Chapter Four: Current and Projected Use of the Study Area

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Chapter Four: Current and Projected Use of the Study Area

A. Communities

1. Nenana

Nenana (population 486) is located 55 road miles southwest of Fairbanks on the George Parks Highway on the south bank of the Tanana River, just east of the mouth of the Nenana River. The area encompasses 6 mi^2 of land and 1 mi^2 of water. Nenana is in the western-most portion of Tanana Athabascan Indian Territory. The discovery of gold in Fairbanks in 1902 brought intense activity to the region. A trading post and roadhouse were constructed in 1903, to supply river travelers and trade with Indians. St. Mark's Episcopal mission and school were built upriver in 1905. Native children from other communities, such as Minto, attended school in Nenana. A post office opened in 1908. By 1909, there were about 12,000 residents in the Fairbanks area, most drawn by gold mining activities. In 1915, construction of the Alaska Railroad doubled Nenana's population. The community incorporated as a City in 1921 (ADCED, 2001).

The population of Nenana is a diverse mixture of non-Natives and Athabascans; 47.3 percent of the population are Alaska Native or part Native. A federally recognized tribe (Nenana Native Association) is located in the community. The majority of residents participate in subsistence activities. There are 2 schools located in the community, attended by 1,889 students. Local hospitals or health clinics include Valley Family Health Services and the Nenana Native Clinic.

Nenana has a strong private sector economy with a seasonal fluctuation as the center of rail-to-river barge transportation center for the Interior. Yutana Barge Lines is the major private employer in Nenana, supplying villages along the Tanana and Yukon Rivers each summer with cargo and fuel. Twenty-seven residents hold commercial fishing permits (ADCED, 2001).

2. Minto

Minto (population 258) is located on the west bank of the Tolovana River, 130 miles northwest of Fairbanks via the Elliot Highway and an 11-mile spur road off the highway. During the late 1800s, some residents of Minto traveled to Tanana, Rampart, and Fort Yukon to trade furs for manufactured goods, tea and flour. With the discovery of gold north of Fairbanks in 1902, steamboats began to navigate the Tanana River, bringing goods and new residents into the area. Old Minto became a permanent settlement when some members of the Minto band built log cabins there, on the bank of the Tanana River. A BIA school was established in 1937, but most families still did not live in Minto year-round until the 1950s. The village was relocated to its present location, 40 miles north of the old site, in 1969 due to repeated flooding and erosion. New housing and a new school were completed by 1971. Minto residents are mainly Tanana Athabascans. The population is 92.2 percent Alaska Native or part Native and the Native Village of Minto is a federally recognized tribe (ADCED, 2001).

Most of the year-round employment is with the school, clinic or village council. Many residents work during summers fire fighting for the BLM. Some residents trap or work in the arts and crafts center, making birch-bark baskets and beaded skin and fur items. One resident holds a commercial fishing permit. Subsistence is an important part of the local economy.

The Cultural Heritage and Education Institute has a Summer Cultural Camp in Old Minto. High school students of Minto visit the historical sights, learn their place names and locations, and become a part of recording the events and stories the Elders want preserved. The Minto Mapping Project began several years ago with the intent of recording indigenous place names of traditional and contemporary land sites used by the people of Minto Flats. This collaborative effort was done by the Cultural Heritage and Education Institute, Alaska Rural Systemic Initiative/Alaska Native Knowledge Network, and Minto High School Students. The idea for the Minto Mapping Project originated at the Summer Cultural Camp in Old Minto. The Elders expressed a need for their young people to learn the locations and the importance of several historical places before this knowledge was lost. They felt this information needed to be handed down to their children and grandchildren so they would understand some of the life-style and historical events from times past, and the role the countryside where they lived, played in their daily lives. Students are using the latest technology, such as computers, to incorporate audio and photographs into web pages (CHEI, 2001).

3. Anderson

Anderson (population 513) lies adjacent to the study area on a spur road 6 miles west off the George Parks Highway, and 76 miles southwest of Fairbanks. Clear Air Force Station, a ballistic missile early warning site completed in 1961, is located within its boundaries. The city is named for Arthur Anderson, one of several homesteaders who originally settled in the area in the late 1950s. In 1959, Mr. Anderson subdivided his 80-acre homestead into ¼-acre lots for sale. Most of the lots were purchased by civilian workers from Clear AFS. An elementary school was established in the community in 1961, and Anderson incorporated as a City in 1962. Most of Anderson's residents are non-Native military personnel or civilian employees of Clear AFS and their families. There is one school located in the community. The school, city, and other government positions employ over 92 percent of the residents of Anderson. A $106.5 million intercontinental ballistic missile radar warning system is under construction at Clear Air Force Station (ADCED, 2001).

B. Transportation

Most of the study area is off the road system and is accessible by foot, ATV, small boat, snow machine, helicopter, and ski or floatplane. The George Parks Highway and the Alaska Railroad traverse the eastern portion of the study area near Nenana and provide access to Fairbanks and Anchorage. The railroad provides daily freight service to Nenana. Five RS 2477 rights of way are within or adjacent to the study area: Dunbar Brooks, Ester Dunbar, Nenana-Tanana/Serum, Nenana Minto Mail, and Dunbar Tolovana (ADNR, 2002). The Nenana Municipal Airport offers a 5,000 ft. paved and lighted runway, with floatplane and ski plane landing areas. The Nenana Port Authority operates the dry cargo loading and unloading facilities, dock, bulkhead, and warehouse. The Tanana River is navigable, but shallow, with a maximum draft for loaded river barges of 4.5 feet (ADCED, 2001).

Minto is accessible by the Elliott Highway, a 130-mile drive to Fairbanks. The Tolovana River allows boat access to the Tanana and Nenana Rivers, but no barge service is available because it is too shallow. A new state-owned 2,000 ft. gravel airstrip is available. It is a local priority to extend the runway length in order to accommodate loaded Twin Otters. Trucks, cars, snowmachines, ATVs and riverboats are used for transportation, recreation and subsistence purposes (ADCED, 2001).

Anderson lies on a 6-mile spur road west of the George Parks Highway. The community is also served by a state-owned 4,000 ft. lighted asphalt runway is located at Clear, 4 miles south of Anderson. Charters and private aircraft serve the airstrip. A private 2,500 ft. dirt strip is located at Clear Sky Lodge (ADCED, 2001).

C. Tourism

Tourism in the study area is mostly limited to guided fishing and hunting charters. The City of Nenana is developing a tourist economy with the Alaska Railroad Museum, the Golden Railroad Spike Historic Park and Interpretive Center, the historical Episcopal Church, Iditarod dog kennels, and a replica of the sternwheeler Nenana. A heritage center is also under development. The Nenana Ice Classic – a popular competition to guess the date and time of the Tanana River ice break-up each spring, began in 1917 among surveyors for the Alaska Railroad. The Ice Classic administration provides short-term employment for nearly 100 locals. Other tourism resources in the study area include historic mine sites and other mining relics (ADCED, 2001).

D. Tanana Basin Area Plan

The study area is within the Tanana Basin Area Plan. The plan designates the uses that will occur on state lands within the Tanana Basin. It does not direct land uses for private, borough, or federal land, nor does it direct land uses for areas already designated for specific purposes, such as parks or wildlife refuges. Oil and gas activities are allowed throughout the basin (ADNR, 1992:1-11). The plan defers any decisions regarding leasing for oil and gas and other energy resources to ADNR's existing leasing (licensing) process.

E. Recreational Activity

The study area offers a wide variety of recreational activities. In the summer there is boating, rafting, recreational gold panning, biking, and berry picking. During the winter months residents participate in dog sledding, snow machining, cross-country skiing, snowshoeing, and trapping. Year-round there is hunting, fishing, hiking, camping, photography, and wildlife viewing. There are more than a dozen personal use and trapping cabins within the study area (ADNR, 2002).

1. Sport Fishing

A wide diversity of sport fisheries occur within the study area throughout the year, targeting northern pike, Arctic grayling, burbot, salmon, and rainbow trout. Whitefish and sheefishburbot are also taken each year with lesser harvests of char, and sheefish. The Minto flats area in the Tolovana and Chatanika river drainages is an excellent sportfishing area for trophy size northern pike. Access to Minto Flats is by boat, floatplane or by road. Guided fishing trips are available in the area. In early summer, the best fishing is at the confluences of the main rivers and in the lakes (ADF&G, 1986:638).

The State of Alaska, through the Alaska Board of Fisheries, manages sport fishing in state waters. Sport fishing is the catch and harvest of fish under a set of sport fishing regulations based on management strategies and gear restrictions designed to conserve the fisheries resources while allowing all Alaskans to participate in the fisheries and enjoy the resource. Sport fishing lends itself very well to family participation, with participants in all age and skill levels. Angling is the most common technique employed by those engaged in sport fishing, but in some situations harvest with setline, spear and/or bow and arrow is included in sport fisheries.

The fisheries within the study area provide a wide diversity of angling opportunity and a positive economic impact to the Tanana Valley. Both residents and non-residents benefit. The study area lies within ADF&G Division of Sport Fish's Lower Tanana River Management Area (LTMA). Additional information on LTMA sport fisheries can be found in the annual Area Management Reports. Summarized data include results from a statewide mail-out survey. Some estimates of catch, harvest, and effort in this section are specific to

fisheries of the study area. In other cases, inferences are made based on information generated for the entire LTMA.

Sport fishing occurs year-round within the study area, and includes stocks of fish found outside of the area that migrate through or otherwise seasonally depend on the study area. Many of the fisheries are small, but in aggregate they represent substantial opportunity. For some of the fisheries, sufficient information exists only to say that they exist and can be characterized. For others, more use data and biological information is available. Within the study area, sport catch includes chinook, coho, and chum salmon, northern pike, sheefish, burbot, Arctic grayling, and some whitefish. Across the LTMA, the proportion of sport catch which is harvested is: burbot, 72%; whitefish, 41%; sheefish, 29%; northern pike, 18%; and Arctic grayling, 6% (Doxey, in prep).

Salmon sport fisheries occur in the lower Nenana River Drainage (clear-water channels and upwelling areas in the Nenana River, Teklanika River, Seventeenmile Slough, Julius Creek, and Lost Slough area). Annual catch of chinook and coho salmon is a few hundred, and combined annual harvest, which is about 22 percent of catch in this area's fishery, is less than 200. The area also supports a grayling fishery, with some incidental angler catch of whitefish, burbot, and northern pike. Portions of the lower Nenana River Drainage streams are accessible by roads and trails from the Parks Highway. Access to the remainder is by boat from Nenana or from a landing on Julius Creek near Anderson.

Salmon are typically not part of the directed sport harvest in the Tanana River within the study area, but are taken in subsistence and commercial fisheries as they pass through. Upstream from the study area, salmon are taken in subsistence, personal use, sport and commercial fisheries.

The Kantishna River Drainage within the study area, including Rock Creek, supports minor sport fisheries for northern pike, burbot, and sheefish. The fisheries for northern pike and sheefish occur in clear side channels and the lower reaches of clear tributaries, while burbot are also taken in both the clear and glacially turbid waters. The mainstem of the Tanana River and the connected clear waterbodies provide similar opportunity. Available information suggests that local residents are the primary users of these fisheries. Incidental use also occurs by those traveling through, hunting, or pursuing other activities besides directed fishing trips. Primary access to these Tanana River and Kantishna River fisheries is by boat from Nenana, Manley, or Minto, while access by snowmachine and light aircraft is also possible.

The lakes and streams of Minto Flats provide angling opportunity for northern pike, burbot, and sheefish, with a few Arctic grayling and whitefish also taken. This is primarily a summer fishery, accessible by boat and floatplane. There are boat launches at Minto Village, Manley, and Nenana. The trip from Manley or Nenana entails a fairly long boat ride on the Tanana River and Lower Tolovana. There is road access from the Murphy Dome Area down to the Lower Chatanika River, where boaters launch and travel downstream into Minto Flats. However, the Murphy Dome Road down to the Chatanika River is deteriorating and access opportunity is degraded. Minto Flats has numerous stretches of water of sufficient length to accommodate a floatplane.

Minto Flats supports about 50 percent of the northern pike sport fishery in the LTMA. Northern pike are taken in most of the flowing waters and in many of the lakes connected to flowing waters within the flats. Northern pike taken in upstream reaches of Minto Flats rivers and streams (for instance, in the Chatanika River upstream from the Dunbar-Livengood Trail) are considered to be part of the Minto Flats stock. Most of the sport fishing in Minto Flats is concentrated in the Minto Lakes area in the eastern flats. The five-year (1995-99) average annual catch for the entire Minto Flats and lower Chatanika River is about 13,000 northern pike, with about 2,400 fish retained as harvest. For the same period, for Minto Flats (exclusive of the Lower Chatanika River, for which effort cannot be apportioned between northern pike and other species), average annual number of fishing trips is 2,505 and days fished is 4,249. To ensure conservation of the northern pike stock, the Alaska Board of Fisheries has adopted Minto Flats Northern Pike Management plans for both sport

(5 AAC 70.044) and subsistence (5 AAC 01.244) fisheries. Specific additional strategies include restrictions on season, gear, and exploitation rates. The exploitation rates are based on estimated harvest in those waters as a proportion of the estimated northern pike abundance in the Minto Lakes. Should exploitation appear to approach 20 percent additional assessment will be undertaken, followed if necessary by imposition of additional conservation measures. (Doxey, in prep).

Sheefish and burbot are taken in small numbers in the rivers of Minto Flats. Most of the take is likely incidental to the northern pike fishery. Although estimated catch may be somewhat lower than actual catch due to the difficulty of estimating catch in very small fisheries, annual estimated catch ranges from less than 100 to less than 200 per species. Anglers generally harvest about 80 percent of the burbot and about 40 percent of the sheefish that they catch. (Doxey, 2001)

Arctic grayling and whitefish are taken in the Lower Chatanika River, the Tolovana River, the Tatalina River, and Washington Creek. While most of the take in these streams is upstream from Minto Flats, some is reported in flowing waters of the flats (ADF&G 2002b).

Dune Lake provides year-round angling opportunity for stocked rainbow trout, coho salmon, and Arctic grayling. The lake is accessible by winter trail and float- or ski-equipped aircraft. Catch and effort estimates for Dune Lake appear in the statewide harvest, catch, and participation report. Five-year average annual effort for Dune Lake is 795 days fished. Average catch for all species combined is 6,518 fish, and average harvest is 1,804 fish. Anglers brought to the lake by commercial fly-in fishing services generate a considerable proportion of the effort. Firebreak and Oblique/Tschute lakes are developing rainbow trout fisheries, which the ADF&G does not yet produce use statistics. Firebreak and Oblique/Tschute lakes have no trail access at this time.

Sport fisheries contribute significantly to the local and statewide economies. The Lower Tanana Management Area sport fishery generated a minimum of $203,000 in license fees in calendar year 2000 (Doxey, in prep). This is only a proportion of the economic value of the sport fishery, and does not consider the money spent on fishing gear, equipment, transportation, and other amenities by resident and non-resident anglers fishing in the LTMA. Economic studies have been done to assess total net economic value per fishing trip within Sport Fish Division Region III (the northern half of Alaska). Some site-specific estimates are available. Estimated adjusted mean net economic value per trip to the Chatanika River for grayling generated in 1996 by a subset of residents in which Tanana Valley residents predominate was $116 (Duffield et al., 2001a). The equivalent value for species other than grayling was $140. Value per trip to non-specified areas (again primarily from Tanana Valley anglers) in 1998 was $130 for northern pike and $139 for burbot (Duffield et al., 2001b). The value of a fishing trip to Minto Flats for northern pike is likely much higher, since Harding Lake and other roadside northern pike fisheries are factored into the average (ADF&G, 2002b). Much of this money is spent in the local communities. Commercial guiding or air charter businesses provide services to anglers traveling to the Nenana River Drainage and Minto Flats.

Federal monies derived from an excise tax on sport fishing equipment are disbursed to the State of Alaska on a 3 to 1 match with state fishing license receipts to fund the fisheries research and management efforts of Sport Fish Division. All of the research on resident species cited in the fish section of Chapter Three in this finding, such as the radiotelemetry studies documenting winter distribution and movements of northern pike in Minto Flats, were thus funded.

2. General Hunting and Trapping

The high concentrations of waterfowl on Minto Flats, and proximity to Fairbanks, make it one of the most popular waterfowl hunting areas in the state. Available data from state mail questionnaire harvest surveys (1971-1997) indicate that Minto Flats receives some of the highest waterfowl hunter activity in the

state, and that a relatively large proportion of the total state duck harvest is taken on Minto Flats (ADF&G 1998). Although not a premier goose hunting location, goose harvest and hunter activity is moderately high (Petrula, 2002).

The study area encompasses some of the most productive furbearer habitat in Alaska. Trapping is primarily a winter activity for many Interior residents. Trapping activities commence in November and continue into April. Commonly harvested furbearers include beaver, red fox, lynx, marten, mink, muskrat, wolf and wolverine. Marten is perhaps the most commonly trapped species across the region. Target species vary from area to area, from year to year, and among individual trappers. There are customary rules regarding the use or ownership of traplines. Trapping areas are generally recognized as belonging to an individual, consistent with the use of an area over time, and trapping rights to an area are often passed between family members (ADF&G, 1986:809).

Although furbearers are harvested primarily for the cash value of their pelts, some pelts are often retained for local use in making hats, mitts, parka ruffs and handicrafts. In addition, the meat from beaver, lynx, and muskrat is prized as high quality food for both humans and dogs. Beaver carcasses are often sold or traded as dog food. Aside from providing a source of income, food and furs for local use, the traditional land skills associated with trapping make it a valued cultural activity for many residents (ADF&G, 1986:810). Between 1992 and 2000, the average annual reported trapping in the Minto Flats Management Area (MFMA) was 110 beaver, 37 otter, 17 wolf, 9 lynx, and 1 wolverine.

Moose are the most sought after big game animal in Alaska. Hunters report harvesting over 7,000 of Alaska's estimated 175,000 moose each year. Going out to "get a moose" is a fall ritual for tens of thousands of Alaskans. Moose management is designed to maintain productive and abundant moose populations in important hunting areas. Moose are easily managed through regulation of predation, enhancement and maintenance of habitat, and restrictions on annual harvests (Kellyhouse, 2000). Most of the study area lies within either the MFMA (5 AAC 92.530(8)) or the Nenana Controlled Use Area (5 AAC 92.540(3)(J)) (Figure 4.1). Both of these areas have restrictions in place that limit mechanized transportation methods that can be used by moose hunters.

The MFMA is a popular moose hunting area because of the large number of moose and relatively high bull:cow ratios. In FY 2000, 169 hunters reported harvesting 47 bull moose during the general hunt period (September 11-20) (ADF&G, 2001:4). Moose hunting effort and harvest is concentrated in the southeastern portion of the MFMA. On average, more than 50 percent of the general and subsistence season moose hunting effort and harvest reported for the MFMA between 1992 and 2001 occurred within the MFSGR core area.

Black bears are a popular big game animal with a yearlong season, although they are hunted primarily in the spring and fall. An average of 21 black bears were reported taken annually in the MFMA between 1991 and 2000.

F. Forestry

The study area covers portions of the Tanana Valley State Forest (TVSF) Management Plan (Figure 4.2). Both state and the Toghotthele Corporation (the Village Native Corporation for Nenana) have conducted timber sale activities along the Tanana River. These sales occurred between 1989-1994. In December 1997, the Division of Forestry (DOF) postponed a timber sale called Tanana West No. 2 in the Old Minto area. The sale was controversial due mainly to access issues and was postponed pending completion of the management plan. DOF is considering offering this sale again if access issues can be resolved. There are currently three sales on the Five Year Schedule of Timber Sales that may occur in the study area. For more information visit the TVSF website at http://www.dnr.state.ak.us/forestry/resource.htm#tvsf.

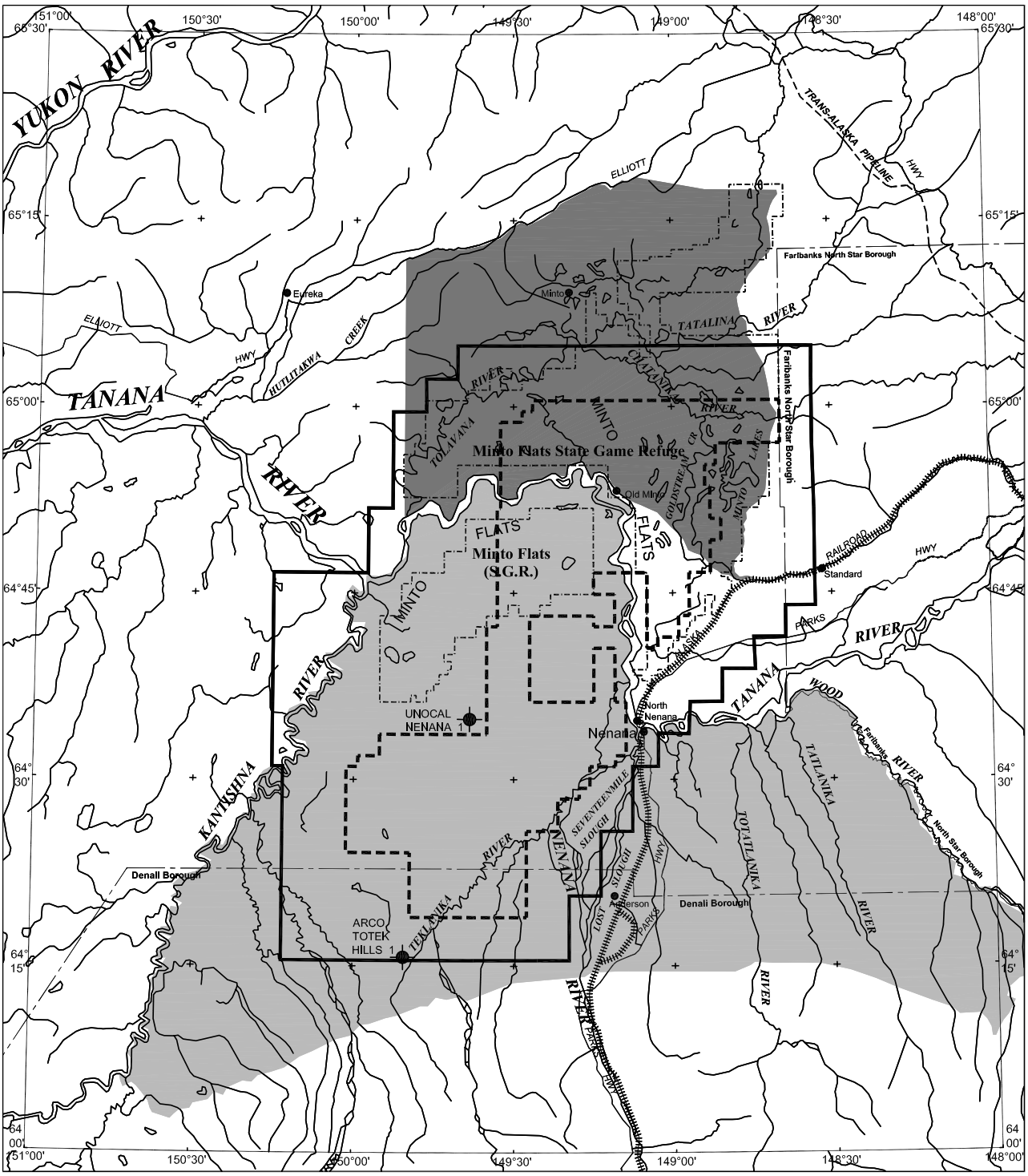

FIGURE 4.1 Minto Flats Management Area And Nenana Controlled Use Area

Nenana Basin Study Area = License Area =

Controlled Use Area = Minto Flats Management Area =

Map Area

SCALE 1:750,000 One Inch Equals 12 Miles Approx.

Source: ADF&G.

10 0 10 20 30 40 50 Miles

10 0 10 20 30 40 50 60 Kilometers

Map created, edited, and published by the State of Alaska, Department of Natural Resources, Division of Oil and Gas.

Albers Equal-Area Conic Projection, 1927 North American Datum, Clarke 1866 ellipsoid with a central meridian of 149° 30', origin latitude of 50°, northern parallel of 65°, and southern parallel of 55°.

ADNR 7/02

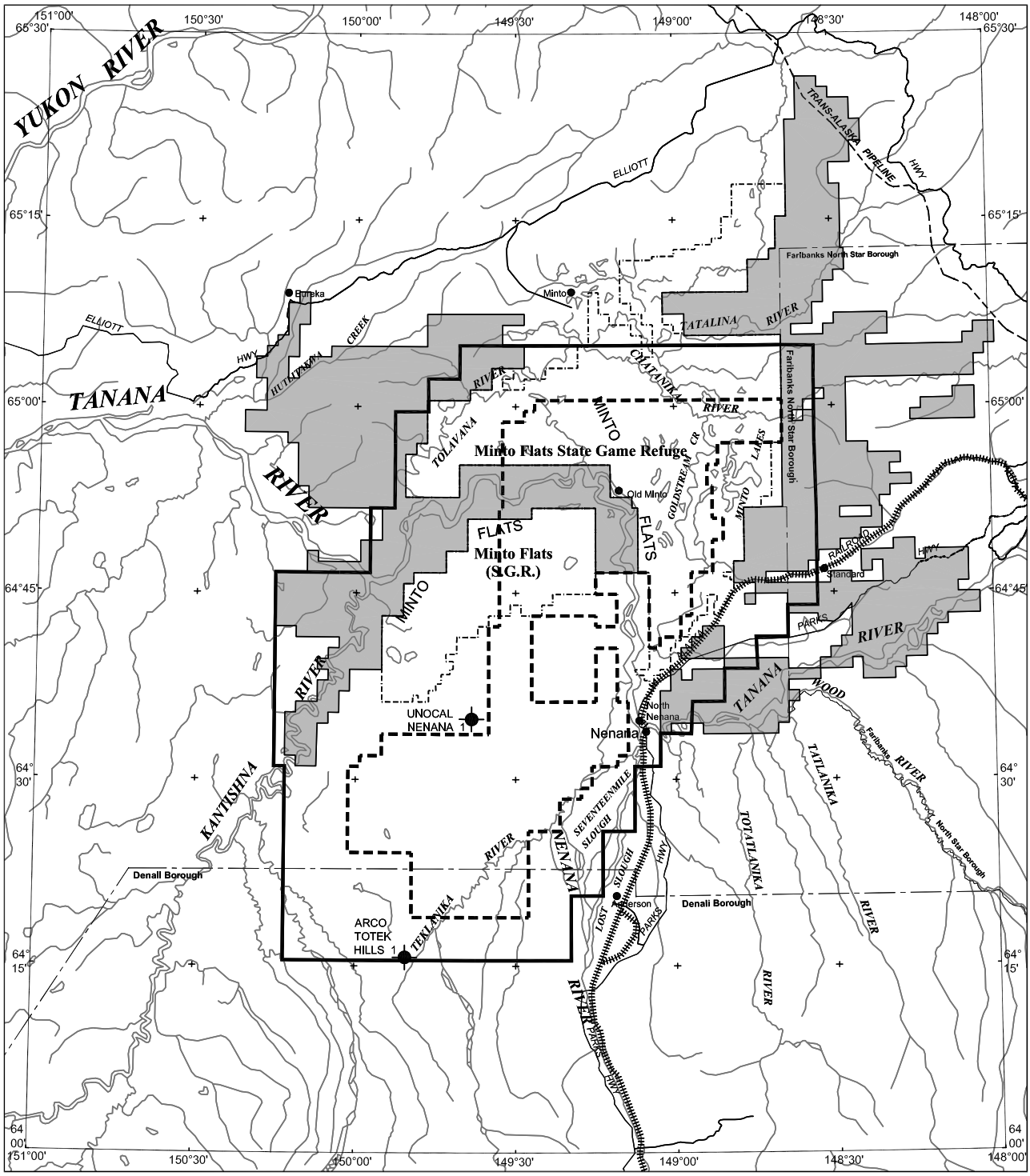

FIGURE 4.2 Tanana Valley State Forest

Nenana Basin Study Area = License Area =

Tanana Valley State Forest =

Map Area

SCALE 1:750,000 One Inch Equals 12 Miles Approx.

10 0 10 20 30 40 50 Miles

10 0 10 20 30 40 50 60 Kilometers

Map created, edited, and published by the State of Alaska, Department of Natural Resources, Division of Oil and Gas.

Albers Equal-Area Conic Projection, 1927 North American Datum, Clarke 1866 ellipsoid with a central meridian of 149° 30', origin latitude of 50°, northern parallel of 65°, and southern parallel of 55°. ADNR 7/02

G. Subsistence

The state of Alaska, through the Boards of Fisheries and Game, manages subsistence resources on all lands and waters in Alaska, and the Federal Government, through the Federal Subsistence Board, is responsible for assuring a federal subsistence priority on federal public lands and waters. Both state and federal laws define subsistence as the "customary and traditional" use of wild resources for food, clothing, fuel, transportation, construction, art, crafts, sharing, and customary trade.

Eligibility for subsistence uses differs in state and federal law. Under federal law, only rural residents qualify for subsistence hunting and fishing on federal public lands. Federal subsistence regulations further restrict eligibility only to those rural residents who have a customary and traditional use of a particular fish stock or game population in a particular area. Some federal public lands remain open to use under state regulation by residents who are not federally qualified subsistence users.

Under current state law, all state residents qualify for subsistence fishing and hunting on state and private lands of those fish and wildlife populations where subsistence use occurs. If non-subsistence uses have been eliminated and the regulatory board has determined that the harvestable surplus of a fish or wildlife population is not sufficient to provide a reasonable opportunity for all subsistence uses, the regulatory board distinguishes between subsistence users and determines eligibility on the basis of (1) customary and direct dependence of the subsistence user on the fish or wildlife population for human consumption as a mainstay of livelihood; and (2) the ability of the subsistence user to obtain food if subsistence use is restricted or eliminated (Haynes, 2000).

Subsistence hunting, fishing, and trapping occur year-round, throughout the entire region. Subsistence foods include salmon, other fish, big game, small game, waterfowl, and furbearers. In addition to fish and game, vegetation is an important subsistence resource within the study area. Subsistence use of vegetation includes many foods and fuel as well as building materials. Virtually all fish and wildlife species present in the region are used for subsistence purposes. Harvest techniques include hunting, fishing, and trapping, with use of boats being important for access to traditional riverine or lake subsistence use areas.

Subsistence use of various resources within the project area has been documented for the villages of Minto (Andrews, 1988; Betts, 1997) and Nenana (Shinkwin and Case, 1984), and the Parks Highway communities of Anderson and Healy (ADF&G, 1992b). There are currently no published data regarding subsistence uses by residents of Fairbanks.

Salmon are an important food source in the subsistence diet. A high percentage of families participate in salmon fishing activities. Chinook, chum, and coho are the primary species available. Salmon runs vary in size, timing and location. Chinook salmon are the first to arrive in late June or early July, followed by “summer” chums in late July and August and “fall” chums and cohos from August until freeze-up. Set gill nets and fish wheels are most commonly used to harvest salmon. Salmon fishing and processing is usually a group activity performed by related individuals. Past use generally establishes a family’s claim to a particular fish camp, net, or wheel site (ADF&G, 1986:804).

Individual household salmon harvests may vary from year to year, depending on wage employment opportunities, water level, strength of salmon runs, and weather conditions for drying fish. The extent of reliance on salmon is largely a function of proximity to salmon runs and local traditions and preferences. Harvested salmon are frequently shared and exchanged among households and communities (ADF&G, 1986:806).

Chinook salmon are favored for human consumption. They are prepared as smoked strips, filets, and canned products. Heads of Chinook salmon are often dried and used in soup. Chum and coho salmon are used for both human consumption and dog food, depending on the quality of harvested fish. Chum and coho salmon are usually gutted, split, filets scored with diagonal cuts, and hung to dry on outdoor racks. Household and community freezers are also used to preserve fish at some locations. Salmon eggs are often dried for human consumption and dog food. Fish entrails are used as dog food or fertilizer (ADF&G, 1986:806).

The importance of salmon as a wild food resource is reflected in its almost universal use throughout the region, the extent to which salmon are shared through kinship, community, and intra-community distribution and exchange networks, and the amount of effort some residents expend to obtain it (ADF&G, 1986:807).

Humpback whitefish, pike, sheefish, and broad whitefish are the most important species of fish used for subsistence purposes (BLM, 1989 citing to Shepherd, et al. 1985). Pike is used for dog food during the summer and human food at other times. The Tolovana and Chatanika rivers are primary pike fishing areas, as are the larger lakes. Set and dip nets are used for pike and whitefish in the spring and summer. In winter, a hook and jig is used for ice fishing for pike, or a short gill net is set under the ice (BLM, 1989 citing to Silas 1987).

Moose are one of the most important subsistence animals in Minto Flats. Not only do moose provide meat for daily consumption, they also provide meat and other substances for potlatches (BLM, 1989 citing to Andrews and Napoleon 1985, Fejes 1981, Wiggins 1978). Moose hunting takes place primarily in September, but may continue through fall and winter. Boats are commonly used for fall moose hunts along major rivers, sloughs, and lakes. Hunting parties typically consist of two to four related individuals. In the winter, snow machines are commonly used to access moose hunting areas, and the stalking and tracking of moose is done on foot with snowshoes. Moose are also taken opportunistically in conjunction with winter trapping activities (ADF&G, 1986:797).

Harvested moose are very thoroughly utilized. Moose meat is eaten fresh or is frozen or canned for future use. In some locations moose meat is also preserved by drying. Hunters report eating the heart, liver, head meat, lower lip, nose, chin, brains, intestine, tongue, kidneys, stomach, and lungs. Normally, the brisket, head, ribs, backbone, stomach, and leg marrow are saved for use during funeral or memorial potlatches when the entire community and guests are present (BLM, 1989:3-71). Moose hides are occasionally tanned and used for making clothing or handicrafts. Moose meat is commonly shared between hunting parties and members of extended families and often distributed widely through an entire community (ADF&G, 1986:798). In FY 2000, 100 Tier II subsistence permits for bull or cow moose were issued and 28 bulls and 25 cows were reported taken during the September 1-20 and January 10-February 28 seasons (ADF&G, 2001:4).

Moose meat from a successful hunt often is distributed throughout the community to relatives, unsuccessful hunters, elders, and needy persons. Thus, moose fills social and religious, as well as subsistence needs.

Brown bears are not a major food resource in Interior Alaska. Nuisance brown bears that threaten life or property may be shot and the meat and hide utilized, but hunters for food only occasionally pursue brown bears. Black bears are more widely utilized than brown bears throughout the Interior. Black bears are typically hunted in conjunction with other hunting, fishing, or gathering activities, or when other meat is not available. Black bears are harvested in May at or near den sites and more commonly in late summer or early fall. Black bear meat is commonly served at community feasts and potlatches. Fat black bears are preferred for human consumption. Bear fat is sometimes rendered into oil, but the entrails are not generally eaten. The hides of black bears are tanned for local use and sale. Spring bear hide is considered best for mittens, boots, and moccasins (ADF&G, 1986:800).

The contribution that small game and waterfowl make to the diet and economy of Interior households should not be underestimated. A variety of ducks, geese, grouse, and snowshoe hare are generally available and are widely used and highly valued sources of wild food. Ptarmigan, porcupine, and arctic ground squirrel are used, but less frequently (ADF&G, 1986:802).

Small game hunting is often carried out in conjunction with other hunting, fishing and gathering activities. Whereas big game hunting is typically an adult male activity, small game hunting is pursued by young and old hunters alike, and by both men and women.

After breakup, the lakes, ponds, and streams of Minto Flats support an abundance of waterfowl. Both subsistence and recreation hunters intensively hunt ducks and geese. Area lakes are particularly important habitat for nesting and breeding populations of ducks, geese, and swans (BLM, 1989 citing to Andrews, 1988). The waterfowl species most often harvested include the Canada and white-fronted goose, mallard, pintail, and oldsquaw. Waterfowl hunting occurs in May, when ducks and geese are highly valued as a source of fresh meat and variety to the local diet. Peak harvesting usually occurs in September. Following freeze-up of lakes in the late fall, waterfowl hunting is concentrated along rivers and sloughs (ADF&G, 1986:802). Duck in soup is a traditional funeral and memorial potlatch food, and the first harvest of the year often means a community picnic celebration (Andrews 1988).

Snowshoe hares are shot and snared throughout the year, but are more commonly harvested in the fall and winter. Hares are prepared fresh or preserved by freezing. Hares are also used as trap bait or dog food, and their fur is used for boot or mitten liners. Porcupines are highly prized by some hunters for their meat and fat. Quills are sometimes used in making handicrafts. Porcupines are occasionally shot but more often clubbed. They are commonly regarded as an emergency food source that can easily be obtained without the use of firearms (ADF&G, 1986:803).

Plant resources provide an important source of food, fuel, and raw material to area residents. Berries picked in season include high and low bush cranberries, raspberries, blueberries, blackberries and cloudberries. Berries are frozen or cooked for preservation. Many are donated for potlatches, where, when mixed with Crisco, sugar, and sometimes fish eggs for "ice cream" or made into a pudding, they are the traditional dessert during potlatch meals. Another plant harvested for subsistence is wild rhubarb, cooked with sugar and canned for use at potlatches (BLM, 1989 citing to Andrews 1988).

Wood is a major source of fuel across much of the Interior, and firewood cutting is an activity that takes place year-round. Most households heat with wood, although some also use oil. Birch is used to make sleds, snowshoes, and other Items. The bark is used to make baskets, plates and other traditional items (Andrews 1988). Willow is used as reinforcement in basket making, as supports in camp cooking, as clothing holders, and in drying fish. Poplar is used for smoking meat and fish (BLM citing to Andrews 1988).

Gathering of edible plants such as Indian potato, wild rhubarb, and mushrooms, occurs during the summer. Firewood is gathered throughout the year, but wood-gathering activities intensify around October (ADF&G, 1986:810). Gardening is often overlooked as a means of subsistence, providing cabbage, potatoes, carrots, turnips, and other fresh vegetables.

The harvest and use of these foods represent activities with significant social and cultural meaning as well as economic importance, especially within Alaska Native communities (MMS, 1995:III.C.6). Subsistence activities tie the community together and provide group identity and community stability.