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They have been observed in water depths of 50 m near Cape Bathurst (Northwest Territories). There appears to be a southwestward shift in the bowhead range during August, with many whales occurring in the shallow waters of the Mackenzie River delta region.

Bowheads begin to move out of their summering grounds in the Canadian Beaufort Sea in mid August, with the major portion of the migration occurring in September. This westward movement occurs over a broad front, with swimming speeds estimated at up to 4 km/hr. Bowheads are found at all depths during this time; however, a shift in distribution occurs in mid September as more bowheads are found in shallower water (20-50 m) nearshore. It has been suggested that this nearshore movement occurs because of pelagic prey concentrations found at this time.

Based on the 1981 aerial surveys of the eastern Beaufort Sea and data collected from shore-fast ice counting stations, the International Whaling Commission (IWC) in 1982 established a minimum population estimate for the western arctic bowhead whale at 3,857 animals. The 1985 IWC official estimate was 4,417 whales, with a 95 percent confidence interval (2,613-6,221).

Bowhead whales are classified as endangered and are protected under the Endangered Species Conservation Act (ESA) of 1969 (PL 91-135) and Marine Mammal Protection Act of 1972 (MMPA, PL 92-522). The National Marine Fisheries Service (NOAA, U.S. Department of Commerce) oversees bowhead whales for the federal government. Bowhead whales have been completely protected from commercial whaling since 1946 by the International Convention for the Regulation of Whaling, the same treaty that set up the IWC. The MMPA restricts the importation of marine mammal products and allows only Alaskan Natives to take bowhead whales for subsistence and for creating handicraft items and clothing for personal use and sale. The MMPA and ESA allow for regulation of subsistence take if the stock is declared depleted.

Areas of Special Concern

With regard to the present oil/gas leasing decisions (i.e., ANWR, Sale 50, 55) an area of particular interest and concern for bowhead whales is the area east of Barter Island used for feeding. Additionally, the whales use shallow nearshore Alaska coastal waters (20 m and deeper) as a fall migratory corridor under some ice conditions. Thus, the nearshore coast from the Alaska/Canada border well past the ANWR area (as far west as Camden Bay) must be considered as important for the whales and for subsistence whaling activities.

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PEREGRINE FALCON (Falco peregrinus tundrius)

Peregrine falcons, the arctic subspecies, are presently classified as a threatened species by the USFWS.

Distribution and Abundance

Except as specifically noted, the information presented below is drawn from the Initial Report Baseline Study of the Fish, Wildlife, and their Habitats, Arctic National Wildlife Refuge Coastal Plain Resource Assessment (USFWS, 1982).

The peregrine falcon is a rare summer resident and possible breeder within the ANWR coastal plain. During migrations, it is not uncommon to see peregrine falcons along the coast, where they probably prey upon shorebirds and passerines. Migration routes for peregrine falcons using the North Slope probably lie both along the Brooks Range and the arctic coast, so many more birds than the resident population probably move through the ANWR, especially during the fall.

The current status of this species within the 1002 area of the ANWR is uncertain. Poor habitat quality, relative to areas further south with greater relief, limits the potential of the area to support nesting peregrine falcons. At the current time, no nesting pairs are known within the ANWR 1002 area, although one male bird has been seen defending a territory near the southern boundary of the area in the Jago River drainage (R. Ambrose, 1986). This is a sign that nesting could take place in this location, given the dispersal of birds from other habitat areas saturated to capacity with peregrine falcons. The coastal plain between Prudhoe Bay and the Canning River represents a major data gap in knowledge of the distribution of this species. Surveys to gather this information may be conducted in the summer of 1986 (R. Ambrose, 1986).

Although little "classic" nesting habitat exists in the area between the Sagavanirktok River and the Canadian boundary, the present general rising trend in population level for peregrine falcons makes it likely that marginal habitats (e.g., dirt bluffs) may be occupied in the near future. Therefore, some establishment of nests within the area under consideration can be expected, although potential sites are, at this time, unknown (R. Ambrose, 1986).

Peregrine falcons are known to nest along the Sagavanirktok River. Multiple eyries are located along Franklin Bluffs on the east side of the river, and again at two bluff areas on the west side of the river near Sagwon.

Areas of Special Concern

There are no areas of special concern within the immediate area of the 1002 lands. Multiple eyries do exist along the Sagavanirktok River and these eyreis plus the riparian habitat of the Sagavanirktok River in the general vicinity of these nest sites is considered essential for peregrine falcons.

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WATERFOWL

Unless specifically noted, information presented below is from the Alaska Habitat Management Guide--Arctic Region (ADF&G 1986), or the 1002 baseline report (USFWS 1982).

Tremendous numbers of waterfowl move into the coastal areas of arctic Alaska in the spring. Timing of migration is related to the pattern of spring breakup, and birds move into the nesting areas via the MacKenzie and Yukon rivers and along the coastlines. Around mid-July, many waterfowl species shift from breeding areas to lakes, ponds, and coastal areas to molt. As freeze-up approaches, birds generally move out of the north along the same routes used in spring.

Distribution and Abundance

Tundra (Whistling) Swans

Approximately 800 tundra swans summer on the North Slope, 200 or more of which are found in the ANWR. Nesting occurs in river delta areas, especially ponds and lakes in and near drained-basin complexes. Tundra swans nest and reside in traditional concentration areas on the coastal plain. The major concentration areas in the ANWR are the Canning-Tamayariak, Hulahula-Okpilak, and the Aichilik-Egaksrak-Kongakut river deltas, and the Demarcation Bay and Barter Island lakes. The overall density of swans is lower on the coastal plain of the ANWR than elsewhere on the North Slope. However, the density of nesting swans in the ANWR, especially the Canning-Tamayariak river delta, is equal to or higher than nesting densities elsewhere on the North Slope.

Canada Goose

This species migrates to the ANWR in late May from the east and departs to the east during late August.

Canada geese have been reported nesting in few locations on the arctic coastal plain. Approximately 200-300 pairs of Canada geese nest along the Colville River. A few pairs nest on islands (e.g., Howe Island, Duck Islands, Tigvariak Island) near Prudhoe Bay. In the Canning River drainage, the Canada goose is a fairly common breeder and a common migrant. Following the breeding season a molt migration to the west is apparent in late June to early July as nonbreeders and failed breeders vacate tundra habitats and migrate west, probably to the Teshekpuk Lake goose molting area. Birds which do not reach Teshekpuk Lake before becoming flightless often spend the feather molting period

in July in river delta habitats. About 15,000 Canada geese molt along the Beaufort Sea coast from Smith Bay in the National Petroleum Reserve-Alaska to the Canning River.

Black Brant

During spring migration (eastward) along the ANWR coast, brant tend to follow lagoon shorelines and cut across points of land, sometimes leading them 1-5 kilometers inland. The tendency for brant to use the lagoon shorelines in spring may be related to their use of the coastal vegetated mudflats which are usually located on gradually sloping lagoon shorelines.

Brant breed sparingly on the Alaska Beaufort Sea coast, apparently more commonly in the western portion than the eastern segment. A total of 293 nests have been observed in the Colville River delta. In the Prudhoe Bay area, a few brant nest in the river delta areas and on some offshore islands. In the ANWR, a colony of 15 pairs was documented nesting at the Okpilak River Delta. In the Canning River drainage, the black brant is an uncommon breeder and common-to-abundant migrant (+24,000).

In fall, brant appear to be confined to a narrow corridor along the Beaufort Sea coast. General movement is to the west.

White-fronted goose

The estimated breeding population of white-fronted geese on the Arctic slope is 50,000 birds. White-fronted geese are a fairly common breeder from the central arctic slope (Sagavanirktok River region) to the west. White-fronted geese molt in small flocks throughout much of the arctic coastal plain, although they are most concentrated on a few lakes near Teshekpuk Lake in National Petroleum Reserve, where up to 4,900 geese have been counted during the molt period. East of the Sagavanirktok River drainage, this species seems to be much less common. In the ANWR, this species is commonly observed in spring, is absent by mid-summer, and is again commonly observed as an eastward fall migrant.

Snow Goose

The only known breeding colony of snow geese in the United States is located on Howe and Duck islands in the outer Sagavanirktok River delta in the Prudhoe Bay area where approximately 60 pairs nest. Scattered pairs are found nesting in other locations, such as Flaxman Island. In the ANWR, there are typically small flocks of snow geese (five to 75 birds) noted in June, with the net direction of movement often uncertain. In August, there is a massive

influx of snow geese into the coastal plain of the ANWR from the Northwest Territories. The most consistently used areas in the ANWR are east of the Hulahula River in the vicinity of Barter Island. However, this westward influx of snow geese occasionally extends to the Canning River. During a normal year, this westward movement is followed by a one or two week period of predominantly resting and feeding (staging) activities. Snow geese normally depart the ANWR by late September but have been observed in the area as late as mid October. The geese apparently remain in the staging areas long enough to accumulate sufficient energy reserves for fall southward migration, regardless of weather conditions.

The maximum estimated number of snow geese occurring on the ANWR was 325,760 in 1978. During the period 1973-1984 there were 3 years in which the estimated numbers were greater than 190,000, there were 4 years in which there were between 40,000 and 110,000, and 4 years in which there were 20,000 or fewer birds. Annual variation occurs in the staging areas used, the numbers of snow geese using each area, and the duration of use. Weather most likely exerts the major influence upon timing and extent of movements from the breeding areas to the staging areas (Garner and Reynolds 1985 Appendix 7 - Table 3).

Pintail

The pintail is considered to be the most numerous duck on the arctic coastal plain, although in the ANWR it usually is not as common as the oldsquaw. The breeding population of pintails on the arctic slope has been estimated at 120,500 birds. In years of drought in the southern prairies, pintail occur in greater numbers in the arctic. Nesting seems to be more frequent in the western portions of the arctic coastal plain than in the eastern portions. However in the ANWR, pintails are fairly common breeders and fall migrants in the Okpilik River area, common summer residents and fairly common breeders on the Jago River, and are uncommon breeders and spring migrants on the Katakurak River area. In the Canning River drainage, pintails are considered very common migrants, a common summer resident, and a rare breeder.

Green-winged Teal

Green-winged teal are relatively rare on the North Slope but occur throughout the area in small numbers. The breeding population of teal has been estimated to be 4,200 birds on the arctic slope. Green-winged teal breed in the interior arctic coastal plain.

American Widgeon

This species has been described as having a widely scattered light population. In the ANWR, widgeon appear to be frequent migrants.

Oldsquaw

Oldsquaws are the most numerous duck in the ANWR, but to the west they are outnumbered by pintails in some sites. Widespread breeding is recorded across the arctic coastal plain and into the Brooks Range. Oldsquaws are abundant during the molt period on the coastal lagoons and on large lakes of the arctic coastal plain.

Common Eider

Common eiders are found nesting on spits and beaches along the entire Alaska Beaufort Sea coast, and they nest colonially on barrier islands. Small numbers are sometimes seen on the tundra in spring, and small flocks have been seen flying west in mid-to-late June in the ANWR. In the Canning River drainage eiders are considered to be an uncommon breeder but a fairly common migrant.

Mallard

Mallards have been regularly recorded in small numbers over various parts of the North Slope. At the Jago River in the ANWR, mallards are a rare summer visitant and breeder. The mallard breeding population is estimated to be about 500 birds on the entire arctic slope.

Areas of Special Concern

Several habitat areas are identified as essential to the well-being of waterfowl.

Barrier island areas are important to eider duck nesting. Vegetated islands such as Barter, Flaxman, and Tigvariak are attractive nesting areas to many species of waterfowl.

Protected waters (lagoons, bays, estuaries, and coastal lakes) are important resting, feeding, and molting areas for the majority of waterfowl species.

Lagoon shorelines are important resting and feeding areas for waterfowl. Vegetated coastal mudflats are believed to be essential feeding areas for arriving black brant during the spring migration.

River delta areas are favored by all waterfowl as nesting, resting, molting, and feeding areas. Coastal spits and mudflats are also favored resting and feeding areas for waterfowl.

The entire arctic coastal plain of the ANWR has been utilized by snow geese for feeding and resting activities. The most consistent area of use in the ANWR 1002 area, however, has been from the Hulahula River (Barter Island vicinity) east to the Aichilik River. The area of use extends from the coast inland to about the 305 meter (1,000 ft) elevation contour line.

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SHOREBIRDS

Distribution and Abundance

Unless otherwise noted in the text, the following material has been paraphrased from the Initial Report Baseline Study of the Fish, Wildlife, and Their Habitats, Arctic National Wildlife Refuge Coastal Plain Resource Assessment (USFWS, 1982).

Shorebirds of the families Charadriidae and Scolopacidae are the dominant breeding birds of the Alaskan Arctic Coastal Plain. Studies from the coastal and inland areas of the region, as well as across its east-west extent have investigated aspects of life history, habitat use, energetics, etc. However, much remains to be discovered, and insufficient data exist at present to make estimates of total population size for most species. More than 100 species of birds have been recorded within the ANWR 1002 study area, with at least 26 shorebird species being represented. Of these, the golden plover, ruddy turnstone, red-necked phalarope, red phalarope, semipalmated sandpiper, Baird's sandpiper, pectoral sandpiper, dunlin, and buff-breasted sandpipers are the most common breeders and residents. Several other species (e.g. sanderling, long-billed dowitcher) are uncommon in the ANWR coastal plain during the breeding season, but increase in numbers dramatically during migration periods. This portion of the coastal plain is important to some species only because it serves as a migration corridor for birds on their way to summering areas elsewhere.

Breeding bird studies from different locations along the Alaskan Arctic Coastal Plain indicate that the densities in the eastern portion (i.e., ANWR) are lower than elsewhere, especially near Barrow (although methodological differences may contribute to the apparent magnitude of these results). Also, topographic and geomorpholgic differences between the ANWR study area and regions further west tend to restrict the amount of good shorebird habitat available in the 1002 study area. The width of the coastal plain is much narrower on ANWR than further west, and a larger proportion of upland, mesic tundra inland from the coast reduces the value of the eastern coastal plain to most shorebird species. Although nesting shorebird species differ in specific habitat preferences, they in general prefer wetter sites. Since inland areas in ANWR have more relief, better drainage, and more shrubs, areas suitable for nesting are less available than near the coast. As a result, breeding shorebirds are nearly twice as dense at the coast than inland.

Few studies of shorebirds have been undertaken between the Canning and Sag Rivers. However, the general relationships of shorebirds to their habitat on the North Slope seem to be consistent, based on the observations made at widely separated points, and it is assumed that the same patterns of use exist in this area.

Perhaps the most striking aspect of summer use of the coastal plain habitats by shorebirds is the shift of birds from inland to the coast which begins after courtship is completed. In several species, one sex of each pair leaves the nesting area and moves to premigration areas on the coast. These birds are joined successively by unsuccessful breeders, females that have completed breeding, non-breeders, and young-of-the-year. This results in a gradual shift in the center of distribution and in habitat use, beginning in late July and continuing through the early and middle parts of August. Thus, while a variety of habitats are used for courtship and breeding (including uplands), wet habitat types, and especially wet areas near the coast are important for shorebirds using the ANWR study area and adjacent lands to the west. One study found that wet sedge meadow was the most important habitat both in terms of numbers of species and individuals. However, it was noted that often the importance of these areas was enhanced by the presence of other habitats ("very wet sedge meadow" and "moist sedge meadow") nearby. Like many wildlife species, shorebirds seemingly benefit from habitat diversity. Another important habitat for shorebirds was "wet saline tundra."

Shorebird concentrations in coastal habitats double or triple after late July, and then decline steadily (with the exception of pulses as migrations move through the area) as birds emigrate.

Areas of Special Concern

Shorebirds dominate the use of mainland shore habitats while waterfowl tend to dominate spit and lagoon areas. Of these areas, river "dunes" which were windswept and snow-free early in the season, and "wet saline tundra" at the head of bays (except during spring migraton when these areas were ice-covered), were the areas of most importance to shorebirds. Brackish mudflats in the littoral zone are important to migrating shorebirds, and are used heavily as the shoreward shift described above takes place. Turnover rates are high at this time, indicating that birds are continually moving through the area and being replaced by newcomers.

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WOLF (Canis lupus)

Distribution and Abundance

Observations of wolves within the 1002 study area are sparse. Weiler et al. (1985) summarize reported wolf sitings on and adjacent to the coastal plain of the ANWR occurring between 1969 and 1984. The majority of such sitings occurred to the south of the coastal plain in the foothills and mountain valleys of the Brooks Range.

Radiotelemetry studies of wolves were initiated in 1984 by the USFWS and ADFG. Eleven wolves were collared between May 19 and July 5, mostly on an opportunistic basis during caribou surveys (Weiler et al. 1985). Activity areas were identified for the Sadlerochit, Aichilik, and Kongakut packs. The Aichilik pack showed the greatest use of the 1002 study area (primarily between the Aichilik and the upper Okerokovik rivers), but the majority of its range fell outside the 1002 boundary. The Kongakut pack was found well to the east of the 1002 area, while a very small proportion of the Sadlerochit pack's activity area fell within the 1002 boundary. Observations of the Canning River and Old Man Creek packs placed them well south of the 1002 boundary. Weiler et al. (1985) observed individual wolves within the 1002 area on several occasions in 1984 but concluded that there appeared to be little use of the coastal plain west of the Aichilik River, at least during mid- and late summer. Coastal plain use by wolves was much higher east of the Aichilik.

Telemetry work continued during the 1985 field season with the collaring of 15 wolves, mostly incidental to grizzly bear studies (Weiler 1986). The distribution of wolves once again showed that identified packs had activity areas lying largely outside the 1002 study area, with occasional lone or dispersing individuals found on the coastal plain. The loss of one pack in 1984 from hunting mortality (Weiler et al. 1985) and the loss of two packs in 1985 from rabies and hunting mortality, along with the appearance of two new packs in 1985, indicates a dynamic situation with regard to wolf distribution on the ANWR (Weiler 1986).

The overall abundance of wolves on or adjacent to the ANWR coastal plain was similar in 1984 and 1985. Weiler et al. (1985) reported a minimum of 27 adult wolves and seven pups using the northern portion of the ANWR in late summer 1984. Twelve mortalities were known to have occurred during the winter of 1984-85, leaving a minimum late summer population of 22 adults and 14 pups in 1985. These authors also report that wolf populations on the North Slope are considered low as compared to their abundance prior to the intensive aerial wolf hunting and predator control that occurred in the early

to mid-1950s. Weiler et al. (1985), citing a series of authors, state that "prey abundance, social dynamics of packs, human disturbance and harvest levels, diseases, and other ecological factors . . ." apparently influence wolf density in a given range. Mortality data reported by Weiler (1986) indicate that of 34 wolves alive in late summer 1984, 12 died during the winter of 1984-85 from hunting, disease (rabies), and unknown causes. Subsequently, 14 pups were produced in 1985, which provided a rough balance between population additions and losses, if documented emigration and potential immigration are assumed in balance. Seven mortalities documented during the winter of 1983-84 were all hunter kills, but losses from disease and other causes, if any, were unmeasurable in the absence of collared individuals during this period. We may conclude on the preceding evidence that hunting and disease have influenced wolf abundance on the ANWR over the last several years.

Areas of Special Concern

Wolves are highly mobile predators. Their distribution seems to depend upon prey availability rather than upon the physical structure of their habitat (Paradiso and Nowak 1982). Nevertheless, one component of physical habitat, the availability of den sites, is important to wolf reproduction. Wolf dens in arctic Alaska may be excavated in thawed ground found in "cut banks, escarpments, dunes, kames, and moraines . . ." (Weiler et al. 1985). Haugen (1985) studied den sites on the Canning and Kongakut rivers during 1983 and 1984. The Canning River den site consisted of six major holes in a mound lying 15-25 m from the river and measuring 50 m long by 4 m high, and the Kongakut River den site consisted of two dens in a southfacing ridge within 300 m of the main river channel. Weiler (1986) reported that all den sites located during recent ANWR wolf studies have been found in the mountains rather than the coastal plain; however, wolves do "den on the coastal plain to the west of ANWR" (Weiler et al. 1985).

Dens are used by the parturient female and pups for 8 to 10 weeks (Paradiso and Nowak 1982). Haugen (1985) observed the dominant male, the maternal female, and a subdominant female present at the Kongakut den site for several weeks (presumably after parturition had occurred) before seeing two subdominant males and another subdominant female near the den. The subordinate wolves visited the den on a regular basis, although at a lower appearance rate than the dominant pair. Thus, during the denning period, breeding pairs appear to have limited mobility, and the successful rearing of offspring may depend on free and undisturbed use of key denning habitat.

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WOLVERINE (Gulo gulo)

Distribution and Abundance

Wolverines occur across the northern United States and Canada at relatively low densities (Wilson 1982). In Alaska, wolverines are found in both tundra and taiga regions (Mauer 1985). Of 11 observations of wolverines on the ANWR in 1984, four were within the 1002 study area and the remainder were in foothills or mountains south of the coastal plain (Mauer 1985). Aerial observations made in 1985 in conjunction with grizzly bear and wolf research failed to reveal any wolverines; however, five or six incidental observations of wolverines (including those made in the mountains outside the 1002 area) were recorded on the northern portion of the ANWR in 1985 (Mauer 1986). Observations prior to 1984 indicate few wolverines on the coastal plain. Only one of 10 sitings made north of the continental divide during baseline studies by Arctic Gas Limited in the early 1970s occurred on the coastal plain, but wolverines apparently occur in all types of arctic terrain (Mauer 1985).

Although wolverines occur at densities ranging from 1/55 km^2 to 1/74 km^2 in the arctic foothills of northwestern Alaska (Mauer 1985), the difficulty in observing, and failure to capture, wolverines in the northern portion of the ANWR may indicate that wolverine densities there are considerably lower than in other areas of northern Alaska (Mauer 1986).

Areas of Special Concern

Wolverines exhibit considerable mobility. In northwestern Alaska, female wolverines had home ranges averaging 115 km^2 and male wolverines had home ranges averaging 666 km^2 (Mauer 1985). When pursued, individual wolverines have moved up to 65 km without resting (Wilson 1982). Thus, wolverines may avoid most disturbances by using their mobility. Nevertheless, lactating females may restrict their range of movement "during March and April when young are born and reared" (Mauer 1985). Therefore, denning may be the most sensitive life function of wolverines.

In Lapland, wolverines den in tunnels up to 40 m long dug beneath the snow, often in ravines (Wilson 1982). In northwestern Alaska, "remnant snow drifts in small drainages with associated meltwater caverns were an important rearing habitat used by maternal females and their offspring" (Mauer 1985). It is reasonable to expect that similar denning and rearing habitat is used by wolverines on the ANWR; however, no denning studies have been done on the refuge. Although at least one author cited in Wilson (1982) believed that the

availability of wolverine denning sites influenced territory size, it is not known whether or not such availability affects wolverine abundance on the ANWR.

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FOXES (Vulpes vulpes and Alopex lagopus)

Two species of fox occur on Alaska's North Slope: the red fox (Vulpes vulpes) and the arctic fox (Alopex lagopus). The following discussion will treat both species; however, most available information addresses arctic foxes.

Distribution and Abundance

Red Fox

The red fox occurs throughout most of the United States and nearly all of Canada. In Alaska, the northern limit of red fox distribution appears to be the arctic coastal plain (Samuel and Nelson 1982). Eberhardt (1977) found red fox dens as far north as Alyeska Pump Station #2 near the boundary between northern foothills and the arctic coastal plain. Chesemore (1967) stated that few red foxes occurred in the Teshekpuk Lake area and were among species of furbearers that either were sparsely distributed or tended "to concentrate in the foothills and mountains of the Brooks Range." Red fox distribution in the ANWR has not been studied; however, aerial surveys related to pipeline baseline studies in the early 1970s did locate the dens of red foxes "along or near rivers in the mountains and foothills" (Eberhardt 1977). Based on the preceding references, it appears that red foxes may be largely absent from the coastal plain and the 1002 study area but likely occur in the foothills and mountains to the south. Eberhardt's (1977) work showed that red fox dens were located along river valleys; thus, mid- and upper portions of the drainages between the Sagavanirktok and the U.S.-Canada border may be assumed to support red foxes.

The abundance of red foxes in northeast Alaska is unknown. In the lower 48 states, home ranges of radio-collared foxes in diverse habitat varied from 57.5 to 161.9 hectares but increased to "5.12 km^2 for an adult male in a less diverse farming area" (Samuel and Nelson 1982). It is unlikely that red foxes reach these densities at the northern extreme of their distribution in Alaska. Eberhardt (1977) found a mean distance of 6.1 km between occupied dens in the Sagavanirktok River valley, which is a crude indication of red fox abundance in riverine habitats of northern Alaska.

Arctic Fox

The arctic fox has a circumpolar distribution which includes the northern portion of Alaska (Underwood and Mosher 1982). Chesemore (1967) cites several references describing the general occurrence of arctic foxes in Alaska along the arctic coast to the U.S.-Canada border. Specific studies of

arctic foxes have been conducted in the Teshekpuk Lake area (Chesemore 1967), the Prudhoe Bay area (Eberhardt 1977, Fine 1980), the Sagavanirktok River valley (Eberhardt 1977), and Demarcation Bay in the ANWR (Burgess 1984). Eberhardt (1977) found that "arctic foxes denned only on the level tundra plain north of the confluence of the Sagavanirktok and Ivishak rivers and west of Franklin Bluffs." The general limitation of arctic foxes to the coastal plain may be influenced by red foxes preying upon them and by interspecific competition between arctic and red foxes (Chesemore 1967; Eberhardt 1977).

Arctic foxes exhibit highly adaptive physiological and morphological characteristics for life in the arctic (Underwood and Mosher 1982) which allow them "to move seasonally between summer breeding habitats in wet tundra and winter habitats, where they are widely dispersed on the coast and far out on the sea ice" (Burgess 1984). Observations of radio-collared arctic foxes in the Demarcation Bay area of the ANWR coastal plain indicated that medium-relief, low-center polygon and meadow habitats received use in proportion to their occurrence on the study area. Foxes selected against tussock slope and low-relief, low-center polygon habitats while they selected for gravel beach and high-relief, high-center polygon habitats. The remaining, less common habitats were also selected by foxes (Burgess 1984). In summary, within the area of interest, arctic foxes are distributed across the coastal plain from the U.S.-Canada border westward to the Sagavanirktok River, and most commonly available habitats within the region are used by these foxes.

Estimates of arctic fox abundance are difficult to obtain. Burgess (1984) reported minimum home range sizes of 23.9 km^2 and 18.5 km^2 for two female foxes near Demarcation Bay. A mean home range size of 20.8 km^2 has been reported for the Prudhoe Bay area (Burgess 1984). Fine (1980) observed at Prudhoe Bay that "at least 26 dens occurred in approximately 390 km^2, an average of one den per 15 km^2." Fifty percent of these dens "had pups present sometime during the summer" of observation. Eberhardt (1977) reported a mean distance of 7.1 km between occupied arctic fox dens in the Prudhoe Bay and lower Sagavanirktok River areas. Macpherson (1969) found a mean density of one den per 36 km^2 in the Aberdeen Lake area of the Canadian Northwest Territory. None of the preceding indicators of density provide direct estimates of arctic fox abundance in the 1002 study area or on the coastal plain between the Canning and Sagavanirktok rivers. In addition, arctic fox numbers may fluctuate by a factor of ten between consecutive years (Underwood and Mosher 1982), which limits the usefulness of single-year data. Nevertheless, we may assume that arctic foxes are moderately abundant on the arctic coastal plain between Prudhoe Bay and the U.S.-Canada border.

Areas of Special Concern

Foxes, like other terrestrial carnivores exhibit considerable mobility. Accounts of movements up to 1,120 km in a two-year period exist for arctic fox, and migrations over hundreds of kilometers have been recorded for this species in the USSR (Underwood and Mosher 1982). In spite of this mobility, denning and rearing of young is a life function for which foxes have specific habitat requirements and are constrained in their movements.

Red Fox

Literature accounts of red fox reproduction state that breeding occurs from December to March with a 52-day gestation period (Samuel and Nelson 1982). In northern Alaska, red foxes complete den selection by early May. Dens in the Sagavanirktok drainage were located in small mounds on river terraces, in river banks, and "in the edges of ravines which faced the river valley"; were characterized by tall willow cover; and were excavated in fine to medium sand or silty loam soil (Eberhardt 1977). Eberhardt (1977) concluded that den sites for red foxes were numerous in the foothills portion of the Sagavanirktok River drainage. The abundance of potential den sites in drainages to the east of the Sagavanirktok is not known.

Red fox pups begin walking at three weeks of age and do not leave the den site (unless moved by the parents) for the first month of life. Unaccompanied movements of pups away from the den site begin at 10 weeks of age and become much longer after 12 weeks of age. Juvenile dispersal of first-year foxes begins in September and October (Samuel and Nelson 1982). Based on the preceding discussion, it appears that denning red foxes (parents and offspring) have limited mobility during the months of May through July and thus may be more sensitive to disturbance than during other portions of the year.

Arctic Fox

Breeding in arctic foxes occurs March through April and gestation takes 52 days (Chesemore 1967, Burgess 1984). Eberhardt (1977) noted that den selection by arctic foxes in the Prudhoe Bay and lower Sagavanirktok River area was "apparently complete by early May." Arctic fox dens in these areas were excavated in pingos, low ridges, sand dunes, and river terraces. Soil at den sites ranged from fine to coarse sand as well as stones, silt, and loam. Arctic fox den sites supported much more grassy cover than surrounding terrain; den vegetation was generally less tall and lush than that associated with the dens of red foxes. Most arctic fox dens in Eberhardt's (1977) study area were classified as "mature" indicating repeated use, perhaps resulting from scarcity of suitable den locations. Chese-

more (1967) concluded that a minimum mound height of one meter was necessary for successful den excavation, and 49 of the 50 dens examined by this author were in mounds from one to four meters high. The abundance of potential den sites for arctic foxes in the 1002 study area and westward to the Sagavanirktok River is unknown.

Arctic fox pups have been observed outside their den at three to four weeks of age (Eberhardt 1977), but do not spend much time there until they are more than eight weeks old (Fine 1980). At 11 weeks of age, arctic fox pups spend little time within the den. Periodic visits to the den site occur through August (Fine 1980), but by late summer juveniles disperse from the natal den (Burgess 1984). Based on the preceding discussion, it appears that denning arctic foxes, like red foxes, have limited mobility during the months of May through July and thus may be more sensitive to disturbance than during the remainder of the year.

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POLAR BEAR

Distribution and Abundance

Unless otherwise noted, the following discussion has been abstracted from the Alaska Habitat Management Guide for the Arctic Region (ADFG 1986) or USFWS 1982.

Polar bears (Ursus maritimus) are found in and adjacent to the ANWR 1002 study area, but precise abundance and distribution data are not available. These bears belong to the northern Alaska population, which extends westward to approximately Point Lay. In 1978, this population was estimated to consist of 2500 to 3000 animals. Mark and recapture studies are currently underway to better define the population limits and abundance of Alaskan polar bears.

Except for some denning females, Alaskan polar bears remain associated with sea ice throughout the year, unless they are attracted onshore by carrion. Polar bears are most abundant in drifting pack ice where they feed on ringed seals, their primary food source. Polar bears are found in the ANWR vicinity from fall through spring in association with the sea ice and within 40 km inland from the Beaufort Sea. Bears also may be present during the summer depending on the location of the sea ice relative to the coastline. Shorefast ice is used as a travel route by some pregnant females in September or October as they move to denning sites on land. A high but unknown percentage of the pregnant females den on the sea ice. Other members of the population travel across the shorefast ice when attracted to carrion on land or on the barrier islands. Female polar bears den in October and November, and cubs are born in December or January. The sow and cubs emerge from the den in March or April, remain near the den for one to two weeks, then move onto the shorefast ice zone where they feed on ringed seals.

Areas of Special Concern

The onshore polar bear denning habitat in the ANWR region merits special concern. The main habitat requirement for a maternal den site is snow of sufficient depth for den excavation and protected enough to remain in place during the denning period. Drainages and cut banks provide the best den site locations because adequate snow accumulations occur in conjunction with these topographic features. Of 35 maternity dens found onshore in Alaska by reasearchers, seven were on land within the ANWR study area. Three confirmed dens and two possible dens also were found just north of the ANWR on the shorefast ice. The locations of these den sites are identified in the USFWS's 1982 Section

1002 report. Additionally, six drainages with good to excellent potential denning habitat were identified, including the Katakturuk, Anjun, Okerokovik, and Jago rivers and Carter and Marsh creeks.

Literature Cited

ADFG. 1986. Alaska Habitat Management Guide - Arctic Region, Vol. 1. Alaska Department of Fish and Game, Juneau, AK. 465 pp.

USFWS. 1982. Arctic National Wildlife Refuge Coastal Plain Resource Assessment: Initial Report Baseline Study of the Fish, Wildlife, and their habitats. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Region 7, Anchorage, AK. 507 pp.

BROWN BEAR

Distribution and Abundance

Unless otherwise noted, the following discussion has been abstracted from the ADFG 1986 or USFWS 1982.

Precise population estimates are not available for brown bears (Ursus arctos) inhabiting the ANWR 1002 study area. However, between 1982 and 1984, 103 brown bears were captured and marked on the coastal plain, adjacent foothills, and in the mountains of northeastern ANWR (DOI 1985). The age structure of the captured bears suggests that the population is stable or increasing (ibid).

Detailed studies of brown bears that seasonally occupy the ANWR coastal plain have not been conducted. General observations indicate that brown bears move to the coastal plain in late May or early June, with the majority of sightings occurring during June and July. Bear sightings are common in the foothills extending from south of Barter Island west into Canada. The highest number of sightings has usually been in the area between the Aichilik River and the Canadian border.

Habitat use patterns are seasonal and begin each year when bears emerge from their winter dens. Adult males emerge first in mid-April while females with new cubs often remain in dens until mid-May. Preliminary data indicate that brown bears move from denning areas in the foothills and mountains south of the ANWR to the coastal plain in June and early July. This timing coincides with the presence of calving and post-calving caribou, and observations suggest that caribou are an important food source for the ANWR brown bears. In October and November the bears again move south into the foothills and mountains to den. Only two bears in 1983 and two bears in 1984 denned in the 1002 study area. The locations of the 1984 den sites are identified in the DOI's 1985 1002 study report.

Areas of Special Concern

River drainages in the coastal plain appear to play an important role in seasonal movements of brown bear. Upon emerging from their dens, bears tend to move downstream through major river drainages. Early emergent vegetation and carrion appear to be important food sources during the spring period. During the summer months, many bears move out of the river drainages to forage in upland areas. In fall, bears move back into the river valleys and travel upstream to denning areas. River drainages appear to provide both a travel corridor and important spring and fall foraging habitat for brown bears.

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ADFG. 1986. Alaska Habitat Management Guide - Arctic Region, Vol. 1. Alaska Department of Fish and Game, Juneau, AK. 465 pp.

USFWS. 1982. Arctic National Wildlife Refuge Coastal Plain Resource Assessment: Initial Report Baseline Study of the Fish, Wildlife, and their habitats. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Region 7, Anchorage, AK. 507 pp.

RINGED SEAL (Phoca hispida hispida)

Distribution and Abundance

Unless otherwise noted, the following discussion has been abstracted from ADF&G 1986 and USFWS 1982.

Ringed seals occur along the arctic and subarctic coasts of North America. Because they are associated with ice year-round, the seasonal ice cycle has an important effect on their distribution and regional abundance. Within the 1002 study area, ringed seals are found in waters of the ANWR that are claimed by both the federal and state governments. Population estimates for the 1002 study area are not available, however Alaskan waters may contain as many as 1.5 million ringed seals.

Ringed seals are the most ice-adapted of all northern pinnipeds and are the only seals in the Northern Hemisphere that regularly inhabit the fast ice. During the winter and spring, the highest densities of breeding adult seals have been found on stable land-fast ice; subadults are more numerous in adjacent flaw zones.

Ringed seals use open leads and cracks in the ice to surface and breathe during freeze up. As the ice mass solidifies the seals use their claws to actively keep breathing holes open. When drifted snow covers breathing holes, some holes are enlarged and seals haul out and excavate lairs in the snowdrifts. Lairs are used by males and females of all ages for resting and by adult females for pupping. Sufficient snow for lair construction (20 cm) is usually found only to the lee of ice hummocks or along pressure ridges. In flat areas little or no snow accumulates and few lairs are constructed.

During the late spring and early summer, ringed seals haul out on the ice to complete their annual molt. They use the fast ice, as well as relatively large flat floes in the pack ice, and are usually seen near cracks, leads, or holes where they have rapid access to water. Feeding is greatly reduced during the molt and the amount of time spent on the ice increases as the molt season progresses.

In summer, most ringed seals of all age classes and both sexes are found along the edge of the permanent ice pack and near nearshore ice remnants. A small portion of the population, mainly subadults, may be found in ice-free areas. Ringed seals spend most of the summer and early fall in the water feeding intensively. They feed mainly on benthic and pelagic crustaceans and arctic cod.

Areas of Special Concern

Most of the lagoons in the ANWR study area are shallow and winter ice is usually anchored to the bottom. Therefore, they are not available to ringed seals as pupping or winter feeding habitat. Lagoons must be deeper than 2.5 - 3.0 m and there must be deep water connections with the ocean in order to provide suitable pupping habitat. Lagoons such as Nuvagapak, Angun, and Jago are 3.0 - 3.6 m deep in places, and are open to the ocean. These lagoons may provide suitable pupping and winter feeding habitat and should receive special consideration.

Literature Cited

ADFG. 1986. Alaska Habitat Management Guide - Arctic Region, Vol. 1. Alaska Department of Fish and Game, Juneau, AK. 465 pp.

USFWS. 1982. Arctic National Wildlife Refuge Coastal Plain Resource Assessment: Initial Report Baseline Study of the Fish, Wildlife, and their habitats. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Region 7, Anchorage, AK. 507 pp.

Enclosure B

MAJOR FISH AND WILDLIFE ISSUES

Resource Category 1 (USFWS Mitigation Policy)

The USFWS Mitigation Policy directs the USFWS to consult with the applicable state wildlife agency in developing recommendations for habitats to be included in Resource Category 1. To our knowledge, the USFWS has never formally consulted with the ADFG in regard to recommendations for habitats in ANWR to be included in this category. Although ADFG concurs with USFWS in placing the PCH core calving area in Resource Category 1, the department recommends that one additional habitat type be placed in this category: spring areas as documented by the USFWS (Shublik Spring, Red Hill Spring, Katakturuk River Tributary Spring, Sadlerochit Spring, Hulahula Spring, Okerokivik River Spring, and Aichilik River Spring). As stated on page 37 of the 1002 report, "overwintering habitat is probably the greatest limiting factor for arctic anadromous and freshwater fish populations." There are inadequate water supplies in the 1002 area to support even exploration activities such as exploratory wells. In order to provide a high degree of protection to this limiting habitat type, these springs and the water therein should be placed in Resource Category 1.

Core Calving Area of the Porcupine Caribou Herd

The department supports the placement of the "core calving area" of the PCH as defined in the ANWR 1002(h) report in Resource Category 1. Furthermore, the department's position is that this area should not be opened to oil and gas exploration and development (i.e., this area should not be leased). It is our interpretation of Resource Category 1 that these areas so designated cannot be opened for oil and gas leasing. The "core calving area" is defined in the ANWR 1002 report as that zone where calving densities have been equal to or greater than 50 caribou per square mile in five out of the last 14 years (Plate 2, Map A).

The ADFG's position is based on a number of factors, including the best professional judgment of departmental biologists who have extensive experience and expertise in assessing the potential effects of various activities on biological resources. It is our belief that the opening of the "core calving area" in the ANWR could result in a significant adverse effect to the PCH and that development, if it occurred within the "core calving area," could lead to a reduction in total numbers of caribou.

Our position is based on a number of factors, which we have summarized below:

(1) The ANWR was established for the purpose of preserving unique wildlife, wilderness, and recreational values. ANILCA redefined the purpose to include the conservation of fish and wildlife populations and their habitats in their natural diversity including but not limited to the PCH;

(2) The PCH is an internationally important herd consisting of 180,000 animals;

(3) Caribou from the PCH are important to a number of communities for subsistence use. These communities are located in both Alaska and Canada;

(4) The "core calving area" for the PCH has been documented based on 14 years of data collected by the USFWS, ADFG, and industry consultants;

(5) Cows during calving are more sensitive to disturbance than other caribou groups;

(6) Studies conducted by the ADFG have documented that oil and gas development and associated activities result in the displacement of cows during calving;

(7) The recommendation from the ANWR caribou workshop (November 19-20, 1986) consisting of 14 caribou biologists was that the "core calving area" should not be leased (note, there was one dissenter from this view);

(8) In the 1002 report, the Department of Interior postulated that development in the core calving area could include loss of 32 percent of the most critical PCH core calving areas as a result of displacement. Displacement was considered in the report to represent a complete loss of habitat values; and

(9) Studies conducted by other researchers have demonstrated that roads, pipelines, and other land development activities have resulted in demographic effects (i.e., reductions in total numbers of animals in specific herds of caribou in Europe).

In summary, the ADFG firmly believes that the "core calving area" of the PCH should be retained in Resource Category 1 and that this area should not be leased for oil and gas exploration and development.

Caribou Insect Relief Habitat

The ADFG's position is that a three-mile terrestrial corridor along the coast should be maintained free of development in order to provide protection for insect relief habitat used by both the CAH and PCH, to maintain a zone for the movement of large aggregations of caribou, as well as to provide protection for calving areas of the CAH. The department's position is based on a number of factors, including the best professional judgment of its biologists who have extensive experience and expertise in assessing the potential effects of various activities on biological resources. Post calving aggregations of large numbers of caribou (e.g., greater than 10,000) utilize the coastal areas for insect relief and these large bands of caribou use the coast extensively for east/west movements. The department recognizes that some development may be essential in this three-mile buffer zone but these developments should be limited to two major port type facilities and a limited number of other oil transport systems. All pipelines and roads that may be deemed to be mandatory in this zone must be oriented north and south and fully designed to provide for the free movement of large bands of caribou (e.g., east/west movements). The department is extremely concerned that proliferation of facilities in the coastal area could dramatically alter caribou movement patterns and use of these areas.

The ADFG position if based on a number of factors which are summarized below:

(1) The ANWR was established for the purpose of preserving unique wildlife, wilderness, and recreational values. ANILCA redefined the purpose to include the conservation of fish and wildlife populations and their habitats in their natural diversity. This includes but is not limited to the Porcupine Caribou Herd (PCH);

(2) The PCH is an internationally important herd consisting of 180,000 animals;

(3) Caribou from the PCH are important to a number of communities for subsistence use. These communities are located in both Alaska and Canada;

(4) Access to coastal mosquito relief areas during the mosquito season is believed to be important especially to cows and calves. Survival of cows and calves over the ensuing winter can depend on caribou obtaining sufficient food during the summer when forage plants are at their nutritional peak. When caribou are harassed by mosquitoes, they move to coastal bluffs, dunes, and river deltas where winds tend to minimize mosquito harassment. As a result, maintaining caribou

access to mosquito relief areas is thought to be important to ensure that caribou do not unnecessarily use up important energy reserves essential to their winter survival;

(5) The "insect relief habitat" for the PCH and CAH has been documented based on data collected by the USFWS, ADFG, and industry consultants;

(6) The movement of large aggregations of CAH caribou has been altered by oil development in the Prudhoe Bay/Lisburne Development Area. Movement of large numbers of caribou along the coast in the Prudhoe Bay/Lisburne Development Area no longer occur;

(7) The recommendation from the ANWR caribou workshop (November 19-20. 1986) consisting of 14 caribou biologists was that a 3 to 5-mile wide non-development buffer zone should be maintained along the coast to facilitate caribou movements and access to insect relief habitat (note, the majority of biologist supported this conclusion);

(8) In the Department of Interior report (page 112), it is stated that 29 percent of the coastal insect relief habitat could be reduced or eliminated. Furthermore, it is stated that nearly 80 percent of the coastal insect relief habitat could be affected if development proves to be a barrier to caribou movements; and

(9) The coastal zone east of the Hulahula River is used for post calving movements by tens of thousands of PCH.

In summary, the ADFG believes that the "insect relief area" of the PCH and CAH should be retained free of development to the maximum extent practicable. The department recognizes that corridors for access to the coast will be required (i.e., two major marine docks were identified in the ANWR 1002 report) and that there may be other special cases where other essential facilities may be permitted in this zone. The granting of such variances will be limited to those cases in which full mitigation is proposed by the applicant and the necessity for the facility is amply justified.

Stream Buffers and Setbacks

The ADFG position is that stream buffers should be established to protect waterbodies in the ANWR. The buffers should be 3/4-mile for specified streams and 500 feet for all other waterbodies. Buffers are recommended to protect waterbodies from pollution, to ensure that the habitats associated with waterbodies (i.e., riparian zones) are maintained to the fullest extent possible, and to mitigate

the effects of facilities and activities on wildlife species using these habitats (i.e., minimize displacement of wildlife from preferred habitats). There are a number of wildlife species which use the habitats associated with streams and providing for development free buffers will ensure continued protection of these habitats and the use of these habitats by these species. It is recognized that transportation corridors (roads, pipelines) will traverse streams and riparian habitats and that in specific cases, variances to the buffers may be necessary for certain facilities. Therefore, the department also recommends that a variance procedure be established by which allowances can be made for the placement of some essential facilities (e.g., pipelines, roads, drill pads) in these valuable habitats. Non-essential facilities would include such things as camps and support facilities (i.e., facilities which can be sited in other areas to avoid valuable habitats).

Buffers to protect riparian habitat associated with some of the major stream systems in ANWR are required in order to protect a variety of fish and wildlife species. Muskoxen use these habitats for movements, calving, and feeding, particularly in those stream systems to the west of the Hulahula River. Caribou from the PCH use the riparian habitats for calving and as migration corridors during their movements to coastal insect relief habitats. Polar bear den sites are most commonly found in snow drifts along cut banks of these stream systems. Shorebirds, wolverines, foxes, and moose also utilize these habitats. In summary, these habitats are unique and utilized by a variety of species including the key species of ANWR as identified in the ANWR 1002 report (e.g., polar bears, caribou, muskoxen, and arctic char).

The 3/4-mile setback should be applied to the following streams:

(1) Canning River - buffer will protect fisheries resources, caribou, muskox, waterfowl and loon nesting areas, polar bear denning habitat, and moose;

(2) Tamayariak River - buffer will protect fisheries resources, caribou, muskox, and waterfowl and loon nesting areas;

(3) Katakturuk River - buffer will protect caribou, muskox, cliff nesting raptors and ravens, and moose;

(4) Sadlerochit River - buffer will protect fisheries resources, caribou, muskox, cliff nesting raptors and ravens, polar bear denning habitat, and moose;

(5) Hulahula River - buffer will protect fisheries resources, caribou, and waterfowl and loon nesting areas;

(6) Okpilak River - buffer will protect fisheries resources, caribou, waterfowl and loon nesting areas, and moose;

(7) Jago River - buffer will protect caribou, cliff nesting raptors and ravens, waterfowl and loon nesting areas, and moose;

(8) Okerokovik River - buffer will protect caribou, muskox, and moose;

(9) Niguarak River - buffer will protect caribou, muskox, and and polar bear denning habitat; and

(10) Aichilik River - buffer will protect fisheries resources, caribou, and waterfowl and loon nesting areas.

These major river systems and adjacent riparian habitat are essential to a variety of wildlife species. Major movements of animals occur within these riparian corridors. Buffers along these systems will provide a certain degree of protection to those specific fish and wildlife species mentioned. These habitats also are used extensively by other species in the ANWR 1002 area such as snow geese, wolves, wolverines, shorebirds and passerines, and brown bears.

Water Availability and Use

The department recommends that all spring areas in the ANWR 1002 area be placed in Resource Category 1 and that water removal from these areas be prohibited. Ample evidence exists that this habitat type is limiting to fishes in the ANWR area, and these waters should not support exploration or development of oil and gas.

Water for industrial use on Alaska's north slope has been a resource issue beginning with the early development of the Prudhoe Bay oilfield. The conflicts result from the use of limited surface water sources which are also important overwintering habitat for several species of arctic fish. The north slope region is characterized by low annual precipitation and long periods of extreme cold. Groundwater is very limited due to the unique characteristics of the permafrost environment which prevents infiltration into groundwater aquifers. The groundwater that is available is generally unsuitable having a high salt content. As a result of these conditions, fresh water supplies are limited

to surface waters. The availability of surface water is greatly reduced during the winter season as many of the shallow lakes and ponds as well as small streams and significant portions of the larger rivers freeze solid by late winter. During late winter the available surface water sources on the North Slope consist of deep lakes, deep holes or pockets of water in large river systems and springs or perennial groundwater sources generally associated with the Lisburne formation in the foothills of the Brooks Range. These surface water areas along with brackish waters in deltas of the large river systems represent the pool of available habitat for overwintering anadromous and fresh water fish. Several fish biologists believe the availability of overwintering habitat is a key factor in the regulation of populations of arctic cisco. The available freshwater habitat in the large river systems is reduced by at least 95 percent from that available during the open water season. Any reduction in the quantity or quality of available overwintering habitat is likely to have serious impacts on arctic fish stocks.

Formerly, water for use in the Prudhoe Bay oilfield was taken from the Sagavanirktok River adjacent to the Deadhorse industrial area. This water removal resulted in dewatering of fish overwintering habitats and documented mortality of large numbers of fish. Currently, in order to provide fresh water for industrial uses in the Prudhoe Bay area several large surface water reservoirs have been developed. The majority of the reservoir sites are depleted deep gravel mine sites that have been flooded with surface water. Other sites are shallow tundra lakes that have been deepened to provide winter water supplies. These water reservoirs are filled either passively or actively from nearby drainages during the spring breakup period and are, in general, isolated from river and stream systems during the remainder of the year. Generally, seismic and exploratory drilling operations can operate in areas where developed water sites are not available by utilizing water provided by snow melting, saltwater desalination, or hauling from the large reservoirs or specified deep lake sites.

Surface waters in the 1002 area differ in character from those found west of the Sagavanirktok River. The 1002 river systems exhibit a high degree of braiding and have relatively steep gradients--i.e., fitting the commonly used descriptions of "mountain" type streams. Water depths are shallow and deep isolated pool type overwintering habitats are rare. Overwintering habitats consist of perennial ground water sources (springs) which are found on most of the major drainages in the 1002 area. Several large deep lakes also occur in the area which could provide winter water for oil and gas exploration and development activities. Spring water sources in these river systems are critical to the maintenance of fish stocks. Populations of

arctic char are dependent upon these discrete spring areas to provide spawning and overwintering habitat. Large aggregations of arctic char, arctic grayling and other resident freshwater fish species are confined to habitats created by spring areas are also important to other forms of aquatic biota, such as insects and other benthic organisms, and biomass is often high in these areas. Open water areas associated with springs also attract winter resident birds and mammals as a source of moisture. These areas can be described as biologically productive "oases" in the polar environment. Several drainages (Katakturuk River, Marsh Creek and Jago River) within the ANWR 1002 area lack spring areas or other suitable overwintering habitat. Lack of adequate overwintering habitat limits fish abundance to very low levels in these drainages.

The departments recommended mitigation for protection of waters in the ANWR area consists of the following points:

(1) The state water policy prohibiting water use during the winter from North Slope streams and rivers has been effective in reducing impacts to overwintering fish populations. A similar policy should be applied to any water use in the 1002 area;

(2) Spring areas that provide fish overwintering habitat should be included in Resource Category 1. Instream flow allocations for the maintenance of fish habitat should be obtained; and

(3) Large surface water reservoirs should be created to provide an adequate supply of fresh water for oil and gas related industrial activity. Deep pit type excavations adjacent to active channels of the streams identified as lacking suitable fish overwintering habitat could provide a winter water source and provide overwintering fish habitat. These reservoir sites should incorporate features that will enhance their value as fish and wildlife habitat (e.g., areas of shallow water, varying shoreline, provide for free movement of fish in and out of sites).

Gravel Sites

The ADFG position is that gravel sites in ANWR be sited, developed, and rehabilitated in such a manner that overall impacts to fish and wildlife resources are mitigated. Plans for gravel removal must include detailed plans for the rehabilitation of the site and rehabilitation must be conducted in phases concurrent with the removal of gravel. The importance of rehabilitation cannot be overemphasized, based on experiences to date in the Prudhoe Bay/Kuparuk development areas in which, to date, no material site has

been rehabilitated from the standpoint of improving the site for fish and wildlife resources. The department also recommends that gravel sites be developed in such a manner that they can be used as water sources for both the exploratory and developmental phases of oil and gas activities.

Gravel mining can result in adverse impacts to fish and wildlife habitats with direct effects on individual fish and wildlife species. Use of upland gravel sources can result in habitat loss through surface disturbance, interference with drainage patterns, and the loss of upland/wetland habitats. Gravel removal from floodplain environments can result in the disruptions of flow patterns leading to channel diversions, increased sedimentation of waterbodies, fish blockages and entrapment, increased potential for aufeis formation, and other floodplain alterations that reduce overall habitat quality. For example, at a gravel site located on the Kavik River, just west of the 1002 area, removal of stream bank cover led to a reduction in the number of arctic char juveniles as compared with control areas located downstream of the gravel removal site.

Large quantities of gravel are required for any major development and the selection of sites (upland versus floodplain) should be based on a thorough knowledge of the overall gravel needs for a development project, the mineral resources available, and the fish and wildlife resources and their habitats potentially affected by the gravel operation. Specific data on gravel resources including locations of alternative sites, type and quantity of material present, depth of deposits, amount of overburden and method of disposal, quantity of surface organics and anticipated uses, and the potential rehabilitation options of gravel sites are needed. Combining the mineral resource data with the known fish and wildlife resources in the various alternative sites should be used as the basis for determining which sites should be mined, how they should be mined, and what the specific restoration requirements will be for each specific site including a schedule for completing the various phases.

At a minimum, any gravel site whether upland and/or floodplain should be sited and designed (a complete and detailed mining plan should be required) to conform to the guidelines as defined in the Gravel Removal Guidelines Manual for Arctic and Subarctic Floodplains (USFWS, Woodward-Clyde Consultants, 1980). Information presented in these guidelines and supporting technical report deal exclusively with gravel sites in floodplain environments. Environmental changes associated with gravel removal are presented allowing the resource management agencies to assess and determine what levels of impact, both positive and negative, are acceptable for any given site.

Marine Facilities/Causeways

The department's position is that causeways constructed of gravel (i.e., solid filled causeways) should not be authorized in nearshore waters adjacent to ANWR. Solid filled causeways, including structures with minimal breaching, interfere with the free movement of wildlife and alter the water quality characteristics of the nearshore environment. These nearshore habitats are important to a number of anadromous fish species and other wildlife (e.g., waterfowl).

The design, location, and construction of marine facilities in the 1002 area will have consequences on marine and freshwater fish that are not limited to the 1002 area. Many of these marine and freshwater anadromous species utilize the Beaufort Sea nearshore environment over a wide geographic area. For example, arctic cisco migrate between the Colville River and Mackenzie River deltas. Arctic char (an evaluation species in the 1002 report) move back and forth along the coast. Therefore, the potential adverse effects of marine facilities including subsea pipelines, seawater treatment plants (STP's), and causeways should be thoroughly evaluated. The description in the DEIS of the marine facilities does not provide a clear picture from which to analyze the potential impact. For example, the "Environmental Consequences" section mentions that each marine port will will impact 20 acres, whereas table V-1 refers to two 200-acre sites. Without additional description of facility design and local bathymetry it is difficult to determine even what the gravel footprint of such a facility may be. Three types of marine facilities--seawater treatment plants (STP's) for waterflood, marine pipelines, and causeways--are discussed below.

In general, the operation of the Prudhoe Bay and Kuparuk waterflood STP's appears to have resulted in little impact to aquatic organisms. The potential impacts of entrainment and impingement have apparently been successfully mitigated; therefore, the current technology can be applied to similar facilities in the 1002 area.

Marine pipelines are an untested technology at Prudhoe Bay. During the deliberations regarding the Endicott causeway, evidence was presented that subsea pipelines are feasible in the Arctic, and may be cost-effective. Two constraints on the construction of subsea hot oil pipelines--ice scour and burial in permafrost--are mentioned in the 1002 report. Ice scour in the nearshore area generally is less than that offshore because of the extensive shore-fast ice zone along the former, and multi-year ice grounds out in relatively deeper water. Therefore, sufficient burial depth may eliminate this constraint. Research has shown that permafrost under the sea often begins at a greater depth than that on

land; therefore, burial of a hot oil pipeline may not result in thaw/stability pipeline integrity problems. Further evaluation of the feasibility of subsea pipelines should be completed before this alternative is rejected.

One of the major environmental issues regarding oil development at Prudhoe Bay has been the construction of solid-fill gravel causeways offshore. The issue has not been the effects on nearshore fish habitat and movements; rather, the issue has been the significance of these effects on fish populations--essentially, the definition of "impact." The DEIS for the Endicott project, for example, concluded that solid-fill causeways would impede fish movements and cause changes in the temperature and salinity regimes and circulation of nearshore waters. These effects have since been empirically demonstrated, as in the case of the West Dock causeway. A variance was issued by the state for the Endicott project to account for the projected area of impacts, deemed to be a "mixing zone." Although the effects mentioned above have been corroborated by extensive monitoring studies, there remains sufficient dispute over the interpretation of these results and the significance of these effects that the Corps of Engineers announced in May 1985 that construction of solid-fill causeways would be suspended until the results of monitoring studies are completed.

Using the standard of the USFWS Mitigation Policy that impact is defined in terms of habitat modification as well as population changes, there appears to be sufficient evidence that solid-fill causeways will impact fish species that use the nearshore environment. Minimization of some of these impacts (e.g., breaches as mitigation for impedance of fish movements) is possible, but other impacts (e.g., degradation of water quality) may only be mitigated by selecting alternatives other than solid-fill causeways. Feasible alternatives exist, and include pile-supported structures, concrete "honeycomb" structures, or buried pipelines.

Mud Pits

ADFG recommends that prior to approval of the use of reserve pits for exploratory and production drilling, a program for evaluating the impacts of reserve pits on biological resources be undertaken, and the results of that program be applied as the basis for authorizations for the use of reserve pits during drilling.

Current petroleum industry practice for North Slope exploratory and production drill sites is to construct an adjacent reserve pit ("mud pit" or "sump") into which spent drilling muds and cuttings from the well hole and other byproducts

from the drill rigs (e.g., oily wastes, solvents) are discharged. At typical North Slope drilling depths the total volume of muds and cuttings from each well may reach 12,000-15,000 barrels. In addition to muds and cuttings, other waste products from drilling as well as meltwater and precipitation accumulate in the pit to increase the volume of material that must be contained and disposed. Because of the large volume of disposal material and the potentially toxic nature of the compounds in this material (e.g., heavy metals, brines, hydrocarbons, corrosives), ADFG is concerned that inadequate containment and disposal methods can result in this material reaching the surrounding environment and impacting North Slope fish and wildlife and their habitat.

ADFG's concerns fall into two general categories: (a) mechanical destruction of wetland habitat, and (b) chemical destruction of or damage to aquatic and wetland habitat and animals due to discharge of reserve pit supernatant. The latter can result in chronic and/or acute contamination of wetland organisms by heavy metals, hydrocarbons, or salts, and the introduction of excessive turbidity or settleable solids into an aquatic system. ADFG is also concerned about the potential contamination of upland as well as wetland habitat along the road system where reserve pit supernatant has been applied as dust control. "Fugitive dust" and water runoff could spread contaminants such as heavy metals to adjacent areas.

Mechanical destruction of habitat by construction of a reserve pit is unavoidable due to the "footprint" of gravel and overburden that is necessary to construct the pit. Given the vast amount of terrestrial habitat on the North Slope, the loss of such small areas due to gravel overlay is not a significant problem. However, most of the production reserve pits are concentrated in coastal wetland areas, and many of these are interconnected with other coastal wetlands. Coastal wetland habitat is one of the most productive on the North Slope, and is more scarce on ANWR than in areas further to the west. The only effective mitigation of the impact of mechanical destruction is to minimize the number and spatial extent of reserve pits.

A more important biological concern is the effect on water quality and wetland habitat and animals as a result of reserve pit contents entering surrounding wetland areas, and the potential for chemical contamination of plants and animals with hydrocarbons, heavy metals, and other compounds. Most of the several hundred North Slope production reserve pits are located in wetlands and near ponds where reserve pit compounds may accumulate in the water column, in sediments, plants, or animals. The few water quality comparisons between reserve pits, adjacent ponds receiving direct or indirect discharge, and controls indicates that water quality in ponds near the pits is lower than controls,

and that the effects are attenuated with further distance from the pits. Water quality studies have identified elevated levels of alkalinity, turbidity, pH, aliphatic hydrocarbons, chromium, cadmium and nickel in ponds 100-200 m away from the reserve pits.

Studies of the effects of reserve pits on vegetation have been few, and the scope has been limited to gross phytological changes. Chemical destruction of vegetation immediately adjacent to North Slope reserve pits has been observed, and is thought to be due to the seeping of contaminants such as hydrocarbons and brines from the pits. Differences in tolerances of plants to reserve pit contaminants has been demonstrated; however, definitive studies have not been performed. Research in arctic Canada has demonstrated that upland vegetation around reserve pits has been destroyed, but plant mortality and community changes due to contamination could not be conclusively separated from those due to mechanical destruction. These studies deal with gross phytological changes; however, studies of the effects of reserve pit discharge on phytoplankton and other smaller forms of plant life have not been undertaken. Effects on these forms may be more serious than effects on larger plants.

Studies on the biological effects of reserve pit supernatant on animals have also been limited. Toxicity studies with a several fish and macroinvertebrate species and aquatic invertebrate community structure indicate that discharge of reserve pit fluids can affect aquatic life. Although absorption of toxic compounds by grayling in laboratory studies has been documented, no acute toxic effects were shown. Chronic effects on grayling have not been studied. In situ studies on aquatic invertebrates that are important components of the coastal wetland ecosystem have shown significant mortality, prolonged immobility, and reduced fecundity and growth when exposed to various concentrations of reserve pit supernatant. Investigations of aquatic invertebrate community structure at sites varying in distance from reserve pits indicate that reserve pits were devoid of any invertebrate life, and that the number and diversity of invertebrates decreased significantly as proximity to the pit increased.

Although the data are strongly suggestive that impacts to fish and wildlife habitat and to lower food-chain organisms are occurring as a result of reserve pit discharges to the surrounding environment, the conclusive link, that of effects on higher food-chain organisms, remains to be proven. However, all indicators suggest that such impacts can and probably do occur--water quality degradation around the pits has been documented, uptake of compounds known to be detrimental to organisms in laboratory conditions has been found, an important aquatic food-chain organism has

been effected, and aquatic invertebrate community structure has been changed.

In light of the results of the studies alluded to above, ADFG recommends that prior to approval of the use of reserve pits for exploration and production drilling, a program for evaluating the impacts of reserve pits on biological resources be undertaken, and the results of that program be applied as the basis for authorizations of use of reserve pits during drilling. This program should contain at a minimum: (1) a comprehensive biological program to evaluate the effects of reserve pit contaminants on aquatic ecosystems and upland habitats to which reserve pit contaminants may be applied; and (2) an examination of operational changes that will minimize the possibilities of reserve pit contents reaching the surrounding environment.

A comprehensive biological program to determine the effects of reserve pit contamination on higher organisms should have, at a minimum, the following objectives: (1) document the extent of contamination by sampling water, soils, plants, and animals potentially affected by reserve pit discharges including potential contamination of upland areas by reserve pit supernatant used as dust control; (2) conduct lab and in situ studies of chronic and acute effects of reserve pit supernatant and contaminated receiving water on selected indigenous animals; and (3) determine the changes in aquatic plant and invertebrate community structure around reserve pits, and the effects of these changes on selected species of fish (e.g., sticklebacks) and wildlife (e.g., shorebirds).

The evaluation of operational methods to prevent reserve pit contaminants from reaching the surrounding environment should concentrate on methods to reduce the volume of contents required in the pits, and enhanced containment methods for those contents that must be disposed of in the pits. The evaluation should at a minimum include the following topics: (1) reducing the amount of contents to be placed in reserve pits (e.g., methods for enhanced solids recovery, improved reinjection technology); (2) improved snow removal techniques (e.g., use of blowers rather than dozers) to minimize the meltwater portion of supernatant; (3) design pits in "cellular" configuration to allow closeout of portions of pits immediately after each well is completed; and (4) the use of impermeable liners in pits.

Enclosure C

SUMMARY OF ADFG COMMENTS ON THE ANWR 1002 MITIGATION (PAGES 145-147 OF DEIS)

Note: The following ADFG remarks are based on the assumption that the PCH core calving area will be closed to oil exploration and development and that spring areas in ANWR will be added to Resource Category 1 and will also be closed to oil and gas activities. These comments take into consideration that the 1002 area is a refuge.

Stipulations (from DEIS, pp. 145-147)	ADFG Recommended Changes and Additions
	Recommended Additions: There are a significant number of terms and conditions which should be added. First, there are mitigative measures mentioned in the species discussions in the "Environmental Consequences" chapter of the 1002 report that are not contained in the summary section. These mitigative measures should be added to the summary section. Secondly, there are a number of factors which are either not addressed or not handled in sufficient detail in order to provide for an overall effective mitigation program. Examples include the following: coordinated state/federal process for design review, permitting, field surveillance, compliance, and enforcement; rehabilitation; maintenance of public fish and wildlife resource use; material exploration, extraction, and rehabilitation; solid waste management; timing, setbacks, and use of explosives; liquid waste management; hazardous waste management; stream crossings and fish passage; water management; bonding and financial responsibility; right of access; erosion control; oil spill planning; penalty provisions for non-compliance; definitions of key terms; identification of information needs; design criteria and compliance plans, quality assurance/quality control; air quality; and support service industries. These subject matters need to be addressed in a comprehensive manner and mitigative measures and processes developed.
1. Consolidate, site, construct, and maintain facilities and pipelines to minimize effects on sensitive habitats and species. Locate nonessential facilities outside caribou calving areas.	Expand to include locating nonessential facilities outside of caribou insect relief habitat and riparian zones.
2. Design all bridges and culverts to handle at least 50-year flood events.	All roads and associated drainage structures shall be designed so as to not interfere with or restrict the movement of water. All gravel fills shall be designed in such a manner that these structures are

Stipulati	ADFG Recommended Changes and Additions
	stable under a variety of stream flow conditions. Unless it can be clearly demonstrated that other designs are acceptable from the standpoint of fish passage and cross drainage, all major stream and floodplain crossings will be bridged such that the entire floodplain width remains unrestricted. In-channel river-training structures that will adversely impact fish habitat or restrict fish passage will not be allowed. Design criteria and specifications for all cross-drainage structures will be developed and shall be reviewed and approved by the appropriate state and federal agencies. All roads will be sited so as to minimize the number of stream crossings and will include a detailed assessment of the streams and drainages to be crossed and on-site surveillance of crossing construction. During development, bridges will be the preferred means of crossing streams containing fish. Culverts shall be considered for use in fish bearing waters where it can be demonstrated that these structures will not result in fish blockage or increased instream activities due to maintenance requirements. Placement of culverts in fish spawning or overwintering areas shall be prohibited. Bottomless arch culverts are preferable over either round or elliptical culverts. Burial depths for all culverts, except bottomless arch culverts, shall be a minimum of 0.31 m (12 inches) below the stream thalweg. Burial depths for round or elliptical culverts shall be equal to 20 percent of the diameter of the culvert or eighteen inches, whichever is less. Criteria for sizing of the culvert structure will be the responsibility of the applicant.
3. Use ice or gravel-foam-timber pads, where feasible, for exploration wells.	Expand to state that all exploration facilities will be temporary in nature and will not be constructed of gravel.
4. Develop and implement an approved rehabilitation plan as part of leasing program.	Expand to require rehabilitation plan for exploration, development, and abandonment. Also, include requirement for conducting necessary research to develop techniques and measures for the rehabilitation of specific sites (e.g., gravel pads, seismic lines, material sites, etc.).
5. Prohibit off-road vehicle use within 5 miles of all pipelines, pads, roads, and other facilities, except by local residents engaged in traditional uses or if otherwise specifically permitted.	Modify as follows: Prohibit off-road vehicle use, except for travel by snowmachines, unless otherwise specifically permitted.

Stipulati	ADFG Recommended Changes and Additions
6. Limit oil exploration, except surface geology studies, to November 1- (exact dates to be determined by Refuge Manager). Cease exploration activities and remove or store equipment at an approved site by May 15. Local exceptions may be made.	Revise beginning to read "Limit oil exploration <u>and exploration</u> May 1 <u>activities</u>, except..."
7. Prohibit: gravel removal from active stream channels on major fish-bearing rivers; winter water removal from fish-bearing rivers, or springs and tributaries feeding into fish-bearing waters; spring, summer, or fall water removal from fish-bearing waters at levels that will not easily pass fish or maintain quality rearing habitat.	Separate and address separately gravel removal-vs-water removal. Support prohibition of winter water removal from fish-bearing waters, springs, tributaries, etc. Modify summer/fall water removal language to read: During summer and fall, water removal shall be restricted to those operations that will maintain instream flows at levels necessary to provide optimum fish passage and rearing habitat, and water quality. With respect to gravel removal, prohibit removal in all fish spawning and overwintering areas. Additionally, gravel removal from all fish-bearing rivers/streams prohibited unless approved on site-specific basis.
8. Elevate pipelines to allow free passage of caribou in areas without ramps or buried sections. 9. Place ramps over pipelines at natural crossings or where development tends to funnel animals. 10. Bury pipeline where possible. 11. Separate roads and pipelines 400-800 feet, depending on terrian, in areas used for caribou crossing.	Modify by adding a general statement of intent, then incorporating items 8-11 under that statement, and add an additional item regarding traffic control. The suggested language is as follows: a. [No. 8] b. [No. 9] c. [No. 10] d. Separate roads and pipelines. Offset distances shall be optimum for preventing synergistic effect of roads and pipelines, based on most current relevant research. e. A surface traffic control plan shall be prepared, approved by the Regional Directors, and implemented. The plan shall consider such measures as convoying, pulsed traffic, and seasonal or daily restrictions.
12. Restrict surface occupancy in the zone from the coastline inland 3 miles to marine facilities and infrastructure necessary to support	Modify as follows: "Restrict surface occupancy in the zone from the coastline inland 3 miles to marine facilities and two transportation corridors (i.e., Camden and Poktok Bays) necessary to support activities outside the restricted zone. Provide a mechanism by which other essential facilities could be authorized using a variance type procedure within guidelines established to ensure that coastal habitat remains relatively free of development and that movement patterns of caribou are not adversely affected.

Stipulati	ADFG Recommended Changes and Additions
13. Monitor populations, productivity, movements, and general health of key species. Research measures to further minimize adverse effects of development; implement corrective actions.	Modify to make two separate terms. One that states: "Monitor populations, productivity, movements, and general health of key species in relation to ANWR oil and gas activities." Then add a separate requirement to: "Monitor impacts of oil and gas activities on selected species, their habitats and human uses to evaluate effectiveness of mitigation employed and develop corrective actions, including improved mitigative techniques, as necessary."
14. Close areas within 3/4 mile of high-water mark of specified water courses to permanent facilities and limit transportation crossings. Gravel removal may occur on a site-specific basis.	Modify to specify that 3/4 mile setback will, at a minimum be applied to the Canning, Tamayariak, Katakturuk, Sadlerochit, Hulahula, Okpilak, Jago, Okerokovik, Niguarak, and Aichilik Rivers. Also should be modified to require 500 foot setback of permanent facilities from all other streams and waterbodies. A provision should be made which would allow for transportation corridors across streams and a variance procedure should be developed to handle other site specific actions that may be required (e.g., material sites, drill pads). If sited within 500 feet of waterbodies or within 3/4 mile of specified rivers, other mitigation measures will be required.
15. Acquire authority to require aircraft to maintain 1,500 feet altitude above nest level within 1 mile horizontal distance of historic peregrine or other raptor nest sites April 15-August 31 (June 1 if nest is unoccupied).	Modify to incorporate language developed by federal peregrine falcon recovery team. Apply to all raptors as in 1002 report.
16. Prohibit use of explosives or other noisy activities within 2 miles of raptor nest sites April 15-August 31 (June 1 if nest is unoccupied), unless specifically authorized by the FWS.	Same as comments on 15.
17. Prohibit ground level activity, permanent facilities, and long-term habitat alterations (material sites, roads, and airstrips) within 1 mile of known peregrine or other raptor nest sites. April 15-August 31 (June 1 if nest is unoccupied) unless specifically authorized.	Same as comments on 15.
18. Survey suitable habitat annually to locate nesting peregrines and other raptors.	Support.
19. Track radio-collared female polar bears. Establish no-activity zone of at least ½ mile around any den.	Expand to require annual fall monitoring program to follow bears moving ashore and identify den site locations.

Stipulati	ADFG Recommended Changes and Additions
20. Avoid construction in coastal areas near river systems with topographic relief of bluffs. Minimize activities along the coast during late October-early November when polar bears come ashore to den.	Support.
21. Close area within 5 miles of development and associated infrastructure hunting, trapping, and discharge of firearms.	Additional discussion is needed on this subject and the potential to effects on human use of resources in the ANWR 1002 area.
22. Prohibit surface occupancy in the Sadlerochit Spring Special Area (pl. 1A).	Support.
23. Define range of the candidate plant Thlaspi arcticum. Minimize surface occupancy in immediate vicinity of areas identified as supporting the plant. Position pads, collecting lines, and associated roads at least ½ mile from candidate plan locations.	Support.
24. Construct docks and causeways so that fish movements are not impeded and lagoon water chemistry is basically unchanged.	Solid fill causeways will be prohibited. All causeway structures needed for logistical support, waterflooding, or oil and gas transportation should be designed in such a manner that these structures do not alter nearshore water circulation patterns. In addition, these structures should be designed and constructed such that changes in water quality characteristics (e.g., salinity, temperature, suspended solids) are not induced or maintained in an unnatural state by the structure. In general, this will mean that the causeway will have to be a pier-supported elevated bridge structure, or in the case of an oil or gas pipeline, that facility would be either elevated or buried beneath the seafloor.
25. Establish time and area closures or restrictions on surface activity in areas of wildlife concentration during muskox calving, April 15-June 5; caribou calving, May 15-June 20; caribou insect harassment, June 20-August 15; snow goose staging, August 20-September 27; and overwintering and spawning.	Support.
26. Acquire authority to establish time and area closures and minimum aircraft altitude of 2000 feet above ground level (AGL) during muskox and caribou calving and caribou insect harassment, April 15-August 15; and snow goose staging, August 20-September 25. At other times the minimum altitude generally will be 1000 feet AGL over areas of animal concentrations.	Expand to include aircraft overflight restriction above barrier islands, lagoons, river deltas, and wetlands within one mile of coast between May 1 and September 30.

Stipulati	ADFG Recommended Changes and Additions
27. Fence camps and pump stations; incinerate garbage daily; prohibit wildlife feeding.	Modify to prohibit new solid fill disposal sites during exploration. Also, specify that fences must be designed to be bear proof (i.e., require the development of design standards for fences to minimize human/carnivore interactions).
28. Limit use of development infrastructure, roads and airstrips, to persons on official business.	Support.
29. Inventory project areas for cultural resources, evaluate resources and implement mitigation to avoid or minimize impact.	Defer to DNR
30. Develop & implement plans for control, use, and disposal of fuel and hazardous wastes.	Defer to DEC
31. Reinject drilling muds, cuttings, and other wastes where geologically feasible. Remove hazardous wastes to an approved disposal site.	Defer to DEC
32. Provide: environmental orientation briefings for workers; program for monitoring development activities; continuation of fish and wildlife population monitoring; follow-up programs to evaluate effects; and adequate staffing for full and effective enforcement of mitigation.	Support.

Enclosure D

GENERAL ISSUES

Decision-Making Process (Mitigation Standard)

The department proposes that a memorandum of understanding be developed between the USFWS and the Division of Governmental Coordination to facilitate the review of permits, plans of operations, and other federal, state, and local authorizations. The general standard for the review of these authorizations should be one which is consistent with the provisions of ANILCA concerning ANWR (16 USC 3142) and the existing standard used by resource agencies of the State of Alaska: An activity should be conducted in such a manner that it does not have a significant adverse effect (including any cumulative effects from a series of activities) upon the environmental values which will be impacted. Environmental values include both individual fish and wildlife species as well as their habitats. In order to comply with this general standard, the activity must, at a minimum, be conducted in accordance with the specific mitigation measures adopted for ANWR (e.g., stream setbacks, seasonal restrictions, etc.). In those instances where variances to specific mitigation measures are requested by the applicant, a detailed and complete justification for the variance must be completed by the applicant and approved by the appropriate resource agencies.

If upon review of a plan of operations or permit application, it is determined by reviewing agencies that the proposal will have significant adverse effects upon environmental values (e.g., fish, wildlife, and water quality) at risk, then mitigation measures must be incorporated into the plan of operations such that negative effects will be insignificant. The procedure used to develop the proper mitigation measures is identified in the USFWS mitigation policy (i.e., the five-step definition of mitigation found at 46 CFR 7657, January 23, 1981). In order to meet these overall goals, it should be necessary for the applicant to enter into preapplication negotiation and conference with state and federal agencies regarding both individual permits and overall exploration and development plans. The objective of these preapplication conferences should be to ensure, to the maximum extent practicable, that the plans of operations, permits, and similar applications that are submitted will contain the necessary mitigative measures (e.g., design considerations, specifications, and timing). This procedure places emphasis on developing a plan that addresses environmental values and minimizes the need for the agencies to add specific stipulations or conditions to the permits issued by the appropriate agency. This process also recognizes the fact that it is the applicant's, not the agencies', responsibility to develop an acceptable plan.

Only when a plan of operations has been developed, which in the best professional judgment of the agencies will not have significant adverse effects, would it be approved. In the event that agreement could not be reached between the agencies and the applicant, then it should be the responsibility of the applicant to appeal the decision and to support the appeal with detailed information regarding the engineering, environmental, and cost aspects of the project. The agencies would, upon the request of the applicant, consider any appeal filed. In no case would cost be the sole criterion by which an appeal is judged.

In those cases where the agencies determine that the appeal filed by the applicant is not valid, the project should be amended by the applicant and authorized or the project would be denied. In those cases where the appeal is determined to be valid, the impacts to environmental values would be mitigated to the fullest extent possible. It should be assumed that for those instances where significant adverse impacts will occur and which cannot be mitigated because of cost, environmental, and engineering considerations and that the agencies would consider compensation for environmental losses for these projects.

Strategic Planning

The department recommends that there be a requirement for strategic planning for any oil and gas exploration and development activities in the 1002 area and that the planning should incorporate adjacent lands where applicable. The state has in the past used a planning process for such areas as Bristol Bay in which large geographical areas were addressed and specific zones were closed to oil and gas development to protect renewable resources. Another example is the Tanana Basin Area Plan which has established guidelines for a variety of land use activities.

Because fish and wildlife populations ignore political boundaries, this protection will be effective only if planning encompasses the 1002 area and adjacent federal and state lands. This would ensure that optimal mitigation is consistently applied throughout the region. This would not only benefit fish and wildlife resources but would also assist industry in its planning by ensuring consistency in the application of standards. A planning process would also prevent unnecessary duplication of facilities and/or service areas, thereby minimizing social, environmental, and economic costs.

A strategic planning process would provide a framework for the timely incorporation of new information on mitigation and fish and wildlife use as it becomes available, and would ensure that mitigation methods applied at one point in time

are not negated by later activities (e.g., the benefits of a caribou ramp constructed to facilitate passage are negated when a drill pad is later constructed immediately adjacent to the ramp).

The goals of this planning effort should be to ensure that fish and wildlife resource values are considered at every stage of exploration and development so that impacts are mitigated, and so that refuge values are retained. In addition, the process should ensure that mitigation is consistently applied throughout the 1002 area as well as on adjacent state and federal lands, and that updated information is incorporated as it becomes available.

The department recommends that at a minimum, a planning process include the following basic elements:

(1) Habitat Classification System - Habitats should be typed and both quantitatively and qualitatively assessed in terms of their values to fish and wildlife species, based on an acceptable methodology that will provide the relative value of lands as fish and wildlife habitats, and the sensitivity of those habitats to oil and gas development. This system should be used to form the basis for mitigation methods (e.g., siting of facilities, seasonal restrictions) and should be completed sufficiently in advance of development to be used in planning of that development;

(2) Facilities Siting Criteria - Criteria for siting of facilities needs to be developed to ensure that fish and wildlife as well as other aspects (e.g., geotechnical, air and water quality) are considered during planning for location of facilities (e.g, camps, disposal sites, transportation corridors);

(3) Construction Scheduling - During exploration and development activities provisions should be made to minimize sensory disturbance to fish and wildlife as well as unnecessary destruction of habitat (i.e., terrain and vegetation damage), by meshing seasonal wildlife usage with "windows" of construction activities. Exploratory and development activities should be differentiated such that restrictions can be effectively and efficiently applied, consistent with the level of activity proposed;

(4) General Issue-Specific Plans - Generic plans for oil and gas activities ("1.6.1 Plans as developed for the Northwest Alaska Pipeline Company proposed gas pipeline project) should be required in order to provide criteria for addressing a number of aspects of oil and gas exploration and development (e.g., material exploration and extraction, stream crossings, liquid waste management, solid waste management, air quality).

These types of plans can be prepared for each development under general guidelines that are applied regionwide, or can be prepared once at the start of development and replicated with updated revisions for each succeeding development.

The following discussion pertains to Stipulation 1.6.1 Plans as required for the Northwest Alaska Pipeline Company gas pipeline project. Environmental constraints for the gas pipeline project included an array of state, local, and federal permits and authorizations. Many of these constraints were summarized and outlined in a series of environmental plans. The plans as identified during the negotiation process were intended to fulfill a variety of functions such as the basis for facility design, support for permit applications, and the development of field workplans employing best management practices on a site-specific basis. Plans covering the following were required: air quality; blasting; camps; clearing; cultural resource protection; environmental briefings; erosion and sedimentation control; fire control; liquid waste management; material exploration and extraction; oil and hazardous substances control, cleanup, and disposal; insecticides, herbicides, and other chemicals; pipeline contingency; quality assurance/quality control; restoration; river training structures; solid waste management; stream, river and floodplain crossings; surveillance and maintenance; visual resources; wetland construction; seismic considerations; and human/carnivore interactions.

The concept of requiring environmental plans for certain topics evolved during the drafting of the federal right-of-way grant stipulations. The markup document used was the Department of Interior Grant of Right-of-Way (GROW) for the Alyeska Oil Pipeline project. The environmental stipulations in this document were carefully scrutinized and their efficacy on the TAPS project was reviewed. For the most part, there was a general consenus between the sponsors and governmental representatives that the environmental stipulations for TAPS afforded an adequate level of protection and were usable. They were, therefore, left largely intact for the gas pipeline GROW, with the exception of requiring environmental plans for the topics listed in the preceding paragraph.

The purpose of the plans was to provide the procedures and methods of action by which particular subject areas would be addressed by the project sponsor during design, construction, operation, and termination. Each plan was to contain all information, criteria, procedures, methods, best management practices, and

construction techniques pertinent to a particular topic. The plans were to include an identification of all codes, regulations, GROW stipulations, other stipulations and permits, and other applicable codes and project requirements.

The environmental plans described how environmental impacts were to be mitigated and how resources were to be protected. The plans constituted a separate set of documents and applied to the entire project. They also served as support documents for permit applications, notices to proceed, or field design changes.

The GROW also required the development of a set of basic design criteria for the pipeline system. These criteria, by definition, included what constitutes a preliminary design for the pipeline system.

(5) Updating of Plans - The department recognizes that planning and development of planning type documents is an iterative process that must incorporate new information from the standpoint of mitigation technology as well as well as oil field development (e.g., further delineation of reservoirs).

Joint State/Federal Project Review

The department strongly recommends that a joint state/federal project review team be established to handle all oil and gas exploration and potential development in the ANWR. This project team would address and be responsible for planning, design review, permit actions and approvals, field surveillance, compliance, and enforcement. In concept, this would be an interdisciplinary project team with expertise in many of the areas associated with oil and gas exploration and developmental activities. In assembling such a team, we believe, however, that at least state members should remain accountable to their parent organizational units within the various departments.

The department also believes that it would be beneficial for all parties to cooperate in coordinating the project review, permitting, field surveillance, and compliance and enforcement efforts of state, federal, and local authorities. The state's existing coastal management consistency process as well as the jurisdiction of such state agencies such as ADFG, the Department of Environmental Conservation, the Department of Natural Resources, and the Alaska Oil and Gas Commission need to be effectively brought to bear on the overall project. Lack of sufficient and effective coordination could lead to each agency dealing independently with applicants and could result in permitting efficiencies and compliance and enforcement problems.

Transportation Routing Considerations

Statements in the 1002 report refer to a transportation corridor (road and pipeline) between ANWR and TAPS Pump Station (PS) in Prudhoe Bay. Implicit in these statements is the assumption that this route is the optimal route. ADFG questions this basic assumption, and we suggest that alternative routes, such as one to TAPS PS 2 or 3, should be investigated. An inland route between ANWR and PS 2 or 3 has several advantages over a more coastal oriented route to PS 1. Some of these advantages, from a habitat perspective, include but are not limited to the following:

(1) A pipeline route over more upland terrain may traverse soil conditions that allow greater portions of the pipeline to be buried. Buried pipelines offer practically no impediment to free passage of big game;

(2) An inland route would avoid the concentrated calving area and coastal insect relief areas of the CAH;

(3) An inland route would provide more opportunities to cross fish streams in the upper portions where the channels are better defined and not as braided as along the coast. This would reduce the overall impacts to fish and riparian habitats; and

(4) An inland route would avoid almost all impacts on nesting and staging waterfowl and shorebirds on ANWR and adjacent state lands.

Use of Prudhoe Bay as the Industry Standard

The 1002 report frequently refers to current industry practices in Prudhoe Bay as the standard against which industry practices in ANWR will be measured. For example, on page 2 the report states that "The evidence generated during the 18 years of exploration and development at Prudhoe Bay indicates minimal impact on wildlife resources." Likewise, on page 97 the report states that "Mitigation is considered in terms of current technology and standard requirements on previous oil developments in the Arctic." At a recent industry/agency caribou impact workshop in Girdwood, Alaska, representatives of industry and agencies agreed that caribou calving had essentially ceased, and that coastal insect relief movements were disrupted by Prudhoe Bay development. This does not appear to be "minimal impact," especially in view of the definition of impact in the 1002 report. Additionally, a number of air and water quality and hazardous waste problems have been identified at Prudhoe Bay. It is important to understand that oil production technology and "standard industry practices" have improved since the development at Prudhoe Bay. Likewise,

the industry's ability to mitigate many fish and wildlife impacts has improved. Given the incentive to do so, industry will likely be able to provide mitigation that is improved over current technology. It is the latter standard that should be developed and improved on a continuing basis. It also must be recognized that certain impacts are unavoidable in light of oil and gas development and that some of these impacts cannot be mitigated.

In the 1002 report, reference also was made to the ability of industry to mitigate adverse impacts to fish and wildlife resources as evidenced during construction of the TAPS. In contrast to the experiences at Prudhoe Bay, the ADFG acknowledges that a high degree of attention was given to resource protection during the TAPS construction and post-construction phases. It is worth noting, however, that a joint state/federal team was in place, terms and conditions were adequate to ensure protection of resource values, and that the terms and conditions were enforced. Examples of progress made during the TAPS experience include the rehabilitation of all disturbed areas (e.g., material sites were restored) and correction of drainage problems (e.g., over 70 percent of all cross drainage structures were reconstructed following construction to provide for free fish passage of fish and to prevent erosion). A process was in place for TAPS, the state and federal agencies had the resources (engineering and biological expertise and budget), a design review and approval process, and a substantial field presence with enforcement capability. With these key elements in place and working in cooperation with Alyeska, a high degree of protection was afforded fish and wildlife resources. Without similar mechanisms in place, fish and wildlife resource protection may not be achieved.

A similar type of process was established for the proposed Northwest Alaskan Pipeline Company gas pipeline from Prudhoe Bay to the Canadian Border. During the preconstruction phases of this project (project is on hold at this time) significant advances were made in addressing and resolving resource related issues. These two projects, more than any others in the arctic environment, should be viewed as basic building blocks for oil and gas development in the ANWR.

Enclosure E

HUMAN USES OF FISH AND WILDLIFE

Impacts of oil and gas activity in the 1002 area on fish and wildlife resources can adversely affect human uses of these resources. This is true both in the 1002 area and in other Canadian and Alaskan communities that rely on wildlife which use the 1002 area, most notably the Porcupine Caribou Herd (PCH). Since human uses of fish and wildlife are important activities that are consistent with the purposes of ANWR, there should be extensive discussion of human uses and of potential impacts to fish and wildlife resources used for subsistence purposes.

The draft 1002 report does not present a complete picture of subistence uses and potential impacts associated with oil and gas exploration and development in the 1002 area. The discussion focuses principally on subsistence uses in the community of Kaktovik, and makes only passing reference to some but not all other communities that use the PCH. A more comprehensive discussion of subsistence uses by communities that use the PCH is required in order to accurately assess the potential impacts of disruptions to the herd's migration pattern consequent to development on and near the 1002 area. More detailed information on the subsistence use patterns of other communities that use the PCH is available in reports prepared by state and federal agencies.

The draft report also fails to examine the potential cumulative impacts of state and federal oil and gas exploration and development in northeast Alaska on the subsistence harvest and use of fish and wildlife resources. Development of the 1002 area cannot be viewed in isolation, since such development will facilitate additional exploration and development of existing but currently unprofitable reserves. Such activities may cumulatively have substantial impacts on habitat, fish, and wildlife resources, access to these resources, and uses of these resources by local residents in the years ahead.

Significantly, the report does not discuss a strategy for identifying impacts to human uses and for mitigation of these impacts. The ANILCA Section 810 evaluation process, which requires federal agencies to consider the effects of proposed land actions upon persons engaged in subsistence uses, is not even mentioned in the report. The Section 810 evaluation and resulting mitigation measures are intended to provide for the continuation of subsistence hunting and fishing, which constitute a reliable economic base for rural communities in Alaska. Attachment 1 to this Enclosure describes the basic requirements of ANILCA 810 and provides a systematic approach for meeting these requirements when making a decision on a federal oil and gas lease sale.

March 14, 1986

Mr. Alan Powers
Regional Director
Alaska OCS Region
Minerals Management Service
P.O. Box 101159
Anchorage, AK 99510

Dear Mr. Powers:

The State of Alaska appreciates the invitation to attend the public hearings on the Minerals Management Service's (MMS) §810 analysis for Sale 89, St. George Basin under the Alaska National Interest Conservation Act (ANILCA). Although we were not able to attend the meetings, we wish to submit the following comments on the §810 analysis. For your information and future reference the Governor's Office of Management and Budget, Division of Governmental Coordination (DGC) communicates the State's response to implementation of ANILCA §810 by federal agencies. Although DGC should be viewed as the "appropriate State agency" for notification under §810, the State's response reflects a consensus of the State's resource agencies. We would therefore request that in the future when DGC is notified under §810, copies of that federal notice also be sent to the Alaska Departments of Fish and Game, Environmental Conservation and Natural Resources.

The Sale 89 §810 analysis does not provide enough detailed information to adequately evaluate the effects of the proposed action on subsistence uses and needs in localized areas. It relies upon data presented in the Final Environmental Impact Statement (FEIS), which in many cases is highly regional in nature and does not allow an accurate evaluation of the possible effects of oil and gas activities upon subsistence at the local community level. An adequate §810 analysis must include complete and accurate information on the biophysical effects of the proposed action, and on the people and socioeconomic systems which rely on fish and wildlife resources. In particular, the §810 analysis must identify all the subsistence uses of fish and wildlife resources which may be affected by the proposed action and determine whether significant restrictions to these uses may occur.

Specifically, the Sale 89 §810 evaluation does not adequately assess how the major impacts to marine and coastal birds predicted in the FEIS will affect subsistence uses. The Sale 89 FEIS projects a moderate or major effect on marine and coastal birds depending on what mitigation measures are adopted. Birds and bird eggs are identified in the FEIS (III-63) as important subsistence resources, particularly for St. George Island residents. Consequently, we disagree with the omission of this potentially significant restriction of subsistence uses from the analysis.

The potential for oil spills to impact Unimak Pass resources and in particular, the large salmon runs that migrate through it are also not adequately evaluated in the §810 analysis. If oil is discovered, the Oil-Spill-Risk-Analysis for the proposal indicates a 12 percent chance of Unimak Pass being contacted by a 1,000-barrel or greater spill over three days (FEIS IV-38). Large numbers of salmon, including the majority of the Bristol Bay sockeye run and king and chum salmon destined for the Kuskokwim and Yukon rivers migrate through the pass. These salmon are major subsistence resources for the communities of the Alaska Peninsula, Bristol Bay, and the Kuskokwim and Yukon deltas. The FEIS (IV-39) states that "oil contacting salmon could, depending on its concentration, cause death or sublethal effects such as reduction in salmon food supply and alteration of migration with increased predation." Such effects are of special concern in Unimak Pass because salmon spawning populations occur in this area from early May through the end of July, and rearing immature salmon are estimated to be present from July through the end of November. Depending on the timing of potential oil spills in or affecting Unimak Pass, the effects on local salmon stocks could be significant. Consequently, this potential impact should be evaluated in the §810 analysis.

As previously noted, many of the salmon that migrate through Unimak Pass are destined for regions outside the sale area. Impacts to these salmon could affect villages of inner Bristol Bay and the Yukon - Kuskokwim Delta. The §810 analysis should, therefore, evaluate the potential impacts to these southwest Alaska villages that are located outside of the sale area.

We are also very concerned that no specific measures are proposed to minimize the projected impacts to northern fur seals. The adoption of such measures would reduce the potential for a significant restriction to subsistence uses. Failure to adopt specific measures to protect northern fur seals does not conform to §810(a)(3)(C) of ANILCA, which states that "reasonable steps will be taken to minimize adverse effects upon subsistence uses and resources resulting from such actions." The most "reasonable" step to minimize adverse effects to fur seals would be the adoption of Governor Sheffield's recommendation for Sale 89 under Section 19 of the OCS Lands Act to defer leasing within

approximately 39 miles around the Pribilof Islands. This area contains negligible hydrocarbon resources and its deferral from leasing could substantially reduce oil spill effects on northern fur seals. The deferral of tracts around the Pribilof Islands would also be consistent with §810(a)(3)(B) which states that "the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition." The proposed activity would not be negatively affected by deferring leasing around the Pribilof Islands because this area is projected to contain minimal hydrocarbon resource value (FEIS II-20). However, its adoption would reduce the amount of public lands necessary to conduct the proposed activity which would be in conformance with §810(c)(3)(B).

The benefit of conducting §810 analyses can only be realized if comprehensive measures are actively developed and adopted to minimize significant subsistence restrictions. Unfortunately, such measures have not been developed and proposed for adoption in the Sale 89 §810 analysis.

Finally, we do not believe that the MMS is conforming to §810(a)(3)(B), which states that "the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition." The purpose of the proposed activity is to lease OCS lands that will lead to the production of hydrocarbon resources. The proposed Sale 89 lease sale configuration does not include the minimal amount of land necessary to meet this purpose. The lease sale configuration is an area-wide offering and it includes numerous tracts with no or negligible hydrocarbon potential. To conform with §810 (a)(3)(B) of ANILCA, the MMS should adopt Governor Sheffield's Section 19 recommendations concerning the sale area configuration.

To assist the MMS in revising the Sale 89 analysis and implementing its Section 810 responsibilities in Alaska's other OCS planning areas, we are providing the enclosed guidelines which we believe meet the requirements of Section 810 of the Alaska National Interest Lands Conservation Act. It is our intention that these guidelines will assist you in meeting the requirements of Section 810 in a timely, thorough, and cost-effective manner. These guidelines incorporate the procedures developed by the Section 810 working groups of the Land Use Council.

We appreciate the opportunity to comment on the Sale 89 §810 analysis. Please call me if you have any questions regarding our comments. If you have any questions regarding our proposed

guidelines for preparing Section 810 analyses, please contact Steve Behnke, Alaska Department of Fish and Game's Director of the Division of Subsistence. He may be reached at 465-4147 in Juneau.

Sincerely,

Robert L. Grogan
Associate Director

Enclosure

cc: Irven F. Palmer, MMS, Anchorage

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bcc: Commissioner Ross, DEC, Juneau
Commissioner Wunnicke, DNR, Juneau
Commissioner Collinsworth, DFG, Juneau
John Katz, Office of the Governor, Washington, DC
Laura Davis, Law, Juneau

A Recommended Approach to Implementation of ANILCA §810

March 14, 1986

§810 of ANILCA requires federal agencies to consider the effects of proposed land actions upon people engaged in subsistence uses. Specifically, it requires agencies to:

1. Evaluate the effects of the proposed action on subsistence uses and needs;

2. Determine the availability of other lands for the purposes sought to be achieved and assess whether other alternatives are available which would reduce or eliminate the use, occupancy or disposition of public lands needed for subsistence purposes;

3. Determine whether the proposed action would "significantly restrict" subsistence uses;

4. If the proposed action would significantly restrict subsistence uses, to:

   a. Meet certain public notice and hearing requirements.

   b. Determine that such a restriction meets certain standards, including involving the minimum amount of public lands and minimizing adverse impacts upon subsistence uses and resources.

This paper describes the basic requirements of §810 and provides a systematic approach to meeting these requirements when making a decision on an OCS oil and gas lease sale.

Evaluating Effects on Subsistence Uses

ANILCA §810 provides, as a starting point, that "in determining whether to...lease...public lands...the head of the federal agency having primary jurisdiction over such lands...shall evaluate the effect of such use, occupancy, or disposition...on subsistence uses and needs...."

This section is clearly intended to require a specific assessment of impacts on subsistence uses. An adequate §810 evaluation must include complete and accurate information about the proposed action and about the subsistence uses of potentially affected wild resources.

Information about the wildlife populations, fish stocks, and geographic areas which could be affected by the proposed action

are needed to determine the scope of potential effects on subsistence. Information about the specific subsistence uses of, and needs related to, these resources and areas is required to identify and evaluate these effects. This includes data on:

1. Who uses the resources which could be affected;

2. Where, when, and how the resources are harvested;

3. How much they use; and,

4. The significance of the harvested resources for meeting socioeconomic and cultural needs.

Maps of community subsistence use areas can provide valuable data about which communities and groups of people use fish and wildlife that could be affected. Each §810 evaluation should include a map and list of communities that use the stocks and populations of resources potentially affected by a proposed action. The Alaska Department of Fish and Game routinely develops maps of subsistence use as it conducts community subsistence studies. The state welcomes opportunities to cooperate with federal agencies in improving the subsistence data base.

Once the area and communities which could be affected by an action are identified, an assessment must be made of the potential effects of the action on uses of fish and wildlife. The potential linkages between the proposed action, fish and wildlife resources, and subsistence uses need to be clearly described. This can be accomplished through developing hypothetical scenarios, and tracing their implications out through the biological system to the people who rely on subsistence uses.

The evaluation of effects should address potential positive, neutral, and negative effects, as well as direct and indirect impacts on subsistence uses resulting from a proposed lease sale. The guidelines for implementation of §810 developed by the Alaska Land Use Council are helpful in identifying several effects which would restrict subsistence uses:

1. A reduction in subsistence uses due to direct impacts on the resource, adverse impacts on habitat, increased competition for the resources, or other factors;

2. A reduction in the subsistence uses due to changes in availability of resources caused by an alteration in their distribution, migration, or location; and

3. A reduction in subsistence uses due to limitations

on the access to harvestable resources, such as by physical or legal barriers.

An adequate §810 assessment must consider the potential effects of the proposed action in each community which would be affected. In some circumstances, however, it may be necessary to examine effects on the subsistence uses of "typical" communities or groups of people within the affected zone.

Biological and socioeconomic data need to be at a level of detail which will allow a meaningful assessment of potential impacts on the people who use resources for subsistence. These effects can occur at the individual, household, community and regional level.

A working document has been developed by the Alaska Land Use Council which identifies minimum data standards for making an adequate §810 assessment. (Alaska Land Use Council, Working Group II; November 28, 1984, Draft Standards and Guidelines for the Collection, Analysis, and Presentation of Subsistence Use Information for ANILCA §810 Determination, pp. 5-6.) In some cases existing data on subsistence uses may not be adequate to conduct a §810 analysis. Agencies must anticipate these special data needs at the earliest stages in the EIS process. Public meetings may be useful in compiling additional data on subsistence uses and needs. Additional research may also be necessary to address particular data gaps. New studies should be closely coordinated with the State of Alaska as required by ANILCA §812.

The §810 evaluation must thoroughly describe and document data about subsistence resources and uses so that all concerned parties can ascertain which resources and subsistence uses could be affected by a proposed action.

Identifying Alternatives

§810(a) also requires federal agencies to evaluate "...the availability of other lands for the purposes to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes."

In ANILCA §802 Congress states its policy that the "...utilization of the public lands in Alaska is to cause the least adverse impact possible on rural residents who depend upon subsistence uses of the resources of such lands...." It is therefore important that §810 analyses fully identify and explore alternative areas and approaches which would minimize adverse impacts on rural residents.

Determining Whether Actions Would "Significantly Restrict" Subsistence Use

Once the potential effects of the lease sale upon subsistence uses have been described, the next step required by §810 is to determine whether these effects could "significantly restrict subsistence uses...."

The legislative history of ANILCA gives no clue to the intended meaning of "significantly restrict." The closest parallel to the "significantly restrict" standard appears to be the requirement of the National Environmental Policy Act (NEPA) to analyze actions which may "significantly affect" the environment. Regulations of the Council on Environmental Quality (CEQ) for implementing NEPA state that both the context and intensity of impacts must be considered in deciding significance.

The people who would be affected, and the roles that the particular resources play in their lives provide the obvious context for evaluating significance in relation to restrictions on subsistence uses. The "intensity" of effects also has to be evaluated in relation to use of specific resources by people.

In §810 Congress recognized that subsistence uses are essential to many rural Alaskans, and intended federal land actions to have the least adverse impact possible upon them.

When considered in relation to this mandate, a "significant" restriction to subsistence uses is an effect which imposes a meaningful burden or hardship on particular people.

A determination of "significance" therefore requires discussion of such factors as socioeconomic circumstances, the degree to which harvest of particular resources could be reduced by the proposed action, and the consequences of the frequency, timing, and location of restrictive effects. These need to be evaluated in the context of the people who actually harvest and use the potentially affected resources, and in the context of what would constitute a meaningful burden to those people.

A hypothetical example may be useful in demonstrating the approach suggested above:

During an EIS study a proposed lease sale is determined potentially to affect local salmon stocks. The studies suggest that the activity will not have a major impact on regional salmon populations or regional harvest levels, but depending on its timing and precise location, it could reduce particular stock or run. It is impossible, given uncertainty where or when the activity will occur, to predict exactly which salmon stock might be affected. However, the EIS has identified 20 communities and groups of people who make subsistence use of the

salmon runs which migrate through the general impact area and could be affected. The §810 evaluation therefore identifies these communities and the potential risks. It then examines what effect a reduction in a local salmon run could have for households within typical communities, perhaps dividing the communities into four or five categories, based on location, degree of reliance on subsistence resources, and so forth.

In the hypothetical example, the FEIS concludes that the proposed action could substantially reduce local stocks of king salmon for one or more seasons. As subsistance uses have been shown to occur on these stocks the §810 analysis would then identify this as a potential restriction and then go on to determine whether the action would "significantly restrict" the subsistance use of king salmon. In this analysis king salmon are one of the first fresh foods available to particular households in early summer, and the loss of king salmon for one or more seasons would be a meaningful burden on families in the communities. The §810 analysis, after weighing the risks to subsistence use of king salmon against the important role of king salmon to the people, might conclude that the action could "significantly restrict" subsistence use of king salmon in several of the communities.

Meeting Notice and Hearing Requirements

§810(a) requires the head of each federal agency to meet certain notice and hearing requirements before allowing an action which would significantly restrict subsistence uses. The appropriate state agency and appropriate local committees and regional councils established under §805 must be notified, and a hearing must be held in the vicinity of the area involved.

In ANILCA §801 Congress clearly stated its intent that rural residents, who have knowledge of local conditions and subsistence requirements, should have a meaningful role in decisions affecting subsistence uses and needs. The specific requirements of §810 are intended to ensure that federal agencies have the best available information about the potential effects of proposed actions on rural residents. They also seem, when taken in conjunction with §810(a)(3), to be intended to ensure that local knowledge and experience is brought to bear on the requirement that adverse impacts on subsistence be minimized.

Again, a community focus in evaluating effects would simplify the notice and hearing requirements. Each §810 evaluation should include a map and list of the communities potentially affected, and identify those where subsistence uses could be significantly restricted. In this way §810 assessment itself would indicate many of the groups which should be notified.

It is [redacted] for agencies to follow the §810 procedures for public involvement in instances where a determination of significance is not clear or where there may be significant restriction even though certain data may not yet be available to support the finding.

Public notification of hearings following a determination of significant restriction should follow several avenues, including:

1. Notice published in local and regional newspapers;

2. Notice mailed to local fish and game advisory committees, regional councils, local governments, and Native organizations;

3. Notice aired on local radio and/or television broadcasts;

4. Notice posted in community halls and other local meeting places; and

5. Personal communications with individuals or groups known by the land manager to have an interest in the action.

Minimizing unavoidable adverse impacts upon subsistence uses and resources

§810(a)(3) requires three findings before an action which would significantly restrict subsistence uses can procede.

1. That such a significant restriction of subsistence uses is necessary, consistent with sound management principles, for the utilization of public lands.

This finding of necessity should be specific to the proposed action, and should be based upon an analysis of the potential impacts upon subsistence uses and the relative value of the proposed action in meeting the goals for the use of public lands.

2. That the proposed activity will involve the minimal amount of public land necessary to accomplish its purposes.

The finding of necessity should exclude all public lands that are not necessary to achieving the proposed purpose.

3. That reasonable steps will be taken to minimise adverse impacts upon subsistence uses and resources.

Identification and consideration of possible mitigation measures are required to minimize the adverse impacts to subsistence uses that could result from the proposal to use, occupy, or dispose public lands. These can take many forms, and as noted above, public involvement can play a key role in developing suitable mitigation measures.

The following categories represent a broad range of types of mitigation measures:

1. Alternatives for deleting public lands from the proposed action to reduce the risk of potential subsistence resource restriction.

2. Alternatives for reducing impact to seasonal camps and other harvest and use locations;

3. Alternatives for reducing habitat changes that may reduce species abundance and decrease harvest opportunity;

4. Alternatives for reducing numbers of people living in, working in, or passing through area;

5. Alternatives for reducing numbers of people competing for resources;

6. Alternatives for reducing disturbance, roads, noise, water quality degradation, etc., that may affect distribution of species;

7. Alternatives for reducing land classification and ownership changes;

8. Alternatives for reducing changes in access routes to use areas; or

9. Alternatives for compensating people for losses.

Time and area restrictions on activity may frequently be useful in mitigating effects on subsistence uses.

Summary

Federal agencies can satisfy the requirements of ANILCA §810 by following the systematic approach outlined above. An adequate §810 evaluation for an OCS oil and gas lease sale would clearly meet the following standards:

1. Identify the people who make subsistence use of all wild resources which would be affected by the proposed action;

2. Identify the nature of their subsistence uses and needs for these resources;

3. Describe the potential effects of the proposed action on wild resources and upon community subsistence uses and needs, and identify which of these effects could be restrictions;

4. Make a determination of whether potential restrictions would be "significant" in the context of the meaning of the affected resources to the people who use them, and the role the resources play in their lives;

5. Identify alternatives that would minimize adverse impacts on rural residents;

6. If the proposed action could significantly restrict particular subsistence uses:

   a. meet notice and hearing requirements;

   b. make findings that;

      1. the necessity for the proposed action outweighs the risks to subsistence;

      2. the proposed action will involve the minimal amount of public lands needed to accomplish its purpose;

      3. reasonable steps will be taken to minimize adverse impacts upon subsistence uses and needs.

7. Thoroughly document all data and findings so that concerned parties have access to them.

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Enclosure F

SPECIFIC COMMENTS ON 1002 REPORT AND STIPULATIONS

Development and Transportation Infrastructure

page 76, Exploration: Unlike most other impacts, the impacts of water use during exploration are likely to be qualitatively similar to those during development. Therefore, since this Draft Environmental Impact Statement (DEIS) may not be amended until development, the discussion of "innovative" and other techniques to mitigate such impacts should be expanded.

page 78, Development: The assumption that a pipeline would be routed to Trans-Alaska Pipeline System (TAPS) Pump Station (PS) 1 does not appear to be warranted until all alternatives are evaluated.

page 82, Transportation Options: Again, there appears to be an assumption that a pipeline would be routed to PS 1, in spite of the environmental advantages of an inland route described in later sections of the report (e.g., page 84 of the 1002 report).

page 84, Inland Routes: The same advantages for inland pipeline routes can be expanded to an inland route across adjacent state land to TAPS PS 2 or 3.

Construction Camps: Additional discussion of design items such as bear-proof fencing, solid and liquid waste management, collocation with Central Processing Facilities (CPF's) and other service areas, and siting of facilities in areas of less importance to fish and wildlife habitat would be appropriate.

page 85, Subsea Marine Routes: The statement that "A marine pipeline presents significantly higher environmental risks than does an onshore pipeline." should be qualified. Although the consequences of an oil spill from a marine pipeline may be catastrophic, the probability of such a spill is very low. In contrast, the long-term environmental consequences of an aboveground onshore pipeline may be less on an individual occurrence basis, but cumulatively much more adverse to fish and wildlife than a marine pipeline. Furthermore, the discussion concerning construction problems associated with marine pipelines appears to be more pessimistic than warranted. For example, in many nearshore areas permafrost is deep enough that thermally-induced settlement of a pipeline is unlikely.

page 86, Other Transportation Methods: Although railroads may prove to be impractical from a logistical standpoint, the environmental impacts may be less than a combined pipeline-haul road complex such as that envisioned on page 84-85.

page 87, Natural Gas Transportation: The assumption that natural gas and oil facilities could be shared is not necessarily valid. For example, the oil pipeline route resulting in the least environmental impact may follow an inland route to PS 2 or 3, whereas the gas pipeline route resulting in the least environmental impact may follow a coastal route to Prudhoe Bay. Similarly, there are situations in which safety considerations preclude oil and natural gas systems being collocated. For example, the proximity of the TAPS pipeline with the proposed chilled gas pipeline by Northwest Alaskan Pipeline Company was eventually resolved by requiring that the two pipeline be separated by at least 200 feet.

Alternatives

page 89, Assumptions: Again, a route to TAPS Pump Station 1 is assumed, and mentioned several times later. Contrary to the Executive Summary, there is no mention of deferred leasing in the Porcupine Caribou Herd core calving area.

page 91, Table V-1: The numbers of drill pads and material sites are greatly underestimated. For example, Kuparuk oil field, which is similar to the projected size of one of the fields in ANWR, has over 40 drill pads now, and exploration and development is not completed. Although the final pad configuration cannot be determined now, upward revision of the pad estimate by a factor of at least 4 could occur as a result of development of West Sak Sands.

Environmental Consequences

page 95, Introduction: Although we recognize that the final development scenario cannot be determined, we believe that the statement "The effects would not increase proportionally with increased production" is somewhat misleading. The ultimate number and density of drill pads contributes significantly to the impacts on fish and wildlife; therefore, it is possible that the increase in pads could cause increase in impacts that is not a proportional relationship.

Likewise, development of gas reserves can cause an increase in impacts because of increased human activity in the then existing oil fields. In addition, there are impacts that are unique to gaslines (e.g., frost bulb around a chilled gasline causing ice damming of fish streams).

page 97, Mitigation Policy: The terms "avoidable adverse impacts" and "unnecessary adverse effects" are undefined, and do not appear in the USFWS Mitigation Policy (Federal Register, Vol. 46, No. 15). Adding further to the confusion is a list of "unavoidable effects" on page 101 that includes a mix of those that are truly unavoidable (e.g., loss of habitat by gravel overlay for roads and pads) with many that are avoidable with proper design (e.g., erosion and ponding along roads, water storage pits in streambeds).

The statement in paragraph 6, "Mitigation is considered in terms of current technology and standard requirements on previous oil developments in the Arctic. This includes safety and environmental stipulations that conform with available technology and industry practice" (emphasis added) is of particular concern. Statements elsewhere in the report allude to the unique nature of ANWR, and to the significant biological resources of the 1002 area. These resources provide justification for not treating oil development in this area as "business as usual," and for greater consideration of fish and wildlife mitigation on ANWR than on previous oil developments on the North Slope where current industry practices are used.

page 100, Reserve Pits: Techniques for abandonment of exploratory reserve pits should conform to Solid Waste Disposal regulations recently promulgated by the Alaska Department of Environmental Conservation.

page 101, Consequences of Developmental Drilling: This section needs to be greatly modified and expanded. Although a number of issues (e.g., gravel mining, water sources, and infrastructure) are mentioned, the discussion of each is inadequate or incorrect. For example, upland gravel sites may be more visually displeasing, but are often less destructive of fish and wildlife habitat. Removal of gravel from cutbanks along rivers can cause severe changes in river hydrology and result in impacts on aquatic habitat. In fact, this practice has been generally prohibited on state land for the past decade.

Additional impacts on aquatic systems include changes in stream bank configuration due to the installation of guide banks to protect bridges and pipelines, "piping"

of water along the buried pipe trench, and the "ice dam" across streams that is created by a buried, chilled gasline.

page 104, Sadlerochit Springs Special Area: We endorse restrictions on surface occupancy for this unique area.

page 105, Coastal and Marine, Mitigation: Experience gained from the West Dock and Endicott causeways indicates that significant water quality impacts resulted from these solid-fill causeways. We endorse the concept of using this information to plan marine facilities in the 1002 area so that such impacts do not occur.

Caribou: Although we agree that, in general, drill rigs and activity at the levels usually involved in exploration would result in only a short-term local avoidance of an area by caribou, the statement that exploratory drilling on state land has resulted in "no apparent conflict with the Central Arctic Herd...activities" should be qualified. Fancy (1982, 1983) documented localized avoidance by CAH caribou of two drill rigs on the east side of the Sag River delta, and Wright and Fancy (1980) also documented avoidance of an isolated drill rig. If exploratory rig densities were sufficiently high, large areas might be avoided by caribou.

page 110, last paragraph: This statement should be clarified. Strictly speaking, the harvest was not illegal if it conformed to Alaska hunting regulations; however, the means of access and transport may be illegal according to state law governing use of the Haul Road, and Bureau of Land Management off road vehicle regulations.

page 111, Mitigation, no. 1: Although opportunities for pipeline burial would be virtually nonexistent for a coastal route to PS 1, an inland route to PS 2 or 3 may provide numerous such opportunities for a buried pipeline.

Nos. 8 and 9: Monitoring is not a form of mitigation, unless used within the context of the USFWS Mitigation Policy (page 7660). Rather, monitoring can be used to document the effectiveness of various mitigative measures (e.g., causeway studies in the Prudhoe Bay area). Habitat use should be added to the scope of studies (ref. no. 9). Also surface traffic control measures (e.g., convoying, pulsed traffic) that can be applied within the major oil fields and transportation corridors should be added.

page 113, Mitigation: Refer to comment regarding page 111, nos. 8 and 9.

page 116, Brown Bears, Mitigation: A discussion should be added on bear-proof fencing of camps and incineration of putrescible wastes as mitigation measures. Refer also to the report recommendations for polar bear mitigation measures, page 118.

page 121, Waterfowl, Mitigation: An inland transportation route in the 1002 area and across state land to TAPS would also minimize impacts on waterfowl, especially nesting tundra swans.

page 122, Seabirds: An increase in the population of gulls (which prey on seabird and shorebird eggs and young) as a result of the availability of garbage as an alternate food source can be eliminated if all putrescible wastes are immediately incinerated [refer also to comments on Brown Bear Mitigation].

page 125, Fish: Experience at Prudhoe Bay and Kuparuk oilfields has not demonstrated that culverts can be adequately designed and/or installed on the North Slope to assure fish passage. We recommend that drainage structures in fish streams be limited to bridges.

page 142, Biological Resources: The estimate of loss of marine habitats due to marine facilities is extremely low if a solid-fill causeway is constructed.

page 145, Summary of Recommended Mitigation: See Enclosure B of this memorandum. Additional mitigative measures are mentioned in the species discussions in the "Environmental Consequences" chapter of the 1002 Report. These should be incorporated in the mitigation recommendations summarized in the end of the 1002 report.

STATE OF ALASKA

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November 28, 1986

Dear Reviewer:

The U.S. Department of the Interior, Fish and Wildlife Service, has distributed a draft Arctic National Wildlife Refuge (ANWR) 1002(h) Report for a 60-day public review. The draft report contains information on: (1) the estimated geological potential of the area; (2) a description of fish and wildlife resources and their habitats; (3) an assessment of the potential effects of oil and gas development on fish and wildlife resources and their habitats; (4) a discussion of potential transportation and processing facilities; and (5) recommendations as to whether oil and gas leasing should occur in ANWR.

If you wish to receive the draft 1002(h) Report and have not received a copy of the document, please contact:

Mr. George Sura
U.S. Fish and Wildlife Service
1011 East Tudor Road
Anchorage, AK 99503
(907) 786-3486

In order for your views to be considered in preparation of the State of Alaska's response to the Department of the Interior on the draft ANWR 1002(h) Report, your comments must be received by January 2, 1987.

The following schedule will guide our review of the draft ANWR 1002(h) Report and preparation of the State's response to the Department of the Interior:

Date	Action
November 24	State of Alaska receives notification that the draft 1002(h) Report is available for review.
November 25	Letter to reviewers from Division of Governmental Coordination (DGC) requesting comments by January 2, 1987.

January 2	Comments due from public and government agencies.
January 3 - 12	Consider comments received and prepare draft state response letter.
January 5	Anchorage public hearing.
January 6	Kaktovik public hearing.
January 9	Washington, D.C., public hearing.
January 13 - 21	Prepare briefing documents and conduct interagency meetings to resolve any remaining issues in the state's draft response.
January 22	Submit state's formal written response to the Department of the Interior.

Thank you for your cooperation in this review process.

Sincerely,

Robert L. Grogan
Director

cc: Robert Gilmore, USFWS, Anchorage
George Sura, USFWS, Anchorage

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THE PRECEDING PAGES WERE TREATED AS
A UNIT IN THE ORIGINAL FILE.

MEMORANDUM State of Alaska

TO: Distribution

DATE: June 27, 1986

FILE NO: dk86062701rse

TELEPHONE NO: 465-3562

FROM: Robert L. Grogan, Director
Division of Governmental Coordination
Office of Management and Budget

SUBJECT: ANWR Policy Statements

Attached is the most recent copy of a draft position paper regarding leasing in the coastal plain of the Arctic National Wildlife Refuge. The attached position paper will be discussed at the next resources cabinet meeting tentatively scheduled for Tuesday, July 1, at 7:00 am in the Governor's Conference Room.

Attachments

02-001A(Rev. 10/79)

[255] The Honorable Don Collinsworth, Department of Fish and Game, Juneau
[459] Mr. John Katz, Office of the Governor, Washington
[1960] Ms. Molly McCammon, Office of the Governor, Juneau
[254] The Honorable Bill Ross, Department of Environmental Conservation, Juneau
[124] The Honorable Esther Wunnicke, Department of Natural Resources, Juneau

Distribution List.
June 27, 1986

DRAFT

Governor Sheffield's Position on Leasing in the Arctic National Wildlife Refuge

Background Information

Pursuant to Section 1001 of the Alaska National Interest Lands Conservation Act (ANILCA), the Secretary of the Interior was mandated to assess the Arctic National Wildlife Refuge (ANWR) for potential oil and gas resources and to make recommendations concerning future use and management of those resources, including: (1) an evaluation of alternative transportation routes needed for oil and gas development; (2) review the wilderness characteristics, and make recommendations for wilderness designation of these lands; and (3) study, and make recommendations for protection of the wildlife resources of ANWR. During the course of the study, the Secretary solicited comments and consulted with the State of Alaska.

Section 1002 of ANILCA requires the Secretary, in consultation with the Governor, to conduct a continuing inventory and study of the fish and wildlife of the coastal plains of ANWR and to submit a final report (i.e., 1002(h) report) to Congress. It is our understanding that the 1002(h) report could be submitted to Congress in late November 1986 although several factors (e.g., pending lawsuit by Trustees for Alaska, politics, etc.) will likely affect this submission date. The report will contain information on: (1) the geologic potential of the area; (2) a description of fish and wildlife resources and their habitats; (3) an assessment of the potential effects of oil and gas development on fish and wildlife resources and their habitats; (4) a discussion of potential transportation and processing facilities; and, (5) recommendations as to whether oil and gas leasing shall occur in ANWR.

In order for the Governor to be as informed as possible and to enable him to participate knowledgeably and actively in any congressional debate that might occur this fall, state agencies have been directed to provide information on specific issues relating to ANWR.

Policy Statements

- In view of potential state revenues to be derived from any oil and gas produced from ANWR, the state supports oil and gas development in the coastal plain of the Arctic National Wildlife Refuge subject to the adoption of reasonable measures that will ensure protection to fish and wildlife resources of the area. Fish and wildlife or resources of primary concern include the Porcupine and Central Arctic caribou herds, major stream systems and nearshore estuarine environments critical to spawning and overwintering fish, and coastal tundra habitats utilized by geese, swans and other major concentrations of waterfowl.

- The state has been an active participant in the 1002 ANILCA process which, to date, has provided for a baseline study and a comprehensive and continuing inventory and assessment of the fish and wildlife resources of the coastal plain of ANWR. It would be premature for the state to initiate a detailed and extensive review until we have sufficient information on the fish and wildlife values of the refuge and potential impacts from leasing. It is our understanding that this information will be provided in the 1002(h) report being prepared by the U.S. Fish and Wildlife Service for submission to Congress. Although the state has been an active participant in the ongoing assessment process, an extensive review of any proposal to allow leasing in ANWR will be conducted by the state in the context of the ANILCA 1002(h) report, when delivered to Congress.

- The state is currently entitled to 90 percent of the governmental share of royalties and bonuses derived from any oil and gas produced from ANWR. The state will make every effort to maintain this provision.

- The state does not support Representative Udall's bill (HR 4922) or any other legislation that would propose to designate the coastal plain of ANWR as wilderness.

- With regard to land exchanges in ANWR, the state is not aware of any specific areas that are being considered for trade at this time. At the urging of the state, the U.S. Department of the Interior has assured us that we will be kept appraised of any proposed land exchange under consideration and will be consulted before any final decision is made.

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Fig. 2

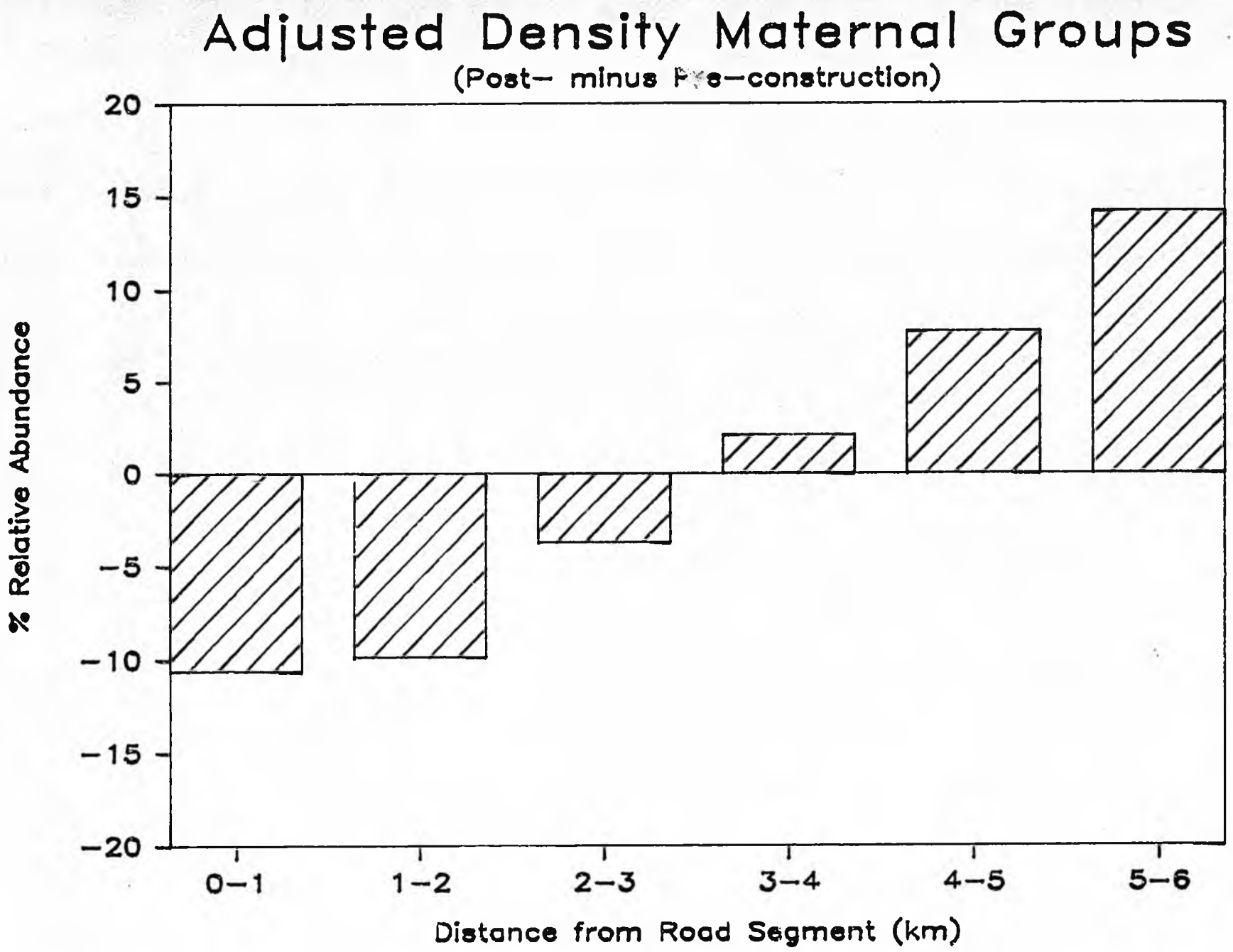
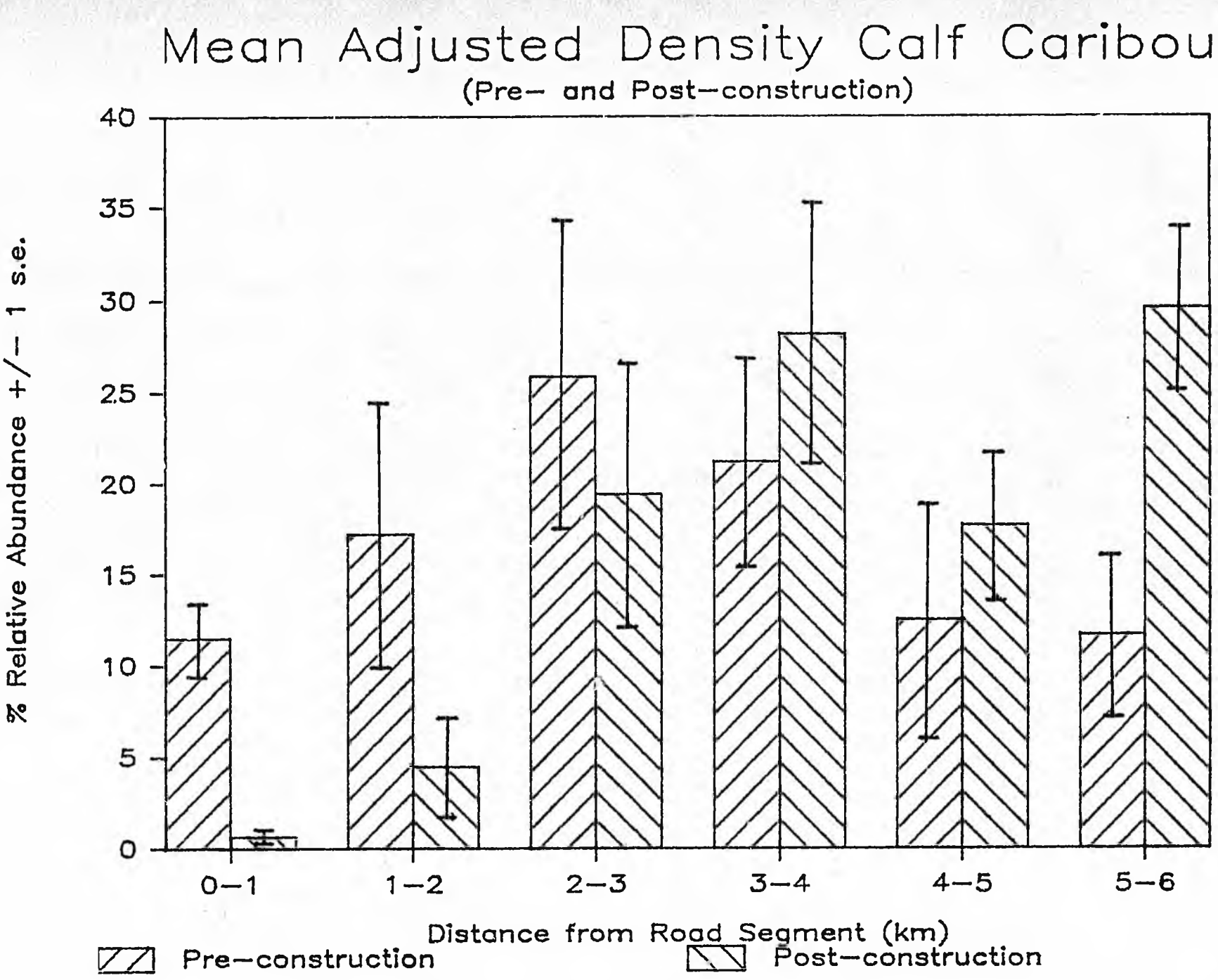

Adjusted Density Maternal Groups
(Post– minus Pre–construction)
20
15
10
5
0
–5
–10
–15
–20
% Relative Abundance
0–1
1–2
2–3
3–4
4–5
5–6
Distance from Road Segment (km)

Fig 1


Mean Adjusted Density Calf Caribou
(Pre- and Post-construction)
% Relative Abundance +/- 1 s.e.
40
35
30
25
20
15
10
5
0
0-1
1-2
2-3
3-4
4-5
5-6
Distance from Road Segment (km)
Pre-construction
Post-construction

National Audubon Society

ALASKA REGIONAL OFFICE

308 G STREET, SUITE 217, ANCHORAGE, ALASKA 99501 (907) 276-7034

TESTIMONY

ON BEHALF OF THE

NATIONAL AUDUBON SOCIETY

AT A PUBLIC HEARING ON THE

DRAFT

ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA

COASTAL PLAIN RESOURCE ASSESSMENT

BY

DAVID R. CLINE

REGIONAL VICE PRESIDENT FOR ALASKA

NATIONAL AUDUBON SOCIETY

Anchorage, Alaska

January 5, 1987

My name is Dave Cline, and I am the Alaska Regional Vice President for the National Audubon Society. I am testifying today on behalf of the Society including its 2,600 members in Alaska.

After carefully examining the "Resource Assessment Report" for the coastal plain of the Arctic National Wildlife Refuge, we are convinced it is not in the long-term conservation, economic or national security interests of the United States to open the coastal plain to leasing at this time. We urge, therefore, that no leasing or land exchanges be permitted by Congress, and that the U.S. Fish and Wildlife Service be directed to protect and manage the entire Arctic National Wildlife Refuge consistent with the conservation purposes for which it was originally established by Congress.

We wish to commend the many dedicated resource professionals in the U.S. Fish and Wildlife Service, U.S. Geological Survey and Bureau of Land Management who gathered information for the assessment report, often at great personal risk and sacrifice. Because of their many contributions, the outstanding resource values of the coastal plain have been reconfirmed and understood better than ever before.

As one of the oldest and largest conservation organizations in the United States, the National Audubon Society has a long history of involvement in the Arctic National Wildlife Refuge. We recognize it as a very special national treasure. Dedicated friends in conservation, including Olaus and Margaret Murie, worked long and hard for its establishment in 1960 to preserve a portion of the eastern Brooks Range of arctic Alaska for its outstanding wilderness values. Thus, unlike many other refuges in the system, the Arctic Refuge was established not out of a singular need to conserve wildlife, but to preserve for all time the spectacular wilderness ecosystem of

northeastern Alaska as a whole. Audubon strongly supported this far-sighted action, and so too enlargement of the refuge in the Alaska National Interest Lands Act of 1980 (ANILCA). Over the years we have worked with other conservationists to protect the refuge from a series of threats from development interests.

Conservationists in Alaska and throughout the nation are becoming increasingly concerned about the ulterior motives of these development interests (including the Reagan Administration) who claim that the oil resources of the Arctic Refuge are critical to fulfilling growing national energy needs, particularly since President Reagan recently vetoed the National Appliance Energy Act of 1986. Passed overwhelmingly by both houses of Congress, this act would have saved the nation millions of barrels of oil and billions of dollars on utility bills by the year 2000, thus making exploitation of the Arctic Refuge totally unnecessary. In addition, the Reagan Administration has opposed establishment of fuel efficiency standards for automobiles and continuance of the 55 mile/hour speed limit.

In this debate over the future of the Arctic Refuge and its coastal plain, it is vitally important to realize that major compromises have already been made on Alaska's North Slope between development and conservation interests. These compromises have resulted in current land jurisdictions that essentially make almost 90 percent of the slope potentially available for oil and gas leasing. This is not to mention the additional 24 million acres of nearshore (state) and offshore (federal OCS) lands available in the adjacent Beaufort Sea. A mere 2 million acres of of the entire North Slope has been committed to conservation purposes in the Arctic Refuge. Now most of that is under siege by development interests. The questions must be asked: Where will the compromising stop? Aren't there any public wilderness lands along the Arctic coast

of Alaska that should be considered sacrosanct?

It is also important to note that this 18 million-acre refuge is the second largest unit in the National Wildlife Refuge System, and the largest and most spectacular arctic wilderness sanctuary for wildlife in the world. Wildlife species of particular national and international concern include the 180-thousand-member Porcupine caribou herd (whose calving ground is on the refuge coastal plain), polar bears, grizzly bears, muskox, Dall sheep, wolves, wolverines, snow geese, peregrine falcons and other migratory birds, and Arctic char and grayling.

When considered in conjunction with the North Yukon National Park that adjoins it on the east, the Arctic Refuge constitutes an international commitment to the protection of nature.

We agree with the Department of the Interior (on page 45 of the draft assessment report) that:

> "The Arctic Refuge is the only conservation system unit the protects, in an undisturbed condition, a complete spectrum of the various arctic ecosystems in North America."

and (on page 46) that:

> "The 1002 area is the most biologically productive part of the Arctic Refuge for wildlife and is the center of wildlife activity on the refuge. Caribou migrating to and from the 1002 area and the post-calving caribou aggregation offer an unparalleled spectacle."

Despite these outstanding natural values, and the fact

that the chance for discovery of an economically recoverable oil field is only 19 percent, the Department of the Interior is recommending that the entire coastal plain be made available for leasing to the oil industry. Meanwhile, officials of the Department are conducting negotiations in secret to trade away refuge lands on the coastal plain to private interests. This subverts the entire assessment report process in my opinion, preempts congressional options, and could lead to privatization of the refuge. Many of the individuals involved in these land trades are the same ones who attempted to trade away wilderness lands on St. Matthew Island to oil interests in 1984. In that case, a federal judge ruled that Interior officials made serious errors in judgement, and that the land trade was not in the public interest. Now they are designing another refuge land trade scheme on an even larger scale. Apparently, little was learned by Interior from their St. Matthew experience.

The Department has left us no reasonable alternative but to oppose its recommendations because of the following serious shortcomings in its resource assessment process for the coastal plain of the Arctic National Wildlife Refuge:

1) Failure to point out that the compromise to establish the Arctic Refuge in 1960 to preserve its unique wildlife, wilderness and recreation values resulted in the remainder of Alaska's vast North Slope and adjacent offshore waters being made available for oil exploration;

2) Failure to release for public review and comment geologic information critical to the 1002 assessment process. This gives those who could profit from exploiting refuge resources advantage over those who actually own those resources--the American people;

3) Failure to reveal its proposed land trades with various

Alaska Native corporations and the State of Alaska, and to demonstrate how such trades will serve the public interest;

4) Failure to justify full leasing when prospects for discovery of even one major economically recoverable oil field on the coastal plain is only 19 percent (pages 49 and 68), and with the market value of leases depressed because of the world oversupply of oil;

5) Failure to conduct a comprehensive economic analysis to show how the benefits to the Alaska and national economies can be optimized from leasing, both in the short and long term;

6) Failure to provide evidence that the Department will ensure that air and water quality will be protected from toxic chemicals and other pollutants such as those creating problems in the Prudhoe Bay oilfield;

7) Failure to explain how adequate water and gravel supplies will be obtained after finding that "...specific locations and sources of water and gravel for exploration and development activities have not been identified; it is understood that these resources, especially water, are not readily available on the 1002 area," (page 75);

8) Failure to explain why it wouldn't be in the national security interests of the United States to purchase more foreign oil at current low prices for addition to our nation's "Strategic Petroleum Reserve" rather than lose income to the federal treasury by further flooding a depressed lease market through opening the Arctic Refuge;

9) Failure to evaluate cumulative impacts on the Arctic Refuge from oil and gas lease sales on more than a million

acres of adjacent state lands (Camden Bay, Demarcation Point and Prudhoe Bay uplands) and 21.2 million acres of OCS leases (Sale 97) in the Beaufort Sea scheduled for July 1987. The latter sale, just off the refuge coast, is the largest oil and gas lease sale ever held in the Arctic Ocean;

10) Failure to thoroughly discuss alternative energy policies that if implemented could make the nation energy secure without exploiting the Arctic Refuge;

11) Failure to assure that scarce refuge staff and funds will not be diverted from refuge conservation programs to monitor and regulate industrial activities on the coastal plain. (Since the coastal plain resource assessment was initiated in 1982, more than 90 percent of the refuge budget has been devoted to the 1002 assessment process, resulting in the almost total neglect of the overall refuge conservation program);

12) Failure to recognize that a North Yukon National Park adjoins the Arctic Refuge and that the United States has responsibilities to cooperate with Canada in protecting shared wildlife resources;

13) Failure to address the need for cooperative management of the Porcupine caribou herd with Canada through the international management agreement that has been negotiated over the past several years;

14) Failure to consult with the appropriate agencies of the Government of Canada as directed in Section 1005 of ANILCA; and

15) Failure to hold public hearings in all Alaskan communities