Impact Analysis of Off-Road Vehicle Use for Subsistence Purposes on Refuge Lands and Resources Adjacent to the King Cove Access Project

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Background

The King Cove Health and Safety Act (Section 353) of the Omnibus Consolidated and Emergency Supplemental Appropriations Act of 1999 (Public Law 105-277) provided money for the Aleutians East Borough to construct a marine-road transportation system between the cities of King Cove and Cold Bay, Alaska. A Final Environmental Impact Statement (EIS) for the King Cove Access Project was released by the U.S. Army Corps of Engineers in cooperation with the U.S. Fish and Wildlife Service in December 2003. The transportation alternative (Alternative 1) in the EIS proposes construction of a 17.2 mile road along the east side of Cold Bay between the King Cove airstrip coupled with a hovercraft terminal on the northeast shore of Cold Bay. A portion of this road would be built on King Cove Corporation lands located within the legislative boundary of Izembek National Wildlife Refuge (Refuge). The presence of a new road adjacent to Refuge lands raises questions about the impacts public access from this road would have on Refuge resources.

The purpose of this report is to discuss potential impacts of off-road vehicle (ORV) use on Refuge lands adjacent to the proposed road corridor. ORVs are defined as highway vehicles, all terrain cycles (2-wheel), all-terrain vehicles (3- 4-, and 6-wheel ATVs), and any other form of terrestrial motorized transport. Prior to the passage of the Alaska National Interest Lands Act (ANILCA), highway vehicle and ORV use at Izembek Refuge was restricted to a system of roads and trails that were created around the City of Cold Bay, formerly Fort Randall, during WWII (See attached report, *Historic Review of the Use of Motorized Vehicles on Lands Administered by Izembek Refuge*, November 2003). The limits of this designated road system were determined during public meetings in Cold Bay in 1980 (USFWS 1980). Snowmobile use was restricted to the designated road system as well, because there is usually little or no snow cover in lowland areas. Special regulations were published in the Federal Register, vol. 45, no. 90, page 30077 (May 7, 1980) restricting the use of motorized vehicles on Izembek Refuge and Unimak Island (Aleutian Islands Wildlife Refuge), effective 5/7/80 through 5/31/82, to the established road system. The restriction was in keeping with Executive Order (EO) No. 11644 issued in February 1972 as amended by EO No. 11989 in 1977. This directive required Federal land management agencies to establish policies and procedures to regulate use of ORVs on public lands to protect the resources of those lands and to minimize conflicts among the various users of those lands. Permanent regulations were to be addressed during the development of the Izembek Refuge Comprehensive Conservation Plan.

ANILCA provides special exceptions governing access to Alaska Federal conservation system units (CSUs). Section 811 of ANILCA states that rural residents shall have reasonable access to subsistence resources on public lands, including the use of snowmobiles, motorboats, and other means of surface transportation traditionally used for this purpose. Section 1110(a) of ANILCA opens CSUs, including all Alaska refuges and designated Wilderness, to public access by airplanes, motorboats, snowmobiles, and nonmotorized surface transportation methods for traditional activities and travel to and from villages and homesites subject to reasonable regulation. According to regulations at 50 CFR 36.12(b), the Refuge Manager may restrict or close a route or area to the methods of access authorized by Section 811(b) of ANILCA if it is determined that such use is causing or is likely to cause adverse impact on public health and safety, resource protection, protection of historic or scientific values, subsistence uses, conservation of endangered or threatened species, or other purposes and values for which the Refuge was established. An area may also be closed to access allowed under Section 1110(a) of ANILCA after a finding that such use would be detrimental to the resource values of the area [43 CFR 36.11(h)].

The Izembek Refuge Final Comprehensive Conservation Plan (CCP) was published in 1985. In this plan, the preferred alternative continued management of the Refuge as it had been managed since its establishment in 1960. Since its establishment, the vegetation, fish, wildlife, soils, and archaeological resources of Izembek NWR had been protected from unregulated use in an effort to maintain them in pristine condition (USFWS 1985, 1987). As described above, the Refuge had always limited motor vehicle use, including ORVs, to the designated road system. It was the intent of the Refuge, outlined in the CCP, to continue restricting ORV access to the designated road system**.** The staff of Izembek Refuge posted signs in the vicinity of the intended closures and developed maps that designated the closed areas, but there is no administrative record that public hearings were held. The regulatory process outlined in 50 CFR 36.12(c) requires the refuge manager to provide adequate public notice that Refuge lands would be closed to ORV access. To correct this oversight and complete the regulatory process, the Refuge will address the closure of Refuge lands to ORV access during the upcoming revision of the CCP.

The King Cove Access Project calls for the construction of a new road and hovercraft terminal site on the east side of Cold Bay, thereby opening new opportunities for access to Refuge lands on the east and northeast sides of Cold Bay and potentially harming the fish and wildlife resources Izembek Refuge was established to protect. The King Cove Access Project has produced the need to address ORV access issues in advance of the public process for revising the CCP. This document discusses resource values in the vicinity of the new road and hovercraft terminal that would be adversely impacted without reasonable regulation of public access.

Environmental Considerations and Anticipated Impacts of Use

Introduction

Izembek National Wildlife Refuge is 417,533 acres in size and is bordered on the north by the Bering Sea and on the south by the Pacific Ocean. In some areas, less than 5 km (3.1 mi) of land separate the two ocean bodies. This relatively small geographic area is inhabited by a diverse and abundant community of fish and wildlife. Salmon spawn in all of the major drainages on the Refuge and are an essential component of the ecosystem. Brown bears, caribou, wolves, wolverines, tundra swans, and willow ptarmigan occupy the Refuge year round. Izembek Lagoon contains one of the largest eelgrass beds in the world and forms the foundation for a rich coastal ecosystem (McRoy 1966, Ward et al. 1997). The Refuge and adjacent coastal areas are an international crossroads for a number of waterfowl and shorebird migration routes, including birds migrating from the North American Pacific, East Asian-Australasian, and West Pacific Flyways (USFWS 1985). Numerous species of birds breed in Alaska, northeastern Russia, and northwestern Canada and funnel through the Izembek area on their way to and from their subarctic and arctic breeding areas. Others remain at Izembek Refuge and adjacent areas for the winter. Together, Izembek National Wildlife Refuge and Izembek State Game Refuge, which encompasses the tidelands of Izembek Lagoon, were recognized for the area's extraordinary ecological values when they became the first site in North America to be designated a Wetland of International Importance (Ramsar site), one of just 19 such sites within the U.S. Izembek National Wildlife Refuge was established to help preserve the rich fish and wildlife resources of this unique area (ANILCA Section 303(3)(B)).

According to the provisions of ANILCA, residents of rural Alaska are allowed reasonable access to subsistence resources on public lands. In the 1990s, ATVs became increasingly affordable and reliable, leading to an expansion of their use for travel and recreation and increased access to remote areas in Alaska (ADF&G 1996). This proliferation of ATVs, in particular, brought increased concern about impacts that widespread ORV use would have on public lands resources. Areas once protected by their remoteness are no longer inaccessible, and the noise and higher speeds of ORVs compared to more traditional forms of access are more likely to startle and stress wildlife. The literature on the negative impacts of ORVs on fish and wildlife and their habitats is extensive. ORV use can have both direct and indirect impacts on fish and wildlife resources. ORV use has damaged soils and vegetation, modified and fragmented habitats, stressed or displaced wildlife, restricted wildlife movements, allowed over-exploitation of resources (both legally and illegally), and conflicted with other outdoor users (Berry 1980, Webb and Wilshire 1983, Sinnott 1990, ADF&G 1996, Happe et al. 1998, Defenders of Wildlife 2002). The greatest impact of road and trail development to wildlands may be that increased access allows more people and a whole range of associated impacts into previously isolated wildlands.

In the past, many wildlife populations on the southern Alaska Peninsula were protected by the difficulty of accessing remote areas. As long as large areas of relatively undisturbed habitat exist, many wildlife species can retreat from the impact of human activities. With the rapid expansion of ORV use, however, these populations can no longer readily escape disturbance.

Wildlife populations of Izembek Refuge are vulnerable to this increased ease of public access, because they inhabit a very limited geographic area. These populations have limited options to escape human disturbances. In addition, the Refuge includes critical habitat for a number of species. Damage to critical habitats could be particularly harmful for these populations. The public has substantial access avenues for all public use activities to much of the Refuge by the road system, boat, or small aircraft. Further unrestricted ORV access would increase human/wildlife interactions, potentially to the detriment of fish and wildlife populations.

The following sections describes environmental concerns associated with opening the Refuge to ORV access on the northeast and east sides of Cold Bay next to the proposed King Cove access road (Figure 1). This region is adjacent to the Joshua Green watershed and the Kinzarof Lagoon wetland complex, areas of special concern to Izembek Refuge (USFWS 1985, 1987, 1996, 1998).

Habitat

The impacts of ORVs on habitats will vary according to time of year, topography (slope and microrelief), substrate, soil moisture level, permafrost, vegetation, temperature, vehicle type and weight, and intensity and frequency of vehicle use (Rickard and Brown 1974, Racine and Ahlstrand 1985, Felix and Raynolds 1989a b, Racine and Ahlstrand 1991, Happe et al. 1998). The ecological impacts of ORV use include soil and snow compaction, damage to vegetation and their root systems, habitat fragmentation, destabilization and erosion of soil, sedimentation of streams and altered hydrology, and visible scars on the landscape (Rickard and Brown 1974, Sparrow et al. 1978, Wilshire et al. 1978, Berry 1980, Abele et al. 1984, Happe et al. 1998, Sinnott 1990, Ahlstrand and Racine 1993). Tundra habitats are particularly sensitive to disturbance and slow to recover because of low air and soil temperatures, an abbreviated growing season, thin organic soil layers, and a lack of species diversity (Bliss et al. 1973). Recovery of vegetation is especially prolonged if the organic mat covering the soil is sheared or destroyed (Abele et al. 1984, Walker et al. 1987).

Most of the lowland habitat surrounding Cold Bay is open low shrub-ericaceous shrub tundra (USFWS 1985). The vegetation that grows in this habitat is readily destroyed by ORV traffic. At Wrangell-St. Elias National Park, dwarf shrub cover was quickly damaged even at low levels of ORV use, and it had very poor rates of recovery after trails became inactive (Happe et al. 1998). Sometimes, the vegetation in ORV trails takes many years to recover and can be different from surrounding vegetation (Walker et al. 1987). At Cold Bay, numerous old tracks scar the tundra, a legacy of unrestricted ORV use by the military 60 years ago. ORV use in open low shrub-ericaceous shrub tundra could affect rock sandpipers, Lapland longspurs, American pipits, willow ptarmigan, arctic ground squirrels, red foxes, and various small mammals during the spring and summer. In the fall, ORV access could disturb the many species feasting on crowberries, including emperor and Canada geese, brown bears, and willow ptarmigan. The low shrub-ericaceous shrub tundra surrounding Cold Bay is also important wintering habitat for caribou. Lichens, a critical winter food resource for the caribou, are sensitive to disturbance and can be destroyed by the single passage of an ATV (Ahlstrand et al. 1988).

Soil depth and drainage are important factors in the long-term impact of ORV traffic (Sparrow et al. 1978, Happe et al. 1998). When ORV users cross wet areas, they churn up the surface and damage vegetation, creating wet, muddy areas that other drivers want to avoid. Continued use widens trails as successive riders seek to avoid wet and rutted areas. This behavior can be observed on the Outpost Road, an unmaintained road, of Izembek Refuge. As ruts become deep and ponds form in the low areas, users continue to widen and braid the road to avoid these spots (Figures 2a and 2b). This road crosses tundra habitat that is relatively dry most of the year, and therefore would seem to be less prone to impact. Most public use at Izembek Refuge, however, occurs during the fall when conditions are wetter and ORV impacts are most damaging.

Wetlands and moist herbaceous meadows can suffer extensive damage by ORV traffic as a result of the actions described above (Happe et al. 1998, Bane 2001). Herbaceous meadows and wetlands occur east of Kinzarof Lagoon and in the Joshua Green watershed. Damage to these habitats would affect tundra swans and other species of waterfowl, loons and grebes, shorebirds, and savannah sparrows during breeding and migration periods.

Scattered alder thickets occur in mid-slope areas on the east side of Cold Bay and are important habitat for a variety of species. Numerous birds nest within these shrubs, including yellow and Wilson=s warblers, hermit thrushes, fox and golden-crowned sparrows, and redpolls. Willow ptarmigan and porcupines depend on shrubs for food and cover. Brown bears use alder shrubs for resting and hiding. Shrubs are particularly susceptible to damage by ORV passage, because the vehicles strip the protective bark and mangle or break branches and stems (Sparrow et al. 1978).

Alpine and subalpine habitats occur at higher elevations on the east side of Cold Bay. These habitats are home to rock ptarmigan, snow buntings, gray-crowned rosy finches, rough-legged hawks, wolverines, and denning brown bears. The vegetation in these dry habitats is fragile and very slow to recover from disturbance (Walker et al. 1987). Once the vegetative layer is removed, there is the increased problem of erosion, especially on steep slopes (Happe et al. 1998). If the protective layer of vegetation is sheared by ORV traffic on the slopes of the hills and mountains on the east side of Cold Bay, erosion could be a significant problem, particularly in the windy climate of this region.

One may argue that ORV traffic off the roads on the Refuge will be light. Significant damage, however, may occur to vegetation after only 10 passes by an ORV (Ahlstrand and Racine 1993). Numerous instances occur of ORV use producing unplanned trails in previously undisturbed areas of many federal lands (NPS 2003). On Unimak Island, just a few individuals using ATVs at Urilia Bay are creating unplanned trails in a Wilderness area (Figures 3a and 3b). Once a trail is created, people not only use the trail, but they also expand the trail network by branching out from the original trail into new areas (Sinnott 1990). At Cold Bay, ORV users follow dead-end trails leading off the existing road system, presumably thinking these trails will lead somewhere in particular. This tendency to follow visible trails, even when these trails are posted as closed to

vehicular traffic, has unnecessarily increased damage to habitats along the existing road corridors.

Finally, trails are usually created along particular terrain features that concentrate use, such as through valleys or along ridgetops (Sinnott 1990). Trails also lead to areas of high wildlife concentrations because that is what most users are interested in accessing (Sinnott 1990). Concentrating use within specific areas would substantially increase impacts. Foot traffic, alone, is producing a network of well-worn trails to highly desirable waterfowl hunting areas at Izembek Lagoon. ORV use would produce a more extensive and highly visible network of trails that would visibly scar the landscape and reduce the wilderness qualities of the Refuge (Figure 4). Finally, some ORV users who like to test themselves against natural obstacles drive aggressively on their ORVs. This operating style can be much more damaging to vegetation and soils than straight travel from point A to point B (Bane 2001).

Brown Bear

One of the purposes of Izembek Refuge is to conserve fish and wildlife populations and habitats in their natural diversity including … brown bears; Section 303(3)(B) of ANILCA. Brown bears use a wide variety of habitats on the Alaska Peninsula, including shoreline, lowland meadows and tundra, streams, midland tall shrub, and alpine zones (Glen and Miller 1980, Dau 1990). During spring and early summer, bears are widely dispersed, looking for opportunistic food sources such as beached marine mammal carcasses, caribou and moose calves, or newly sprouted sedges. By mid-July, bears concentrate on salmon streams where they may feed on salmon until late fall. Bears also visit the tundra uplands to supplement their salmon diet with berries. During the fall, most bears move into the subalpine and alpine areas and by mid-November many have moved to their den sites

The Joshua Green watershed and adjacent Right and Left Hand valleys on the northeast side of Cold Bay is critical habitat for brown bears throughout the year. This area supports the highest bear densities on the southern Alaska Peninsula, an average of 0.29 bears/km^2 (0.75 bears/mi^2) during the salmon runs in late August compared to a density of 0.17 bears/km^2 (0.44 bears/ mi^2) for the entire southern Alaska Peninsula (Sowl 2003). The Joshua Green is an extremely important natal area, producing young bears that disperse throughout the southern Alaska Peninsula (Dau 1990). On average, 25% of the adult bears observed during August surveys are maternal sows (Sowl 2003). Lowland habitat provides important foraging areas during much of the summer. During the fall, high numbers of bears are attracted to the abundance of salmon spawning in this region. Finally, the hills and mountains surrounding the Joshua Green area, including the upland areas north of Lenard Harbor, support high density denning areas (USFWS 1996, U.S. Army Corps of Engineers 2003). Brown bears in this portion of the Peninsula have very small home ranges (9-19 km^2 or 3.5-7.3 mi^2; Dau 1990) in comparison to other areas on the Alaska Peninsula (over 250 km^2 or 96.5 mi^2; Glen and Miller 1980), indicating that all necessary food and habitat requirements are met within a small geographic area. This concentration of critical brown bear habitats within such a small area increases the vulnerability of these bears to disturbance.

The literature has extensive documentation of the negative impact of roads and human activities on brown bear behavior and mortality (Schallenberger 1980, Mattson et al. 1987, Kasworm and Manley 1990, McLellan and Shackleton 1998, Gibeau et al. 2002). Bears tend to avoid human developments and roads, especially females with cubs of the year, unless they have learned to access human-produced food sources. Human activity can cause severe alterations in behavior, displace bears from preferred habitats, and disrupt foraging activities, and this disturbance has the greatest negative impact during post-denning in the spring and prior to denning in the fall (Mattson et al. 1987). Human disturbance at den sites during the fall can also cause bears to abandon their dens (Quimby 1974). Adult females were the most likely group to avoid human disturbances, even if it meant avoiding high quality habitats, and thus these females were at higher risk of mortality and were likely to have lower fecundity rates (Mattson et al. 1987, Mace et al. 1996, Gibeau et al. 2002). Increased human-bear interactions frequently lead to increased human-caused mortality of bears (Suring and Del Frate 2002). Bears also distribute themselves across the landscape in relation to other bears. Females with young cubs and subadults avoid adult males, while adult males seek out breeding females. Compression of bears into smaller areas leads to more, potentially hazardous, interactions amongst the crowded bears and displaces maternal sows into poorer quality habitats.

Because of their sensitivity to human disturbance, construction and use of a road on the east side of Cold Bay will negatively impact the brown bear population in this region by causing individuals to abandon some traditional foraging areas and denning sites. Public activities that occur off of roads (hiking, fishing, and berry picking) have been shown to alter the behavior of and displace bears that are within 3 km (1.9 mi) of the human activity (Schleyer et al. 1984). Increased access will also increase the level of legal and illegal harvest and increase the frequency of adverse human-bear interactions. Human activities associated with the existing roads in the Cold Bay area have already altered the density, distribution, and population composition of brown bears in this area (Dau 1989). The King Cove Access Project road corridor will also be less than 5 km (3.1 mi) from the critical bear habitat of the Joshua Green area. Allowing ORV access off of the King Cove Access road would substantially increase human penetration into previously remote high density bear use areas, further increasing disturbance to the bears living in this critical habitat area and potentially impacting the southern Alaska Peninsula population.

Caribou

The Southern Alaska Peninsula Caribou Herd (SAPCH) ranges from Port Moller to the southern end of the Alaska Peninsula, inhabiting the lowland and midland tundra between 50 and 300 m in elevation (Pitcher et al. 1990). A significant portion of the herd passes through narrow isthmus between Izembek and Kinzarof Lagoons during the semi-annual migration between their wintering areas on Izembek Refuge and calving areas around Black Hill/Trader Mountain and northward (USFWS 1997). The area north and east of Kinzarof Lagoon has also historically been used by wintering caribou (USFWS 1985). The SAPCH is a numerically small herd that inhabits a limited geographic region; therefore, this herd is more vulnerable to disturbance and

overharvest than larger herds. To maintain traditional caribou distribution patterns during the winter and avoid adverse effects on this important subsistence species, the Refuge has traditionally limited vehicle use in the Cold Bay area to the designated road system (USFWS 1985).

Wildlife responses to vehicle disturbance will vary with species, physical condition of the individuals, past experience, habitat, type of vehicle, actions of vehicle, and time of year (Altmann 1985). It has been shown in numerous studies that human developments, roads, and vehicle traffic are disruptive to traditional caribou movements and habitat use (Child 1973, Smith and Cameron 1983, Dau and Cameron 1986, Cameron et al. 1992, James and Stuart-Smith 2000). Disturbance to wild ungulates is more detrimental if the disturbance is frequent and unpredictable (Geist 1970); therefore, unlimited access by ORV users could have a more adverse effect on wildlife populations than more predictable vehicular traffic on roads. Predators, both humans and wolves, can use manmade trails to ease their travel and increase their efficiency in capturing caribou (James and Smith 2000). ORV users would be able to exploit remote game areas with relative ease, disturbing wildlife in a much greater area. ORV access can also result in displacement of wildlife from critical habitat areas leading to reduced survival and reproduction, more intensive harvest that can negatively impact sex ratios and age structures of the populations, and degradation of important habitats (Yarmoloy et al. 1988, Sinnott 1990). Wildlife are especially vulnerable to disturbance during seasonal concentrations, preparing for the winter, and when under the stress of severe weather and food limitations that occur during the winter (Sinnott 1990). Increased disturbance of wintering caribou can deplete energy reserves, resulting in additional mortality of adults and reduced production of young during the following spring.

Much of the wintering area of the SAPCH is already accessible from the existing road system at Cold Bay. Additional access would also be possible from a road on the east side of Cold Bay. Allowing ORV access off the road system would substantially increase access to a vulnerable population that winters in a relatively small geographical area, causing elevated levels of disturbance at a physiologically stressful time of year and requiring a more intensive level of population management and law enforcement to prevent overharvest and illegal harvest.

Tundra Swan

Tundra swans nest, raise young, and molt in the freshwater lakes and wetlands surrounding Cold Bay, with highest densities in the Joshua Green River area on the northeast side of Cold Bay (USFWS 1998). Average breeding density in the Joshua Green is 0.06 pairs/km^2 (0.16 pairs/mi^2; Izembek NWR, unpubl. data). The Izembek population of swans is unique in North America and in the circumpolar range of the species due to its non-migratory behavior (Dau and Sarvis 2002). Individuals winter on the lower Alaska Peninsula and Unimak Island, with most concentrating around the Peterson Lagoon area of Unimak Island during harsh winters (Izembek Annual Narrative Reports, 1977-1996). In addition, swans breeding on Izembek Refuge appear to be morphologically distinct from other tundra swan populations (Dau unpublished data). Annual productivity of swans within the Izembek Refuge and adjacent lands is low in comparison to

other breeding areas due to high rates of mortality of eggs and young (Izembek Annual Narrative Reports, 1977-1996), and the population persists primarily due to adult longevity. Because of its unusual migratory status, numerically small size, and low reproductive rate, the Izembek population has been given special status and has been excluded from sport harvest (Somerville 1981). Similar special status is anticipated being granted for protection of these swans from subsistence hunting.

Swans are intolerant of human disturbance while breeding or molting (Hansen et al. 1971, Barry and Spencer 1976, Murphy and Anderson 1993, Limpert and Earnst 1994, Monda et al. 1994). Swans will frequently leave nests in response to approaching humans, sometimes while the humans are more than a kilometer away, and will rarely return to nests as long as humans are in sight (Hawkins 1986, Henson and Grant 1991, Monda et al. 1994). Meanwhile, the eggs are left uncovered and vulnerable to cooling or predation. Repeated disturbance will lead to nest abandonment (Henson and Grant 1991). Human disturbance also forces broods off natal ponds, elevating their predation risk (Hansen et al. 1971). On Izembek Refuge, tundra swan families that have been disturbed off their brood-rearing lakes have moved up to 6 miles overland (USFWS 1987). Although swans can habituate to regular traffic on road systems, they are disturbed if vehicles stop or make excessive noise (Henson and Grant 1991). Trumpeter swans nesting on the Copper River Delta, which is accessible by both road and boat, had significantly poorer reproductive success than those nesting in less accessible areas of the Kenai Peninsula (Hansen et al. 1971).

Annual breeding pair surveys indicate that the population of tundra swans breeding on Izembek Refuge has steadily declined over the past two decades (Sowl *In prep*). In particular, the number of swans breeding in the vicinity of the Cold Bay road system has been depressed. Human activity along these roads may be influencing the breeding densities of swans in the existing road system (Sowl *In prep*). A road on the east side of Cold Bay, particularly the hovercraft terminal site, will provide increased access to swan nesting and molting areas on the northeast side of Cold Bay. Additional ORV access to these wetlands from the King Cove Access Project road or the hovercraft terminal site will likely have a negative effect on the breeding and molting activities of the swans in this area, an effect that will significantly impact a small population that is already experiencing a population decline.

Waterfowl and Other Waterbirds

Izembek Refuge supports a large variety and abundance of waterfowl throughout the entire year. The lowland tundra, meadows, and wetlands around Cold Bay and Izembek Lagoon are important waterfowl breeding habitat (USFWS 1985). The most common ducks breeding on the Refuge are mallards, greater scaup, and black scoters, which occur at densities of 7.5, 6.0, and 2.7 birds/km^2 (19.3, 15.5, and 7.1 birds/mi^2), respectively (Dau and Schafer 1996). Two of these species, black scoters and greater scaup, are of special interest because populations are declining (Austin et al. 2000, Sea Duck Joint Venture 2003). Green-winged teal, northern pintail, American wigeon, and red-breasted mergansers occur at lower densities (< 1 bird/km^2 or < 2.5 birds/mi^2) on the Refuge. In addition to waterfowl, other waterbirds such as common and red-

throated loons and red-necked grebes nest in freshwater ponds and lakes on the Refuge. Red-throated loons are also a species of concern because of population declines (Gotthard 2001).

One of the purposes of Izembek Refuge as designated by ANILCA, Section 303(3)(B), is to conserve waterfowl and their habitats. Unrestricted ORV access to the lowland habitats on the northeast side of Cold Bay could substantially increase disturbance of waterfowl breeding in these areas. Human disturbance can stress nesting hens, increase nest abandonment rates, and lower survival rates of eggs, young, and adults (Geis 1956, Bálat 1969, Hanson and Eberhardt 1971, Eisenhauer and Kirkpatrick 1977, Brown and Brown 1981). In high density nesting areas, ORV use could directly impact reproductive success as users run over nests and young birds. Finally, damage to wetland habitats by ORV traffic would degrade waterfowl breeding and foraging areas. As mentioned earlier, wetland habitats frequently sustain greater damage from ORV traffic than drier habitats.

Izembek Refuge provides critical migration and wintering habitats for Pacific Flyway populations of migratory waterfowl. Peak numbers of waterfowl are present on the Refuge in spring (March/April) and fall (September/October), when numerous species funnel through the Izembek area on their way to and from their subarctic and arctic breeding areas. Over 90% of the Pacific Flyway population of brant (120,000 to 150,000 birds) stage in Izembek and Kinzarof Lagoons each fall, gaining most of the fat reserves they will need for their non-stop migration to the Baja Peninsula in Mexico (Dau 1992). An average of 23,000 Steller=s eiders, a threatened species, molt in Izembek Lagoon each September and many eiders remain in the area throughout the winter (Laubhan and Metzner 1999, Dau et al. 2000). Other common migrants include Taverner's and cackling Canada geese, emperor geese, northern pintails, green-winged teal, mallards, American wigeon, and common goldeneyes (USFWS 1985, Kincheloe et al. 1988). In addition, many species of waterfowl overwinter in the Izembek area. Kinzarof Lagoon, which includes the one of the most substantial intertidal eelgrass beds on the Pacific side of the Alaska Peninsula, is frequently ice free when Izembek Lagoon is frozen and provides critical habitat for overwintering waterfowl, particularly brant and Steller=s eiders (Dau and Ward 1997, Laubhan and Metzner 1999).

The coastal lagoons and waters on Izembek Refuge receive the highest concentrations of migrating waterfowl. Many of these migrants forage on eelgrass, eelgrass seeds, or the invertebrates and fish that live amongst the eelgrass meadows. Many ducks and geese also roost, drink, and forage in the freshwater ponds on the tundra surrounding Izembek Lagoon and Cold Bay (USFWS 1985, 1996). Berries that grow on the crowberry heath tundra surrounding Cold Bay provide another important food resource for Canada and emperor geese (Hupp and Safine 2002). The lowland tundra and ponds on the northeast side of Cold Bay host moderate densities of staging waterfowl, while Kinzarof Lagoon is critical staging and wintering habitat (USFWS 1996, 1998).

The management direction outlined in the Refuge's CCP protects areas sensitive to disturbance, including migration staging areas (USFWS 1985). Disturbance of migratory waterfowl has long been recognized as a significant potential problem for the Refuge (USFWS 1985). Staging

waterfowl are particularly vulnerable to disturbance because they must consume enough calories to accumulate the fat reserves needed to meet energetic demands of nesting and migration (Fredrickson and Drobney 1979). Staging waterfowl are sensitive to a variety of disturbances, including boat traffic, aircraft overflights, and vehicle traffic along roads and trails (Madsen 1985, Bélanger and Bédard 1989, Ward et al. 1994, 1999, Hupp and Safine 2002).

Research at Izembek Lagoon has shown that frequent disturbances of staging brant causes a reduction in body weight, which could compromise their migration readiness and survival rates (Ward et al. 1994). Waterfowl may be able to habituate to predictable disturbances, such as frequent vehicle traffic on roads, but they still react strongly to unpredictable disturbances, such as sporadic intrusions of humans on unpredictable paths (Murphy and Anderson 1993). Wintering waterfowl, which are frequently concentrated along the south and east ends of Kinzarof Lagoon (Izembek Refuge, unpubl. data), can also be sensitive to excessive disturbance, because they need to spend a considerable portion of their daily activity cycle foraging to meet the energetic demands of wintering in such a harsh environment (Laubhan and Metzner 1999).

Waterfowl staging at Izembek Refuge already experience disturbance from hunters and overflights of aircraft from the Cold Bay airport, but some areas of the Refuge are difficult to access and provide escape habitat where the waterfowl can forage largely undisturbed. Since waterfowl hunting is one of the primary consumptive uses of wildlife resources on the Refuge, human activity at Kinzarof Lagoon and the northeast side of Cold Bay is expected to increase as a result of increased access provided by the road on the east side of Cold Bay. Increased access to previously remote staging areas, particularly through use of ORVs, could interrupt of foraging activities and displace birds from feeding areas, compromising migration readiness and survival (Bélanger and Bédard 1989, 1990, Ward et al. 1994, 1999). Allowing unrestricted ORV use off this road would result in degradation of important foraging habitat and penetration into previously remote staging areas. Extensive disturbance of waterfowl during this critical staging period could be detrimental to these populations.

Salmon

Protection of salmon populations and their habitats is also another mandate of Section 303(3)(B) of ANILCA for Izembek Refuge. Pacific salmon spawn in most of the major streams on Izembek Refuge, including the streams that flow into the eastern end of Kinzarof Lagoon and the upper end of the right hand fork of the Joshua Green River (EIS 2003). ORVs crossing streams harm salmon spawning habitat by wearing down embankments, widening the stream, and altering the water flow (Bane 2001). Erosion from ORV use can also lead to sedimentation of streambeds. ORV users may travel through streams to avoid rough, steep or bushy surrounding terrain. ORV travel in streams can lead to damage of the streambed, destruction of aquatic invertebrates, and mortality of salmon eggs and fry (Bane 2001).

Archaeological Resources

Unrestricted ORV use damages archaeological sites in two general ways. Direct impacts caused

by vehicles running over sites mirror those amply documented for habitats (Rickard and Brown 1974, Wilshire et al.1978, Ahlstrand et al.1988, Bane 2001). These include compaction of soil, loss of vegetation cover, and altered hydrology. On archaeological sites, these impacts change the surface characteristics of a site that affect scientific values through compaction of surface and subsurface features (remains of houses, burials, hearths, storage pits, etc.), and breakage of artifacts. Site integrity, a necessary element for listing on the National Register of Historic Places (36 CFR 60.4; National Park Service 1997), is also affected by the visible changes wrought by vehicle tracks and erosion.

Indirect impacts arise as a result of the direct impacts of vehicle damage to sites as well as from making formerly inaccessible areas more accessible. Erosion of sites exposes artifacts that are then collected by passersby. Examples from refuges in Alaska have included incidents at Peterson Lagoon on Unimak Island (Corbett 1993, 2004), Becharof Lake (Hood 1995), and Russian River (Corbett 1997). Equally damaging is the increased access to formerly remote sites caused by unregulated ORV use. Damage to archaeological sites increases dramatically when the sites are accessible enough to be reached but remote enough to preclude monitoring (Corbett and Reger 1994, Reger and Corbett 1999, Steffian et al. 2003). Many prehistoric Aleut village sites occur on the lower Alaska Peninsula (Maschner et al. 1997). These village sites are usually located in areas with sources of freshwater and access to abundant fish and wildlife resources. Unrestricted off-road use of ORVs could potentially damage village sites as subsistence users are attracted to the same resource-rich areas as the former residents. Shearing overlying vegetation and increasing erosion of soils would be particularly damaging to the sites.

Conclusion

The intent of ANILCA was to achieve a variety of purposes, including preserving natural habitats and undisturbed ecosystems, protecting subsistence resources, protecting historic and archeological sites, preserving wilderness resource values, and allowing recreational, scientific, and subsistence activities (see Title I, Section 101(b)). Under ANILCA, residents of rural Alaska are allowed reasonable access to subsistence resources on public lands. This may include ORV access where it has been determined that such access existed prior to the establishment of the refuge. Izembek Refuge must provide opportunities for continued subsistence use by local rural residents in a manner consistent with the purposes set forth for conserving fish and wildlife populations and habitats in their natural diversity. A balance must be achieved between reasonable access and unreasonable impact and disturbance of wildlife and their habitats. Modes of access will be of particular concern as human populations increase and transportation technology improves.

Over 60 miles of designated roads and trails already exist in the Cold Bay area, allowing extensive access to subsistence resources. In addition, many areas of the Refuge can be reached by marine and air transportation. Few Refuges in Alaska have such extensive avenues for public access. Allowing use of ORVs off established roads and trails within Izembek Refuge is unwarranted and could be detrimental to key fish and wildlife species found within the Refuge. Unregulated ORV access would significantly increase consumptive use of fish and wildlife

resources, significantly expand the portion of the Refuge experiencing human disturbances, substantially increase damage to habitats, increase displacement of animals from preferred habitats, disrupt animal movements, and put extra stress on populations that are engaged in energetically demanding activities such as breeding, molting, migration, and overwintering.

Izembek Refuge includes important regional, national, and international concentrations of fish and wildlife (e.g., Pacific salmon, brown bears, caribou, Pacific brant, emperor geese, Steller's eiders). The diverse and abundant wildlife resources within the Refuge are particularly vulnerable to increasing levels of human disturbance because they are concentrated within a very limited geographical area. Access to public lands should not compromise the conservation of fish and wildlife and their habitats for which these lands were set aside. To degrade the environment and resources of the Refuge will ultimately limit future opportunities for subsistence use.

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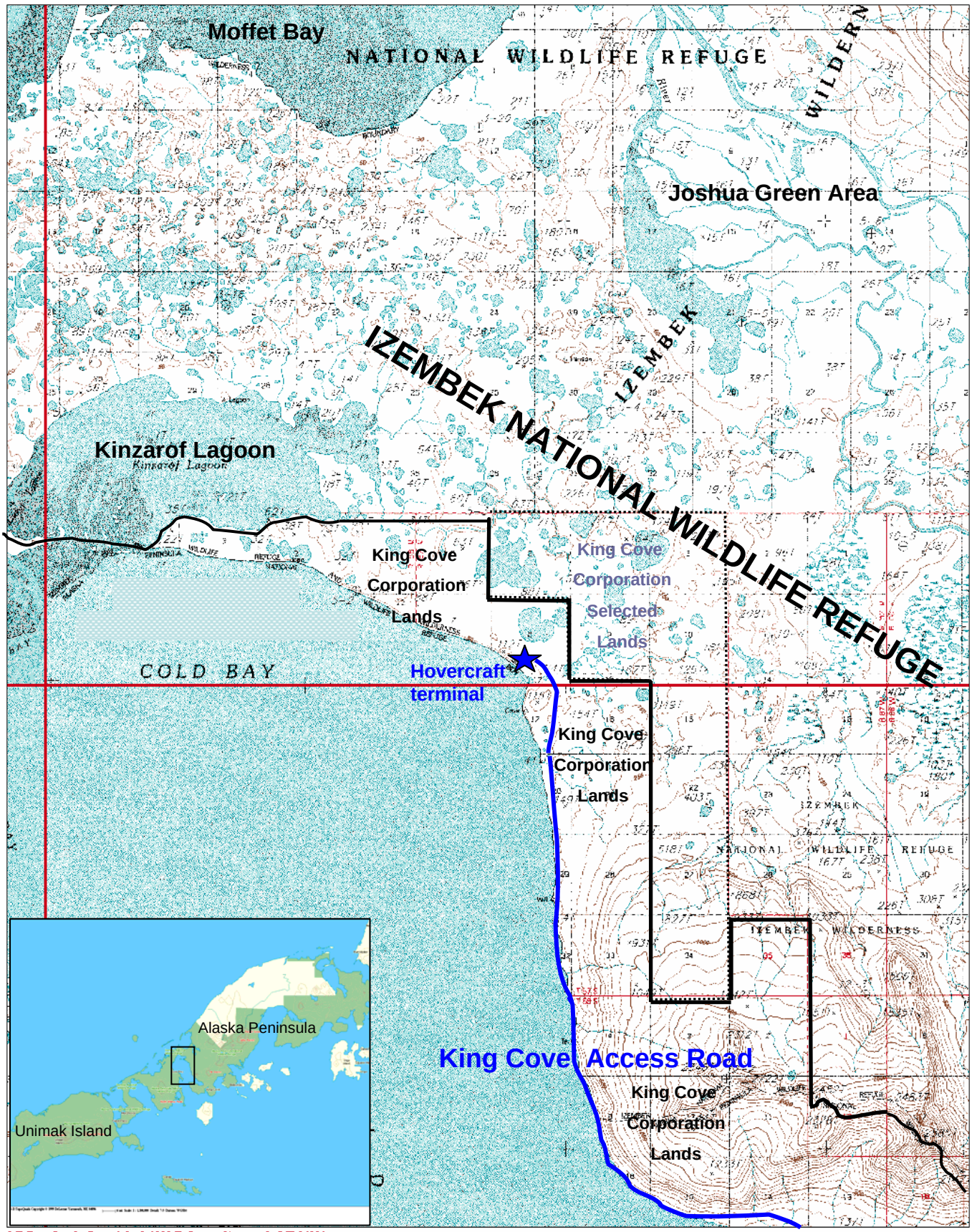
Figure 1. Map of King Cove Road Access Project



The purpose of this map is to show the approximate location of the King Cove Access Road. The alignment of the road as shown on this map is tentative and subject to change.

Figure 2a. Water-filled ruts on the Outpost Road, Izembek National Wildlife Refuge.

Figure 2b. Braiding of road to avoid water-filled ruts on the Outpost Road. Izembek National Wildlife Refuge.

Figure 3a. Newly formed, unplanned ATV trail at Urilia Bay, Unimak Island. July 2003.

Figure 3b. Braided tracks of unplanned ATV trail at Urilia Bay, Unimak Island. July 2003.

Figure 4. The “footprint” of an ORV trail on Izembek National Wildlife Refuge.