

Appendix A

Literature Cited

- Alaska Department of Fish and Game, 1995. *The state of Anchorage's wildlife: A discussion paper*. Anchorage: Division of Wildlife Conservation.
- Anchorage Waterfowl Working Group, 1998. *Anchorage goose management annual report, 1998*. Alaska Department of Fish and Game and the U. S. Fish and Wildlife Service.
- Andres, B., 1999. Personal communication. U.S. Fish and Wildlife Service biologist.
- Bonner, J. T., 1980. *The evolution of culture in animals*. Princeton, New Jersey: Princeton University Press.
- Bostick, D., 1997. *A preliminary report on the ecology, behavior, and management of nuisance black bears on military lands within the Municipality of Anchorage*. Base Conservation Office, 3rd Civil Engineer Squadron, Elmendorf Air Force Base, Alaska.
- Dalle-Molle, J. and J.C. Van Horn, 1982. *Bear/people conflict management in Denali National Park, Alaska*. Bear-People Conflict: Proceedings of a Symposium on Management Strategies, Yellowknife, NWT.: 121-127.
- Dasmann, R. F., 1964. Wildlife Biology. New York: John Wiley and Sons.
- Decker D. J. and K. G. Purdy, 1988. *Toward a concept of wildlife acceptance capacity in wildlife management*. Wildlife Society Bulletin 16:53-57.
- Dittrick, R., 1999. Personal communication. U. S. Fish and Wildlife Service biologist.
- Fair, J., 1998. *The status of loons in Anchorage and the lower Matanuska-Susitna valley of Alaska: A summary report of Alaska Loon Watch 1985-1997*. Fairwinds Wildlife Services for Anchorage Audubon Society and Matanuska-Susitna Borough.
- Knight, R. L., and Gutzwiller, K. J., Editors, 1995. Wildlife and Recreationists: Coexistence through Management and Research. Washington, D.C.: Island Press.
- Loker, C. A., D.J. Decker and S.J. Schwager, 1999. *Social acceptability of wildlife management actions in suburban areas: Three cases from New York*. Wildlife Society Bulletin 27(1):152-159.
- Maack, C., 1999. Personal communication. National Audubon Society member and Anchorage birder.
- McArthur, K.L., 1981. *Factors contributing to the effectiveness of black bear transplants*. Journal of Wildlife Management 45:102-110.

- McCarthy, 1994. *Reducing non-sport losses attributable to food conditioning: Human and bear behavior modification in an urban environment*. International Conference on Bear Research and Management 9(1): 75-84.
- Rogers, L., 1986. *Effects of translocation distance on frequency of return by adult black bears*. Wildlife Society Bulletin 14:76-80.
- C. Rossi. Unpublished data. U.S. Department of Agriculture, Wildlife Services.
- Scher, R.L., 1993. Field Guide to Birding in Anchorage, Second Edition, Anchorage, Alaska: Alaska Art Print Company.
- Shelby B. and Heberlein, T.A., 1986. *Carrying Capacity in Recreation Settings*. Corvallis, Oregon: Oregon State University Press.
- Tibbetts, L., 1999. Personal communication. U.S. Geological Survey biologist.
- U. S. Fish and Wildlife Service, 1998. *Canada goose population management in Anchorage, Alaska*. Environmental Assessment prepared in consultation with the Anchorage Waterfowl Working Group.
- Viereck, L.A., C.T. Dyrness, A.R. Batten and K.J. Wenzlick. 1992. *The Alaska vegetation classification*. *Gen. Tech. Rep. PNW-GTR-286*. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.
- Whittaker, D. and R.L. Knight, 1998. *Understanding wildlife responses to humans*. Wildlife Society Bulletin 26(2): 312-317.
- Whittaker, D. and M. J. Manfredo, 1997. *Living with wildlife in Anchorage—A survey of public attitudes*. *Summary Report 35*. Project Report for the Alaska Department of Fish and Game. Ft. Collins: Colorado State University, Human Dimensions of Natural Resources.
- Whittaker, D., M.J. Manfredo, R. Sinnott and S. Miller, In press. *Understanding beliefs and attitudes toward an urban wildlife hunt: Moose hunting near Anchorage, Alaska*. Accepted for publication in Wildlife Society Bulletin with minor revisions in September 1999.

Appendix B

Methods Used to Estimate Numbers of Wildlife in the Anchorage Area

Black bears and brown bears. Accurate and reliable estimates of bear populations are difficult and costly to obtain (Miller *et al.* 1997). Bears are typically wide-ranging, low-density species that are difficult to observe directly in most areas. An accurate technique developed in Alaska uses a standard capture-mark-resight technique. A search area is selected containing representative proportions of different habitats used by bears throughout a year. Bears are captured by darting them from helicopters and fitted with radio collars. A year or more later an aerial survey determines the number and identity of radio-marked bears present in the search area in early summer. At the same time, an independent visual search using fixed-wing aircraft (usually Piper Supercub PA-18) determines the number of marked bears among the total number of bears observed in the search area. The flight pattern is designed to maximize the likelihood of seeing bears – usually flight patterns are large circles in forested and tall shrub habitats, straight lines in open tundra or low shrub habitats, and along elevation contours in steep terrain or narrow drainages. The entire search area is usually searched on a single day to minimize the possibility that unmarked bears would be counted more than once. These flights are replicated on other days.

This technique has not been used in Anchorage due to the difficulty in sighting bears in the heavily forested terrain found in most of the Anchorage lowlands, and the expense (Miller *et al.* 1997). However, the technique has been used for black bears in the middle portion of the Susitna River drainage and on the Kenai Peninsula, and for brown bears in several locations in southcentral Alaska (Miller *et al.* 1997). The estimate of brown and black bear numbers in the Anchorage area is based on a subjective extrapolation from density estimates in similar habitats in southcentral Alaska (Miller 1993, Miller *et al.* 1997). Because the Anchorage estimates are based on extrapolations of short-term studies in other areas, it is impossible to determine annual population fluctuations, except in a subjective sense based partly on public calls about nuisance bears and other bear sightings.

Moose. Moose populations are estimated using a census technique developed in Alaska (Gasaway *et al.* 1986), accompanied by trend counts. In the Anchorage area, only Fort Richardson (including the upper Ship Creek drainage) and Elmendorf Air Force Base are censused. Using a modified Gasaway technique, the two military reservations were divided into 14 survey areas using natural terrain features. As soon as possible after the ground is covered with fresh snow, these survey areas are flown by pilot and observer teams using fixed-wing aircraft (usually Piper Supercub PA-18). The flight pattern is designed to maximize the likelihood of seeing moose--usually flight patterns are straight lines in forested habitats and along elevation contours in steep terrain or narrow drainages. All moose seen are circled to identify sex and antler size and search for other moose, especially calves. Moose are differentiated by adult/calf, bull/cow, and small/medium/large bulls based on body size and antler presence and size. Each survey area is searched on a single day to minimize the possibility that moose would be counted more than once. Immediately after a survey area is censused, a small, predetermined portion of the area is resurveyed much more intensively by flying tight, overlapping circles with the goal of seeing every moose. This allows a statistical estimate of the percentage of moose missed in each of the 14 survey areas, which is

used to calculate moose population size and confidence limits. Usually both military reservations can be censused in two to three days.

Trend counts are conducted in predetermined drainages. Survey areas are selected each year based on funding level and management interest. Areas with a higher density of moose and more hunting pressure have the highest priority. In Anchorage these survey areas include the drainages of Peters Creek, Knik/Hunter Creek, upper Campbell Creek/Anchorage Hillside, and the Twentymile/Portage/Placer rivers. Other areas are surveyed as time and money allow. In Anchorage these survey areas include Eagle River, Bird Creek, Glacier Creek, and Kincaid Park. Trend counts use the same methods as the Gasaway technique; however, small areas are not resurveyed to determine a sightability correction factor. Instead, the average sightability correction factor for the Fort Richardson/Elmendorf census is used to calculate an estimate for all of the trend count survey areas.

An estimate for the entire Anchorage area is calculated by totaling estimates from the Fort Richardson/Elmendorf census, all trend counts, and subjective extrapolations from survey areas not counted (based on comparing population trends in other survey areas with the most recent counts in unsurveyed areas). It is possible to determine trends in annual fluctuations in the Anchorage moose population. The surveys cost approximately \$5,000 each for flight time.

Dall sheep and mountain goats. Dall sheep and mountain goat populations are estimated by aerial counts. Dall sheep are relatively easy to see because they are white against the neutral or dark background of alpine slopes (Nichols 1970) and experienced observers can count over 90% of adults and nearly 90% of lambs (Lawson and Johnson 1982). Goats are more scattered than sheep and tend to inhabit more broken terrain. They also spend the warmer midday on snowfields or in shrub habitat and tend to hide from planes by flattening against cliff faces or under overhangs. Therefore, they are more difficult to see than sheep.

Dall sheep surveys are flown every summer in the Anchorage area, if the weather permits. After most of the snow has melted in the Chugach Mountains (late June-early August), a survey is flown by a pilot and observer team using a Piper Supercub PA-18. The flight pattern follows elevation contours above treeline. All sheep are circled to accurately count individuals in groups (especially lambs among groups of ewes) and identify horn length. Sheep are classified into adult rams (categories include $\frac{1}{2}$ to $\frac{3}{4}$ -curl horns, $\frac{3}{4}$ to full-curl, and full-curl or greater), "ewe-like" sheep (includes all ewes and yearling rams and some 2-year-old rams with less than $\frac{1}{2}$ -curl horns), and lambs. The survey takes about three days and costs about \$3,000 for flight time. Because almost all the sheep are presumably seen, the total count usually serves as the population estimate.

Mountain goats are counted annually during sheep surveys. However, most of the goat population inhabits Lake George, Twentymile River and Glacier Creek drainages and these are not included in sheep surveys (because they have little or no sheep habitat). A mountain goat survey is flown in these drainages every two to four years to monitor population trends. This survey is flown in August because goats tend to be found at higher elevations than sheep, where the snowpack lasts longer. The survey is also flown late in the evening when goats tend to be more active and visible. A pilot and observer in a Piper Supercub PA-18 follow elevation contours above treeline. Goats are classified into adults and kids. The survey takes about two days and costs less than \$2,000. The total count in recent surveys has been 500-600; however, a higher population estimate is obtained by adding a correction factor of 25-50% to

account for missed goats and unsurveyed drainages. Population trends can be determined for both sheep and goats.

Wolves and wolverines. Wolves and wolverines can be counted from the air during winter using a method developed in Alaska (Becker 1991, Becker *et al.* 1998). Wolves and wolverines are not trapped or hunted in Chugach State Park or the Anchorage Bowl; therefore, monitoring population levels is not a high priority. One aerial survey using this technique was conducted in the Anchorage area in 1995 (Sinnott 1996). The survey area included all potential wolf and wolverine habitat in the Municipality.

The survey was conducted by two teams of a pilot and observer using a Piper Supercub PA-18. Potential wolf and wolverine habitat was partitioned into 3x3-mile square sample units. Sample units were grouped into strata depending on the presumed likelihood (high or low) of observing a fresh wolf or wolverine trail after a snowfall. Stratified random sampling selected a greater proportion of units with high likelihood than low. The aerial census was conducted on 23-25 February, beginning about 24 hours after a snowfall. Most of the sample units were censused in the first two days. When fresh tracks were found in a sample unit they were backtracked to the point where they were no longer considered fresh, and then followed forward to the animal(s). By using stratified random sampling and noting the number of animal groups, the number in each group, and all the sample units that the fresh tracks intersected, this method allows an accurate population estimate with confidence intervals. The survey cost approximately \$4,000 for flight time. Since 1995, the wolf population estimate has been adjusted slightly based on trapper sealing records, trapper reports, and other incidental observations.

Beavers. An aerial survey was conducted in the Anchorage area by a pilot and observer team using a Piper Supercub PA-18 in October 1995 (Sinnott 1997). The survey attempted to locate all beaver colonies in the Anchorage Bowl and on Fort Richardson and Elmendorf Air Force Base. Streams, ponds, and lakes were searched for dams, food caches, lodges, and freshly cut trees. Lower Ship Creek (below Post Road) and lower Campbell Creek (below Campbell Airstrip) and lakes and ponds in west Anchorage were searched on foot in late October and early November because the low-level, looping survey technique conflicted with air safety near the major airports. Beaver colonies were counted if dams and lodges included fresh material and fresh cuttings were observed, and an average of 5 beavers were assumed to live in each colony. The aerial survey cost approximately \$700. Since 1995 several other colonies have been found in the Anchorage Bowl.

Feral rabbits. No one has attempted to count feral rabbits in the Anchorage Bowl. The population estimate is based on observations of one to several dozen rabbits at numerous sites on the Anchorage Hillside--but also at the Clitheroe Center in west Anchorage and several sites in midtown—and homeowner complaints to the Department of Fish and Game.

Bald eagles. Eagle nests are monitored annually. Active nests are usually reported to the Department of Fish and Game by Anchorage residents. The rough population estimate includes two adults for each active nest plus eaglets and older juveniles.

Mallards, pigeons, and ravens. Every winter, usually in late December, the Anchorage Audubon Society attempts to count as many birds as possible in a day and within a 7.5-mile radius of downtown Anchorage and Eagle River. These “Christmas bird counts” have been conducted by volunteers for several decades and are reported in *American Birds* magazine and on the Internet (<http://birdsource.cornell.edu/cbc>). Although many birds are presumably not counted, mallards, pigeons,

and ravens are large and relatively easy birds to see in urban areas in winter. The population estimates for these species assume that half to one fourth of the birds are counted. Population trends can be determined from these counts.

=====

Literature Cited

- Becker, E. F. 1991. A terrestrial furbearer estimator based on probability sampling. *Journal of Wildlife Management* 55:730-737.
- , M. A. Spindler, and T. O. Osborne. 1998. A population estimator based on network sampling of tracks in the snow. *Journal of Wildlife Management* 62:968-977.
- Gasaway, W. C., S. D. Dubois, D. J. Reed, and S. J. Harbo. 1986. Estimating moose population parameters from aerial surveys. *Biological Papers Univ. Alaska* No. 22. 108 pp.
- Lawson, B., and R. Johnson. 1982. Mountain sheep, *Ovis canadensis* and *O. dalli*. Pages 1036-1055 in J. A. Chapman and G. A. Feldhamer. *Wild mammals of North America: biology, management, and economics*. The Johns Hopkins Univ. Press, Baltimore.
- Miller, S. D. 1993. Statewide brown bear population estimates. Memorandum dated June 9. Div. Wildlife Conservation, Alaska Department of Fish and Game, Anchorage. 4 pp.
- , G. C. White, R. A. Sellers, H. V. Reynolds, J. W. Schoen, K. Titus, V. G. Barnes, Jr., R. B. Smith, R. R. Nelson, W. B. Ballard, and C. C. Schwartz. 1997. Brown and black bear density estimation in Alaska using radiotelemetry and replicated mark-resight techniques. *Wildlife Monographs* 133:1-55.
- Sinnott, R. 1996. Wolf and wolverine surveys on Fort Richardson and surrounding areas: final report. Unpubl. report. Div. Wildlife Conservation, Alaska Department of Fish and Game, Anchorage. 8 pp.
- , 1997. Beaver surveys on Fort Richardson and surrounding areas: final report. Unpubl. report. Div. Wildlife Conservation, Alaska Department of Fish and Game, Anchorage. 6 pp.
- Timmermann, H. R. 1993. Use of aerial surveys for estimating and monitoring moose populations – a review. *Alces* 29:35-46.
- Wigal, R. A., and V. L. Coggins. 1982. Mountain goat, *Oreamnos americanus*. Pages 1008-1020 in J. A. Chapman and G. A. Feldhamer. *Wild mammals of North America: biology, management, and economics*. The Johns Hopkins Univ. Press, Baltimore.

Appendix C

Fish and Wildlife (Vertebrates) of Anchorage, Alaska

Mammals

This list includes 48 indigenous species and four feral introduced species known or suspected to occur in Anchorage, Alaska. Footnotes identify introduced and suspected species. All others are either well-known residents or are represented by specimens at the University of Alaska Museum in Fairbanks or published reports in scientific journals.

<u>Common Name</u>	<u>Scientific Name</u>
INSECTIVORES	
Shrew family	Soricidae
Common (or masked) shrew	<i>Sorex cinereus</i>
Pygmy shrew ¹	<i>Sorex hoyi</i>
Tiny shrew ¹	<i>Sorex minutissimus</i>
Dusky shrew	<i>Sorex monticolus</i>
Water shrew	<i>Sorex palustris</i>
Tundra shrew	<i>Sorex tundrensis</i>
BATS	
Vesper bats	Vespertilionidae
Little brown bat	<i>Myotis lucifugus</i>
PRIMATES	
Hominids	Hominidae
Human	<i>Homo sapiens</i>
CARNIVORES	
Dog family	Canidae
Coyote	<i>Canis latrans</i>
Wolf	<i>Canis lupus</i>
Red fox	<i>Vulpes vulpes</i>
Dog ²	<i>Canis familiaris</i>
Cat family	Felidae
Lynx	<i>Lynx canadensis</i>
Cat ²	<i>Felis domesticus</i>
Weasel family	Mustelidae
River otter	<i>Lutra canadensis</i>
Wolverine	<i>Gulo gulo</i>
Marten	<i>Martes americana</i>
Ermine (short-tailed weasel)	<i>Mustela erminea</i>
Least weasel	<i>Mustela nivalis</i>
Mink	<i>Mustela vison</i>

Bear family	Ursidae
Black bear	<i>Ursus americanus</i>
Brown bear (grizzly)	<i>Ursus arctos</i>
PINNIPEDS	
Steller's sea lion	<i>Eumetopias jubatus</i>
Harbor seal	<i>Phoca vitulina</i>
WHALES	
Orca (killer whale)	<i>Orcinus orca</i>
Beluga (white whale)	<i>Delphinapterus leucas</i>
Gray whale	<i>Eschrichtius robustus</i>
Minke whale	<i>Balaenoptera acutorostrata</i>
HOOFED MAMMALS	
Deer family	Cervidae
Moose	<i>Alces alces</i>
Caribou	<i>Rangifer tarandus</i>
Sitka black-tailed deer ¹	<i>Odocoileus hemionus sitkensis</i>
Goat/antelope subfamily	Caprinae
Mountain goat	<i>Oreamnos americanus</i>
Dall sheep	<i>Ovis dalli</i>
RODENTS	
Squirrel family	Sciuridae
Hoary marmot	<i>Marmota caligata</i>
Arctic ground squirrel	<i>Spermophilus parryii</i>
Red squirrel	<i>Tamiasciurus hudsonicus</i>
Northern flying squirrel	<i>Glaucomys sabrinus</i>
Beaver family	Castoridae
Beaver	<i>Castor canadensis</i>
Jumping mouse family	Dipodidae
Meadow jumping mouse	<i>Zapus hudsonius</i>
Mouse family	Muridae
Northern red-backed vole	<i>Clethrionomys rutilus</i>
Singing vole or tundra vole	<i>Microtus oeconomus</i>
Long-tailed vole ¹	<i>Microtus longicaudus</i>
Meadow vole	<i>Microtus pennsylvanicus</i>
Alaska vole	<i>Microtus miurus</i>
Brown lemming ^{1,3}	<i>Lemmus trimucronatus</i>
Muskrat	<i>Ondatra zibethicus</i>
Northern bog lemming ¹	<i>Synaptomys borealis</i>
House mouse ²	<i>Mus musculus</i>

New World porcupine family Porcupine	Erethizontidae <i>Erethizon dorsatum</i>
LAGOMORPHS	
Pika family Collared pika	Ochotonidae <i>Ochotona collaris</i>
Rabbit and hare family European rabbit ² Snowshoe hare	Leporidae <i>Oryctolagus cuniculus</i> <i>Lepus americanus</i>

¹ Probable, but not substantiated.

² Introduced species.

³ See Chernyavsky, F. B., Abramson, N. I., Tsvetkova, A. A., Anbinder, E. M. and Kuryshva, L. P., 1993, Zoologicheskii Zhurnal 72:111-121.

Fish

This list includes species confirmed on both Fort Richardson and Elmendorf Air Force Base.

<u>Common Name</u>	<u>Scientific Name</u>
pink salmon ("humpy")	<i>Oncorhynchus gorbuscha</i>
chum salmon ("dog")	<i>Oncorhynchus keta</i>
coho salmon ("silver")	<i>Oncorhynchus kisutch</i>
sockeye salmon ("red")	<i>Oncorhynchus nerka</i>
chinook salmon ("king")	<i>Oncorhynchus tshawytscha</i>
Dolly Varden	<i>Salvelinus malma</i>
arctic char	<i>Salvelinus alpinus</i>
rainbow trout (stocked)	<i>Onchorynchus mykiss</i>
three-spine stickleback	<i>Gasterosteus aculeatus</i>
nine-spine stickleback [^]	<i>Pungitius pungitius</i>
slimy sculpin [^]	<i>Cottus cognatus</i>
arctic grayling	<i>Thymallus arcticus</i>

[^] Confirmed on Elmendorf AFB only.

Sources: Gossweiler, W.A. 1984. Fort Richardson Natural Resources Plan. Table 4 and Rothe, et al., 1983. Natural Resource Inventory of Elmendorf Air Force Base, Alaska.

Amphibians and Reptiles

<u>Common Name</u>	<u>Scientific Name</u>
wood frog	<i>Rana sylvatica</i>

No reptiles occur in Anchorage.

Birds

The following list includes common, uncommon, rare, and casually-seen species that occur within the boundaries of the Municipality of Anchorage. Many other species may occur here, but so rarely that they are referred to as “accidental”, and are not included in this list. For an indication of how common or rare, etc. the different species are, see *Birds of Anchorage, Alaska checklist* (Anchorage Audubon Society, 1993) and *Anchorage Area Military Reservations checklist* (Department of Defense Partners in Flight, Elmendorf AFB and Fort Richardson). Species are grouped in taxonomic order.

<u>Common Name</u>	<u>Scientific Name</u>
LOONS AND GREBES	
common loon	<i>Gavia immer</i>
Pacific loon	<i>Gavia pacifica</i>
red-throated loon	<i>Gavia stellata</i>
red-necked grebe	<i>Podiceps grisegena</i>
horned grebe	<i>Podiceps auritus</i>
SHEARWATERS AND PETRELS	
fork-tailed storm-petrel	<i>Oceanodroma furcata</i>
CORMORANTS	
double-crested cormorant	<i>Phalacrocorax auritus</i>
HERONS	
great blue heron	<i>Ardea herodias</i>

CRANES

sandhill crane *Grus canadensis*

WATERFOWL

tundra swan *Cygnus columbianus*
trumpeter swan *Cygnus buccinator*
greater white-fronted goose *Anser albifrons*
snow goose *Chen caerulescens*
brant *Branta bernicla*
Canada goose *Branta canadensis*
mallard *Anas platyrhynchos*
gadwall *Anas strepera*
green-winged teal *Anas crecca*
American wigeon *Anas americana*
Eurasian wigeon *Anas penelope*
northern pintail *Anas acuta*
northern shoveler *Anas clypeata*
blue-winged teal *Anas discors*
cinnamon teal *Anas cyanoptera*
canvasback *Aythya valisineria*
redhead *Aythya americana*
ring-necked duck *Aythya collaris*
greater scaup *Aythya marila*
lesser scaup *Aythya affinis*
common eider *Somateria mollissima*
Steller's eider *Polysticta stelleri*
black scoter *Melanitta nigra*
white-winged scoter *Melanitta fusca*
surf scoter *Melanitta perspicillata*
harlequin duck *Histrionicus histrionicus*
oldsquaw *Clangula hyemalis*
Barrow's goldeneye *Bucephala islandica*
common goldeneye *Bucephala clangula*
bufflehead *Bucephala albeola*

MERGANSERS

common merganser *Mergus merganser*
red-breasted merganser *Mergus serrator*
hooded merganser *Lophodytes cucullatus*

RAILS

Fulica americana American coot

SHOREBIRDS

semipalmated plover *Charadrius semipalmatus*
blackbellied plover *Pluvialis squatarola*
lesser golden plover *Pluvialis dominica*

marbled godwit *Limosa fedoa*
bar-tailed godwit *Limosa lapponica*
Hudsonian godwit *Limosa haemastica*
whimbrel *Numenius phaeopus*
greater yellowlegs *Tringa melanoleuca*
lesser yellowlegs *Tringa flavipes*
solitary sandpiper *Tringa solitaria*
spotted sandpiper *Actitis macularia*
wandering tattler *Heteroscelus incanus*

Wilson's phalarope *Phalaropus tricolor*
red-necked phalarope *Phalaropus lobatus*
red phalarope *Phalaropus fulicaria*

short-billed dowitcher *Limnodromus griseus*
long-billed dowitcher *Limnodromus scolopaceus*
common snipe *Gallinago gallinago*
ruddy turnstone *Arenaria interpres*
black turnstone *Arenaria melanocephala*
surfbird *Aphriza virgata*
rock sandpiper *Calidris ptilocnemis*
dunlin *Calidris alpina*
sanderling *Calidris alba*
semipalmated sandpiper *Calidris pusilla*
western sandpiper *Calidris mauri*
least sandpiper *Calidris minutilla*
Baird's sandpiper *Calidris bairdii*
pectoral sandpiper *Calidris melanotos*

JAEGERS, GULLS, AND TERNS

parasitic jaeger	<i>Stercorarius parasiticus</i>
long-tailed jaeger	<i>Stercorarius longicaudus</i>
Bonaparte's gull	<i>Larus philadelphia</i>
common black-headed gull	<i>Larus ridibundus</i>
ring-billed gull	<i>Larus delawarensis</i>
mew gull	<i>Larus canus</i>
herring gull	<i>Larus argentatus</i>
California gull	<i>Larus californicus</i>
glaucous gull	<i>Larus hyperboreus</i>
Thayer's gull	<i>Larus thayeri</i>
slaty-backed gull	<i>Larus schistisagus</i>
glaucous-winged gull	<i>Larus glaucescens</i>
black-legged kittiwake	<i>Rissa tridactyla</i>
arctic tern	<i>Sterna paradisaea</i>
Aleutian tern	<i>Sterna aleutica</i>
Caspian tern	<i>Sterna caspia</i>

AUKS AND PUFFINS

common murre	<i>Uria aalge</i>
--------------	-------------------

VULTURES, HAWKS AND FALCONS

golden eagle	<i>Aquila chrysaetus</i>
bald eagle	<i>Haliaeetus leucocephalus</i>
northern harrier	<i>Circus cyaneus</i>
sharp-shinned hawk	<i>Accipiter striatus</i>
northern goshawk	<i>Accipiter gentilis</i>
red-tailed hawk (Harlan's hawk)	<i>Buteo jamaicensis</i>
rough-legged hawk	<i>Buteo lagopus</i>
osprey	<i>Pandion haliaetus</i>

American kestrel	<i>Falco sparverius</i>
merlin	<i>Falco columbarius</i>
peregrine falcon	<i>Falco peregrinus</i>
gyrfalcon	<i>Falco rusticolus</i>

GALLINACEOUS BIRDS

spruce grouse	<i>Dendragopus canadensis</i>
white-tailed ptarmigan	<i>Lagopus leucurus</i>
rock ptarmigan	<i>Lagopus mutus</i>
willow ptarmigan	<i>Lagopus lagopus</i>

PIGEONS AND DOVES

rock dove (pigeon)	<i>Columba livia</i>
--------------------	----------------------

(This bird is a non-native, introduced species.)

OWLS

short-eared owl	<i>Asio flammeus</i>
great horned owl	<i>Bubo virginianus</i>
great gray owl	<i>Strix nebulosa</i>
snowy owl	<i>Nyctea scandiaca</i>
northern saw-whet owl	<i>Aegolius acadicus</i>
northern hawk owl	<i>Surnia ulula</i>
boreal owl	<i>Aegolius funereus</i>

HUMMINGBIRDS

rufous hummingbird	<i>Selasphorus rufus</i>
--------------------	--------------------------

KINGFISHERS

belted kingfisher	<i>Ceryle alcyon</i>
-------------------	----------------------

WOODPECKERS

northern flicker	<i>Colaptes auratus</i>
downy woodpecker	<i>Picoides pubescens</i>
hairy woodpecker	<i>Picoides villosus</i>
northern three-toed woodpecker	<i>Picoides tridactylus</i>
black-backed woodpecker	<i>Picoides arcticus</i>

PERCHING BIRDS

olive-sided flycatcher	<i>Contopus borealis</i>
western wood-pewee	<i>Contopus sordidulus</i>
Say's phoebe	<i>Sayornis saya</i>
alder flycatcher	<i>Empidonax alhorum</i>
horned lark	<i>Eremophila alpestris</i>
tree swallow	<i>Tachycineta bicolor</i>
violet-green swallow	<i>Tachycineta thalassina</i>
bank swallow	<i>Riparia riparia</i>
rough-winged swallow	<i>Stelgidopteryx serripennis</i>
cliff swallow	<i>Hirundo pyrrhonota</i>
barn swallow	<i>Hirundo rustica</i>
Steller's jay	<i>Cyanocitta stelleri</i>
gray jay	<i>Perisoreus canadensis</i>
black-billed magpie	<i>Pica pica</i>
northwestern crow	<i>Corvus caurinus</i>
common raven	<i>Corvus corax</i>
black-capped chickadee	<i>Parus atricapillus</i>
chestnut-backed chickadee	<i>Parus rufescens</i>
boreal chickadee	<i>Parus hudsonicus</i>
brown creeper	<i>Certhia americana</i>
red-breasted nuthatch	<i>Sitta canadensis</i>
winter wren	<i>Troglodytes troglodytes</i>
arctic warbler	<i>Phylloscopus borealis</i>
golden-crowned kinglet	<i>Regulus satrapa</i>
ruby-crowned kinglet	<i>Regulus calendula</i>

Townsend's solitaire	<i>Myadestes townsendi</i>
Swainson's thrush	<i>Catharus ustulatus</i>
gray-cheeked thrush	<i>Catharus minima</i>
hermit thrush	<i>Catharus guttata</i>
varied thrush	<i>Ixoreus naevius</i>
American robin	<i>Turdus migratorius</i>
northern wheatear	<i>Oenanthe oenanthe</i>
northern shrike	<i>Lanius excubitor</i>
American pipit	<i>Anthus rubescens</i>
American dipper	<i>Cinclus mexicanus</i>
bohemian waxwing	<i>Bombycilla garrulus</i>
European starling	<i>Sturnus vulgaris</i>
warbling vireo	<i>Vireo gilvus</i>
orange-crowned warbler	<i>Vermivora celata</i>
yellow-rumped warbler	<i>Dendroica coronata</i>
Townsend's warbler	<i>Dendroica townsendi</i>
blackpoll warbler	<i>Dendroica striata</i>
yellow warbler	<i>Dendroica petechia</i>
Wilson's warbler	<i>Wilsonia pusilla</i>
northern waterthrush	<i>Seiurus noveboracensis</i>
savannah sparrow	<i>Passerculus sandwichensis</i>
song sparrow	<i>Melospiza melodia</i>
American tree sparrow	<i>Spizella arborea</i>
dark-eyed junco	<i>Junco hyemalis</i>
white-crowned sparrow	<i>Zonotrichia leucophrys</i>
golden-crowned sparrow	<i>Zonotrichia atricapilla</i>
fox sparrow	<i>Passerella iliaca</i>
Lincoln's sparrow	<i>Melospiza lincolnii</i>
Lapland longspur	<i>Calcarius lapponicus</i>
snow bunting	<i>Plectrophenax nivalis</i>
red-winged blackbird	<i>Agelaius phoeniceus</i>
rusty blackbird	<i>Euphagus carolinus</i>
brown-headed cowbird	<i>Molothrus ater</i>
pine siskin	<i>Carduelis pinus</i>
red crossbill	<i>Loxia curvirostra</i>

white-winged crossbill	<i>Loxia leucoptera</i>
pine grosbeak	<i>Pinicola enucleator</i>
common redpoll	<i>Carduelis flammea</i>
hoary redpoll	<i>Carduelis hornemanni</i>
brambling	<i>Fringilla montifringilla</i>

Sources:

CH2M Hill, 1994. *Comprehensive Evaluation Report, Eagle River Flats, Fort Richardson, Alaska*. Table 2-5.

Cook, J.A. and C.T. Seaton. 1996. *Checklist to the mammals of Fort Richardson, Alaska*.

Elmendorf Air Force Base. 1994. *Natural resources management plan*. Appendix E.

Gossweiler, W.A. 1998. *Integrated natural resources management plan 1998-2003: U.S.Army Alaska Vol. 2 – Fort Richardson*. Appendix 8-2

-----, 1984. *Fort Richardson natural resources plan*. Table 4.

Sinnott, R. 1999. Alaska Department of Fish and Game wildlife biologist.

Appendix D

FWS70181-9-K235

MEMORANDUM OF UNDERSTANDING

REGARDING

A COMPREHENSIVE WILDLIFE MANAGEMENT PLAN,

Living with Wildlife in Anchorage: A Cooperative Planning Effort

FOR

ANCHORAGE, ALASKA

among the

Alaska Department of Fish and Game
Alaska Department of Natural Resources
Division of Parks and Outdoor Recreation
U.S. Fish and Wildlife Service Region 7
Bureau of Land Management
USDA Forest Service
U.S. Army, Fort Richardson
3rd Wing, Elmendorf Air Force Base
and the Municipality of Anchorage

I. BACKGROUND:

The Municipality of Anchorage is a unique urban and suburban environment containing a diversity of wildlife species. Extensive natural areas in and around the city provide habitat for moose, black bears, brown bears, Dall sheep, wolves, coyotes, lynx, beaver, bald eagles and other raptors, loons, swans and other waterfowl and shorebirds, as well as numerous species of migratory songbirds. Marine mammal species, including beluga whales, are also present in the nearby waters of Cook Inlet. The Anchorage area also offers unique recreational fishing opportunities in an urban environment. Wild and hatchery stocked salmon runs support popular fisheries and viewing opportunities on several area streams.

These distinctive wildlife and fish populations offer outstanding recreational opportunities to Anchorage residents and visitors and contribute to a quality of life in Anchorage that is unparalleled in other large urban areas. Many of these species are also valued as symbols of wild Alaska and almost all Anchorage residents have some appreciation for the wildlife that exist in the area. Wildlife and fish resources are truly an integral part of the Anchorage community.

Human-Wildlife Conflicts

Unfortunately, the abundant wildlife and large human population lead to numerous human-wildlife conflicts as well. Conflicts include human safety issues (e.g. aggressive encounters with moose and bears, and wildlife-related aircraft and vehicle crashes) and wildlife nuisance complaints (e.g., pets injured or killed by wolves, bears, coyotes, and moose; trees felled by beavers; moose eating ornamentals; and Canada geese on ballfields and lawns).

One challenge of planning for wildlife in the Anchorage area is determining how to minimize the conflicts that are occurring with wildlife while enhancing the opportunities for positive interactions with wildlife. Lethal control of individual problem animals is not acceptable to most Anchorage residents except when human life is threatened.

Maintaining or increasing populations of moose, geese, and bears will likely maintain or increase wildlife nuisance and hazards, while efforts to decrease populations could decrease wildlife viewing and hunting opportunities. To the greatest extent possible, creative solutions for resolving human-wildlife conflicts must be developed for Anchorage's urban environment.

In addition, there is a need to clarify and agree on roles and responsibilities among local agencies and the public in reducing wildlife conflicts, and dealing with those that do occur.

Enhancing the Benefits of Wildlife

Considering the abundant wildlife resource in Anchorage, relatively little has been done to enhance opportunities to enjoy and learn about wildlife. Opportunities to use wildlife through hunting and trapping have been drastically reduced in the Anchorage Bowl due to increased human population and residential developments. At the same time, services, programs and facilities to provide wildlife viewing opportunities and educate the public about wildlife have not been widely developed.

Such programs could help decrease human-wildlife conflicts, increase community stewardship of wildlife and wildlife habitats, and provide substantial economic benefits to the community. Increasing wildlife-related education and recreation opportunities in and near Anchorage could help retain tourists in the city for additional days as well as encourage residents to spend more leisure time within the city. Both would increase money spent for local goods and services.

The key to capitalizing on the economic potential of local fish and wildlife resources is maintaining local habitat for wildlife distributed throughout the Anchorage Bowl. Additional benefits could be realized by increasing natural history interpretation and local tours along Anchorage's extensive trail system. An example of specific programs that could enhance the benefits of wildlife is the proposed Potter Marsh Nature Center. Potter Marsh boardwalk is one of the sites most visited by Alaska's tourists and attracts 30,000-40,000 visitors annually, mostly to view and learn about birds and spawning salmon.

II. PURPOSE

The purpose of this MOU is to:

1. Recognize the cooperative planning effort among local government, state and federal agencies, the public and the business community which has resulted in a comprehensive plan for managing wildlife in the Municipality of Anchorage;
2. Accept the overall purpose of the comprehensive wildlife plan, to:
 - Minimize conflicts between humans and wildlife;
 - Maintain and enhance the benefits of wildlife in Anchorage;
3. Affirm the intention of the signatories to implement actions recommended in the comprehensive wildlife plan to the greatest extent possible.

Such a cooperative planning effort has many benefits, including enhanced recreational, educational, conservation, and economic opportunities. This agreement will enhance continuing efforts of public

agencies and private organizations to conserve wildlife and fish resources in Anchorage while seeking to reduce human-wildlife conflicts.

III. Authority

This MOU is made and entered into by and among the Alaska Department of Fish and Game (ADF&G); Alaska Department of Natural Resources (DNR), Division of Parks and Outdoor Recreation (PARKS); U.S. Fish and Wildlife Service Region 7 (FWS); Bureau of Land Management (BLM); USDA Forest Service, Chugach National Forest (USFS), U.S. Army, Fort Richardson (Army), 3rd Wing, Elmendorf Air Force Base (Air Force); and the Municipality of Anchorage (MOA) under provisions of:

1. ADF&G: A.S. 16.05.050(13)
2. Parks: A.S. 41.21.010-.020 and A.S. 38.05.295
3. Army and Air Force: Sikes Act, as amended 1998, 16 U.S.C. ## 670a-670f (1988).
4. BLM: Federal Land Policy and Management Act of 1976, 43 U.S.C. # 1701-1782 (1988); an Act approved October 24, 1984, Pub. L. No. 98-540, 98 Stat. 2718; MOU between ADF&G and U.S. Department of Interior, Bureau of Land Management, for cooperative management of fish and wildlife resources, 8/22/83; 16 U.S.C. 679 et. seq., and BLM/ADF&G Sikes Act Agreement, 5/25/76.
5. FWS: Fish and Wildlife Act of 1956, 16 U.S.C. # 460k-2 (1988); Fish and Wildlife conservation Act of 1980, 16 U.S. C. ## 2901 et seq (1988); and Fish and Wildlife Coordination Act, 16 U.S.C. # 661 (1988);
6. MOA: A.M.C. Title 7.

IV. Introduction

The parties to this agreement have responsibilities or interests in conserving wildlife and their habitats and in addressing wildlife-human conflicts within the geographic area defined by the boundaries of the Municipality of Anchorage. The parties agree that increased efforts should be made to improve coordination of wildlife conservation and management. The parties further recognize and agree that a cooperative approach should be followed whenever practical.

The ADF&G represents the wildlife agency with the lead responsibility for conserving and managing wildlife and providing for public use statewide. In this role, ADF&G will initiate and assist development of this partnership to enhance the conservation and management of wildlife and fish resources within the Municipality of Anchorage.

The participating municipal, state, and federal agencies have a variety of responsibilities in managing their diverse lands and programs. Among some of these are the responsibilities to provide wildlife-

associated recreation opportunities, and to ensure and manage the abundance and diversity of wildlife and their habitats. Even though these agencies have different mandates and policies, many opportunities exist to enhance wildlife conservation and management, and the social and environmental benefits related to wildlife resources.

Local advisory groups, community councils, visitor and tourism based businesses and other private organizations and individuals have an interest in the conservation of wildlife resources, and strategies for addressing conflicts between humans and wildlife within Anchorage. These entities therefore have participated with cooperating municipal, state and federal agencies and other public organizations by assisting in the development and implementation of the Comprehensive Wildlife Management Plan to address wildlife issues within Anchorage.

In summary, it is the mutual belief of the signatories that implementation of this MOU will help to achieve the following goal and related objectives:

Goal: Conserve and enhance a wide diversity of fish, wildlife and their habitats throughout the Municipality of Anchorage that live in harmony with the community.

Objective 1—Identify and conserve biologically and socially optimal population levels of native wildlife and their habitats in the Municipality of Anchorage (MOA).

Objective 2—Identify and conserve wild and natural fish populations and their habitats in the MOA.

Objective 3—Maximize positive interactions with fish and wildlife and minimize conflicts between people and their pets and fish and wildlife in the MOA.

Objective 4—Promote the economic, social and other benefits related to fish, wildlife and their habitats in the MOA.

Objective 5—Foster a sense of stewardship for fish, wildlife and their habitats among the public, organizations and agencies within the MOA.

Objective 6—Integrate fish, wildlife, habitat and corridor issues into land use planning and decision-making within the MOA.

V. IT IS MUTUALLY AGREED AND UNDERSTOOD BY AND BETWEEN THE SAID PARTIES THAT:

1. Each public agency will adopt by this Memorandum of Understanding the goals, objectives, strategies, and actions identified in the Comprehensive Wildlife Management Plan subject to applicable laws, regulations, policies, and land use and activity plans for the affected area, and subject to approval by an authorized official of the agency administering the area involved;
2. Participating agencies will assume joint responsibility for implementing the Comprehensive Wildlife Management Plan, with each agency taking lead responsibility on lands they manage or control;
3. Any party may provide leadership for implementation and monitoring of the Plan developed pursuant to this agreement and supplemental to this agreement.
4. Nothing in this agreement will be construed as obligating the participating parties to expend, or involve the United States, the State of Alaska, the Municipality of Anchorage, or any other party in any obligation for future payment of money, except for appropriations authorized by law and administratively allocated for these purposes.
5. The federal government's liability will be governed by the provisions of the Federal Tort Claims Act (28 U.S.C. 2671-80).
6. This agreement may be revised as necessary, by mutual consent of all parties, and by issuance of a written amendment signed and dated by all parties.
7. Any party may terminate participation under this agreement by providing 30 days written notice to all other parties. Unless terminated by written notice of all parties, this agreement will remain in force indefinitely, subject to a 5-year review.
8. Each party agrees that it will be responsible for its own acts and the results thereof and each party shall not be responsible for the acts of the other party; and each party agrees it will assume to itself risk and liability resulting in any manner under this agreement.
9. Each party will comply with all applicable laws, regulations, and executive orders.
10. Nothing herein is intended to conflict with federal, state, or local laws or regulations. If there are conflicts, this agreement will be amended at the first opportunity to bring it into conformance with conflicting laws or regulations.

Appendix E

Acronym List

ABC	Alaska Bird Center at Potter Marsh
ADFG	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AFB	Air Force Base
AMATS	Anchorage Metropolitan Area Transportation Study
ANHA	Alaska Natural History Association
ANILCA	Alaska National Interest Lands Conservation Act
APD	Anchorage Police Department
APLIC	Alaska Public Lands Information Center
AWAIC	Alaska Women's Aid In Crisis
AWWG	Anchorage Waterfowl Working Group
BCC	biological carrying capacity
Bird TLC	Bird Treatment and Learning Center
BLM	Bureau of Land Management
BOF	Board of Fish
BOG	Board of Game
BRAC	Base Realignment and Closing
CARA	Conservation and Reinvestment Act (HR 701/S25)
CBC	Christmas bird count
CIP	Capitol Improvement Project
COE	(U.S. Army) Corps of Engineers
DLP	defense of life and property
DOT	Department of Transportation
EA	Environmental Assessment
FHWA	Federal Highway Administration
FOPM	Friends of Potter Marsh
GIS	Geographic Information Systems
ISTEA	Intermodal Surface Transportation & Efficiency Act (of 1991)

MOA	Municipality of Anchorage OR Memorandum of Agreement
MOU	Memorandum of Understanding
NALA	North Anchorage Land Agreement
NEPA	National Environmental Protection Act
NRCS	Natural Resources Conservation Services
SAC	social acceptance capacity
TIP	Transportation Improvement Program
USAF	U.S. Air Force
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WHIP	Wildlife Habitat Incentives Program