of conservation concern	Sensitive species	—	Featured species for conservation	Vulnerable population	Imperiled species	—	Species of high concern	—
Black Turnstone (*Arenaria melanocephala*)	—	—	—	—	Vulnerable population	Vulnerable species	—	Species of high concern	—
Surfbird (*Aphriza virgata*)	—	—	—	—	Declining or depressed population	Imperiled/ vulnerable species	—	Species of high concern	—
Rock Sandpiper (*Calidris ptilocnemis* ssp. *ptilocnemis*)	Species of conservation concern	—	—	Featured species for conservation	Declining or depressed population	Imperiled/ vulnerable species	—	Species of high concern	—

Species	USFWS[b]	BLM[c]	USFS[d]	ADF&G[e]	Audubon Alaska[f]	AKNHP[g]	NAWCP[h]	ASG[i]	BPIF[j]
Dunlin (*Calidris alpina* ssp. *pacifica*)[n]	Species of conservation concern	—	—	—	Declining or depressed population	—	—	Species of high concern	—
Short-billed Dowitcher (*Limnodromus griseus* ssp. *caurinus*)	Species of conservation concern	—	—	—	Vulnerable population	—	—	Species of high concern	—
Marbled Murrelet (*Brachyramphus brevirostris*; Alaska breeding population)	Species of conservation concern	Sensitive species	—	Featured species for conservation	Declining or depressed population	Vulnerable species	Species of high concern	—	—
Olive-sided Flycatcher (*Contopus cooperi*)	Species of conservation concern	Sensitive species	—	Species of special concern and featured species for conservation	Declining or depressed population	—	—	—	Priority species for conservation
Gray-cheeked Thrush (*Catharus minimus*)	—	Sensitive species	—	Species of special concern	—	—	—	—	Priority species for conservation
Varied Thrush (*Ixoreus naevius*)	—	—	—	Priority species for conservation	Declining or depressed population	—	—	—	Priority species for conservation
Blackpoll Warbler (*Dendroica striata*)	—	Sensitive species	—	Species of special concern and featured species for conservation	Declining or depressed population	—	—	—	Priority species for conservation

Notes:

a. See Methods (Section 45.6.2) for definition of species of conservation concern.

b. U.S. Fish and Wildlife Service (USFWS): Endangered, Threatened, Proposed, Candidate and Delisted Species in Alaska (USFWS, 2010); and Birds of Conservation Concern (USFWS, 2008). Species included from USFWS (2008) are listed for one or two Bird Conservation Regions (BCRs) (western Alaska and/or northwestern interior forest) because the Cook Inlet drainages and Cook Inlet marine study areas are near the border between the two BCRs.

c. Bureau of Land Management (BLM): Alaska Threatened, Endangered, and Sensitive Species List (BLM, 2005).

d. U.S. Forest Service (USFS): Alaska Region Sensitive Species List (Goldstein et al., 2009).

e. Alaska Department of Fish and Game (ADF&G): State of Alaska Endangered Species List (ADF&G, 2010); Species of Special Concern (ADG&G, 1998); and Comprehensive Wildlife Conservation Strategy (ADF&G, 2006). No bird species recorded in the Cook Inlet drainages or Cook Inlet marine study areas is listed as endangered by the State of Alaska.

f. The Audubon Alaska Watchlist 2010 (Kirchhoff and Padula, 2010).

g. Alaska Natural Heritage Program (AKNHP): Vertebrate Species Tracking List for 2008 (AKNHP, 2008); state listings only; the highest conservation ranking for either the breeding or nonbreeding season is shown; secure and apparently secure rankings (roughly equivalent to low and moderate conservation-concern classes) are not shown.

h. North American Waterbird Conservation Plan (NAWCP) (Kushlan et al. 2002 and 2006); species in the higher concern classes only; species of low to moderate concern are not shown.

i. Alaska Shorebird Group (ASG): Alaska Shorebird Conservation Plan Version II (ASG, 2008); species of high concern only; species of low to moderate concern are not shown.

j. Boreal Partners in Flight Working Group (BPIFWG): Landbird Conservation Plan for Alaska Biogeographic Region (BPIFWG, 1999).

k. Dash indicates the species is not listed or its conservation ranking is below the threshold for inclusion in this study (see Section 45.6.2 and notes g, h, and i above).

l. Although not definitively recorded in the Cook Inlet marine study area, Kittlitz's Murrelets are expected to occur there (see text).

m. Another subspecies of Peregrine Falcon (*F.p. anatum*) may occur in the Cook Inlet marine study area also, especially during migration. The *anatum* and *tundrius* subspecies of Peregrine Falcon have been delisted from the Endangered Species Act (USFWS, 2010), but all subspecies are of conservation concern (USFWS, 2008).

n. Another subspecies of Dunlin (*C.a. arcticola*) occasionally may occur in the Cook Inlet marine study area during migration.

TABLE 45-4
Threatened and Endangered Mammal Species Listed Under the Endangered Species Act (ESA) and Mammal Species of Conservation Concern[a] Recorded in the Cook Inlet Marine or Cook Inlet Drainages Study Areas, 2004–2008, and Listing Status by Agency or Conservation Organization

Species	U.S. Fish and Wildlife Service[b]	National Marine Fisheries Service[c]	Bureau of Land Management[d]	Alaska Department of Fish and Game[e]	Alaska Natural Heritage Program[f]
Threatened and Endangered Species					
Steller's sea lion[g] (*Eumetopias jubatus*)	—[h]	ESA endangered species, depleted stock	—	Priority species for conservation and species of special concern	Imperiled species
Beluga[i] (*Delphinapterus leucas*)	—	ESA endangered species, depleted stock	—	Priority species for conservation and species of special concern	Critically Imperiled species
Northern sea otter[j] (*Enhydra lutris* ssp. *kenyoni*)	ESA threatened species	—	—	Priority species for conservation and species of special concern	Vulnerable species
Species of Conservation Concern					
Alaska tiny shrew (*Sorex yukonicus*)	—	—	—	—	Vulnerable species
Harbor seal (*Phoca vitulina*)	—	—	Sensitive species	Species of special concern	—
Gray whale[k] (*Eschrichtius robustus*)	—	ESA delisted species	—	Priority species for conservation	—

Notes:

a. See Methods (Section 45.6.2) for definition of species of conservation concern.

b. USFWS Endangered, Threatened, Proposed, Candidate, and Delisted Species in Alaska (USFWS, 2010).

c. NMFS Marine Mammal Species under the Endangered Species Act (NMFS, 2010a); and Marine Mammals [conservation status] (NMFS, 2010b).

d. BLM Alaska Threatened, Endangered, and Sensitive Species List (BLM, 2005).

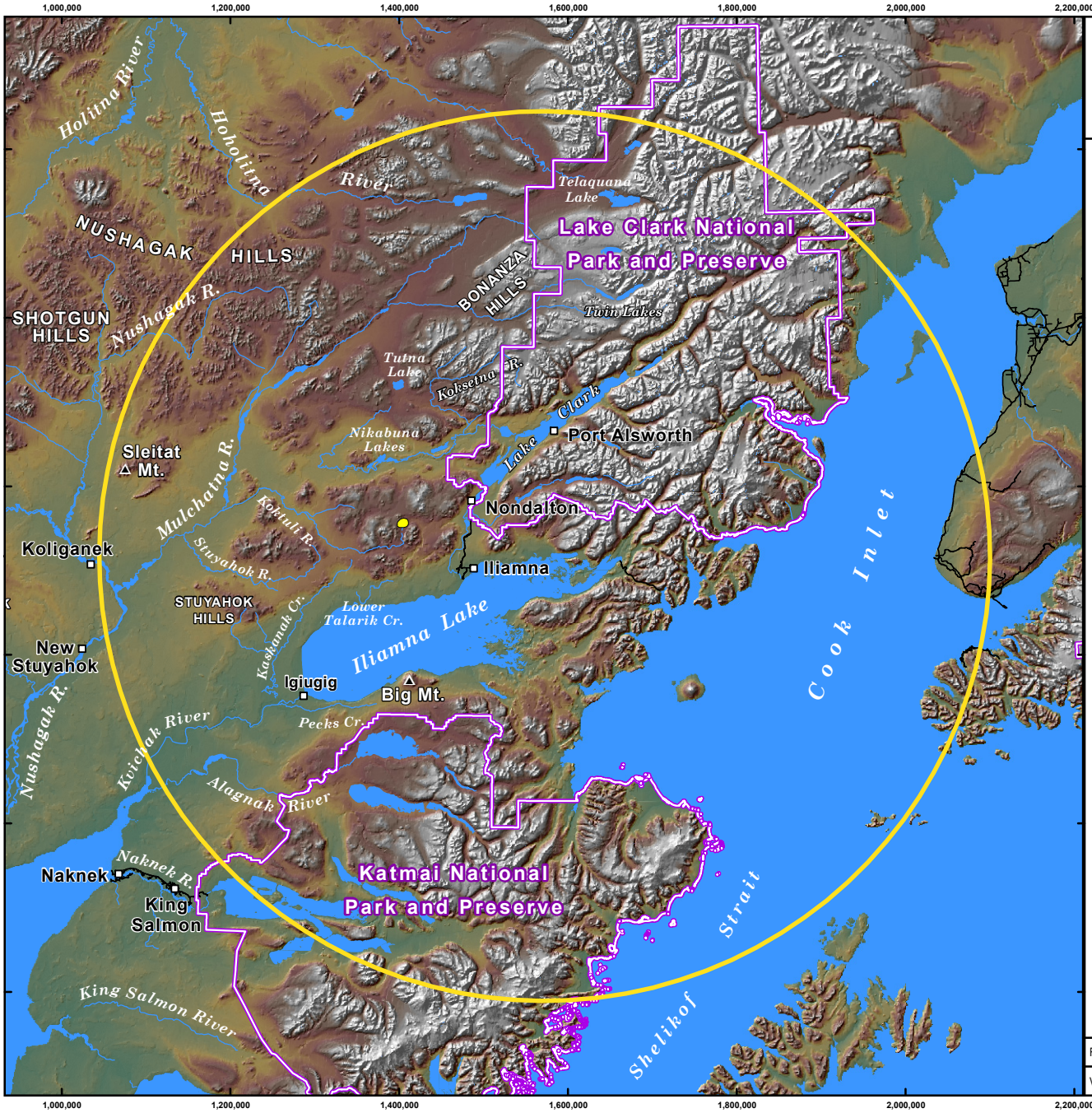
e. Alaska Department of Fish and Game (ADF&G): State of Alaska Endangered Species List (ADF&G, 2010); Species of Special Concern (ADG&G, 1998); and Comprehensive Wildlife Conservation Strategy (ADF&G, 2006). No mammal species recorded in the Cook Inlet drainages or Cook Inlet marine study areas is listed as endangered by the State of Alaska.

f. AKNHP Vertebrate Species Tracking List for 2008 (AKNHP, 2008); state listings only; the highest conservation ranking is shown; secure and apparently secure rankings (roughly equivalent to low and moderate conservation-concern classes) are not shown.

g. Western population of Steller's sea lion (west of 144°W longitude).

h. Dash indicates the species is not listed or its conservation ranking is below the threshold for inclusion in this study (see Section 45.6.2 and note f above).
i. Cook Inlet distinct population segment of beluga.
j. Southwestern Alaska distinct population segment of northern sea otter.
k. Eastern Pacific population of gray whale.

FIGURES

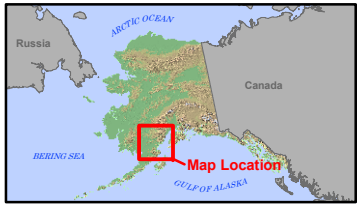


THE pebble PARTNERSHIP

Figure 45-1
Search Area Used for the Assessment of Rare Plant Potential, 2007

Legend

- Search Area for Rare Plants
- General Deposit Location
- Existing Road
- Town or Village
- Summit



Miles: 0 10 20 30 40 50

Kilometers: 0 20 40 60 80

Scale 1:2,250,000

N

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: 45-1_RarePlantRadius_Mine_PLP_EBD_v01.mxd	Date: Jan. 21, 2011
Version: 1	Author: ABR-AZC

THE pebble PARTNERSHIP

Figure 45-2
Critical Habitat Delineations for Belugas and Sea Otters in the Vicinity of the Cook Inlet Marine Study Area

Legend

- Proposed Critical Habitat for Belugas[1]
- Critical Habitat for Sea Otters[2]
- Existing Road

[1]Proposed critical habitat for the Cook Inlet distinct population segment of belugas (Lewis, pers. comm., 2009).

[2]Final designated critical habitat for the southwest Alaska distinct population segment of the northern sea otter (Burn, pers. comm., 2009).

Miles 0 2 4 6 8 10 12

Kilometers 0 5 10 15 20

N

Scale 1:575,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: 45-2_SEOTBELU_CrHab_CI_PLP_EBD_v01.mxd	Date: Jan. 21, 2011
Version: 1	Author: ABR-AZC