

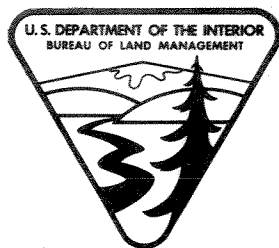
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***Wildlife Of The Titna, Tozitna, And
Kateel Watersheds***

by Scott R. Robinson



Bureau of Land Management

Alaska

OPEN FILE REPORTS

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WILDLIFE OF THE TITNA, TOZITNA AND KATEEL WATERSHEDS

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WILDLIFE OF THE TITNA, TOZITNA AND KATEEL RIVERS, ALASKA

SCOTT R. ROBINSON, Wildlife Biologist, Northwest Resource Area, Fairbanks District, Bureau of Land Management. 1985.

INTRODUCTION

The Bureau of Land Management (BLM) is directed by the Federal Land Policy and Management Act (FLPMA) of 1976 to develop land use plans for the Public Lands. The Bureau initiated such a plan for its Central Yukon Planning Area in 1983. Acquiring existing information is an early step, followed by inventory activities to fill any data gaps. Three inventory field trips were conducted on the Titna, Tozitna and Kateel Rivers to acquire additional fisheries and wildlife information (Figure 1). This report summarizes the wildlife resources, while Webb (1983a, b, c) summarizes the fisheries resource.

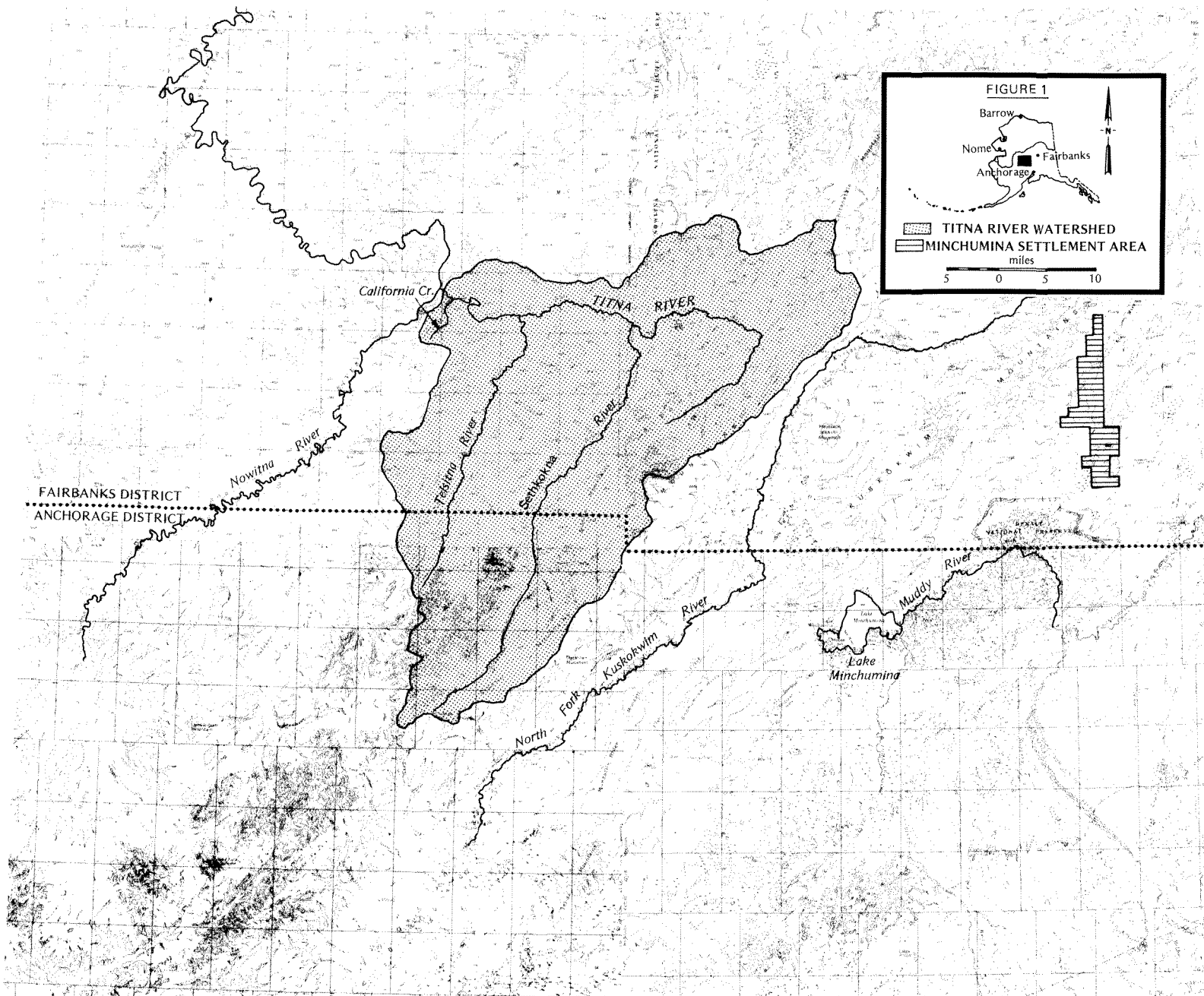
Very little inventory work has been conducted in these watersheds. The Alaska Department of Fish and Game (ADF&G) has conducted moose trend surveys in the Titna and other watersheds adjacent to the Kateel while this author conducted a moose trend survey in the Tozitna watershed and caribou surveys in the neighboring Ray Mountains. Twelve students associated with the Northern Studies Program at Middlebury College, Vermont, conducted a comprehensive environmental field study of the Ray Mountains (Farquhar and Schubert 1980). Additional wildlife surveys of adjacent watersheds have been conducted (White and Boyce 1978, Durtsche 1979, Durtsche and McLean 1979, Robus et al 1979, Webb 1979, Williamson 1982).

Several people representing various skills participated in the 1983 field season. The team members are listed as follows:

Titna River:	Stan Bloom (Cartographic Technician) Larry Knapman (Natural Resource Specialist) Scott Robinson (Wildlife Biologist) Joe Webb (Fisheries Biologist)
Tozitna River:	Laun Buoy (Wildlife Biologist) Carl Hemming (Habitat Biologist - ADF&G) Scott Robinson (Wildlife Biologist) Joe Webb (Fisheries Biologist)
Kateel River:	Mike Burke (Fire Seasonal) Melanie Miller (Fire Effects Specialist) Don Pendergras (Fire Seasonal) Scott Robinson (Wildlife Biologist) Jeff Tucker (Fire Seasonal) Joe Webb (Fisheries Biologist)

STUDY AREA

The Central Yukon Planning Area contains approximately 9.5 million acres of BLM land in Interior Alaska. Wahrhaftig (1965) divided these and all other lands within Alaska into physiographic divisions.



The Titna watershed contains approximately 582,383 acres within the Kuskokwim Mountains division. The ridges crest at about 2,000 feet with some rugged glaciated mountains reaching to 3,500 feet. The Titna drains west into the Nowitna, which drains north into the Yukon River. The mouth of the Titna lies approximately 180 air miles southwest of Fairbanks (Figure 1).

The mouth of the Tozitna River lies approximately 140 air miles northwest of Fairbanks. Its watershed contains approximately 1,042,467 acres within the Kokrine-Hodzana Highlands and Tozitna-Melozitna Lowland divisions. The hills vary from 2,000 to 5,500 feet in altitude. The Tozitna River lies in a broad valley with numerous thaw and oxbow lakes. Its drainage is generally west and south into the Yukon River (Figure 2).

The mouth of the Kateel River lies approximately 290 air miles northwest of Fairbanks. Its watershed contains approximately 1,021,118 acres within the Nulato Hills division. The ridges have rounded summits at 1,000 to 2,000 feet, with some steeper ridges rising to about 4,000. The Kateel is one of several paralleling river valleys. Its drainage is general northeast into the Koyukuk River, which drains south into the Yukon River (Figure 3).

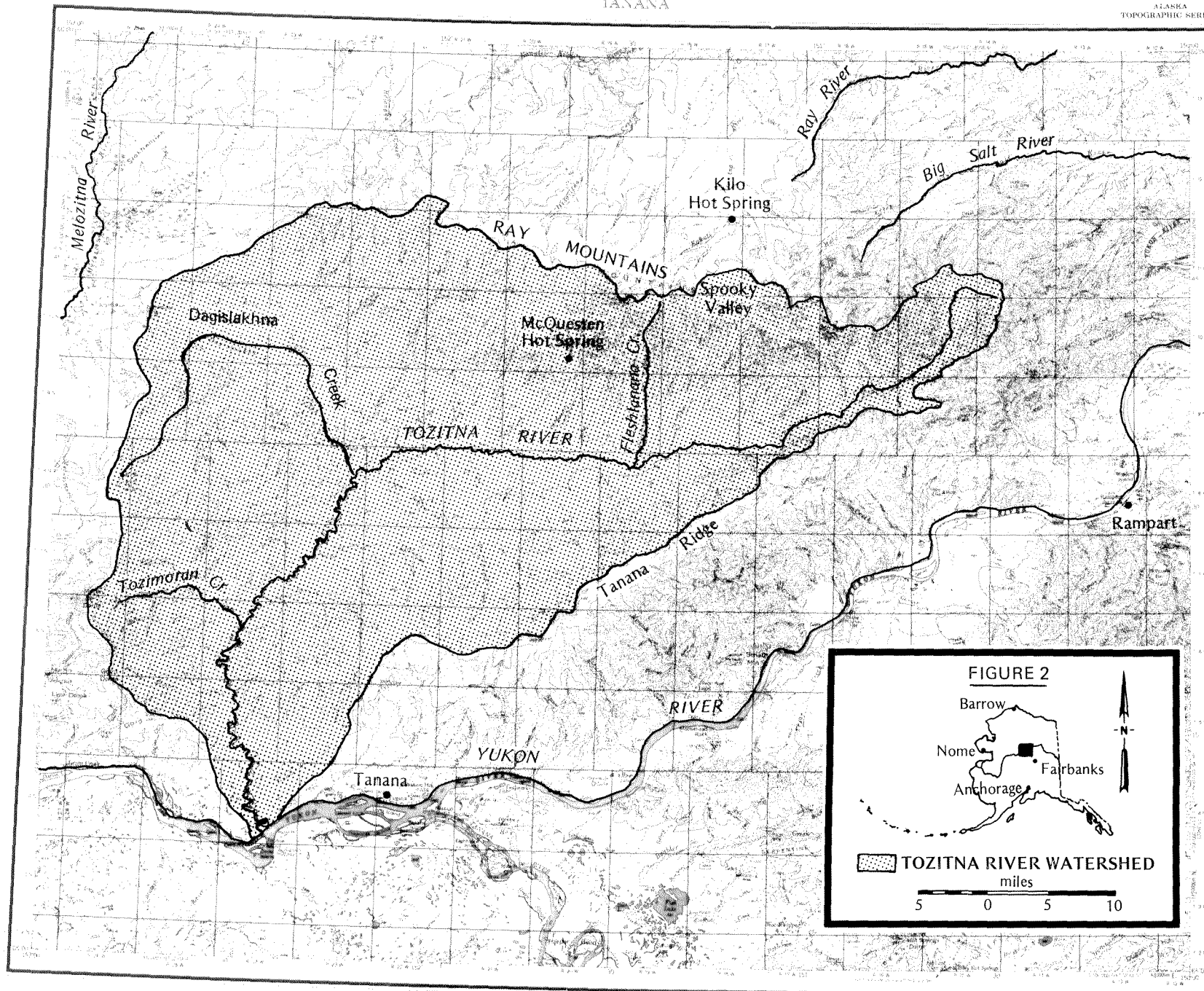
Land ownership is shown in Table 1. The BLM - Fairbanks District Office administers 91 percent of the total 2,645,968 acres including 194,891 acres of land selected by the Native corporations and State of Alaska. The U.S. Fish and Wildlife Service is the second largest landowner with six percent of the total area. Portions of the Titna watershed are within the Nowitna National Wildlife Refuge and portions of the Kateel watershed are within the Koyukuk National Wildlife Refuge. Two percent of the total area has been tentatively approved for conveyance to the State of Alaska, and the remaining one percent has been interim conveyed to Native corporations.

All three watersheds receive human use. Six homesites and one Trade and Manufacturing site located along the Tozitna River have applications for patent. A relatively new trapping cabin was discovered and is thought to be in trespass. The Titna River has one trapping cabin under permit application and a homesite suspected to be in trespass. A third cabin is approximately 30 years old and is in dilapidated condition. No structures were observed on the Kateel River. Active mining claims are located in the Titna and Tozitna watersheds. Furbearers are trapped in all three watersheds, while moose is mostly hunted in the Titna and Tozitna watersheds.

METHODS

The Titna River was surveyed from 20 to 25 June 1983. Transportation was by fixed-wing aircraft between Fairbanks and Lake Minchumina, and then by helicopter to the river. The river was floated in two inflatable rafts from the Sethkokna River (RM 43) downstream to the Nowitna River (RM 0). The Tozitna River was surveyed from 6 to 13 July 1983. Transportation was by fixed-wing aircraft between Fairbanks and Tanana, and then by helicopter to the river. The river was floated in two inflatable rafts from Fleshlanana Creek (RM 72) downstream to Tozimoran Creek (RM 23.5). Wildlife observation techniques include observations of animals, songs, tracks and scats.

The Kateel River was surveyed from 1 to 5 August 1983. Transportation was again by fixed-wing aircraft between Fairbanks and Galena, and then by



helicopter to the river on a daily basis. Wildlife observations were taken from various points along the river in addition to the following listed sites where small mammals were trapped:

Site 1	-	KRM	T. 2 N., R. 4 E., S. 8	TRAPNIGHTS	57
2	-	KRM	T. 1 S., R. 1 E., S. 12		58
3	-	KRM	T. 1 S., R. 1 E., S. 13		48
4	-	KRM	T. 2 S., R. 1 E., S. 35		48
5	-	KRM	T. 5 S., R. 3 W., S. 21		56
6	-	KRM	T. 7 S., R. 4 E., S. 11		46

Traplines were composed of one Victor Rat Trap and one McGill Mouse Trap per station. Additional Museum Special traps were attempted until difficulty in setting the trap surpassed the author's patience. Trap stations, which were approximately 33 feet apart, were set along rodent runways and at entrances to their burrows. Rolled oats mixed with peanut butter was used for bait. A total of 213 trapnights were used to collect data. Selected specimens were collected and given to Bob Mowrey of the Institute of Northern Forestry for identification. Jim Grace identified the specimens.

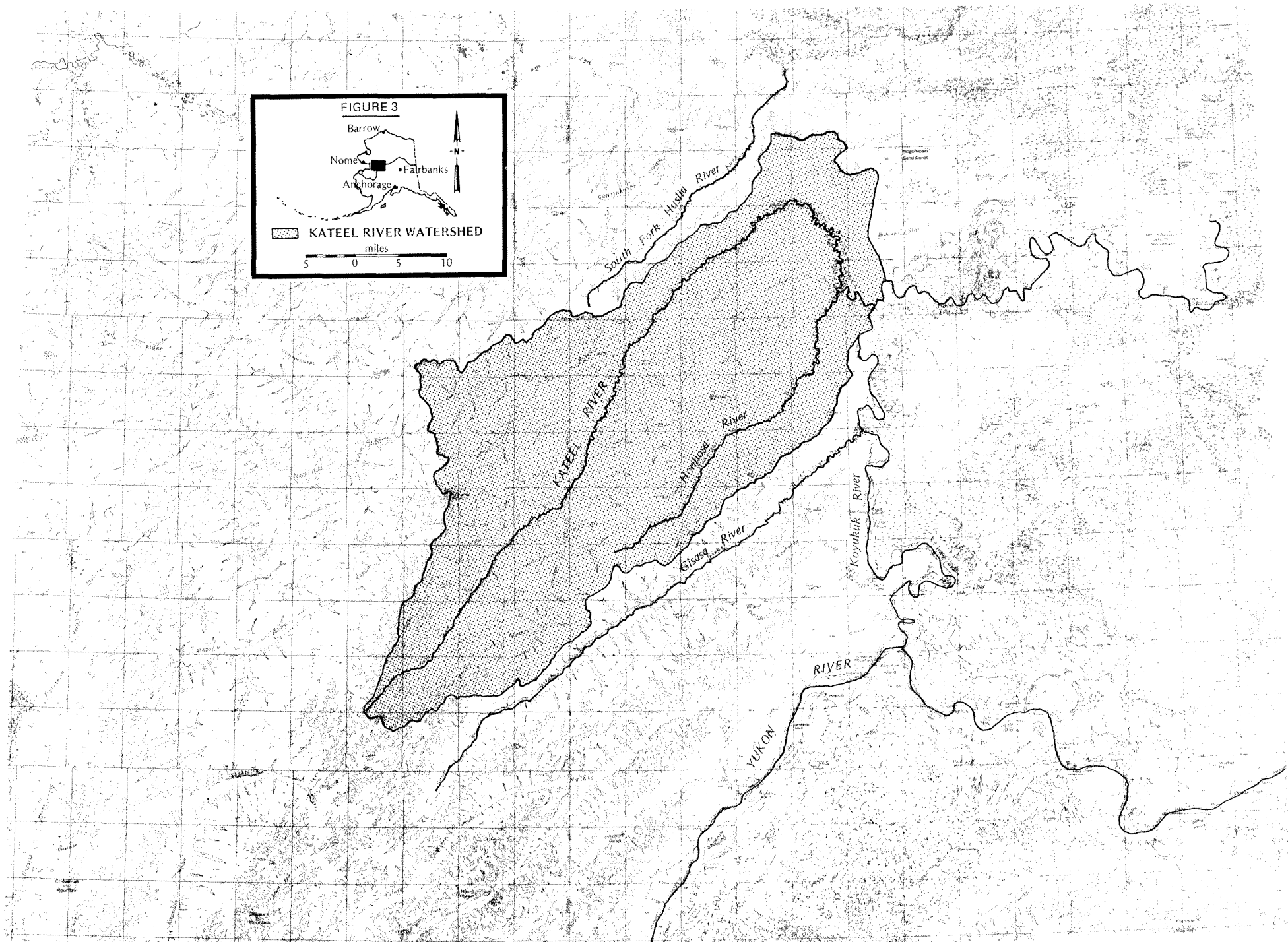
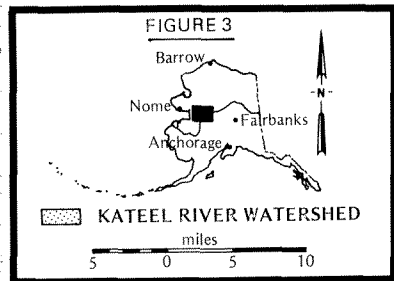
Enhanced Landsat images of the Central Yukon Planning Area have been produced. However, interpretation of the images has not been completed at the present time. Therefore, analysis of standard habitat sites for each of the watersheds has not been attempted in the report.

RESULTS AND DISCUSSION

Species Account. The BLM has observation records for 67 species of mammals, birds and amphibians with an additional three species verified by ADF&G furbearer sealing certificates. The ADF&G (1973 and 1978) also describes general distribution for an additional 12 species. Although trumpeter swans were not observed, they inhabit adjacent areas. Table 2 lists all 83 species. All observation data and field maps are on file in the BLM Northwest Resource Area Office, Fairbanks.

The following species account treats only the species either observed or reported for the Titna, Tozitna and Kateel Rivers. When an observation has not been recorded for one of these rivers, then previous inventories of adjacent areas were searched for verified occurrence in that area. Repeated references will include Durtsche and McLean (1979) for the Gisasa River, Robus et al (1979) and Webb (1979) for the Melozitna River, and Farquhar and Schubert (1980) for the Ray Mountains. Phylogenetic sequence and nomenclature follow Jones et al (1975) for mammals and AOU (1983) for birds. Unless otherwise described, population status for furbearers and gamebirds are provided by Barnett (1983c) and status and nesting habitat for birds are provided by Armstrong (1980) and Spindler and Kessel (1980).

Masked Shrew (*Sorex cinereus*). Eight shrews were captured at Kateel River Sites 3, 4 and 6. Site No. 3 is presently tussock tundra habitat. It is a post-burn site that will eventually return to spruce. Site No. 4 is an open spruce-birch forest in early seral stage resulting from fire. Site No. 6 is a closed spruce-birch forest located in the Nulato watershed. The Research Natural Area inventory team captured another shrew in river riparian habitat on 3 July 1983. This shrew favors wet habitats in high latitudes (Farquhar



and Schubert 1980).

Snowshoe Hare (Lepus americanus). Evidence of hares was observed in all three watersheds, with one captured at Kateel River Site 2, a white spruce woodland. Present Interior populations are moderate to high with increasing trends. Spruce, birch, willow and alder provide important winter forage for hares (O'Farrell 1960, Trapp 1962, Wolff 1978b).

Marmot (Marmota spp.). Occurrence in all three watersheds is reported by ADF&G (1978). Farquhar and Schubert (1980) observed marmots in the Ray Mountains. Their research suggests that M. caligata remains south of the Yukon River and that M. broweri can be found north of the Yukon. Marmots seem to favor steeper rock slopes in upland habitats and may be closely associated with ground squirrels.

Arctic Ground Squirrel (Spermophilus parryii). Two squirrels were captured at Kateel River Site 5, which is low ericaceous shrub tundra habitat. They inhabit unvegetated, well drained areas where permafrost is deep. Their discontinuous distribution in the Ray Mountains suggests that each colony constitutes a local population. Their abundance further suggests that they provide an important link in the food chain.

Red Squirrel (Tamiasciurus hudsonicus). Although none were captured, several vocalizations were heard in the closed white spruce forests along all three river channels. White spruce seed is their major food item (Brink 1964, Kelly 1978, Nodler 1973, Smith 1967).

Northern Flying Squirrel (Glaucomys sabrinus). Occurrence in all three watersheds is reported by ADF&G (1978). No flying squirrels were observed due to their nocturnal habitats. Although they require white spruce for nesting, their diet is composed largely of mushrooms and truffles (Mowrey 1977, Mowrey et al 1981).

Beaver (Castor canadensis). Beavers, caches and dams were observed on all three rivers, but were most numerous on the Titna. Beaver houses on the Titna are characterized by food caches anchored against the plentiful supply of cut-banks. Only side channels along the three rivers have dams. Aspen, willow and alder provide important winter forage.

Northern Red-backed Vole (Clethrionomys rutilus). The northern red-backed vole was the most abundant and widespread of the trapped mammals. Forty-one specimens were captured in all but the low ericaceous shrub tundra. The spruce-birch forest (early seral stage) produced the highest yield of voles, and the number of captured red-backed voles decreased as the density of shrub cover also decreased. This same relationship occurs in the Ray Mountains.

Meadow Vole (Microtus pennsylvanicus). Three meadow voles were captured at Kateel River Sites 1 and 3. Site No. 1 is presently low willow between the gravel bar and taller alder, and Site No. 3 is the post-burn tussock tundra site. This species was not reported in the Ray Mountains.

Tundra Vole (Microtus oeconomus). Only two tundra voles were captured at Kateel River Site 3, the post-burn tussock tundra site. It also was not reported in the Ray Mountains.

Muskrat (Ondatra zibethicus). Occurrence in all three watersheds is reported by ADF&G (1978). Present population levels are low throughout Interior Alaska. The best habitat along the major rivers and in the valley bottoms would maintain the core populations during low population periods. Consequently, the lesser quality habitat along the minor river drainages would have few to no muskrats.

Brown Lemming (Lemmus sibiricus). The Research Natural Area inventory team identified jaws of a brown lemming at McQuesten Creek Hot Spring on the Tozitna side of the Ray Mountains. This species had not been previously reported by Farquhar and Schubert (1980).

Porcupine (Erethizon dorsatum). Occurrence in all three watersheds is reported by ADF&G (1978). Porcupines are most commonly found in the deciduous and coniferous forests. The closed white spruce along the river channels provide prime winter habitat, while the alder-willow thickets in the tributaries provide travel lanes to higher summer habitat.

Coyote (Canis latrans). Occurrence in all three watersheds is reported by ADF&G (1978). Coyote population levels are low throughout Interior Alaska.

Wolf (Canis lupus). Wolf tracks were observed in the Tozitna and Kateel watersheds, while sealing certificates report harvest in all three watersheds. Wolves traverse many different habitats in pursuit of prey. Present Interior population levels are moderate and stable.

Red Fox (Vulpes vulpes). Occurrence in all three watersheds is reported by ADF&G (1978). Red foxes traverse many different habitats in pursuit of hares and rodents. Present Interior populations levels are high.

Black Bear (Ursus americanus). Three black bears were observed along the Titna River: one in spruce-poplar-willow mix, one in closed low willow and one in closed birch forest. Tracks were seen on nearly every gravel bar. An interview with local miner Jesse Mitchell revealed high density around the mine on California Creek, a tributary to the Titna. Three additional bears were seen along the Kateel, while the Tozitna had the least amount of observed bear sign. The ADF&G has no information on population status and trend.

Grizzly Bear (Ursus arctos). Grizzly bears were observed along the Tozitna and Kateel Rivers, and ADF&G (1973) reports occurrence in the Titna watershed. Grizzlies spend much of the year in the highlands to den and to forage for berries, but they travel down to the rivers to feed upon spawned-out salmon. Present Interior population levels are moderate and stable (Hinman 1982).

Marten (Martes americana). Occurrence in all three watersheds is reported by ADF&G (1978). In addition, miner Jesse Mitchell experienced poor trapping success on the lower end of the Titna. Martens require spruce forest habitat and feed extensively on microtine rodents (Lensink 1953). Present Interior population levels are moderate with perhaps a slight decline.

Ermine (Mustela erminea). Occurrence in all three watersheds is reported by ADF&G (1978). Farquhar and Schubert (1980) expected to find ermine in streamside alder-willow thickets and in drier rocky areas where microtines and

ground squirrels are most common.

Least Weasel (Mustela nivalis). Occurrence in all three watersheds is reported by ADF&G (1978). Nothing else is known about this tiny carnivore.

Mink (Mustela vison). Occurrence in all three watersheds is reported by ADF&G (1978). Mink inhabit the river riparian habitat where it can hunt microtines, hares, muskrat and fish. Present Interior population levels are moderately low and stable.

Wolverine (Gulo gulo). Furbearer sealing certificates have reported harvest in all three watersheds. Wolverines inhabit forests and rock fields beyond treeline. They are carrion eaters, but they also consume microtine rodents, ground squirrels and marmots. Blueberries and porcupines are also eaten (Rausch and Pearson 1972). Present Interior population levels are low and stable.

River Otter (Lutra canadensis). Furbearer sealing certificates have reported harvests in the Tozitna and Kateel watersheds and ADF&G (1978) reported occurrence in the Titna watershed. Like mink, otters inhabit the river riparian habitat where they can pursue prey. Present Interior population levels are moderate to low and stable.

Lynx (Felis lynx). Furbearer sealing certificates have reported harvest in all three watersheds. Lynx inhabit mature forests and feed extensively on snowshoe hares. Present Interior populations are at low to moderate levels. They are stable except for a substantial increase in the Nulato Hills.

Moose (Alces alces). Moose inhabit all three watersheds. The Titna watershed was surveyed in November 1980 with reported densities of 0.2 moose per square mile in the lowland floodplain and 0.9 moose per square mile in the upland post-burn habitat. A portion of the Tozitna was surveyed in November 1983 with a density of 0.2 moose per square mile in upland conifer and broadleaf forests. Other surveys adjacent to the Tozitna reported 0.3 moose per square mile in Hess Creek (1981) and 0.1 moose per square mile in the Big Salt and Ray Rivers (1983). Habitats are similar to the Tozitna survey area. Survey techniques are described by Gasaway et al (1981). The Kateel River has not been surveyed. However, a November 1982 survey in the South Fork of the Huslia reported 1.8 moose per square mile and November 1983 surveys in the Honhosa (Kateel tributary) and Gisasa watersheds each reported 0.3 moose per square mile. Population trends appear stable (Barnett 1983b).

LeResche et al (1974) described four major habitat types used by moose in Alaska. Climax communities consist of either upland willow or birch dominated communities and lowland bog areas. Seral communities consist of habitat created by either glacial or fluvial action and fire. The upland climax communities are timberline shrub complexes composed of streamside willow and birch on drier sites just below timberline. This habitat provides important summer-fall range. Moose rarely occupy this habitat in extreme densities. Therefore, overbrowsing does not appear to be a problem. The lowland bog areas also are important summer range. All known major calving concentrations in Alaska occur in this habitat type. Abundant herbaceous vegetation and escape cover can support large numbers of moose.

Glacial and fluvial actions create basic riparian willow habitat. This provides important winter range and some summer range. Several food habits studies and reviews for moose are recorded in the literature (Spencer and Hakala 1964, Milke 1969, LeResche and Davis 1973, Peek 1974, Coady 1976, Cushwa and Coady 1976, Wolff 1976, Oldemeyer et al 1977, Wolff 1978a, and Machida 1979). All agree that willow is the number one forage plant of Interior moose populations, followed by birch, aspen and alder. Moose select certain willow species over others. Milke (1969) found that the most preferred species in descending order were Salix interior, S. alaxensis, S. arbusculoides and S. pulcha. Coady (1976) agreed with this species list, except S. lasiandra was most preferred in his study. Machida (1979) and Wolff (1976) placed S. alaxensis as most preferred. Milke (1969) thought that S. alaxensis and S. pulcha were the most important browse species by virtue of their high palatability, wide distribution, and relatively high abundance. During severe winters, high densities of moose concentrate in the river bottoms, and overbrowsing may become a potential problem.

While the riparian willow habitat serves as a reservoir for core moose populations, fire-created habitats support the greatest population explosions and densities in Alaska. While these habitats provide important winter ranges, dense populations can be supported throughout the year. Not only do important browse species reinvade burned-over areas, but increased amounts of edge between feeding habitat and cover habitat are created. Cover provides important needs such as thermal insulation, escape, and refugia from deep snow.

Migration and other types of movements are unknown for moose on BLM land within the Central Yukon Planning Area. However, moose in the Alaska Range/Tanana Flats exhibit three patterns of movement (LeResche 1974). One group remains resident in the lowlands, a second group remains resident in the uplands, and a third group migrates between the uplands and lowlands. The third group calves with the first group in the lowlands and mixes with the second group in the uplands during fall.

Moose show a strong tradition of returning to the same individual home ranges year after year. They also show a strong tradition in using the same routes of travel between seasonal ranges. Movements that do not include elevational changes follow the same schedules, while movements that do include elevational changes may have variable schedules. Ascent to summer-fall range may be related to plant phenology, while descent is dependent upon snowfall (LeResche 1974).

Caribou (Rangifer tarandus). Caribou have been observed in the Tozitna watershed and adjacent Ray Mountains, an antler was found at the Kateel River Site 1 and ADF&G (1973) reports occurrence in the Titna watershed. Distribution in the Titna represents historic summer range for the Sunshine-Cloudy Mountain Herd. Population dynamics are not well understood. Consequently, ADF&G is conducting telemetry studies to provide this information.

The Ray Mountain population was once thought to be part of the Western Arctic Herd. However, recent surveys (Robinson 1984) suggest that a resident herd of at least 400 animals inhabits the Ray Mountains and Tanana Ridge (northeast of Tanana). The area around Kilo Hot Springs in the adjacent Kanuti watershed to the north appears to be very important habitat.

The Western Arctic Herd inhabits the northern portion of the Nulato Hills, while the Andreasky Herd inhabits the southern portion with overlap near the Unalakleet River (Davis 1978). The Western Arctic animals are winter residents, while the Andreasky animals are yearlong residents. Recent population levels of the Western Arctic Herd have fluctuated from an estimated high of 300,000 in 1964, to a low of 75,000 in 1976, and back up to 138,000 in 1980. This growth represents a 14% annual increase since 1976 (Barnett 1983a). Various people have observed animals in the northern portion during the summer period, but this is not sufficient evidence to recognize a northward movement of the Andreasky Herd.

Arctic Loon (Gavia arctica). Arctic loons were observed at three different locations on the Titna River. Robus et al (1979) reported arctic loons on the Melozitna River. These birds normally nest on projecting points or small islands in lakes in tundra and coniferous forest habitat. Arctic loons are common summer residents in Interior Alaska.

Trumpeter Swan (Cygnus buccinator). No swans were observed on the three rivers. However, swans have been observed near the Minchumina Settlement Area and Muddy River in 1968, 1975, 1980, and 1983. They have also been observed along the Nowitna River downstream from the mouth of the Titna in 1975 and 1980. Trumpeter swans nest on ponds that are located in the lowlands, and they are uncommon summer residents in Interior Alaska.

Greater White-fronted Goose (Anser albifrons). Thirty-seven adult and 89 gosling white-fronted geese were observed on the Titna River. None were observed on either the Tozitna or the Kateel Rivers, but were reported on the Melozitna River. Like the Canada geese, white-fronts use the gravel bars for feeding and loafing and use the white spruce, poplar and tall willows for escape cover. Region-wide populations have been declining. (Charles Blair, USFWS, personal comm.).

Canada Goose (Branta canadensis). Two family groups plus three more occurrences of six Canada geese were observed on the Titna River. One family group plus one more occurrence of one goose were observed on the Tozitna River. Geese use the gravel bars for feeding and loafing and use the white spruce, poplar and tall willows for escape cover. The Titna has the least amount of gravel bars and, consequently, the least of amount feeding habitat. None were observed on the Kateel River, but they were reported on the Gisasa River. Canada Geese are common summer residents in Interior Alaska.

Mallard (Anas platyrhynchos). One pair, two lone females and one family group (1 female, 11 ducklings) were seen on the Titna River. One lone female was also seen on each of the Tozitna and Kateel Rivers. Of the observed waterfowl, mallards are the most adaptable in using all portions of the river channel. Mallards are common summer and rare winter residents in Interior Alaska.

Gadwall (Anas strepera). A small group of gadwalls was observed flying upstream at our first camp on the Titna. None were observed on either the Tozitna or the Kateel Rivers, but were reported on the Melozitna River. These birds nest in dense vegetation near sedge-grass marshes. Because gadwalls are so rare in Interior Alaska, these birds may have been mistaken for either female mallards or wigeon.

American Wigeon (Anas americana). Three males, one female and two ducklings were observed on a pond separated from the Titna River by a stand of closed white spruce. None were observed on either the Tozitna or the Kateel Rivers, but they were reported on the Melozitna River. They nest on the ground, and their nests may or may not be near the water. American Wigeons are common summer residents in Interior Alaska.

Harlequin Duck (Histrionicus histrionicus). Three females were observed on two different occasions on the Titna River and a single female was also seen on the Tozitna. None were observed on Kateel, but were reported on the Gisasa River. These birds breed along cold, rapidly flowing streams. They nest on the ground in areas close to the water that are is protected by dense vegetation. Harlequin ducks are uncommon summer residents in Interior Alaska.

Merganser (Mergus spp.). Common mergansers (M. merganser) and red-breasted mergansers (M. serrator) were observed on the Titna and Tozitna. The Titna River had six single occurrences of 16 adults and one family group of three adults and six young. The Tozitna River had eight single occurrences of 12 adults and four family groups of seven adults and 33 young. None were observed on the Kateel River, but were recorded on the Gisasa River. The red-breasted was expected but not found in the Ray Mountains. Both mergansers are rare residents in Interior Alaska.

Bald Eagle (Haliaeetus leucocephalus). One adult and one immature bald eagles were observed on the lower portion of the Tozitna River. Each was perched in a white spruce tree as we floated by. Both locations are adjacent to chum salmon spawning areas. Bald eagles usually nest in white spruce along the larger rivers. They are uncommon summer and rare winter residents in Interior Alaska.

Northern Harrier (Circus cyaneus). Two female and one male harriers were observed above the Tozitna River and one male above an adjacent black spruce muskeg. None were observed in either the Titna or the Kateel Rivers, but they were reported along the Melozitna River. At least six pairs were encountered in the Ray Mountains in 1979. Northern harriers nest on the ground in open, marshy habitat. They are uncommon summer and casual winter residents in Interior Alaska.

Red-tailed Hawk (Buteo jamaicensis). We identified four locations on the Titna plus another four on the Tozitna where red-tailed hawks screamed in defense of their nest sites. The actual nests, however, were not observed. All suspected nest sites were in closed white spruce forests. Birds were also seen on two other occasions when they did not scream at us. The birds that we observed are within the breeding range of B. j. harlani and its intergrade forms. Although all observed birds were not noted by subspecies, more than one bird possessed harlani characteristics (Mindell 1983). Red-tails are common summer residents in Interior Alaska.

Golden Eagle (Aquila chrysaetos). One lone golden eagle was observed during the helicopter flight from Tanana to the Tozitna River. It may have been hunting over upland tundra habitat. White and Boyce (1978) reported one golden eagle nest along the Kateel River. They generally nest on cliffs. While golden eagles may be rare in the Ray Mountains, they are common summer and casual winter residents in Interior Alaska.

American Kestrel (Falco sparverius). Kestrels were heard along the Titna and Tozitna Rivers but not along the Kateel. They were in the closed poplar forest portion of the river riparian zone. Kestrels nest in tree cavities and are common summer residents in Interior Alaska.

American Peregrine Falcon (Falco peregrinus anatum). Only one possible peregrine falcon was noted during the summer excursions. A very suitable nest site was located on the Titna River, but positive identification was not made. Miner Jesse Mitchell has seen a peregrine up California Creek to Mastodon Mountain, but he does not know where it nests. He believes that the bird hunts grouse and ptarmigan. The peregrine used to be the second most commonly observed hawk in Alaska (Cade 1960), but it is now considered rare. This subspecies is currently listed as endangered by USDI.

Gyr Falcon (Falco rusticolus). Only one gyrfalcon was observed all summer, and it was near Kateel River Site 5. The habitat is low ericaceous shrub tundra. This bird was seen flying with a small mammal grasped in its talons. Gyrfalcons are cliff nesters and are uncommon summer and rare winter residents in Interior Alaska.

Spruce Grouse (Dendragapus canadensis). A flock of ten grouse was found at the Kateel River Site 6, which is a closed spruce-birch forest located in the Nulato watershed. The spruce grouse is the most common and widespread gamebird in Interior Alaska.

Willow Ptarmigan (Lagopus lagopus). Occurrence in all three watersheds is reported by ADF&G (1978). Webb (1979) reported willow ptarmigan along the Melozitna River. This ptarmigan prefers the willow thickets along the rivers that provide important food throughout the winter. Ptarmigan numbers are moderately low throughout Interior Alaska.

Rock Ptarmigan (Lagopus mutus). Occurrence in all three watersheds is reported by ADF&G (1978). Rock ptarmigan prefer drier, more open habitat such as shrubby tundra from treeline to about 3,500 feet elevation. Buds and catkins of dwarf birch are its primary winter diet; the summer diet is more varied with leaves, berries and seeds.

Ruffed Grouse (Bonasa umbellus). Evidence of three ruffed grouse was observed on the Titna and Tozitna Rivers. One male was drumming deep inside the closed poplar forest at our first campsite on the Titna. The scat of a second bird was collected from another closed poplar forest along the Tozitna River. A third bird was located in an alder thicket also along the Tozitna. Grouse numbers are moderately low in most areas of Interior Alaska.

Sharp-tailed Grouse (Tympanuchus phasianellus). Occurrence in all three watersheds is reported by ADF&G (1978). Sharp-tailed grouse prefer ecotones between forest and open habitat, such as muskeg, willow thickets and stunted spruce forests.

Semipalmated Plover (Charadrius semipalmatus). Semipalmated plovers were observed on several gravel bars of the Titna and Tozitna Rivers. A family group of one adult and three young was seen on June 23, while another group of three adults and one young was seen on July 11. All other observations were of single adults. Semipalmated plovers are common summer residents in

Interior Alaska.

Lesser Yellowlegs (Tringa flavipes). Four lesser yellowlegs were observed along the Titna and six more were seen along the Tozitna River. These birds were seen either flying above black spruce muskeg or perched in spruce trees. None were observed along the Kateel River, but they were reported along the Gisasa River. Muskegs and fresh-water marshes provide breeding habitat. Lesser yellowlegs are common summer residents in Interior Alaska.

Spotted Sandpiper (Actitis macularia). Spotted sandpipers were observed along all three rivers with one juvenile recorded on July 9. Juveniles in the Ray Mountains were observed from 19 July to 12 August 1979. All of our observations were seen on gravel bars. Spotted sandpipers, like semipalmated plovers, nest on the gravel bars. They are also common summer residents in Interior Alaska.

Least Sandpiper (Calidris minutilla). Only one least sandpiper was identified on the Tozitna River, although other "peeps" were seen. All these peeps were seen on gravel bars near the water's edge. They are ground nesters in freshwater marshes and muskegs. Least sandpipers are uncommon summer residents in Interior Alaska.

Common Snipe (Gallinago gallinago). Male common snipe were heard winnowing from June 21 until July 12 on the Titna and Tozitna Rivers. Two males and one female were observed together flying above black spruce muskeg habitat. All vocalizations were heard adjacent to muskegs which, combined with freshwater marshes, provide breeding habitat. None were observed along the Kateel River, but they were reported along the Gisasa River. Although only one bird was observed in the Ray Mountains in 1979, snipes are normally a common summer resident in Interior Alaska.

Long-tailed Jaeger (Stercorarius longicaudus). Seven long-tailed jaegers were observed by the Research Natural Area Inventory Team on June 30. These birds were seen above a ridge surrounding Spooky Valley in the Ray Mountains. They are ground nesters in the drier upland tundra. Long-tailed jaegers are common summer residents in Interior Alaska.

Bonaparte's Gull (Larus philadelphia). Two observations of possibly the same Bonaparte's gull were recorded on the Titna River. They nest in low conifer trees near lakes and rivers. Bonaparte's gulls are uncommon summer residents in Interior Alaska.

Mew Gull (Larus canus). Mew gulls were the most commonly observed gull along all three rivers. All observations were of adults, except for two juveniles seen at the Kateel River Site 1. They are ground and tree nesters near lakes and rivers. Mew gulls are common summer residents in Interior Alaska.

Herring Gull (Larus argentatus). Two observations of probably one herring gull were recorded on the Titna River. This is another large gull, but it has jet black wing tips. They nest on the ground near lakes and rivers. Herring gulls are uncommon summer residents in Interior Alaska.

Glaucous Gull (Larus hyperboreus). Only one glaucous gull was seen during the summer, and it was on the Tozitna. The pale gray wing mantle without either

dark wing tips or white spots identified this species. A previous observation was reported on the Melozitna River by Robus et al (1979). Glaucous gulls are rare summer residents in Interior Alaska.

Great Horned Owl (Bubo virginianus). One pair plus two more single adults were observed in white spruce and poplar trees along the Titna River. Previous observations have been reported along the Gisasa and Melozitna Rivers. They nest in abandoned hawk nests in these two forest types. Great horned owls are common residents in Interior Alaska.

Belted Kingfisher (Ceryle alcyon). Belted kingfishers were observed on all three rivers. They used the white spruce and poplar trees as hunting perches, and several cut-banks for nest burrows. Many of the cut banks that are suitable for burrows are also used by bank swallows for colonies. Belted kingfishers are common summer residents in Interior Alaska.

Northern Flicker (Colaptes auratus). The yellow-shafted subspecies of the northern flicker was noted on the Tozitna and Kateel Rivers but not on the Titna. Flickers inhabit poplar forests, which are in plentiful supply along all three rivers. They are common summer residents in Interior Alaska.

Western Wood Pewee (Contopus sordidulus). One western wood pewee was identified by song along each of the Titna and Tozitna Rivers but not along the Kateel. Both songs came from within closed poplar forests along the rivers. Western wood pewees are tree nesters, and are uncommon summer residents in Interior Alaska.

Alder Flycatcher (Empidonax alnorum). One alder flycatcher was identified along the Tozitna and another along the Kateel, but none along the Titna River. Both birds were observed in closed willow scrub habitat. Alder flycatchers nest low in the shrubs and are common summer residents in Interior Alaska.

Tree Swallow (Tachycineta bicolor). Tree swallows were recorded only along the Titna River: once at the mouth of the Sethkokna River and again at the inhabited homesite near California Creek. They have been reported along the Gisasa and Melozitna Rivers. Like violet-greens, tree swallows are closely associated with human settlement and are predicted to be near the Tozitna homesites. Tree swallows nest in cavities and crevices. They are common summer residents in Interior Alaska.

Violet-green Swallow (Tachycineta thalassina). Violet-green swallows were observed along the Titna and Tozitna Rivers, but not along the Kateel. However, they were reported along the Gisasa River. All observations were adjacent to inhabited homesites. They also nest in cavities and crevices of trees, cliffs and buildings. Violet-green swallows are common summer residents in Interior Alaska.

Bank Swallow (Riparia riparia). Bank swallows are the most commonly observed swallow along all three rivers. The Titna River had more nesting colonies than the Tozitna River. The fewer observations for the Kateel may be a reflection of our different study design instead of a lack of suitable habitat. Bank swallows are common summer residents in Interior Alaska.

Gray Jay (Perisoreus canadensis). Gray jays were observed along all three rivers. These conspicuous birds were seen most often within the white spruce forests and black spruce muskegs adjacent to the rivers. Post fledged juveniles were seen on June 24. Farquhar and Schubert (1980) reported fledged juveniles on June 26. Gray jays nest in conifers and are common residents in Interior Alaska.

Common Raven (Corvus corax). Common ravens were observed along the Titna and Tozitna Rivers, but not along the Kateel. However, they were reported along the Gisasa River. Most observations were made from all the different forest types along the rivers. Ravens will compete with rough-legged hawks, gyrfalcons and peregrine falcons for the same cliff nest sites. Ravens are common residents in Interior Alaska.

Boreal Chickadee (Parus hudsonicus). Boreal chickadees were observed along all three rivers in all forest types except closed broadleaf forests. Boreal chickadees nest in conifers and are common residents in Interior Alaska.

Swainson's Thrush (Catharus ustulatus). Swainson's thrushes were heard along the Titna and Tozitna Rivers but not along the Kateel. However, they were reported along the Gisasa River. All songs came from within closed white spruce and poplar forests plus closed tall willow stands. They nest in mixed deciduous-coniferous forests and are common summer residents in Interior Alaska.

American Robin (Turdus migratorius). Robins were observed along the Tozitna and Kateel Rivers, but not on the Titna. The observations were in open conifer and closed broadleaf forests adjacent to the river. Farquhar and Schubert (1980) reported fledged juveniles by July 30. Robins show a clear preference for nesting in quaking aspen and are common summer and casual winter residents in Interior Alaska.

Varied Thrush (Ixoreus naevius). Varied thrushes were the most common thrush heard along the Titna and Kateel Rivers but not along the Tozitna. All songs came from within all forest types. One individual was observed hopping from a short willow to a gravel bar. Varied thrushes nest in mixed deciduous-coniferous forests and are common summer residents in Interior Alaska.

Bohemian Waxwing (Bombycilla garrulus). Bohemian waxwings were observed along the Tozitna, seen once along the Titna and not seen along the Kateel. However, they were reported along the Gisasa River. The birds would pursue insect prey above the water and return frequently to their perches in white spruce and poplar trees. They nest in trees that are adjacent to muskegs. Bohemian waxwings are common summer and rare winter residents in Interior Alaska.

Northern Shrike (Lanius excubitor). One northern shrike was observed along the Titna River near the mouth of the Sethkokna River where the habitat is a closed poplar forest. Northern shrikes nest in a small broadleaf tree and are common summer and rare winter residents in Interior Alaska.

Yellow Warbler (Dendroica petechia). One yellow warbler was observed flitting into a willow clump along the Tozitna River. Yellow warblers were also

reported along the Melozitna River. Farquhar and Schubert (1980) expected, but did not identify, yellow warblers in the Ray Mountains. They nest in tall shrub scrub; the presence of water is important. Yellow warblers are common summer residents in Interior Alaska.

Yellow-rumped Warbler (Dendroica coronata) The myrtle subspecies of the yellow-rumped warbler was frequently observed along the Titna and Tozitna Rivers but not along the Kateel. However, they were reported along the Gisasa River. They were seen in closed white spruce, closed mixed forests, and closed tall willow stands. Farquhar and Schubert (1980) reported fledged juveniles by July 18. They nest in mature deciduous forests of either paper birch or quaking aspen. Yellow-rumped warblers are common summer residents in Interior Alaska.

Northern Waterthrush (Seiurus noveboracensis). Several northern waterthrushes were observed along the Titna and Tozitna Rivers but not along the Kateel. They were seen in closed poplar forests and closed tall willow stands. Farquhar and Schubert (1980) also expected to find this species in the Ray Mountains, but they did not. They nest on the ground adjacent to the water's edge. Northern waterthrushes are common summer residents in Interior Alaska.

American Tree Sparrow (Spizella arborea). One tree sparrow was observed in a black spruce muskeg adjacent to the Tozitna River. This species is abundant and wide spread in the Ray Mountains and prefers shrub thickets. Farquhar and Schubert (1980) reported fledglings as early as July 9. They nest on the ground under low bushes. Tree sparrows are common summer and casual winter residents in Interior Alaska.

White-crowned Sparrow (Zonotrichia leucophrys). Several white-crowned sparrows were heard singing and were observed along the Titna and Tozitna Rivers but not along the Kateel. However, they were reported on the Gisasa River. The birds inhabited closed white spruce, black spruce muskeg, closed poplar and closed tall shrub thickets adjacent to the river. Farquhar and Schubert (1980) reported juveniles as early as July 18. They nest either on the ground or in a low shrub. White-crowned sparrows are common summer and casual winter residents in Interior Alaska.

Dark-eyed Junco (Junco hyemalis). Dark-eyed juncos were observed along all three rivers in all forest types except the closed poplars. They are ground nesters in conifer forests, scrub and muskegs. Dark-eyed juncos are common summer and rare winter residents in Interior Alaska.

Rusty Blackbird (Euphagus carolinus). Rusty blackbirds were observed along the Titna and Tozitna Rivers but not along the Kateel. However, they were recorded along the Gisasa River. They were usually seen in closed white spruce but one male was seen in a black spruce muskeg. This is another species that was expected, but not found, in the Ray Mountains. Rusty blackbirds nest in tall shrubs adjacent to the water. They are common summer and rare winter residents in Interior Alaska.

Wood Frog (Rana sylvatica). One wood frog was captured and photographed along the Titna River at the mouth of the Sethkokna River, where the habitat is a closed poplar forest. This is a diurnal species that hibernates underneath layers of duff and snow.

Wildlife Harvest. Table 3 lists the total recorded harvest of selected big game and furbearing species for the Titna, Tozitna and Kateel watersheds from 1978 to 1982. Data for big game are from ADF&G computer print-outs. One grizzly bear from the Tozitna and four more from the Kateel have been harvested during this five year period. Nineteen moose from the Titna and nine more from the Tozitna have been harvested during this same period. Most of the Kateel moose are harvested on the Koyukuk National Wildlife Refuge (Tim Osborne, ADF&G, per. comm.). Caribou data are not available.

Data for beaver, wolf, wolverine, river otter and lynx come from ADF&G furbearer sealing certificates. The three watersheds have produced 114 known animals during this five year period. The Kateel has been the biggest producer of 14 animals per year followed by the Tozitna (average = 5) and the Titna (average = 4). Of these furbearers, lynx is the most sought after species. Other species, such as marten, are the mainstay for many trappers, but data by watershed cannot be extrapolated.

Prime Habitats. The combined distribution of all wildlife species would cover most of the three watersheds. However, within each species distribution, some areas are more productive than others. The more productive areas have been labelled as prime habitat by ADF&G. Prime habitat is able to support maximum population densities of the species on a long-term basis and are necessary to the perpetuation of the population. Prime habitat may include one or more of the following:

1. supports seasonally high concentrations;
2. provides elements necessary for special uses, i.e., migration corridors, feeding, calving or breeding;
3. may be used by endangered species.

Table 4 lists acres of prime habitat of priority management species for unselected BLM lands. Caribou has the greatest amount of prime habitat in the three watersheds (76%), followed closely by grizzly bear (70%). Prime habitat for both species overlap in the high country, with the lower boundary varying between 1,000 and 2,000 feet above sea level. The ridgetops and hillsides are rich in lichens and berries.

Prime habitat of moose, furbearers, raptors and waterfowl overlap along the river riparian zone. Furbearer habitat represents the largest proportion of this overlap. Hare, squirrel, beaver, marten, ermine, mink, otter and lynx depend upon this habitat for food and cover requirements. Most of the prime moose habitat is in the Tozitna watershed, with much of it along Dagislahna Creek (tributary). The prime raptor habitat determination is based upon the observed nesting distribution of red-tailed hawks and the suspected peregrine falcon sighting. The only prime waterfowl habitat is designated along the lower end of the Kateel River, which is merely a finger of the much larger portion of prime habitat along the Koyukuk River.

Crucial Habitats. Prime habitat may also include crucial habitat, which is defined as "necessary to sustain the existence and/or perpetuation of a wildlife species at critical periods during its life cycle." Portions of salmon spawning streams within prime grizzly bear habitat constitute crucial

habitat. Webb (1983b) reported approximately three miles of chum salmon spawning habitat within prime habitat on the Tozitna River. Webb (1983c) also reported approximately 43 miles of chum and possible king salmon spawning habitat on the Kateel River.

Tankersley (1981) found that natural springs often provide sodium supplements to the early summer diet of moose. Animals may travel out of their way to visit a lick while moving between winter and summer ranges. September visits may provide important social contact for rutting bulls. One such spring was located in Sec. 29, T. 4 S., R. 1 W., KRM. This plus the McQuesten Creek Hot Spring located in Sec. 35, T. 10 N., R. 20 W., FM should be designated as crucial habitat.

HABITAT CONFLICTS

Present habitat condition is often determined by the existing mixture of food, cover and water. While little can be done to influence the water element, wildland fires can greatly influence the food and cover elements. Kelleyhouse (1980) and Viereck and Schandelmeier (1980) describes fire effects on wildlife. The following premises are generally agreed upon:

1. Fire and wildlife have coexisted for thousands of years.
2. Fire returns plant succession to an earlier seral stage.
3. Early to mid-seral stages have greater floral diversity and, thus, greater wildlife diversity.

The species and numbers of wildlife which humans wish to perpetuate always has been and will be an unsettled argument. However, BLM's policy is to maintain a maximum diversity of wildlife species in sufficient numbers to meet public demands (USDI BLM 1973). This stated policy can be satisfied by allowing fires to burn where threats to human life and property do not exist.

Traditional policy of fire suppression is slowly changing as Alaska Interagency Fire Management Plans are written and implemented. The Titna and Tozitna watersheds fall within the boundaries of the Tanana-Minchumina Fire Planning Unit, while the Kateel watershed falls within the boundaries of the Seward-Koyukuk Fire Planning Unit. Most of the three watersheds are designated as Limited Action Areas. Increased benefits to wildlife habitat from additional burned acreages have not been realized during the first two years of implementation of the Tanana-Minchumina Fire Plan (Robinson 1983, 1984). The Seward-Koyukuk Fire Plan is scheduled for implementation in 1984.

Anaconda Minerals Company recently recorded 680 tungsten lode claims in the western Ray Mountains. Development of these claims may cause negative impacts to caribou such as displacement of animals and increased harvest due to increased human contact.

If the cliff nest site along the Titna River is utilized by the suspected peregrine falcon, then the suspected trespass cabin is within a two mile radius of it. This is in direct conflict with the protection measures outlined for peregrines (Frickie et al 1982).

RECOMMENDATIONS

A variety of wildlife species was encountered along the Titna, Tozitna and Kateel Rivers. Habitat quality for moose, furbearers, waterfowl and gamebirds resulting from excessive fire suppression activities is in a downward trend. However, present habitat quality remains in pristine condition when compared to the potential negative impacts resulting from development of mineral resources. The following recommendations are provided for future inventory work and resolving habitat conflicts within the Central Yukon Planning Area.

1. The present enhanced Landsat images should be interpreted so that standard habitat sites can be identified. All wildlife observations on file should then be tied to a standard habitat site for further analysis. This and other pertinent data should then be computerized on an acceptable system.
2. Systematic surveys of the Ray Mountains Caribou Herd were initiated in March, 1983. These surveys should continue so that data will be available for impact analysis if Anaconda develops their tungsten lode claims.
3. Moose trend surveys were initiated by the BLM in November, 1983. These surveys should also continue for future analysis of fire management plans and acquiring a data base of a major subsistence resource.
4. Swan surveys should be established by the BLM in September, 1985. The USFWS conducts periodic swan surveys throughout Interior Alaska. Participation by BLM will help expand USFWS's data base in addition to monitoring wetland-riparian habitat on BLM land for potential oil and gas development and settlement.
5. Use of the Titna nest by peregrine falcons should be verified. A verified nest site on the Dulbi River should be revisited to determine its continued use.
6. Fire suppression activities on BLM land should be guided by the Alaska Interagency Fire Management Plans. Additional recommendations for smoother implementation of these plans are presented in Robinson (1984).

LITERATURE CITED

- Alaska Department of Fish and Game. 1973.
Alaska's wildlife and habitat. Juneau, Alaska.
- _____. 1978.
Alaska's wildlife and habitat - Volume II. Juneau, Alaska.
- American Ornithologists' Union. 1983.
Check-list of North American birds. Sixth edition. Allen Press, Inc., Lawrence, Kansas. 877 pp.
- Armstrong, R. H. 1980.
A guide to the birds of Alaska. Alaska Northwest Publishing Company. Anchorage, Alaska. 309 pp.

- Barnett, J. A. (ed.). 1983a.
Annual report of survey-inventory activities. Vol. XIII, Part II.
Caribou. Alaska Dept. Fish and Game Fed. Aid in Wildl. Rest. Proj.
W-22-1. Juneau, Alaska.
- _____. 1983b.
Annual report of survey-inventory activities. Vol. XIII, Part III.
Moose. Alaska Dept. Fish and Game Fed. Aid in Wildl. Rest. Proj.
W-22-1. Juneau, Alaska.
- _____. 1983c.
Annual report of survey-inventory activities. Vol. XIII, Part VII.
Beaver, furbearers, lynx, wolf, and wolverine. Alaska Dept. Fish and
Game Fed. Aid in Wildl. Rest. Proj. W-22-1. Juneau, Alaska.
- Brink, C. H. 1964.
Spruce seed as a food of the squirrels Tamiasciurus hudsonicus and
Glaucomys sabrinus in interior Alaska. M.S. Thesis, University of
Alaska, Fairbanks. 73 pp.
- Cade, T. J. 1960.
Ecology of the peregrine and gyrfalcon populations in Alaska. University
of California Publications in Zoology. Vol. 63: 151-267.
- Coady, J. W. 1976.
Interior moose and moose disease studies. Alaska Dept. Fish and Game
Fed. Aid in Wildl. Rest. Proj. W-17-7 and W-17-8, Vol. III. Juneau,
Alaska.
- Cushwa, C. T., and J. Coady. 1976.
Food habits of moose, Alces alces, in Alaska: a preliminary study using
rumen contents analysis. Canadian Field-Naturalist. Vol. 90(1): 11-16.
- Davis, J. L. 1978.
History and current status of caribou in Alaska. In D. R. Klein and R.
G. White, (eds.). Parameters of caribou population ecology in Alaska.
University of Alaska Biological Papers, Special Rpt. No. 3. Fairbanks,
Alaska. 49 pp.
- Durtsche, B. 1979.
Dulbi River field trip notes. Typewritten. Bureau Land Manage.,
Fairbanks, Alaska. 6 pp. + maps.
- _____, and L. S. McLean. 1979.
Gisasa River field trip notes. Typewritten. Bureau Land Manage.,
Fairbanks, Alaska. 5 pp. + maps.
- Farquhar, N., and J. Schubert (ed.). 1980.
Ray Mountains, Central Alaska: environmental analysis and resources
statement. Middlebury College Press, Middlebury, Vermont. 390 pp.
- Frickie, D. N., J. D. McGowan, D. G. Roseneau, C. M. White, L. Bouy and
others. 1982.
Recovery plan for the peregrine falcon-Alaska population. Unpublished.
Fish and Wildlife Reference Service, Denver, Colorado. 69 pp.

- Gasaway, W. C., S. D. DuBois and S. J. Harbo. 1981
Moose survey procedures development. Alaska Dept. Fish and Game Fed. Aid in Wildl. Rest. Proj. W-17-9 through W-17-11, W-21-1 and W-21-2. Juneau, Alaska.
- Hinman, R. A. (ed.). 1982.
Annual report of survey-inventory activities. Vol. XIII, Part I. Black bears and brown bears. Alaska Dept. Fish and Game Fed. Aid in Wildl. Rest. Proj. W-19-2 and W-22-1. Juneau, Alaska.
- Jones, J. K., Jr., D. C. Carter and H. H. Genoways. 1975.
Revised checklist of North American mammals north of Mexico. Occas. Papers, Museum, Texas Tech University, Lubbock, Texas. 28: 1-14.
- Kelleyhouse, D. G. 1980.
Fire/wildlife relationships in Alaska. Unpublished. Alaska Dept. Fish and Game. Tok, Alaska.
- Kelly, D. G. 1978.
Population density, territoriality, and foraging ecology of red squirrels (Tamiasciurus hudsonicus) in black and white spruce forests of interior Alaska. M. S. Thesis, University Alaska, Fairbanks, Alaska. 123 pp.
- LeResche, R. E. 1974.
Moose migrations in North America. Naturaliste Canadien. Vol. 101: 393-415.
- _____, and J. L. Davis. 1973.
Importance of nonbrowse foods to moose on the Kenai Peninsula, Alaska. J. Wildl. Manage. 37(3): 279-287.
- _____, R. H. Bishop, and J. W. Coady. 1974.
Distribution and habitats of moose in Alaska. Naturaliste Canadien. Vol. 101: 143-178.
- Machida, S. 1979.
Differential use of willow species by moose in Alaska. M. S. Thesis, University Alaska, Fairbanks, Alaska. 97 pp.
- Milke, G. C. 1969.
Some moose-willow relationships in the interior of Alaska. M. S. Thesis, University Alaska, Fairbanks, Alaska. 79 pp.
- Mindell, D. P. 1983
Harlan's hawk (Buteo jamaicensis harlani): a valid subspecies. The Auk 100: 161-169.
- Mowrey, B. 1977.
Truffles believed vital to forest ecosystem. The Forester's Almanac: 1977. Gen. Tech. Rpt. PNW-62. Pp 117-121.
- Mowrey, R. A., G. A. Laursen, T. A. Moore. 1981.
Hypogeous fungi and small mammal mycophagy in Alaskan taiga. Proc. 32nd Alaska Science Conference, August 25-27. Pp 120-121.

- Nodler, F. A. 1973.
Food habits, vocalizations, and territoriality of Alaskan red squirrels (G. Tamiasciurus). M. S. Thesis, University Alaska, Fairbanks, Alaska. 86 pp.
- O'Farrell, T. P. 1960.
Snowshoe hares in Alaska. I. Home range and aspects of population and natural history in interior Alaska. M. S. Thesis, University Alaska, Fairbanks, Alaska. 77 pp.
- Oldemeyer, J. L., A. W. Franzmann, A. L. Brundage, P. D. Arneson and A. Flynn. 1977.
Browse quality and the Kenai moose population. J. Wildl. Manage. 41(3): 533-542.
- Peek, J. M. 1974.
A review of moose food habits studies in North America. Naturaliste Canadien. Vol. 101: 195-215.
- Rausch, R. A., and A. M. Pearson. 1972.
Notes on the wolverine in Alaska and the Yukon Territory. J. Wildl. Manage. 36(2): 249-268.
- Robinson, S. R. 1983.
Tanana-Minchumina Fire Plan - 1982 Season. Typewritten. Bureau Land Manage., Fairbanks, Alaska. 13 pp.
- _____. 1984
Tanana-Minchumina Fire Plan - 1983 Season. Typewritten. Bureau Land Manage., Fairbanks, Alaska. 19 pp. + appendices.
- _____. 1984.
Status of the Ray Mountain caribou herd. Typewritten. Bureau Land Manage., Fairbanks, Alaska. 10 pp.
- Robus, M., B. Durtsche, H. Brownell, and L. S. McLean. 1979.
Meloizitna River field trip notes. Typewritten. Bureau Land Manage., Fairbanks, Alaska. 8 pp. + maps.
- Smith, M. C. 1967.
Red squirrel (Tamiasciurus hudsonicus) ecology during spruce cone failure in Alaska. M. S. Thesis, University Alaska, Fairbanks, Alaska. 68 pp.
- Spencer, D. L., and J. B. Hakala. 1964.
Moose and fire on the Kenai. Proc. Annual Tall Timbers Fire Ecology Conf. Vol. 3: 11-33.
- Spindler, M. A. and B. Kessel. 1980.
Avian populations and habitat use in interior Alaska taiga. Syesis. 13: 61-104.
- Tankersley, N. G. 1981.
Mineral lick use by moose in the central Alaska Range. M. S. Thesis, University Alaska, Fairbanks, Alaska. 51 pp.

- Trapp, G. R. 1962.
Snowshoe hares in Alaska. II. Home range and ecology during an early population increase. M. S. Thesis, University Alaska, Fairbanks, Alaska. 137 pp.
- USDI BLM. 1973.
Supplemental guidance, manual 1603. Rel. 1-835. Bureau Land Manage., Washington, D. C.
- Viereck, L. A., and L. A. Schandelmeier. 1980.
Effects of fire in Alaska and adjacent Canada - a literature review. BLM-Alaska Tech. Rpt. 6. Anchorage, Alaska. 124 pp.
- Wahrhaftig, C. 1965.
Physiographic divisions of Alaska. Geological Survey Professional Paper 482. USDI, USGS, Washington, D. C. 52 pp.
- Webb, J. 1979.
Fisheries inventory of the Melozitna River. Typewritten. Bureau Land Manage., Fairbanks, Alaska. 21 pp. + supplement (3 pp.).
- _____. 1983a.
Titna River fisheries inventory. Typewritten. Bureau Land Manage., Fairbanks, Alaska. 6 pp. + maps and photos.
- _____. 1983b.
Tozitna River fisheries inventory. Typewritten. Bureau Land Manage., Fairbanks, Alaska. 5 pp. + map and photos.
- _____. 1983c.
Kateel River fisheries inventory. Typewritten. Bureau Land Manage., Fairbanks, Alaska. 4 pp. + map and photos.
- White, C. M., and D. A. Boyce, Jr. 1978.
A profile of various rivers and their raptor populations in western Alaska 1977. BLM Tech. Rpt. 1, Anchorage, Alaska. 77 pp.
- Williamson, D. 1982.
Small hydropower, Northwest Alaska interim project: Nome, Galena, Anaktuvuk Pass. Typewritten. U. S. Fish Wildl. Serv., Fairbanks, Alaska. 35 pp. + appendices.
- Wolff, J. O. 1976.
Utilization of hardwood browse by moose on the Tanana flood plain of interior Alaska. USDA Forest Service Research Note PNW-267. Portland, Oregon. 7 pp.
- _____. 1978a.
Burning and browsing effects on willow growth in interior Alaska. J. Wildl. Manage. 42(1): 135-140.
- _____. 1978b.
Food habits of snowshoe hares in interior Alaska. J. Wildl. Manage. 42(1): 148-153.

TABLE 1. LAND STATUS OF THE TITNA, TOZITNA AND KATEEL RIVERS, ALASKA

Owner/Manager	A C R E S ¹			
	TITNA	TOZITNA	KATEEL	TOTAL
BLM (Unselected) ²	552,221	817,706	840,302	2,210,229
NATIVE SELECTED	20,466	43,829	43,097	107,392
STATE SELECTED	0	34,768	0	34,768
NATIVE/STATE SELECTED	0	52,731	0	52,731
USF&WS	9,696	0	137,719	147,415
ALASKA, STATE OF	0	56,509	0	56,509
NATIVE CORPORATION		36,924	0	36,924
 TOTAL:	 582,383	 1,042,467	 1,021,118	 2,645,968

1/ Areas were planimetered and do not represent official acreages.

2/ Acreages are for Fairbanks District only.

TABLE 2. OCCURRENCE OF WILDLIFE SPECIES IN THE
TITNA, TOZITNA AND KATEEL RIVERS, ALASKA

SPECIES	TITNA	TOZITNA	KATEEL
MAMMALS			
Masked Shrew			X
Snowshoe Hare	X	X	X
Marmot	O	O	O
Arctic Ground Squirrel	O	O	X
Red Squirrel	X	X	X
Northern Flying Squirrel	O	O	O
Beaver	X	X	X
Northern Red-backed Vole			X
Meadow Vole			X
Tundra Vole			X
Muskrat	O	O	O
Brown Lemming		X	
Porcupine	O	O	O
Coyote	O	O	O
Wolf	+	X	X
Red Fox	O	O	O
Black Bear	X	X	X
Grizzly Bear	O	X	X
Marten	X	O	O
Ermine	O	O	O
Least Weasel	O	O	O
Mink	O	O	O
Wolverine	+	+	+
River Otter	O	+	+
Lynx	+	+	+
Moose	X	X	X
Caribou	O	X	X
BIRDS			
Arctic Loon	X		
Trumpeter Swan			
Greater White-fronted Goose	X		
Canada Goose	X	X	
Mallard	X	X	X
Gadwall	X		
American Wigeon	X		
Harlequin Duck	X	X	
Common Merganser	X	X	
Red-breasted Merganser	X	X	
Bald Eagle		X	
Northern Harrier		X	
Red-tailed Hawk	X	X	
Golden Eagle		X	
American Kestrel	X	X	
Peregrine Falcon	X		
Gyr Falcon			X

SPECIES	TITNA	TOZITNA	KATEEL
Spruce Grouse	O	O	X
Willow Ptarmigan	O	O	O
Rock Ptarmigan	O	O	O
Ruffed Grouse	X	X	O
Sharp-tailed Grouse	O	O	O
Semipalmated Plover	X	X	
Lesser Yellowlegs	X	X	
Spotted Sandpiper	X	X	X
Least Sandpiper	X	X	X
Common Snipe	X	X	
Long-tailed Jaeger		X	
Bonaparte's Gull	X		
Mew Gull	X	X	X
Herring Gull	X		
Glaucous Gull		X	
Great Horned Owl	X		
Belted Kingfisher	X	X	X
Northern Flicker		X	X
Western Wood Pewee		X	
Alder Flycatcher		X	X
Tree Swallow	X		
Violet-green Swallow	X	X	
Bank Swallow	X	X	X
Gray Jay	X	X	X
Common Raven	X	X	X
Boreal Chickadee	X	X	X
Swainson's Thrush	X	X	
American Robin		X	X
Varied Thrush	X		X
Bohemian Waxwing	X	X	
Northern Shrike	X		
Yellow Warbler		X	
Yellow-rumped Warbler	X	X	
Northern Waterthrush	X	X	
American Tree Sparrow		X	
White-crowned Sparrow	X	X	
Dark-eyed Junco	X	X	X
Rusty Blackbird	X	X	

AMPHIBIANS

Wood Frog	X
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Subtotal - Mammals	27
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Subtotal - Birds	55
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Subtotal - Amphibians	1
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Grand Total	83
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Sources: X - BLM Observations
+ - ADF&G Furbearer Sealing Certificate
O - ADF&G (1973, 1978).

TABLE 3. TOTAL RECORDED HARVEST OF SELECTED WILDLIFE SPECIES
TITNA, TOZITNA AND KATEEL RIVERS, ALASKA
1978 TO 1982

SPECIES	TITNA	TOZITNA	KATEEL	TOTAL	ANNUAL AVERAGE
Grizzly Bear	0	1	4	5	1
Moose	19	9	0	28	6
Big Game Total	19	10	4	33	7
Annual Average	4	2	1	7	-
Beaver	4	0	18	22	4
Wolf	10	1	10	21	4
Wolverine	1	9	3	13	3
River Otter	0	1	4	5	1
Lynx	6	14	33	53	11
Furbearer Total	21	25	68	114	23
Annual Average	4	5	14	23	-

TABLE 4. ACRES OF PRIME HABITAT OF PRIORITY WILDLIFE SPECIES
TITNA, TOZITNA AND KATEEL RIVERS, ALASKA

SPECIES/GROUP	TITNA	TOZITNA	KATEEL	TOTAL
Grizzly Bear	232,641	486,464	840,302	1,559,407
Moose	0	121,440	4,494	125,934
Caribou	157,154	648,319	798,363	1,603,836
Furbearers	309,504	324,480	61,688	695,672
Raptors	10,736	18,513	0	29,249
Waterfowl	0	0	13,121	13,121
TOTAL	710,035	1,599,216	1,717,968	4,027,219
BLM UNSELECTED TOTALS	552,221	817,706	840,302	2,210,229