United States Department of the Interior

BUREAU OF LAND MANAGEMENT
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FEB 10 2016

In Reply Refer to:
1864 (AK941)

Memorandum

To: Files FF-094608, FF-094609, FF-094610, FF-094611 and FF-094612

From: Ralph Basner, Navigable Waters Specialist (AK941)[1] Ralph Basner

Subject: Navigability of Kantishna River, Birch Creek, Muddy River and Lake Minchumina, in the Tanana River Subregion

On September 20, 2005, the State of Alaska filed applications with the Bureau of Land Management (BLM) for recordable disclaimers of interest (RDI) for the beds of the Kantishna River, Birch Creek (a portion thereof), Muddy River, Lake Minchumina, Deep Creek, and Jim Lake in the Tanana River subregion.[2] Kantishna River, Birch Creek, and Muddy River comprise a historical route of travel by boat to Lake Minchumina. Deep Creek and Jim Lake are small water bodies in the vicinity of Lake Minchumina.

The purpose of this report is to review the merits of the State's RDI applications. The report summarizes, for each water body, the status of adjacent uplands, the history of BLM navigability determinations, and, where appropriate, the evidence of commercial navigation. Because the Kantishna River, Birch Creek, Muddy River, and Lake Minchumina form a route of intra- and inter-regional travel, they are discussed together. The Deep Creek and Jim Lake applications were analyzed and adjudicated separately, resulting in the subsequent issuance of RDIs on December 8, 2014 and March 27, 2012, respectively. Accordingly, the remainder of this report focuses solely on the navigability of the Minchumina-Kantishna corridor (Lake Minchumina, Muddy River, Birch Creek and the Kantishna River).

The State of Alaska asserts that it is the owner of the lands underlying the subject water bodies under title navigability and riparian law. If the water bodies were navigable in fact and in law, then title to the lands underlying the water bodies passed to the State at the time of statehood

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[1] Former BLM employee, C. Michael Brown researched and authored the first draft of this report. Major updates (by Basner) were required due to changing land status, the issuance of RDIs for Jim Lake and Deep Creek, and the submission of additional information regarding the avulsive events affecting the Kantishna River and Birch Creek.

[2] See Dick Mylius to Henri Bisson, September 20, 2005, file FF-094612 (1864), submitting the applications as a group. For specific applications, see Dick Mylius to Henri Bisson, September 21, 2005 for Kantishna River and a segment of Birch Creek in file FF-094612 (1864), Alaska State Office, BLM records, Anchorage (hereafter BLM records). Identical letters were sent for Deep Creek (FF-094609), Jim Lake (FF-094608), Muddy River (FF-094610), and Lake Minchumina (FF-094611).

(1959). If a water body is not navigable, and the State is the riparian landowner, then the State claims ownership of the submerged lands under riparian law. In support of its assertion, the State cites as authorities the Equal Footing Doctrine, the Submerged Lands Act of 1953, the Alaska Statehood Act, the Submerged Lands Act of 1988, and "any other legally cognizable reason."

In support of its applications, the State submitted numerous BLM memoranda and historical reports containing evidence relating to the navigability of the subject water bodies. The information has been incorporated into this report where appropriate. A complete list of the submitted documents by application is attached. A bibliography of sources also used to prepare this report is attached.

The State created and provided four maps showing the location of the subject water bodies. The applied-for rivers and streams, including "all sloughs, channels and braids between the ordinary high water lines of the left and right banks," are highlighted in blue and identified as "navigable waters included in this application" in the legend. The maps are based on U.S. Geological Survey one-inch-to-the mile maps[3] (scale 1:63,360) and 2004 USGS National Hydrography Dataset. The maps are in BLM's serialized casefile FF-094612 (1864).

Kantishna River-Lake Minchumina System

Located in the Tanana River subregion, in Interior Alaska, the Kantishna River-Lake Minchumina system, approximately 225 miles in length, is a historic route of travel and transportation. The system consists of four water bodies (in downstream order): Lake Minchumina, Muddy River, Birch Creek, and Kantishna River. All of the water bodies are ice-free for approximately six months of each year. The system is approximately 200 miles southwest of Fairbanks.

The Kantishna River is a major tributary of the Tanana River. From its head at the confluence of Birch Creek and McKinley River, the Kantishna River meanders northeasterly approximately 175 miles to empty into the Tanana River approximately 69 miles below the town of Nenana, a river port on the Alaska Railroad or approximately 99 miles from the Yukon River.[4] For most of its length, the river is well over 200 feet wide, has a moderate current, and contains many islands in its channel. Although many clearwater streams and lakes (e.g., Bearpaw River, Lake Minchumina) contribute to its flow, the Kantishna River is a muddy stream. Several large rivers, such as the McKinley River, head in glaciers and discharge silty waters into the upper reaches of the river.[5] In addition to McKinley River and Birch Creek, the river's principal tributaries are, in upstream order, the Toklat River (river mile 62.4) and Bearpaw River (river mile 118.5).

The Kantishna River and Lake Minchumina are linked by a fifty-mile-long system of waterways called Muddy River and Birch Creek. From the eastern end of the lake, the Muddy River[6] flows approximately forty-eight miles northeasterly and then southerly through a lake-studded lowland

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[3] The State's maps do not identify what edition (or revision) of the U.S. Geological Survey (USGS) maps was used.
[4] See USGS Mt. McKinley, Kantishna River, and Fairbanks Quadrangles (1:250,000).
[5] Capps 1919, 12.
[6] See USGS Mt. McKinley and Kantishna River quadrangles (scale 1:250,000).

to Birch Creek, which in turn flows approximately two miles to the Kantishna River.[7] Both rivers are narrow, muddy, deep, and flow with little current. According to one report, the Muddy River is so crooked that in some places only ten feet of land separates the channels.[8]

Lake Minchumina (elevation 642 feet) is located approximately 200 miles southwesterly of Fairbanks, the largest city in Interior Alaska, and 65 miles north-northwest of Mt. Denali (formerly "McKinley"). The lake also has the distinction of being about five miles northwest of Alaska's geographic center.[9] At its maximum, the irregularly-shaped lake is about nine miles long and five miles wide for a total area of approximately 16,000 acres. The known maximum depth is thirty-nine feet.[10]

The historic record contains evidence of changes to Lake Minchumina and Muddy River. In a study of subsistence activities, Richard H. Bishop, a former local resident, reported that since the 1940's water levels in Lake Minchumina had generally declined, reaching a low point in 1976. Water levels were two to four feet lower. In the fall of that year, "most of the western portion of the lake was dry" and the remainder was "very shallow." Other researchers have reported continued declines such that, by 2006, water levels had dropped to such an extent that boats could not be used on perhaps a third of the lake.[11]

Earthquakes, insufficient snowfall, and the Foraker River have been identified as possible causes in the decline of the lake's water levels. According to local residents, water levels dropped eight feet after the record-breaking earthquake of 1964. Following an earthquake in October 2002, water levels dropped two feet. In addition, Bishop hypothesized that the Foraker River may be a contributing factor. Since before the 1960's, the Foraker River's mouth has moved from the head of Muddy River to the easternmost part of the lake "several times." When the river discharges silt into the lake, an increase of flow from the lake into Muddy River may result. As Bishop explained it, "siltation has raised the lake bottom, which has increased the gradient at the outlet and resulted in increased scouring and deepening of the channel. This in turn allowed the water level to drop." He noted, however, that this hypothesis did not account for the fact that water levels in the Muddy River were also lower. Before, many sloughs and ponds had

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[7] There is a difference of opinion as to whether this section is in fact Birch Creek or Muddy River. Local Natives reportedly refer to this lowermost reach as part of Muddy River rather than Birch Creek. See Gudgel-Holmes 1991, 92.

[8] Warren "Slats" Lindsay to Mr. and Mrs. Holmes, July 4, 1982, Kantishna Oral History Project, Dianne Gudgel-Holmes, Records, 1910-84, Archives and Special Collections, University of Alaska, Anchorage (hereafter UAA Archives). Lindsay's claim that the river was about 30 feet deep probably is an exaggeration. See "Transcript of Interview Conducted 1/14/84 by Clifford Cernick with Warren ("Slats") Lindsay 'Last of the FAA Riverboaters'; at Lincoln City, Oregon, in same collection. The writer thanks Steve Taylor of the Alaska Department of Natural Resources, Anchorage, for bringing these records to my attention.

[9] See USGS Mt. McKinley quadrangle (1:250,000), and Bishop 1978, 1.

[10] Gerald G. Wright, "Fairbanks Lands and Minerals Management Report on the Compactness of Six Applications for Selection by the State of Alaska," June 4, 1962, file F-028722, state selection files, BLM records.

[11] Hall, D. James, Overview of Environmental and Hydrologic Conditions at Lake Minchumina and Skwentna, Alaska, U.S. Geological Survey, Open File Report 95-438, Prepared in Cooperation with the Federal Aviation Administration, Anchorage, Alaska, 1995.

permanent water connections with the Muddy River, now they were connected at high water stages only.[12]

Land Status and BLM Navigability Determinations[13]

Land ownership along the Kantishna River system is mixed. At the time of statehood, the lands were not in a reserve or withdrawal. Today, the National Park Service (NPS) is the principal federal riparian land manager. Muddy River, Birch Creek, and the Upper Kantishna River are located within the Denali National Preserve, created by the Alaska National Interest Lands Conservation Act of 1980. BLM-managed lands are limited to four sections of land along the Kantishna River in Township (T.) 5 South (S.), Range (R.) 14 West (W.), Fairbanks Meridian (F.M.) (these lands are selected by Doyon Ltd.) and some smaller tracts along the north shore of Lake Minchumina. Although it has taken title to certain lands along Muddy River (Secs. 31 to 33, T. 10 S., R. 21 W., F.M.), Doyon, Limited Regional Corporation is not a major owner of riparian lands in the area.[14] Finally, the State of Alaska owns most land abutting the lower reaches of the Kantishna River, most of it conveyed in the late 1970's and early 1980's under the Alaska Statehood Act. In the early 1960s, the State also received title to most land along Lake Minchumina under the Mental Health Act of 1956.

Kantishna River

The Kantishna River flows through twenty townships.[15] The State is the principal riparian landowner. In its upper reaches, the river flows through four townships (Tps. 11 S., Rs. 18 and 19 W., F.M., and Tps. 12 S., Rs. 19 and 20 W., F.M.) located within the Denali National Park & Preserve and managed by the NPS. (Recent aerial photos show the Kantishna River is currently also located in T. 11 S., R. 20 W., F.M. The State does not claim, nor is there any evidence to suggest, that the river was located in that township at the time of statehood.) In recent years the State has taken title to most of the lower river, starting approximately 29 miles downstream from its head[16] and continuing downstream to the confluence with the Tanana River. Presently, there are only four sections of regional-selected land within T. 5 S., R. 14 W., F.M., at the confluence of the Toklat River.

The State of Alaska is the principal non-federal riparian landowner. The State owns all riparian lands along the Kantishna River in fifteen townships and has a pending selection in one additional township.[17] Prior to conveying these lands to the State, the BLM consistently held

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[12] Bishop 1978, 1, 3, 4. From 1992 to 2001, the Foraker discharged large quantities of glacial silt into the lake. In 2001, the Foraker shifted back and stopped dumping as much silt into the lake. See Holen, Simeone, and Williams, 50, 61, and 62.

[13] Land status analyses are based solely on BLM's current master title plats.

[14] Doyon, Limited has a pending regional selection in Secs. 21, 22, 27 and 28, T. 5 S., R. 14 W., F.M.

[15] The State asserts that the river is located in twenty-one townships. This number includes T. 11 S., R. 20 W., FM, where a minor slough of the Kantishna River is located. We have not included the township because of riparian law issues. See discussion of sloughs, braids, and channels on p. 28. See also Tammas Brown, Natural Resource Manager, State of Alaska, to Mike Brown and Jack Frost, BLM, August 24, 2007, file FF-094612, BLM records.

[16] River mileages calculated from BLM's Storet Maps, Mt. McKinley D-3, D-4.

[17] The fifteen townships are: Tps. 2 and 3 S., R. 12 W.; Tps. 3-5 S., R. 13 W.; T. 5 S., R. 14 W. (partial); Tps. 6-8S., R. 15 W., F.M.; Tps. 8-10 S., R. 16 W.; Tps. 9 and 10 S., R. 17 W., FM and T. 10 S., R. 18 W., FM. T. 6 S., R. 14 W., F.M. remains in selected status. T. 6 S., R. 14 W., F.M. is surveyed and the Kantishna River segregated.

that the Kantishna River was navigable. These determinations were incorporated into the decisions to convey the uplands.[18]

Less than a half dozen Native allotments are located along the Kantishna River. All are surveyed. The river was meandered and the uplands segregated from the riverbed during the federal survey of the allotments.

Birch Creek

The State of Alaska applied for an RDI for Birch Creek from its mouth at Kantishna River to the mouth of Muddy River, a distance of approximately two miles. This reach, located in T. 12 S., Rs. 20 and 21 W., F.M., is located entirely within the Denali National Preserve. The NPS manages the riparian lands. The United States has not yet determined the navigability of Birch Creek.

Muddy River

Muddy River lies in six townships: Tps. 10-12 S., R. 21 W., FM; T. 11 S., R. 22 W., F.M.; and Tps. 11 and 12 S., R. 23 W., F.M. The river is almost entirely located within the Denali National Preserve, which means that the NPS is the principal riparian landowner.[19] (Doyon, Ltd., is the riparian landowner in T. 10 S., R. 21 W., F.M). Where the United States is the riparian landowner, the navigability of Muddy River has not previously been determined.

The State of Alaska owns riparian lands in Sec. 33, T. 11 S., R 23 W., F.M, and in Secs. 4, 5 and 8, T. 12 S., R. 23 W., F.M. The lands are located along the uppermost reaches of the river where it leaves Lake Minchumina. In 1963, under the Mental Health Act of 1956, the BLM granted tentative approval for the conveyance of these lands. The decision to convey the lands stated, "Acreage approved includes both land and water areas as shown on the protracted township diagram. When the official plat of survey is filed patent will issue excluding navigable water acreage." In 1982, the BLM determined that all of Muddy River in Tps. 11 and 12 S., R. 23 W., F.M., was navigable.[20] The lands within Secs. 31-33, T. 11 S., R. 23 W., F.M. are surveyed and patented. The lands within T. 12 S., R. 23 W., F.M. are awaiting patent.

Doyon, Ltd. owns riparian lands in Secs. 31-33, T. 10 S., R. 21 W., F.M. On July 30, 2002, the BLM issued Interim Conveyance No. 1847. The Interim Conveyance document stated that lands underlying rivers or streams three chains wide or wider "and navigable waters, if any," were excluded from the conveyance and that these lands would be identified at the time of survey.[21] The BLM has not yet determined the navigability of this reach of the Muddy River. The bureau

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[18] Some BLM memos refer to a February 17, 1976 memo determining that the Kantishna River is navigable from its mouth to Roosevelt. This report writer did not find a copy of the 1976 memo.

[19] The NPS is the primary land owner in a third township, T. 11 S., R. 23 W., F.M. However a short stretch of Muddy River flows through State lands in Sec. 33 (Tract A).

[20] Robert F. Hilton, Decision, September 11, 1963; C. M. Wheeler, "Mt. McKinley #1, FY83," December 13, 1982; and Robert D. Arnold to Chief, Division of ANCSA and State Conveyances, December 28, 1982, file F-028722, state selection files, BLM records.

[21] Barbara Opp Waldal, Decision, January 18, 2002, and Interim Conveyance No. 1847, July 30, 2002, file F-21904-91, ANCSA files, BLM records. Unlike the Interim Conveyance document, the decision document did not contain a statement providing for the exclusion of lands underlying navigable waters.

has surveyed T. 10 S., R. 21 W., F.M. (plat approved May 19, 2015) and segregated the Muddy River.

The BLM has also issued certificates to several Native allotments along Muddy River. In all cases, the Muddy River was meandered and the submerged lands segregated from the uplands.

Lake Minchumina

Lake Minchumina is located in four townships: Tps. 12 S., Rs. 23-25 W., F.M. and T. 11 S., R. 24 W., F.M. The State of Alaska is the principal riparian landowner. In 1963 the BLM granted tentative approval to conveyance of the lands under the Mental Health Act of 1956 under BLM serial No. F-028722. The decision document stated that navigable waters would be identified at the time of survey. In 1982, the BLM determined that the lake was navigable at the time of statehood.[22] The lake was segregated in the federal surveys.

Numerous patented small tracts and Air Navigation Site No. 190 (U.S. Survey No. 2655) along the lake's northwestern shoreline were excluded from the State conveyance. Several certificated Native Allotments are also on record. In all these cases, lands underlying Lake Minchumina were excluded.

Evidence of Commerce: Tanana River to Roosevelt Reach

Located only fourteen miles from the navigable waters of the North Fork of the Kuskokwim River, the Kantishna-Lake Minchumina system was an important inter-regional route of travel between the Tanana River and the Kuskokwim River. During the gold rush era, the system was also an important route of travel and transportation to placer and hard rock mines in the area around the headwaters of the Kantishna River. With the arrival of the aviation age in the late 1920s, the system as an inter-regional route of travel fell into disuse. The construction of winter tractor roads and a summer truck road from the Alaska Railroad to the mining district in the 1930's also resulted in a decline in traffic. During the 1940's and early 1950's, the barge operations of the Civil Aeronautics Administration (CAA) and later, the Federal Aviation Agency (FAA), to Lake Minchumina was practically the only commercial operation on the system, but this too came to an end when the agency substituted airplanes for barges.

The Kantishna River's history as a highway of commerce is well known. During the Kantishna gold rush of 1905, commercial freighters discovered that the Kantishna River was usually navigable for steamboats and gas-powered boats to Bearpaw River and Roosevelt. Oftentimes, freighters ascended the Bearpaw River to Diamond City. Alternatively, those freighters' boats carrying heavier cargoes continued up the Kantishna River to a short-lived camp called Roosevelt, approximately forty-two miles above the mouth of the Bearpaw River. From this point, miners transported supplies and equipment over summer and winter trails to the gold placer and hard rock mines in the vicinity of Moose Creek, a tributary of Bearpaw River.

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[22] Robert F. Hilton, Decision, September 11, 1963; C. M. Wheeler, "Mt. McKinley #1, FY83," December 13, 1982, and Robert D. Arnold to Chief, Division of ANCSA and State Conveyances, December 28, 1982, file F-028722, state selection files, BLM records.

This pattern of travel and transportation continued well into the 1930's. During the late 1910's and early 1920's, when the Kantishna district experienced a mining boom, Roosevelt became an important trans-shipment point. Large amounts of mail, supplies, and mining equipment were landed at Roosevelt for shipment to Kantishna. The Alaska Road Commission (ARC), the federal agency then responsible for most road and trail construction in Alaska, improved a winter road from Roosevelt to Kantishna. During the winter months, miners had large tonnages of ore transported by horse to Roosevelt for shipment by barge down the Kantishna, Tanana, and Yukon Rivers to St. Michael and thence by ship to a smelter in Tacoma, Washington.

In later years, the Kantishna River as a route for transportation of miners' supplies and equipment declined in importance. Beginning in the 1920's, miners relied increasingly upon airplanes as a means to travel and transport small quantities of freight. In addition, miners and the federal and territorial governments constructed winter roads from the Alaska Railroad to the district for use in transporting heavy mining equipment to the mines and ore from the mines to market. The McKinley Park road, completed in 1936, virtually eliminated the Kantishna River as a summer route of travel and transportation. The construction of the Lignite-Stampede-Kantishna road, completed in 1939, provided winter access to the Alaska Railroad.

Today, there are no large communities located along the river system. Roosevelt has long been abandoned and, since the river has changed course, the place is no longer located along the river.[23] According to the 2000 census, Minchumina, the only community along the system, had a population of thirty-two. A few Native allotments scattered along the system are seasonally occupied. These account for most habitations along the system.

Kantishna Gold Rush of 1905

In 1919 Stephen R. Capps of the U.S. Geological Survey recounted the history of the Kantishna gold rush of 1905 as follows:

> The discovery of gold in the Kantishna district was an indirect result of the Fairbanks rush. In 1904 Joe Dalton and his partner, Reagan, prospected in the basin of Toklat River, and after having found gold in encouraging amounts returned to Fairbanks that fall. The next spring Dalton and another partner, Stiles, returned to the Toklat and prospected on Crooked Creek, a tributary heading in the Kantishna Hills 16 miles south of Mount Chitsia. In the summer of 1905 two other prospectors, Joe Quigley and his partner, Jack Horn, had been told by some trappers that there was gold in Glacier Creek, and they came in to investigate. The found gold in paying quantities, staked the creek, and in June of the year carried the news of their discovery to Fairbanks and so started the stampede to Kantishna. The stampeders began to arrive at the scene of the discovery about July 15, 1905. Meanwhile Dalton and Stiles, having heard nothing of the Quigley-Horn discovery, had traveled along the southeast side of the Kantishna Hills and arrived at Friday Creek. Prospecting there they found gold, and on July 12 they staked that

[23] After taking a boat up the Kantishna from Nenana to Lake Minchumina in August 1974, Val Blackburn of Minchumina complained about how difficult the trip had been. The last five miles below Starr's place on Birch Creek "is worse than he has ever seen it. This is one of the bad spots on the river." He added, "Roosevelt . . . is no longer on the river. The course has changed so greatly that Roosevelt is bypassed completely." *Fairbanks Daily News-Miner*, August 13, 1974, 15. For a discussion of the change in river course in this area, see pages 24-29.

> stream. On July 20 they staked Discovery claim on Eureka Creek, but thinking themselves entirely alone in the country they staked only that claim, having determined to prospect first the upper part of the stream. They went up Eureka Creek, and on their way back to the mouth of that stream they met a man named Cook, who had come in with the rush and had made his way up Moose Creek to the mouth of Eureka Creek. Cook said he had staked claims No. 1 to No. 4 on the Eureka, so Dalton and Stiles returned and staked the rest of the creek above claim
> No. 4.
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> Late in the summer and in the fall of 1905 the Kantishna district was the scene of great excitement. Several thousand people then arrived, most of them coming by boat up Kantishna River and its tributaries, Bearpaw and McKinley rivers during the season of open water, and by dog and sled later in the fall after snow had fallen. Practically every creek that heads in the Kantishna Hills was staked from source to mouth, and the benches and intervening ridges were not ignored. Within a few weeks a number of towns were built, the largest of which were Glacier, on Bearpaw River at the mouth of Glacier Creek; Diamond, at the mouth of Moose Creek; and Roosevelt and Square Deal on Kantishna River. At each of these places log cabins, stores, hotels, and saloons were erected, and between them and the creeks a constant stream of gold seekers traveled back and forth. By midwinter, however, it became generally known that rich, shallow diggings, the eternal hope of the prospector, were restricted to a few short creeks, and an exodus began. The richest ground was mined vigorously during the summer of 1906, but by fall the population had dwindled to about 50, those who remained being the few who had staked paying claims or who were convinced that thorough prospecting held out sufficient promise of new discoveries.
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> In the winter of 1906 Roosevelt, Square Deal, and Diamond were almost completely deserted. Glacier, being nearest to the creeks, is still used as winter quarters by a number of miners who prefer to spend the cold months in the shelter of the timber, near their fuel supply, rather than to haul wood to their summer camps.[24]

Capps did not indicate his sources for this account, but it is most likely that he relied heavily upon the memories of local miners, many of whom participated in the stampede and were lucky enough to find paying ground. The account appears to be correct in its essentials, although his estimate of the number of participants may be too high. Charles Sheldon, who visited the area in the late 1900's and was an important figure in the creation of the Mt. McKinley National Park, estimated 400 to 500 participants. The local newspaper reports usually cited hundreds (not thousands) of people in the Kantishna district. In August 1905, for example, the vice-president of the Northern Commercial Company, the principal mercantile company in Alaska, estimated that there were 300 miners in the district. By September, it was reported in Fairbanks that more than 400 people were in the district. By mid-October, according to two prominent Kantishna miners, "fully one thousand people" were in the district. In mid-November, a Kantishna miner gave an estimate of 1,200 to 1,500 people.[25] Although men continued to stampede into the

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[24] Capps 1919, 75-76.

[25] *Yukon World*, August 30, 1905, 4, September 29, 1905, 3; and October 14, 1905, 1; *Dawson Daily News*, December 22, 1905, 1. The writer thanks National Park Service historian Logan Hovis for providing many local newspaper articles relating to the Kantishna gold rush period of 1905-06.

district during the winter, it is likely that their numbers were not great. Certainly, by February 1906, the tide had turned. After discovering that the district was not suitable for winter mining, people began leaving for Fairbanks and other parts of Alaska.

As Capps stated, most people relied upon boats to reach the new diggings. In the initial stages of the stampede, miners hoped to reach the new diggings before all the creeks were claimed, and so took it upon themselves to pole boats (a laborious and time-consuming task) up the Kantishna River and the Bearpaw River to various points before disembarking and traveling overland to the creeks. In mid-July 1905 a prospector returning to Fairbanks counted some sixty outfits in poling boats ascending the Kantishna River for the Bearpaw River.[26]

Local commercial boat operators on the Lower Tanana River quickly stepped in to meet demands for transportation to the Upper Kantishna. During the months of August and September, 1905, the steamer *White Seal* made at least three round-trips from Fairbanks to the Upper Kantishna. On one of its first trips, the steamer reportedly delivered nineteen passengers and more than twenty tons of freight to the Bearpaw River.[27] In late September, Captain G. P. Sproul of the *White Seal* reported a successful voyage to Roosevelt City, a new camp located on the Kantishna River above the mouth of Bearpaw River, where up to twenty-eight passengers and freight, including a sawmill, were landed. He planned to make another trip up the Kantishna "as soon as orders can be filled" and if water levels were high enough.[28]

Other commercial boats that ascended the Kantishna River to Bearpaw River in 1905 included: the *Jennie M.*, the *Tanana Chief*, the *Dusty Diamond*, the *Tana*, the *Florence S.*, the *Luella*, the *Pup*, the *Zodiac*, and the *Martha Clow*.[29] On August 30, an unidentified steamer left Fairbanks bound for the upper Kantishna, carrying "forty passengers, several outfits for stores, a saloon and restaurant."[30] In late September, the steamer *Dusty Diamond* landed passengers and fifty tons of goods at the mouth of Moose Creek, a tributary of the Bearpaw River. The place, called Diamond, was frequently identified by the newspapers as the head of navigation on the Bearpaw River for small boats.[31]

By August 30, 1905, four townsites were located along the upper Kantishna River: Morgan City, Roosevelt City, McKinley City, and Bearpaw City. The farthest one upriver was Morgan City, located at the mouth of McKinley River. According to one local newspaper, Morgan City was "not so anxious to supply the [Kantishna] mines as it is to be the gateway of a new country to be opened along the McKinley and its forks, and the trade will go up the Kantishna to the Koskokwim [Kuskokwim] and its tributaries." Bearpaw City was located at the mouth of Bearpaw River. Some miners disembarked steamboats here and proceeded up Bearpaw River in

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[26] *Dawson Daily News*, August 3, 1905, 3.
[27] *Fairbanks Evening News*, August 1, 1905, 1; *Fairbanks Weekly News*, August 9, 1905, 1.
[28] *Dawson Daily News*, September 23, 1905, 2; *Fairbanks Evening News*, September 25, 1905.
[29] In mid August steamers *Tanana Chief* and *Jennie M* were running on the Kantishna. *Alaska Forum*, August 19, 1905, 1. In August, the steamer *Florence S.* was advertised in the local newspaper as planning to carry passengers and freight to the Bearpaw on August 26. *Fairbanks Evening News*, August 24, 1905. The *Florence S* transported passengers to Chena in late September. *Yukon World*, September 29, 1905, 3. The steamer *Martha Clow* of Dawson reportedly reached the mouth of the Bearpaw River on October 7 with cargo. *Yukon World*, October 28, 1905, 1.
[30] *Yukon World*, September 15, 1905, 3.
[31] *Fairbanks Weekly News*, September 23, 1905; *Dawson Daily News*, September 23, 1905, 2; Orth, 270.

small poling boats. They planned to return with horses in the winter to move seventy-five tons of freight from Bearpaw City to the mines.[32]

Late in the summer of 1905, freighters debated whether McKinley City or Roosevelt City would become the entrepot for the Kantishna Mining District. Roosevelt City was located approximately ten miles below the mouth of McKinley River; McKinley City, approximately twenty miles below the mouth of McKinley River.[33] McKinley City was founded by a party that included Gordon Bettles, who founded the town of Bettles, the head of steamboat navigation on the Koyukuk River, during the Klondike Gold Rush. The party chartered the steamer *Luella*, at $40 a day, with the intent to locate a townsite at the head of navigation for large steamboats on the Kantishna River.[34] After examining a number of routes from the mines to navigable waters, the Bettles party chose the site of McKinley City and started to build cabins. Critics pointed out that the place was in a swampy area with little timber and that the trail to the diggings was located on wet ground.

In contrast to McKinley City, Roosevelt City was located on well-timbered, higher ground, and the trail to the mines was shorter and drier.[35] According to passengers on the steamer *White Seal*, Roosevelt was founded by two men named George Noble and William Hunter. George Noble was a member of the *Luella* party. Upon learning that William Hunter had built a cabin twelve miles above McKinley City and was able to reach the diggings over a dry trail in eight hours, he spread the news, thereby causing a stampede from McKinley City to what became the site of Roosevelt. Less than a half dozen people were left at McKinley City.[36]

For a short while, there was talk that McKinley City might survive as a townsite as only the smaller boats could be taken to Roosevelt. The larger boats could not pass over a two-hundred-yard-long bar in the Kantishna between McKinley and Roosevelt, even at a good stage of water. Above that section, the river was narrow and swift. The steamer *White Seal* succeeded, albeit with "considerable trouble," in reaching Roosevelt when the water level was above normal. The captain found only two feet of water on the bar. Boosters of Roosevelt, however, believed that once water levels subsided, the river would cut a new channel through that section, making it possible for the larger boats to navigate that section.[37]

Certainly by early September the question was decided when Lee Van Slyke, the U.S. Commissioner of the Kantishna Mining District, decided upon Roosevelt as his headquarters.[38] On September 10, 1905, R. T. Engelbrecht, a trader, recounted Roosevelt City's advantages over McKinley City: "Now, regarding the building site of the city of Roosevelt, I can only say that it is the ideal place for a permanent town—high ground; dry, plenty of moss and timber, flat and level, good water for drinking, and plenty of water for a boat drawing thirty inches of water at all

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[32] *Fairbanks Weekly News*, September 23, 1905; *Yukon World*, September 15, 1905, 3; *Dawson Daily News*, September 23, 1905, 2, and December 22, 1905, 1.

[33] Capps 1919, 18. According to a Fairbanks report in mid October, Roosevelt city was "twenty miles below the mouth of McKinley river and 12[?] miles above where McKinley City was started." *Yukon World*, October 14, 1905, 1.

[34] *Fairbanks Daily News*, August 12, 1905, 1, and August 15, 1905; *Fairbanks Weekly News*, September 23, 1905.

[35] *Dawson Daily News*, October 17, 1905.

[36] *Fairbanks Weekly News*, September 23, 1905, 1.

[37] *Fairbanks Weekly News*, September 23, 1905, 1.

[38] *Dawson Daily News*, September 19, 1905, 1, and September 23, 1905, 2; *Alaska Forum*, September 23, 1905, 3.

times during the season. The trail to the mines is not more than twelve miles, and is high and dry; in fact, on the last seven miles it is hard to get any water. There is plenty of timber for any small bridges, in case they are needed. Two men went over and had dry feet and clothes during the trip, and found it easy walking, and made the trip in five hours." When Engelbrecht wrote his letter, the camp consisted of about twenty cabins.[39] Several weeks later, one stampeder wrote a letter to Fairbanks upon his arrival at Roosevelt City: "We arrived here last night and find the place booming. Everyone is rustling moss and logs for building purposes. Each one who has a town lot thinks he has a fortune in sight. The system of laying out the city is very good. The streets are well proportioned, with alleys to the rear, and the townsite is located on good high ground."[40]

As a gold rush camp, Roosevelt City survived only a few months. In its heyday, the place had population of 150, two stores (operated by Kreier & Teterman and Englebrecht & Co.), and a sawmill. Plans were even underway to install an electric light plant.[41] By the spring of 1906, however, the place was almost abandoned. Some miners moved from Roosevelt to Diamond and Glacier, which were nearer the diggings. Upon finding that much of the ground had already been claimed and in any case was not suitable for winter mining, many people left the district. When the U.S. Commissioner moved his headquarters to Glacier City, on the upper Bearpaw River, so that miners did not have to travel as far to record their claims, there was little reason for people to remain at Roosevelt.[42]

Following the spring breakup of the Upper Kantishna's ice, many miners left the district on the various boats that had spent the winter on the river. These included: the *Tanana Chief*, located about four miles below the Bearpaw River[43]; the steamer *Tana*, about halfway between Bearpaw and Roosevelt; the *Pup* at Roosevelt; and the *Zodiac* near the mouth of the Bearpaw.[44]

In subsequent years, the population in the Kantishna District was low. In 1906, only four people resided at Roosevelt; four at Diamond; and twelve at Glacier. In 1908, a local newspaper reported, "Nothing is left of either Roosevelt or Glacier which once gave evidence of being cities of considerable importance, except the Foster trading post at Glacier." Only twenty-six men and two women spent the winter in the district. These numbers rose during the summer months when mining and prospecting activities occurred. During the season of 1910, there were about sixty miners in the spring and forty-five men in late summer. According to Bundtzen, about thirty-five to fifty placer miners usually remained in the Kantishna district with a few years when the numbers spiked. Most residents spent their summers at Eureka (formerly Kantishna) and their winters at Glacier, Roosevelt, and Diamond where timber and game were available. Only a few people resided at Eureka throughout the year.[45]

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[39] *Fairbanks Weekly News*, September 23, 1905.
[40] *Dawson Daily News*, October 17, 1905.
[41] *Dawson Daily News*, December 22, 1905, 1.
[42] *Alaska Forum*, December 23, 1905, 4; *Valdez News*, January 6, 1906, 1; *Fairbanks Weekly News*, March 17, 1906, 8; *Dawson Daily News*, December 22, 1905, 1.
[43] Another report from Diamond City, dated November 5, stated that the *Tanana Chief* was tied up six miles below the mouth of the Bearpaw River. *Nome Tri-Weekly News*, January 13, 1906, 1, 2.
[44] *Dawson Daily News*, December 22, 1905, 1.
[45] *Fairbanks Daily Times*, December 24, 1906; *Tanana Tribune*, September 29, 1908, 4; *Fairbanks Daily News-Miner* (hereafter FDNM), June 8, 1910, 2, and August 20, 1910, 4; and Bundtzen 1978, 152.

From 1906 to the late 1910's, the Kantishna district miners relied upon commercial boat operators for travel and transportation services. Most of these boats proceeded up the Kantishna and Bearpaw Rivers to Diamond. Among the boats that participated in this trade included the steamer *Dusty Diamond* in 1906; the steamer *Florence S.* in 1906-08; and the steamer *Pup* in 1908. In June 1906 the *Dusty Diamond* reportedly made the round trip from Fairbanks to Diamond City in six days.[46] When in 1910 Kantishna residents were unable to find a steamboat to transport supplies, they chartered Nels Henderson's launch to transport freight to Diamond. Kantishna miners probably continued to rely upon commercial operators like Henderson for their annual supply of groceries and equipment. In the summer of 1913, for example, Henderson transported W. R. Taylor, a prominent miner in the area, and his winter supplies and equipment to the Upper Kantishna. He later made another trip up the river, this time in September for other miners, and was planning to make another trip before the navigation season ended. In the spring of 1915 Henderson returned to Fairbanks from the Upper Kantishna with several miners on board.[47] In 1918 the steam launch *Bluebird* and power barge *Elmer G* were used to transport freight to Diamond. In the spring, the steam launch *Bluebird* and barge transported about twelve tons of supplies.[48] In late August 1918, power barge *Elmer G* delivered seven or ten tons of provisions and mining supplies.[49] Others launches that may have participated in this trade include the launch *Victory*, which was chartered in 1918 by a U.S. Bureau of Mines official for a trip to the Kantishna mines, and the launch *Scripp*, which advertised transportation services on the Kantishna in the local newspaper.[50]

During the same period, commercial boats rarely docked at Roosevelt. Other than a report that the steamer *Dusty Diamond* in June 1906 landed two passengers at Roosevelt, the local newspapers made no mention of boat traffic to Roosevelt in this period.[51] There are, however, occasional reports of relatively large boats proceeding beyond Roosevelt to Lake Minchumina.

Kantishna District Mining Boom, 1919-23

Following the First World War, the Kantishna District experienced a mining boom. Thomas P. Aitken, a well-known mine investor in Alaska, undertook a project to develop a rich silver mine. Both the Mt. McKinley Gold Placers, Inc., and the Kantishna Hydraulic Mining Company began placer gold mining operations in the district. All three mining companies used boats for travel and transportation to Diamond and Roosevelt. To aid these mining developments, the Alaska Road Commission (ARC) improved a road from Roosevelt to the mining district.

Hard Rock Mining

Beginning in the mid 1910's, hard-rock miners in the Kantishna District searched for an economical way to move large tonnages of ore to market. They ultimately decided that ore could

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[46] *Fairbanks Daily Times*, June 5, 1906, and June 13, 1906; *Tanana Tribune*, October 12, 1907, 1; June 13, 1908, 2; June 20, 1908, 5; June 27, 1908, 5; September 13, 1908, 4; and September 29, 1908, 4.

[47] *Fairbanks Daily Times*, June 8, 1911, 3; and FDNM, August 29, 1910, 2; July 22, 1913, 3; September 4, 1913, 4; and FDNM, June 23, 1915, 4.

[48] *Nenana Daily News*, September 26, 1918, 3.

[49] *Nenana Daily News*, August 31, 1918, 3, and September 2, 1918, 1.

[50] FDNM, June 19, 1918, 3; and *Nenana Daily News*, September 10, 1918, 4.

[51] *Fairbanks Sunday Times*, June 24, 1906; *Fairbanks Daily Times*, July 27, 1906.

be transported by horse and sled from the mines to the Upper Kantishna River during the winter months. Following the spring breakup and the opening of navigation, small riverboats and barges could transport the ore down the Kantishna River to the Tanana River, where it could be loaded onto large barges pushed by steamboats and then transported down the Tanana and Yukon Rivers to St. Michael for trans-shipment by ocean-going vessels to the smelter in Tacoma, Washington. The cost of this operation was so high that only the richest ore could be shipped, forcing the miners to leave the rest in the ground until transportation costs were reduced.

Miners first attempted to put this plan in operation during the First World War, when the price for antimony rose to such heights that a profit could be made. In 1916, W. R. Taylor, who held valuable antimony prospects, leased mining property to a well-known mine investor, Col. W. L. Stevenson of Skagway, reportedly for $45,000. According to Taylor, the plan was to ship a thousand tons of ore or more to the States that summer. The ore would be transported by two big Jeffery quads (motor trucks) over a twenty-mile-long road to the confluence of the McKinley River and Kantishna River, located about fourteen miles above the site of Roosevelt.[52] With the opening of navigation, the ore would then be loaded onto barges and taken by small steamboat 150 miles down the river to the Tanana River, where it would be loaded onto the large barges of the American-Yukon Navigation Company for shipment to St. Michael at the mouth of the Yukon River.[53]

It is not clear from the available records whether the miners succeeded in their plan. According to the USGS, miners mined and stacked approximately 150 tons of antimony ore, and some of it was hauled to Roosevelt. It is not known whether the ore was shipped to St. Michael or the States. Writing in 1917, Capps of the USGS reported that the ore had not reached the market.[54]

In 1919 Thomas P. Aitken succeeded in putting this plan into operation. For three years (1919-21), Aitken mined the Quigley silver-lead ore property under lease. In the spring of 1919, he sent a crew with supplies, a complete blacksmith shop, a considerable quantity of drill steel, and horses on a large power scow and a small gasoline launch to Roosevelt. From this point the men were to improve a pack trail to the mining property, a distance of approximately twenty-seven miles. According to James Haney, who was in charge of the mining operation, the power scow *Mary* (owned and operated by Charles McGonagal) had been built at Fairbanks during the last winter for use on the Kantishna River.[55] The scow made several trips between Nenana and Roosevelt, carrying supplies to the miners. One round-trip reportedly was made in four days.[56]

Encouraged by the assay results from the U.S. Bureau of Mines station at Fairbanks, Aitken decided to continue development work with a larger force and placed his brother, W. H. Aitken,

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[52] Capps wrote that the truck road was to be built "from the mine to navigable water on McKinley Fork of Kantishna River at a point about 4 miles above the abandoned town of Roosevelt," which he described as "almost completely deserted." It is more likely that he meant fourteen miles, rather than four miles. No point on McKinley River is within four miles of Roosevelt. See Capps 1919, 18, 76, and 108.

[53] *Fairbanks Daily Times*, February 18, 1916, 2, and July 13, 1916, 3; and FDNM October 6, 1916, 4.

[54] Capps 1919, 107; White, 332; and Wells, 354. Wells stated that a few tons of antimony ore was also mined in 1905.

[55] *Nenana Daily News*, May 29, 1919, 1.

[56] *Nenana Daily News*, June 4, 1919, 4, and July 3, 1919, 4.

in charge of the work. The large steamboat, the *Shusana*, was chartered to deliver supplies for the winter to Roosevelt.[57] In early September 1919, the steamer *Shusana* and two gasoline boats (George Moody's launch and Jimmy Moore's launch) transported some 200 tons of supplies and equipment to Roosevelt for Aitken and other miners. Aitken hired teamster Ed Bartlett to haul the supplies from Roosevelt to the mine and ore from the mine to Roosevelt. Bartlett sent in four horses on the steamer *Shusana*, and intended to drive the remainder (about a dozen) overland to the mine.[58] According to Captain Oscar Webber, the *Shusana* transported approximately 100 tons of supplies to Roosevelt Landing in two trips.[59] When it left Tolovana in late September, many local residents suspected that low water would prevent the steamer from reaching Roosevelt. They were surprised when on October 4 the steamer, its wheel and after part sheathed with ice from the cold weather, arrived at Nenana with two empty barges in tow. The steamer had succeeded in reaching Roosevelt, but it required six days to make the return trip to Nenana.[60]

Freighters George Moody and James Moore were not as fortunate. In late September 1919, the two men used their launches to haul about twenty-five tons of supplies for Aitken and others to Roosevelt, including a stock of general supplies for a store at the new town of Kantishna. In anticipation of a mining boom, miners had laid out a townsite on Moose Creek, at the mouth of Eureka Creek, and named it Kantishna. The new town was approximately thirty miles from Roosevelt. U.S. Commissioner C. Herb Wilson, who handled the sale of townsite lots for the owners (Joe and Fannie Quigley), was the storekeeper. On the return voyage, Moody and Moore encountered a blizzard and the river began running heavy with ice. They sought safety on the Bearpaw River, hoping that the weather would clear, but, on October 3, that river froze, forcing the men to leave the launches in the Bearpaw River for the winter. It took five days for the five men to walk out of the country. They had to 'siwash' it for three nights without blankets, and one night it was so cold they could not sleep.[61]

During the winter of 1919-20, Aitken's crew of fourteen or fifteen men worked day and night at the mine. Only the richest ore, reportedly averaging $500 per ton, was selected and sacked for shipment to market. By mid-December Bartlett, the teamster, had repaired the trail, built relay camps at Moose Creek, Bear Creek, and Roosevelt, and landed between 75 and 100 tons of ore to the foot of the hill near the mine. He used two-horse teams to move the ore from the mine to the foot of the hill; three four-horse rigs were then used to transport the ore to Roosevelt in relays. The first load of ore reached Roosevelt on December 11.[62]

By the spring of 1920, Aitken perhaps had as much as 800 tons of ore at Roosevelt for shipment to market. The American-Yukon Navigation Company was contracted to transport the ore from Roosevelt to St. Michael for trans-shipment to Tacoma, Washington. Early in the season, when water levels were high, the light draft steamer *Reliance* made two round-trips from the mouth of the Kantishna River to Roosevelt, transporting perhaps as much as 333 tons of ore to barges (e.g., the *Montana*) stationed at the river's mouth. On its third trip, the steamer was stopped at

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[57] *Nenana Daily News*, July 9, 1919, 3; August 29, 1919, 4.
[58] *Nenana Daily News*, September 5, 1919, 4; September 8, 1919, 4.
[59] FDNM, October 7, 1919, 1.
[60] *Nenana Daily News*, September 22, 1919, 1, and October 4, 1919, 4.
[61] *Nenana Daily News*, August 29, 1919, 1; September 22, 1919, 4; September 24, 1919, 4; and October 13, 1919, 4.
[62] *Nenana Daily News*, December 15, 1919, 4.

the mouth of the Bearpaw River by low water. By one estimate, up to 500 tons of ore remained at Roosevelt. Andy Livingston, the master of steamer *Reliance*, subsequently used the powerboat *Kestrel* to haul the ore to the Tanana, making at least two round-trips. In late September, the company had to stop work because low water prevented its boat from proceeding beyond the mouth of the Bearpaw River. According to one account, 75 to 100 tons of ore remained at Roosevelt for shipment.[63]

By February 1921, Aitken had decided to abandon mine operations, citing high costs, an insufficient quantity of high-grade ore, and differences of opinion with the property owner over the lease agreement.[64] During the winter of 1920-21, Bartlett was again engaged to transport ore to Roosevelt Landing, and the steamer *Reliance* was chartered to transport the ore to the Tanana River. Perhaps up to 600 tons of ore was transported that season. By early July, the steamer had made two round-trips to Roosevelt. On its trips up the Kantishna River, the steamer also carried supplies and equipment for Kantishna miners and prospectors. On its first voyage, the steamer carried a load of approximately four tons of supplies.[65]

Hydraulic Mining Operations

In the early 1920's, several hydraulic mining companies in the Kantishna district relied heavily on launches and barges for travel and transportation to Diamond and Roosevelt. The two companies, organized by residents of Fairbanks and Nenana, operated on creeks in the headwaters of the Bearpaw River. The Mt. McKinley Gold Placers, headed by Joseph C. Van Orsdel and W. R. Taylor, had ground on Caribou Creek.[66] The Kantishna Hydraulic Company was led by Fairbanks residents Dr. J. A. Sutherland, Sylvester Howell, Carl Selberg, and others. The company held ground on Moose Creek. Together, the two companies employed about sixty men during the 1922 season.[67]

Riverboat operators George Black, George Moody, and Jimmy Moore were hired by the mining companies, as well as other miners in the area, to provide transportation services to Diamond and Roosevelt. In 1920 Black also held the government contract to deliver mail to Roosevelt four times a year during the open season. During the seasons of 1920, 1921, and 1922, Black used the steamer *Pioneer*. In 1920, he hauled about twenty tons of supplies and provisions, besides horses, on two barges to Roosevelt for the Kantishna Hydraulic Mining Company. In 1921 he made at least two trips up the Kantishna River, the last trip as far upstream as Lake Minchumina. In 1922 Black was under contract to McKinley Gold Placers to transport freight to Diamond. In the spring of 1923 the steamer *Pioneer* made at least two round trips to the Kantishna district.

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[63] *Nenana Daily News*, April 17, 1920, 4; May 14, 1920, 4; June 1, 1920, 1; June 11, 1920, 4; June 18, 1920, 4; August 17, 1920, 4; September 23, 1920, 3; and December 30, 1920, 2, 3.

[64] "The cost of transporting ore from mine to smelter was $75 a ton—an uneconomic trip unless the silver assay was at least 100 ounces a ton; silver was worth nearly $1 an ounce in 1920. Lower-grade ores today remain on the dumps." Bundstzen, Spring 1978, 156.

[65] *Nenana Daily News*, November 30, 1921, 1; February 8, 1921, 2; June 7, 1921, 4. Aitken reportedly mined and shipped a total of about 1,200 tons of silver-lead ore. Bundstzen, Spring 1978, 155.

[66] Van Orsdel, who was the U.S Commissioner at Kantishna, also operated a launch, the *Vanity*. *Nenana Daily News*, July 20, 1918, 3.

[67] *Nenana News*, July 6, 1922, 2. Dr. Sutherland of Fairbanks operated a launch, the *Siwash*. FDNM, July 23, 1918, 4. He reportedly made a record-setting run from Roosevelt to Nenana in twenty-nine hours and five minutes. *Nenana News*, June 24, 1922, 4.

On its first trip, the steamer's cargo included general freight and ARC supplies for Roosevelt. On its second trip, it returned to Nenana with eight or nine tons of galena ore.[68]

George Moody, James G. Moore, Sr., and his son, "Jimmy," were also popular commercial carriers on the Kantishna River at this time. (Other than they operated on the Kantishna River to Diamond and Roosevelt, little is known about Moore and his son.) Moody, who had the federal contract to deliver mail to Roosevelt four times during the open season in 1921 and 1922, may have operated on the river more often than Moore. In 1921 Moody was also transporting passengers and mining freight to Roosevelt and returning to Nenana with passengers and ore samples. In 1922 the McKinley Gold Placers, Inc., purchased Moody's launch, renamed it the *Jolly Rover* [or the *Kantishna*], and used it for travel and transportation to the company's camp at Diamond.[69] Moody continued to operate a powerboat, the *Bertha*, between Roosevelt and Nenana. The local newspapers reported little about his activities other than he was operating on the river in 1921 and 1922. The last mention of Moody on the Kantishna was reported on October 3, 1922, when the *Nenana News* noted the arrival of the *Bertha* from Roosevelt with mail and a dozen passengers.[70]

From time to time, miners chartered other freight boats. These included the steamer *Carl White*, the powerboat *Kestrel*, the "Wigger power boat," the steamer *Teddy H.*, and the side-wheel gas boat, the *Mutt*. In 1920 the Mt. McKinley Gold Placers, Inc., chartered the steamer *Carl White* to haul supplies and a new tractor for use in hauling supplies from Diamond to the company's property. On its last voyage of the season, the powerboat *Kestrel* also transported the company's freight to the mouth of the Bearpaw River.[71] In 1920 and 1921, the Kantishna Hydraulic Mining Company used the "Wigger power boat" to transport about sixty tons of equipment and supplies to Roosevelt. In 1922 the company chartered Sam Dubin's steamer *Teddy H* and two barges to haul passengers and freight, including eight horses, to Roosevelt.[72] The Kantishna Transportation Company of Nenana operated the side-wheel gas boat *Mutt* to Roosevelt and Diamond only one season (1923). The company, headed by C.E. Neuser and associates,

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[68] George Moody had the mail contract in 1921 and 1922. For reports on mail trips, see *Nenana News*, June 12, 1920, 1; August 20, 1921, 3; August 1, 1922, 2; August 12, 1922, 4; August 17, 1922, 2; and September 7, 1922, 4. In the spring of 1923 the Post Office Department advertised for bids to make four round-trips between Nenana and Kantishna during the open season, the contractor carrying up to 400 pounds of mail on each one-way trip. It is not presently known whether a mail contract was awarded. See *Nenana News*, April 3, 1923, 2. For information regarding annual riverboat trips, see FDNM, June 28, 1918, 4; *Nenana News*, June 8, 1921, 1; *Nenana Daily News*, August 30, 1921, 4; September 20, 1921, 4; September 29, 1921, 2; June 13, 1922, 1; September 12, 1922, 1; June 12, 1923, 2; June 28, 1923, 4; and *Nenana News*, July 5, 1923, 1.

[69] *Nenana News*, June 13, 1922, 1. In 1922 and 1923, the company also used its own launch, the *McKinley*, for use between Nenana and Diamond. *Nenana News*, July 22, 1922, 1; July 29, 1922, 1; September 12, 1922, 1 and 2; and May 24,, 1923, 4.

[70] *Nenana Daily News*, June 23, 1921, 4; June 25, 1921, 3; August 20, 1921, 3; September 8, 1921, September 10, 1921, 2; September 29, 1921, 2; *Nenana News*, July 18, 1922, 4; July 20, 1922, 4; October 3, 1922, 2, 4; May 31, 1923, 4; and June 2, 1923, 3; and *Anchorage Daily Times*, May 26, 1923, 2.

[71] *Dawson Daily News*, January 1, 1920, 2; *Nenana Daily News*, August 31, 1920, 3; September 7, 1920, 3; September 16, 1920, 3; September 23. 1920, 3; and October 5, 1920, 1.

[72] *Nenana Daily News*, September 23, 1920, 3, and May 21, 1921, 3; *Nenana News*, May 13, 1922, 3, and May 16, 1922, 4. The *Teddy H* left Nenana on May 26. See *Nenana News*, May 27, 1922, 1, and July 14, 1923, 8.

advertised a "regular and reliable service" from Nenana to the Upper Kantishna on the 15th and 30th of each month, beginning on or about May 22.[73]

Commercial Boating to Roosevelt, 1924-1933

After 1923, the year that the Alaska Railroad from Seward to Fairbanks was completed, mining and associated riverboat operations in the Kantishna District declined significantly. In 1925 only thirteen men were mining in the Kantishna district.[74] In 1926, a local newspaper reporter interviewed Joe Quigley, a well-known miner in the district, on the future of the district: "It is his belief that mining in the Kantishna will be at more or less of a standstill until adequate transportation facilities are provided. With the system now in use—either hauling ore to Roosevelt on the Kantishna River for shipment in the summer, or hauling to the railroad—values must be unusually high to yield a profit and it is practically impossible to depend upon such transportation methods for large scale operations."[75] With the possible exception of Quigley in 1925, miners no longer relied upon the Kantishna River for shipping ore to market.[76]

Instead, miners and others in the Kantishna district relied upon airplanes and overland routes for travel and transportation. By the end of the 1920's, airplanes were common conveyances for travelers and small quantities of freight. The aviation age arrived at Kantishna in 1924. On June 19, Carl Ben Eielson landed a miner named Jack Tobin "within 200 yards of his cabin door" at Copper Mountain rather than attempt a landing at a landing field near the Quigley properties, fifteen miles away. In September Noel Wien made the second commercial flight into the Kantishna with H. C. Ingram as passenger. He was bound for Eureka, but was forced by low clouds to land on a sandbar at Glacier. In 1926 Joe Crosson landed Joe Quigley at Moose Creek near Eureka. Later in the summer, the Territorial Road Commission contracted with John Anderson of Wonder Lake to construct an aviation field on a bench above Moose Creek near the mouth of Lake Creek. Afterwards, local miners frequently took passage on planes to Moose Creek.[77] In 1937, miners had to pay ten cents a pound to have supplies flown to the creeks. This was too costly for most miners.[78]

With the construction of the Mt. McKinley Park road, eighty-four miles long in the national park, the Kantishna miners had summer access to their properties. (Winter access was provided by the Lignite-Stampede-Caribou Creek tractor trail.[79]) The road extends from the Alaska Railroad station at Mt. McKinley Park to Wonder Lake. The Alaska Road Commission (ARC) began work on the road from the railroad in the late 1920s. By 1930 trucks had been taken over the

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[73] The *Mutt* made a round-trip from Nenana to Roosevelt in eight days. C. E. Neuser and associates purchased the trading post of Dr. A. B. Carmichael in the Kantishna district. *Nenana News*, April 17, 1923, 1, May 19, 1923, 2, May 24, 1923, 4, June 12, 1923, 2, 3, June 28, 1923, 2, and August 2, 1923, 4.

[74] Bundstzen, Spring 1978, 156.

[75] FDNM, July 14, 1926, 1.

[76] During the winter of 1924-25, Quigley contracted with Harry Warrant to haul thirty-two tons of ore from his mine to Roosevelt. Quigley planned to have it taken out by steamer next summer. No documentary evidence was found that Quigley's ore was hauled out the following summer. FDNM, January 7, 1925, 3.

[77] FDNM, June 19, 1924, 8; 4, September 27, 1924, 8, October 11, 1924, 4, July 27, 1926, 1, July 28, 1926, 1, July 31, 1926, 8, August 27, 1926, 4, and June 21, 1927, 8.

[78] FDNM, May 11, 1937, 4.

[79] In the winter of 1939, the Caribou Mines Company used tractors on this trail to move a dryland dredge to Caribou Creek. FDNM, February 3, 1939, 2; February 21, 1939, 7; February 28, 1939, 7, April 17, 1939, 7, August 30, 1939, 2.

road as far as Stony Creek. Horses were then used on a trail to Wonder Lake and nearby mines.[80] During the winter months, miners used tractors on the road to transport supplies to the mines. By the fall of 1936, according to Joe Quigley, the Park road had been "stripped" to Wonder Lake, only five miles from his home.[81] By the following spring, the road to Wonder Lake was suitable for heavy freighting by trucks. Partly to aid miners in the district and partly to provide tourists in the park an opportunity to view mining operations, the ARC continued to work on the project in the late 1930's. In the summer of 1940, the ARC completed four and a half miles of road outside of the north boundary of the Mt. McKinley National Park to the Kantishna mining district.[82]

During the 1920's and into the 1930's, traders, fur farm operators, and roadhouse keepers replaced miners as the principal commercial operators on the Upper Kantishna River. Roosevelt with its roadhouse and several trading posts was an important year-round stopover for travelers.[83] In 1924 a local newspaper identified two trading post operators at Roosevelt: L. C. Olson and W. B. Rodman. Both men owned boats. W. B. Rodman was reported leaving Nenana in late July with mail and ten tons of freight for Roosevelt. In the spring of 1924, Ralph Norris's launch, the *Mutt*, transported passengers and miners' freight to Roosevelt, and returned with nine passengers, including trappers from Roosevelt and Lake Minchumina. John R. Folgers, who operated a trading post in the Kantishna, used his own boat to freight supplies from Nenana. He was still there four years later. In the spring of 1928, A. G. Vashon, a fur trader, was reported on Folgers's gasoline launch for a trip up the Kantishna River.[84]

By the late 1920's, most trading posts and roadhouses on the Upper Kantishna and Upper Kuskokwim districts had been abandoned. Travelers literally took to the skies, chartering small planes to take them to their destinations. In 1927, Emil Hansen, proprietor of the Roosevelt roadhouse, claimed that his business was on the decline, "due to the invasion of airplanes." He was quoted as saying, "Heretofore, . . .anyone headed for McGrath and Iditarod districts would stop over at my roadhouse, but now the planes carry them straight on through."[85] The final blow came in 1930 when the Post Office Department contracted with an airline company to deliver the mail to McGrath.

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[80] Capps 1932, 235-236.

[81] FDNM, October 15, 1936, 4. In the fall of that year, the Mount McKinley Tourist and Transportation Company hauled sixty tons of supplies from the Park Station on the Alaska Railroad to Mount Eielson (formerly Copper Mountain). A tractor was then used to transport the supplies to Quigley's properties. FDNM, November 7, 1933, 1. In the winter of 1936 miners Ernie Mauer, Joe Meehling, and Mike Siler transported mining equipment and supplies from the Park station to the Kantishna with a new Caterpillar bulldozer. FDNM, January 11, 1936, 8; January 14, 1936, 8.

[82] FDNM, September 19, 1940, 5.

[83] Roosevelt was an important stop on the winter mail trail from the Alaska Railroad to McGrath on the Kuskokwim River. Between 350 and 500 people traveled over the winter trail each year in the period 1925 to 1930. Between thirty and forty tons of freight were transported annually during the same time period. Much of this traffic was probably related to the mail service. U.S., Board of Road Commissioners for Alaska, *Annual Report*, 1922, 63-63; and U.S., Board of Road Commissioners for Alaska, *Annual Report,* 1924, 105-106; *Kusko Times*, January 27, September 1, November 14, 1923, February 16, 1924, April 17, 1926; and U.S., Board of Road Commissioners for Alaska, *Annual Report*, 1932, 19.

[84] FDNM, June 2, 1924, 4, July 5, 1924, 8, July 29, 1924, 5, May 15, 1928, 5; and *Anchorage Daily Times*, June 12, 1924, 4.

[85] FDNM, January 3, 1927, 8.

Captain George Black may have been the last commercial freighter on the Upper Kantishna before the outbreak of the Second World War. Each year, he made at least one trip up the Kantishna River with freight for miners and fox farmers. In late July 1927, he made a trip to Diamond and Roosevelt with the steamer *Pioneer*. In the spring of 1928, he hauled a load of lumber and foodstuffs on the steamer *Pioneer* and a scow to Diamond and possibly Lake Minchumina. In 1929, he hauled a large cargo of lumber, wire, and food to John Hansen's fox ranch, located about twenty-five miles below Roosevelt. The Fairbanks newspaper mentioned Black's boat, the *Bertha*, making freighting trips to the Upper Kantishna in 1930, 1931, and 1933. Roosevelt was specifically identified as the destination in 1930. It is probable that Roosevelt was also the destination in 1931 and 1933; the newspaper simply identified "the Kantishna" as the destination. In 1933 Black may have continued upriver to Lake Minchumina, because some of the freight was reportedly destined for the Kuskokwim region.[86]

Evidence of Commerce: Roosevelt to Lake Minchumina Reach

The Kantishna River, Birch Creek, and Muddy River provide commercial freighters access to Lake Minchumina. Regular commercial riverboat operations to Lake Minchumina occurred from the 1920's to the early 1960's. During the 1920's and early 1930's commercial operators delivered freight to traders and fox farmers at the lake. During the 1940's and 1950's, the CAA and the FAA supplied its station at the lake by boat and airplane. During the early 1960's, a local resident at the lake used a boat to transport fuel needed to provide electrical power to local residents.

The first known instance of commercial boat travel to Lake Minchumina occurred in 1914. In the summer of that year Nels Henderson transported Stephen Foster and four tons of freight to the lake. The two men reportedly intended to start a fox farm, a trading post, and a big game hunting guide business at the lake. It is highly unlikely that they succeeded in their plans, although, later in the summer, Henderson returned to Fairbanks with a cargo of live foxes and mink for the Alaska Fur and Silver Fox Farms at Fairbanks. Foster would not return to Fairbanks for another two years.[87]

During the 1920s, freighters like George Black and George C. Moody were occasionally hired to transport prospectors and government officials to the lake. In the spring of 1921, Black transported six prospectors and their outfits on the *Pioneer* and a barge to Lake Minchumina.[88] In the summer of 1922, the Nenana newspaper reported that Black again intended to go up the Kantishna River to the lake. In the spring of 1923, law enforcement officials wanting to

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[86] FDNM, July 23, 1927, 8, June 19, 1928, 8, September 30, 1929, 8, August 7, 1930, 8, August 19, 1930, 8, September 12, 1931, 4, May 18, 1933, 5.

[87] *Fairbanks Daily Times*, July 17, 1914, 2, September 25, 1911, 1, June 16, 1916, 5, and July 12, 1916, 2; and FDNM, July 10, 1918, 3. He may have returned to the lake country to trap a month later. Foster later became a game warden. In 1918 he went to the lake on Clarence Boatman's launch. Johnson, Gudgel-Holmes, and Levy, p. 81, also state Foster and Henderson were not successful in establishing a fox farm and trading post at the lake.

[88] Black probably provided the following information: "A barge loaded with provisions and also equipped as a cabin for first class passengers, will be towed up streams to the lake, and will probably supply the means for some cussing when the Muddy River, Minchumina's outlet, is reached. The Muddy River is sluggish, and has a reputation for sharp curves which at times, prove troublesome to the shorter motor craft. It is practically impossible to pole a boat in the Muddy, owing to depth and towing is usually resorted to. If the wheel refuses to turn in making some of the curves, Captain Black may be compelled to fit the 'Pioneer' with oarlocks." FDNM June 8, 1921, 1.

investigate the death of a trapper named Henry Bock, hired Moody's launch to take them to the lake. Two years later, Moody transported federal and territorial engineers who located and established an emergency airplane landing field at the lake. Not long thereafter, Captain C. E. Neuse's stern wheel gas boat *Mutt* arrived at the lake with supplies and equipment for several trappers. Neuser reported "a very satisfactory trip . . . without any trouble of any kind." In late July the steamer made another trip to the lake, this time transporting five men and their outfits.[89]

During most of the 1920's, Edward K. Kammersgaard's stern wheel boat was a common sight on this reach of the river system. Kammersgaard, who spent his first winter hunting and trapping at the lake in 1917-18, established a roadhouse and trading post at Lake Minchumina's outlet.[90] In 1925, when Upper Kuskokwim residents were lobbying for a summer mail service from Nenana to McGrath by way of the Kantishna River and Lake Minchumina, Kammersgaard was willing to haul the mail between Nenana and Lake Minchumina. He claimed to be the only person operating a commercial boat to the lake. Depending upon the size of the party, he charged about $200 for the eleven-day round trip between Nenana and the lake. One man and his board cost $50. He would also land freight at the lake for four cents a pound. He claimed that he had never encountered water too low for his boat to reach the lake.[91]

Kammersgaard did not obtain the mail contract, and he may have quit riverboat operations on the Upper Kantishna in 1927 when he put his roadhouse up for sale. After 1925 there is no mention of his boat in the local newspapers. Instead, the newspapers frequently mention him traveling to and from the lake by airplane. In 1929, he made perhaps his last trip by boat to the lake with Gene Miller and his wife in their launch. Circumnavigating the lake, they reported seeing only one Native family at the head of Muddy River and an "old Indian woman" who lived alone and had "a hard time getting enough food to live."[92] After a previous sale of the roadhouse fell through, Kammersgaard again advertised his roadhouse and trading post for sale in the winter of 1929, touting the location as an "ideal place for fur farm." According to one report, he permanently left the area in 1931.[93]

During the late 1920's, several fur farmers on the Upper Kantishna and at the lake were most likely supplied by boat. Louis Blackburn, R. M. White, and John Hansen were the principal farmers. (Knute Lind also operated a fur farm at the lake, but little is known about it.) Blackburn, who died in Fairbanks in 1932, may have started a fur farm in 1926.[94] R. M. White,

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[89] FDNM, August 17, 1922, 2, September 7, 1922, May 17, 1923, 4, May 21, 1923, 1, May 31, 1923, 4, June 2, 1923, 3 June 18, 1925, 1, June 23, 1925, 4, July 7, 1925, 2; *Nenana News*, July 14, 1923, 8, August 2, 1923, 4.

[90] FDNM, July 10, 1918, 3. According to Val Blackburn, Kammersgaard may have been the first white man to settle at the lake. He was located there from 1917 to 1931. See Bishop, 9 and 10, and Schneider, Gudgel-Holmes, and Dalle-Molle, 79. Johnson, Gudgel-Holmes and Levy (p. 82) cite 1916 as the year when Kammersgaard arrived at the lake.

[91] Anchorage Daily Times, February 16, 1925, 6. Johnson, Gudgel-Holmes and Levy, p. 84, stated that the sternwheeler was forty-five feet long.

[92] They also learned that earlier in the summer, a young Native woman had committed suicide by jumping from a boat into the lake and drowning herself. The body was recovered. FDNM, September 12, 1929, 8.

[93] FDNM, January 11, 1929, 8, January 12, 1929, 1, February 7, 1929, 1, July 11, 1929, 8. Kammersgaard advertised his roadhouse for sale as early as 1927. He apparently sold it to G. E. Young, because in the summer of 1929 he sued Young over the title to the roadhouse and won the case. See FDNM, July 12, 1929, 8, February 10, 1930, 5.

[94] FDNM, March 15, 1926, 7, and July 1, 1932, 8. According to Bishop, Kammersgaard was the first one to operate a fur farm, but this has not been confirmed. See Bishop, 10. He said four fur farms were started in the late 1920's

formerly of Anchorage, established a farm at the lake in 1929. Located along the Kantishna River about twenty-five miles below Roosevelt, John Hansen's farm in 1929 was reportedly one of the largest in Alaska, with about 200 red and cross foxes.[95] The farm was in operation from at least 1922. These farms probably failed a few years after the stock market crash in 1929.

The local newspapers sometimes mentioned that these farms were supplied by boat. In 1929 the Fairbanks newspaper reported that George Black had made two trips to the Upper Kantishna and Lake Minchumina with cargo for fur farmers. On the first trip, he hauled eighteen tons of supplies to Hansen's fur farm, and returned to Fairbanks with twelve tons of dried fish. In late September, he reportedly returned to Fairbanks after a two weeks' voyage to Lake Minchumina with fifteen tons of freight, most of it for fur farmers. Five and a half tons was for White, who was then starting a mink farm.[96]

CAA/FAA Barge Operations

In 1940, the new CAA launched a major program to construct airplane landing fields and radio stations in Alaska. Lake Minchumina was selected as the site of an important radio range station on the Fairbanks to McGrath air route. The CAA's station at Lake Minchumina operated from 1941 to 1969.[97] From 1942 to 1954 or 1955, the agency annually used boats and barges to transport groceries and fuel to the station, where about a dozen families resided.[98] Thereafter, airplanes were substituted as a more economical alternative.

Other than what was reported in the local newspapers, few details are known about the founding of the Minchumina station. In the summer of 1941, some forty men were reported at work on the project, which was expected to be completed in three months. In January 1941, Carl Rudberg of Fairbanks was awarded a contract to move 360 tons of supplies and equipment from Nenana to the lake.[99] Tractors, planes, and boats were used in the operation. In the summer of 1941, nearly two dozen CAA employees and their supplies were transported to the lake by airplane. An amphibian plane and a pontoon plane made three trips a day for three days, each plane carrying 1,700 pounds of freight. In addition, river freighters Herman Olson, Carl Hult, and George Black were hired to haul freight to the lake.[100]

Unlike Olson and Hult, who were trappers in the Upper Kantishna area, Black was a longtime riverboat man in Interior Alaska. In 1941 the Fairbanks newspaper reported that Black's

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thru the early 1930's. White reportedly operated the farm at the head of Muddy River until 1934. The property was donated to the University of Alaska. See Schneider, et al., 1984, 79, and Students and Teachers of Minchumina Community School, 20. Jesse Yoder was also identified as someone who may have built a fur farm in 1928. This has not been confirmed.

[95] FDNM, December 4, 1929, 4. Johnson, Gudgel-Holmes and Levy, pp. 86 and 88, state that White operated the mink farm and roadhouse until 1934. It was the last one.

[96] FDNM, September 30, 1929, 8.

[97] Bishop 1978, 11. The Civil Aeronautics Authority was succeeded by the Civil Aeronautics Administration which in turn became the Federal Aviation Agency.

[98] It is not known exactly when the FAA's annual voyages ceased. Lindsay cited the year 1954; Collins, 1955. See Gudgel-Holmes 1979, 110; and Warren "Slats" Lindsay to Mr. and Mrs. Holmes, July 4, 1982, in Gudgel-Holmes, Records.

[99] FDNM, January 16, 1941, 7. In the spring of 1942 another cat train under Morrison-Knudsen may have traveled from Nenana to McGrath via Lake Minchumina.

[100] FDNM, July 31, 1941, 2, and November 26, 1941, 5.

MS *Idler* and a barge were to deliver 135 tons of machinery and fuel oil to the Minchumina airfield. The cargo included a "tractor-dragline combination, bulldozer and trucks."[101] The MS *Idler* spent three weeks "going and coming" on the river system. Afterwards, Captain Black commented, "the going [was] easy most of the way, but encountered shoals on a portion of the upper stretches. The last 80 miles, which was through the Mud River [Muddy River] to the entrance to the lake is full [of] mud flats, but with good depth of water."[102]

A former longtime employee of the FAA at Lake Minchumina, Dick Collins described the agency's annual voyages from Nenana to the lake.[103] From 1942 to 1956, Einer and Emil Hansen, brothers of John Hansen, the fur farmer, were hired to operate two "J" boats, each approximately 25 feet long and 12 to 16 feet wide, one to pull and the other to push a barge up the rivers.[104] Three or four trips to the lake, each lasting ten to twelve days, were made every season. Sometimes, when low water was encountered, it was necessary to lighten the barges by unloading part of the cargo onto the riverbank and then proceed to deeper water with the remaining cargo. The boats would then return to the site and transport the rest of the cargo upriver. Collins recalled only one year (1953) when the boats were unable to reach the lake; they had to be unloaded about a quarter mile below the lake. (He did not mention how the freight was transported from this site to the station.) The "J" boats were used on this run until 1955 when the FAA transferred a larger and more powerful boat from the Koyukuk River. The boat made several trips to the lake that season and, as expected, made the trip in far less time (three days as opposed to ten to twelve days).[105]

Warren "Slats" Lindsay, another longtime employee of the FAA at Nenana, participated in the FAA's on one of the last voyages (if not the last one) to Lake Minchumina. At that time, the agency used the tugboats CIVAR 20 and CIVAR 29 ("Taku Chief"), which he recalled were fifty feet or more long. He described the voyage upstream from Roosevelt as follows:

> Just past Roosevelt we tie the barges to the bank and untie the tugs from the barges. The tugs have been 'pushing' the barges to this point, from now until we reach the Lake, we pull the barges. In order to make the barges 'track' we cut two large birch trees per barge and lash them leaves and all to the rear corners of the barges. This acts as a drag and helps the tugs control them better.
>
> So now we turn off the Kantishna River onto the Muddy River which is straight [sic] on each end and crooked as all heck in between. The Muddy River is very narrow and deep and so crooked that at times the tug would be passing each other heading in opposite direction with only ten feet of land separating them. So we get close to the lake and tie

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[101] FDNM, August 18, 1941, 4. According to Army Corps of Engineers records, the MV *Idler* was 62 feet long, had an 18-foot beam, and could carry up to 10 tons. Gudgel-Holmes, 1979, 101, states that the boat was 85 feet long.

[102] FDNM, August 27, 1941, 4.

[103] The local newspapers noted that Richard Collins as the station manager for the CAA at Minchumina as early as 1953. FDNM, February 20, 1953, 1. His retirement was reported in 1967. FDNM, May 29, 1967, 14.

[104] In the spring of 1953 the newspaper reported the launching of two "Jay boats," which Emil and Einer Hansen were to pilot on a trip to Lake Minchumina with a load of oil and supplies. FDNM, May 27, 1953, 11. In the early 1950's, the Civil Aeronautics Administration operated eight boats in Alaska, all of them over 25 feet in length. See U.S., Congress, House of Representatives 1954, 27.

[105] Gudgel-Holmes, August 1979, 110. Lindsay recalled that one J boat was sixteen to eighteen feet long.

> up so that we can send a kicker boat to the mouth of the Muddy to clear the logs etc., so the tugs can get through onto the lake. We cross the lake going past the Island and on to the CAA station to unload and head back to Nenana.[106]

According to Lindsay, the riverboat trips to the lake were not difficult. As he watched a motion picture of the boat trip, he recalled: "The only problem we ever had getting into Lake Minchumina was at the mouth of Mud River [Muddy River]. We'd have to take saws and whatnot to saw logjams and what not in order to bring the barges and the tugs through."[107]

Holmes' Barge Operations

Beginning in 1960, Weldon S. "Bill" and Frances M. "Fran" Holmes operated a company called Semlol Supply, which provided electrical power to Minchumina. The couple also operated a general store at the lake. Usually, supplies and fuel were flown in from Fairbanks. For a few years, however, Holmes used a tugboat, the *Beaver*, and a barge to transport fuel from Nenana. The riverboat operation ceased, however, when a severe storm damaged the boat and barge on the lake.[108]

Summary and Conclusion

The Kantishna River-Lake Minchumina system was susceptible to use for travel, trade, and commerce at the time of statehood. Since the Kantishna gold rush of 1905 to the early 1930's, commercial riverboats were used to transport passengers, freight, and equipment for miners and fur trappers to Roosevelt. Commercial riverboats were also used during the 1920's and early 1930's to deliver freight to traders and fox farmers at Lake Minchumina. During the 1940's and 1950's, the CAA and the FAA used tugboats and barges to supply its station at the lake. During the 1960's a local resident at the lake used a boat to transport fuel needed to provide electrical power to residents of Minchumina.

Sloughs, Braids, and Channels

The location of Kantishna River, Birch Creek, Muddy River and Lake Minchumina in Alaska is well known and is not disputed. This is not the case with specific sloughs, braids, and channels, however.

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[106] Warren "Slats" Lindsay, Reedport, Oregon, to Mr. and Mrs. [Charles and Dianne] Holmes, July 4, 1982, Gudgel-Holmes, Records. On a different occasion, he described the river: The river "is very, very crooked and pretty soon you'll be seeing one barge going one way and then behind the trees you'll see the other barge going a different way." See "Transcript of Interview Conducted 1/14/84 by Clifford Cernick with Warren (Slats) Lindsay 'Last of the FAA Riverboaters' at Lincoln City, Oregon," pp. 17-18, in Gudgel-Holmes, Records.

[107] *Ibid.* A 1954 photo of two tugboats and a barge on Muddy River is in Gudgel-Holmes Records. The handwritten caption reads, "Lake Minchumina trip Mud River phase at a 'wide' place on the Mud. Warren Lindsay."

[108] Fran Holmes informed Gudgel-Holmes that they barged fuel from Nenana to the lake in the early 1960s. After a storm that "destroyed" the barge and boat in 1964, this operation stopped. Gudgel-Holmes 1979, 110. See also Students and Teachers of Minchumina Community School 1997, 15-16, 36. A photo of the barge appears on p. 17. Bill died in 1979; Fran, in 1997. Both Penny Green (grand-daughter of Holmes) and Groff identified the tugboat as the *Beaver*. See also Groff, 156, and e-mail message, Steve Taylor to Mike Brown, August 8, 2006, file AA-094611, BLM Records.

Under title navigability law, the State of Alaska received title to lands underlying navigable rivers, streams, and lakes at the time of statehood. To put it somewhat differently, on January 3, 1959, the date of Alaska Statehood, title to these lands transferred from the United States to the State of Alaska.

Under riparian law, the State's title to lands underlying navigable waters extends to the ordinary high water mark. The ordinary high water mark is the legal boundary between uplands and State-owned lands underlying navigable waters. "As a general rule," the State correctly noted in its applications, "any sloughs, braids or channels which carry water from a navigable river are an integral part of the river and thus, are navigable as well." Since statehood, many sloughs, braids, and channels of navigable rivers and streams have frequently changed location or simply disappeared as a result of erosion, reliction, and accretion. Under riparian law, where changes were caused by these actions, the State's title to the bed follows the navigable waters. If, however, the change was caused by an avulsive event, the State retains title to the original riverbed. The upland owner holds title to the new riverbed.

Given these considerations, the BLM's decision on the State's RDI applications should waive the regulatory requirement for a land survey. For the same reasons, the RDI should be silent regarding the numerous sloughs, braids, and channels which the State, using post-statehood aerial photographs and USGS maps, identified (highlighted in blue) as navigable waters on maps submitted with its applications. The National Park Service estimates that more than "30 interconnected sloughs" of the Kantishna River within the Denali National Park and Denali National Preserve were identified by the State as navigable. The State has not provided evidence that any of the sloughs were or could have been navigable at the time of statehood. Given the dynamic nature of Alaska's rivers, it is not possible to determine with certainty whether some or any of these sloughs, braids, or channels currently occupy the same channels they did at statehood or even exist at all. In any case, the issue of where sloughs, braids, and channels of navigable water bodies are located is governed by riparian law, not by title navigability law.

Avulsive Events Affecting Upper Kantishna River and Birch Creek

Significant hydrologic changes have been noted in the area where the McKinley River and Birch Creek join to form the headwaters of the Kantishna River and in the upper Kantishna River mainstem. Four cases were identified:

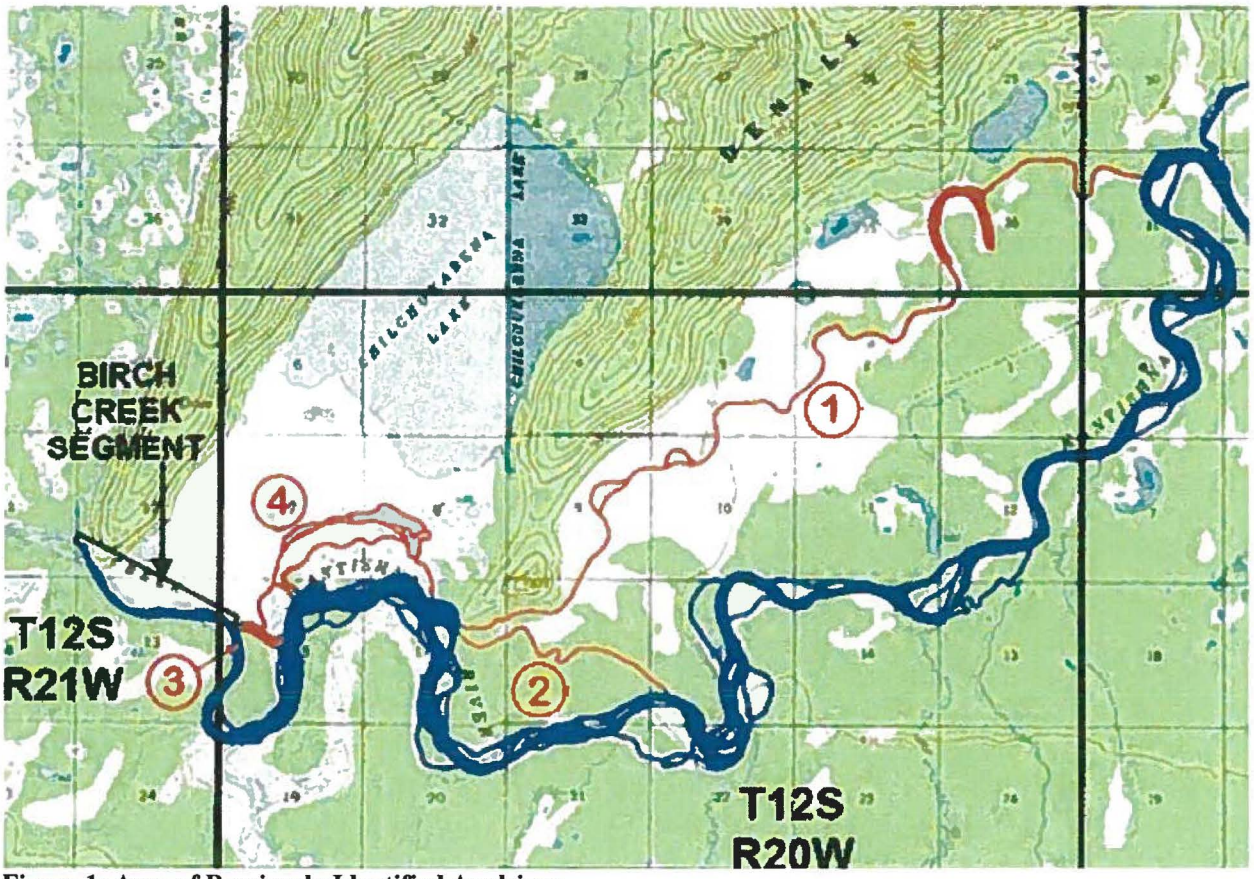

Figure 1: Area of Previously Identified Avulsions

1) The State's application for the bed of the Kantishna River presents a unique study because a nine-mile-long reach of the river (downstream from the confluence of McKinley River and Birch Creek, hereafter referred to as the Upper Kantishna) is presently not at the same location as it was in the years leading up to statehood. The USGS Mt. McKinley D-3 map (1952, minor revisions 1983) and aerial photographs taken in the 1950's show the main channel at its location before statehood. Aerial photographs taken about the year 2000 show the main channel one to two miles north of its former location (Figure 1, Case No. 1).[109]

The State of Alaska and the National Park Service disagree on the significance of the change in the Upper Kantishna's location insofar as the State's RDI application is concerned. Two points are in contention: 1) whether the BLM should consider the apparent post-statehood avulsive events in adjudicating the State's RDI application; and 2) whether the present main channel of the Upper Kantishna occupies a former minor channel extant at statehood. The National Park Service believes that the Upper Kantishna's "new channel may have been created by post statehood avulsion."[110] If correct, the United States holds title to the lands underlying the new

[109] Aerial photos referenced in conjunction with the four channels identified in Figure 1 can be found in the November 16, 2012, memorandum, *State of Alaska Recordable Disclaimer of Interest Application September 29, 2005*, by Frank Hardt, Riparian Specialist, case file FF-94612 (1864), BLM, Alaska State Office.

[110] In an earlier draft of this memo, published for public review, the writer incorrectly wrote, "At a pre-application meeting on April 1, 2005, the National Park Service reported that over a period of perhaps fifty years the upper Kantishna River has cut a new main channel." In fact, Service personnel reported that the change was probably an avulsive event, occurring sometime after the date of statehood.

channel because title to the navigable riverbed remains fixed. Assuming for the sake of argument that an avulsive event had occurred, the State maintains that such events have no bearing upon whether or not title to the beds of the navigable river transferred to the State at the time of statehood. As the State puts it: "The purpose of the RDI application process is to provide BLM an administrative mechanism for disclaiming an interest in submerged lands of water bodies which were navigable in fact or susceptible to use, at statehood. The application was not intended to adjudicate post-statehood changes to water bodies. Post-statehood changes that may affect title of submerged lands of navigable water bodies are governed and resolved by riparian laws." In addition, the State and the National Park Service disagree on whether the present main channel of the Upper Kantishna occupies a former minor channel extant at statehood. The State believes a minor channel existed at the time of statehood; the National Park Service does not.[111] The State and the National Park Service provided a total of four aerial photographs (dated 1952, 1955, 1979, and circa 2000) in support of their positions.

We could not verify the State's assertion that, at the time of statehood, the waters of the Kantishna River flowed through a minor channel where the main channel is now located. The USGS McKinley D-3 quadrangle (1952, minor revisions 1983) does not show the river flowing through a minor channel in this area. Black-and-white aerial photographs of this area which were taken in August 1952 and June 1955 also do not show an active river channel. Rather, there appears to be an old, abandoned river channel. Some portions of the channel are dry; and some contain water.[112] The water is not of the same color as the Kantishna River, an indication that the Kantishna did not flow through the channel at the time of statehood. The source of the water was most likely from nearby lakes or spring water.

The BLM's Manual of Survey Instructions (2009), section 8-98, provides guidance in determining whether a channel change is avulsive:

> "The change in course of a stream is clearly avulsive when the land between the old and new channels remains substantially as it was. The unaltered condition of the land may be indisputably shown by the continued existence of improvements in place or of timber, undergrowth, and other vegetation. A study of historic documents, especially maps and aerial photographs, will often help in determining what process has taken place. As a general rule the abandoned channel is easily identifiable where an avulsive action has occurred."

After reviewing the aerial photographs, we believe that the change in the location, or realignment of the Upper Kantishna's main channel was the result of an avulsive event, more particularly described as "stream capture."[113] In a color infrared aerial photograph taken in July 1979, the main channel of the Upper Kantishna is in approximately the same location as shown on the USGS maps. In the photo, however, the river has clearly jumped its bank and cut a new, much

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[111] Charles M. Gilbert to Chief, Branch of Survey Preparation and Planning (AK-927), August 31, 2007; and Dick Mylius to Callie Webber, October 3, 2007, file FF-094612, BLM records.

[112] Personal communication, Rhonda Reynolds to Mike Brown, November 28, 2007.

[113] Memorandum, Hardt, Frank, A., to Ralph Basner, *State of Alaska Recordable Disclaimer of Interest Application September 29, 2005*, November 16, 2012.

smaller secondary channel through the area where the main channel is now located.[114] The new secondary channel, approximately nine miles long, leaves the main channel about one and one-half miles below the mouth of McKinley River and returns to the main channel near the site of Roosevelt. This "new" northerly channel occupies the remnants of an unnamed watercourse which had no connection to the Kantishna River,[115] visible in the 1950's aerial photographs. As of 1979, the waters of the Kantishna River were clearly flowing through this minor channel because the light blue color of the water, as shown on the infra-red photo (typical of glacial silt-laden waters) in both channels is the same.[116]

By 2009, the aerial photograph[117] clearly shows that the Upper Kantishna River completed its move to the northerly, former secondary channel, now much wider because of the large volume of water flowing through it. At the same time the river completely abandoned its former, southerly channel. Notably, the water in the former main channel no longer appears to be glacial, but instead is stagnant and dark, indicative of springs, rainfall, or snowmelt as the source.[118]

One compelling piece of evidence that the Upper Kantishna's change in course was avulsive is the fact that the landscape between the old main channel and the new main channel has changed little. The same lakes and the same scars of old channels and oxbow lakes in the area between the old and new main channels are visible in the 1955 and post-1979 aerial photos. Clearly, the old main channel did not migrate to its new location through a process of erosion and accretion.[119]

In conclusion the evidence presented by the State is insufficient to conclude that this avulsion occurred prior to the date of statehood. Accordingly, until the State can provide more definitive evidence, we believe the State still holds title to lands underlying the Upper Kantishna's main channel as depicted in the 1955 aerial photo. The United States continues to hold title to the lands underlying the river's new northerly channel (See map, Figure 1).[120]

2) The State's application included an unnamed (almost two mile long) watercourse beginning in Sec. 17 and terminating in Sec. 15, T. 12 S., R. 20 W., F.M (Figure 1, Case No. 2). According to aerial photographs, dated June 8, 1955, there was no connection to the left bank of the Kantishna River in Sec. 17 prior to that date. Also, there is no evidence that this channel was part of the Kantishna River prior to statehood (See map, Figure 1).[121]

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[114] One National Park Service official has suggested that ice jams caused the river to jump its bank and create this minor channel.

[115] Hardt, Pg. 1

[116] See BLM's aerial photos, CIR 60, roll 7, frame 144, August 1979 (flight line 81-1-79) and roll 7, frame 130. A copy of the former photograph is in file FF-094612 (1864). The minor channel, which we believe did not exist at statehood, is shown as "navigable waters" on the State's Map 1, filed with its RDI application for the Kantishna River.

[117] Google Earth Image from May 15, 2009 (Hardt, Figure 16, Pg. 13).

[118] See USGS McKinley D-3 quadrangle (1952, minor revisions 1983). Also see aerial photo mosaic of Landsat 7 imagery from August 28, 1999 and August 16, 2000 in BLM case file FF-094612 (1864). For 2005 imagery (copyright 2005), see website *earth.google.com.*

[119] U.S. Department of the Interior. 2009. *Manual of Survey Instructions: For the Survey of the Public Lands of the United States*. BLM. Denver, CO, Gov't Printing Office, Pg. 199, subpart 8-81; Pg. 203, 204, subpart 8-98.

[120] Hardt, Pg. 16, No. 1.

[121] Ibid.

3) Another avulsion was identified on lower Birch Creek, where it joins the McKinley River to form the head of the Kantishna River (situated in Sec. 18, T. 12 S., R. 20 W., F.M). In its final mile Birch Creek historically made an abrupt turn southerly before joining up with the much larger McKinley River. However, aerial photos,[122] reveal a new avulsive channel cut allowing for a more direct (and shorter) east-west route to its confluence with the McKinley River (Figure 1, Case No. 3). The old south flowing channel apparently continued to carry, at least for a while, a reduced flow of water into the McKinley River confluence. The question arises: when did this avulsion occur? Was it before or after Jan 3, 1959, the date of statehood? The USGS (1:63,000) quad, Mt. McKinley D-4, dated 1953 (aerial photos taken 1952, field annotated 1953, minor revisions 1968) offers no evidence that an avulsion had occurred. Likewise, an aerial photo taken on September, 1952,[123] corroborated the hydrography depicted on the quad with no evidence of avulsive activity on lower Birch Creek. The USGS (1:250,000) quadrangle for Mt. McKinley, dated 1958 (limited revisions 1982) similarly does not show evidence that a new channel had yet been cut – one year prior to statehood. However, according to a 1970 aerial photo[124] and infra-red aerial photography taken in 1979,[125] there is conclusive evidence that a new east-west channel of Birch Creek had been created, diverting water from its south-flowing channel to the McKinley River (prior to the avulsion, the head of the Kantishna River was at this juncture). Based upon the available photographic evidence, the date (or year) of this avulsion cannot be determined.[126]

Yet another hydrologic event, also affecting Birch Creek, occurred sometime after 1979, according to the most recent photographic evidence we have of the creek's pre-avulsed (old) channel.[127] This is an unusual case because it appears that the McKinley River largely abandoned its primary channel to the east and colonized Birch Creek's old south-flowing channel, overtaking it with its north-flowing waters. Improbable as it may seem it appears that this south flowing channel of Birch Creek was actually reversed by the more voluminous north flowing glacial waters of the McKinley River. Further, the previously-avulsed Birch Creek channel effectively became the headwaters of the Kantishna River because the old (south flowing) Birch Creek channel evolved into the main stem of the (north flowing) McKinley River when the McKinley River shifted its main channel westerly and colonized the old channel of Birch Creek. The "newly" avulsed channel of Birch Creek appeared to have also been overwhelmed by the rampaging waters of the McKinley River, effectively further reducing the length of Birch Creek by almost one-half mile (See map, Figure 1).[128]

4) Also highlighted on the State's application (map) are a series of unnamed distributaries (2) flowing northerly, then easterly and finally southerly through Secs. 7, 8, 17 and 18, T. 12 S., T. 20 W., F.M (Figure 1, Case No. 4). These channels had no known hydrologic connection to the left bank of the Kantishna River or the avulsed channel of Birch Creek in Sec. 18, prior to

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[122] June 9, 1970, black & white aerial photo (Aero-Metric, Inc.); See Hardt, Pg. 10, Figure 12.
[123] USGS, VV 555RW M-655 55SRW, 6 Sept. 52 51-AM-1, Fr. 34; See Hardt, Pg. 5, Figure 5.
[124] Hardt, Pg. 10, Figure 12
[125] NASA CIR 60, July 1979, Roll 2792, Fr. 3422
[126] Hardt, Pg. 2, subpart 3
[127] NASA Infra-red, CIR 60, July 1979, Roll 2792, Frame 3422
[128] Google Earth Image, dated July 5, 2008

June 8, 1955.[129] The date that these distributaries were captured by the Kantishna River is unknown (See map, Figure 1).[130]

On September 16, 2015, the State notified the BLM that it modifies its application to include only the submerged lands of the Kantishna River from its mouth, upstream to the abandoned site of Roosevelt, situated in Sec. 31, T. 11 S., R. 19 W., F.M. By excluding the upper stretch of the Kantishna River (from Sec. 31, T. 11 S., R. 19 W., F.M to Birch Creek) the contested area affected by avulsion was effectively excluded from the state's application. According to the State's letter, the stretch of the Kantishna River withdrawn from the State's application is not an admission by the State that the upper Kantishna River is non-navigable.[131] Rather, it modified its application solely for the purpose of simplifying the RDI process.

On October 21, 2015, the State clarified its September 16, 2015, letter by stating its intent was also to withdraw its application for the entirety of Birch Creek, in addition to the stretch of the Kantishna River above the former site of Roosevelt. The precise location of Roosevelt has been difficult to pinpoint on a map. In her historical paper, "Ethnohistory of Four Interior Alaskan Water bodies," [132] Dianne Gudgel-Holmes described the confusion as to the site's location, due to historical accounts whether the community was situated on the McKinley River or the Kantishna River. Gudgel-Holmes concluded the former mining community was situated at the junction of a trail leading to nearby Bear Creek with an offshoot to Glacier and Eureka (Kantishna City). The trail's intersection with the nearby Kantishna River supports the logic that Roosevelt was situated in the south-half of Sec. 32, T. 11 S., R. 19 W., F.M, according to Gudgel-Holmes.[133]

Conclusions

The Federal test of navigability is found in *The Daniel Ball*, 77 U.S. (10 Wall.) 557 (1870). There, the U.S. Supreme Court stated: "Those rivers must be regarded as public navigable rivers in law which are navigable in fact. And they are navigable in fact when they are used, or are susceptible of being used, in their ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water."

In assessing the navigability of inland water bodies, the BLM relies upon this test as well as Federal statutes, Federal case law, and the advice of the Department of the Interior's Office of the Solicitor. Relevant Federal statutes include the Submerged Lands Act of 1953 and the Submerged Lands Act of 1988. The Supreme Court's most recent decision on title navigability, *PPL Montana, LLC v. Montana*, 565 U.S. ___ (2012), summarizes and explains the proper interpretation of *The Daniel Ball* criteria. . In cases concerning prestatehood reservations, BLM uses the established criteria set out and applied by the Supreme Court in two Alaska cases,

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[129] Hardt, Pgs. 14, 15

[130] Ibid.

[131] Letter, to Nichols, Angela, RDI Program Manager, BLM, from Walker, James, PAAD Unit, State of Alaska, DNR, Sept. 16, 2015

[132] Gudgel-Holmes, Dianne, (Project Committee Members: Richard O. Stern, Ron Swanson, Robert Frederick), State of Alaska, DNR, Div. of Research and Development, August, 1979.

[133] The report describes the site as "the southwest corner of T. 11 S., R. "20" W., FM". However, the Mt. McKinley D-3 quad shows the Kantishna River and Trail intersection in Sec. 31, T. 11 S., R. "19" W., FM. which is more logical because the Kantishna River doesn't flow through the SW corner of T. 11 S., R. 20 W., FM.

Alaska v. United States, 545 U.S. 75 (2005) (*"Glacier Bay"*) and *United States v. Alaska*, 521 U.S. 1 (1997) (*"Arctic Coast/Dinkum Sands"*).

After reviewing the State of Alaska's application, riparian land status, and the historic record as set forth above, the history of federal land conveyances in the system, and the legal guidance, we conclude that the applied for water bodies (or reaches thereof) were navigable for travel, trade, and commerce at the time of statehood. Under title navigability law, title to unreserved beds of navigable waters passed to the State of Alaska at the time of statehood. If not navigable, the submerged lands did not automatically transfer to the State. None of the water bodies examined herein was in a reserve or withdrawal at the time of statehood.

1. The Kantishna River from its mouth on the Tanana River to the site of the former mining community of Roosevelt (Sec. 31, T. 11 S., R. 19 W., F.M.) was in fact navigable at the time of statehood.

2. The Muddy River from its mouth at Birch Creek to and including Lake Minchumina, were in fact navigable at the time of statehood.

Recommendations

The BLM should approve the State's applications for recordable disclaimers of interest in the beds of Kantishna River (from its confluence at the Tanana River upstream to the site of the former mining community of Roosevelt), the Muddy River and Lake Minchumina. Under title navigability law, title to the beds of these water bodies (or reaches thereof) passed to the State of Alaska at the time of statehood.

ATTACHMENT A

STATE OF ALASKA'S DOCUMENTARY SUBMISSIONS IN SUPPORT OF RDI APPLICATIONS

Kantishna River (FF-094612)

Arctic Environmental Information and Data Center. "A Study of the Historical Use and Physical Characteristics of Alaska's Inlet Water Bodies." Report for the U.S. Bureau of Land Management. Vol. 10, Southeast Region, Summary Report. Anchorage, 1979. Pages 61-63 re boating on Kantishna and Muddy Rivers.

Arctic Environmental Information and Data Center. Water Body Historical Data, June 10, 1979. pp. 1465-1500.

Brown, C. Michael. "Alaska's Kuskokwim River Region: A History (Draft)," 1983. pp. 303-320. Re North Fork Kuskokwim River and Minchumina Portage.

Gordon, George Byron. *In the Alaskan Wilderness* (1917), pp. 17-19, 24, 25,26, 27, 35, 38, 39, 69, 80, 81.

Grumman Ecosystems Corporation. Report on Navigability of Streams Tributary to the Tanana River, Alaska. Prepared for U.S. Army Engineer District, Alaska (April 1975), p. 3-19, 3-22, 3-36, 3-38, 3-42, 3-43, 3-48, 3-67, 3-68.

Gudgel-Holmes, Dianne. *Ethnohistory of Four Interior Alaskan Waterbodies*, 1979, 114 pp. regarding Kantishna River drainage area.

McVee, Curtis V., BLM State Director, to Joe Upicksoun, President, Arctic Slope Regional Corporation, May 13, 1974, enclosing a list of "Inland Navigable Waters of Alaska."

U.S., Bureau of Land Management. Memo: "Navigable and Nonnavigable Waters in the Upper Kuskokwim Basin," (1980), pp. 62, 63, 67, 69, 86, 87. (Regarding the North Fork Kuskokwim River area.)

U.S., Bureau of Land Management. 40-Mile Area Staff. Navigability Determinations for the Tanana River Drainage, Vol. I, p. 85.

U.S., Bureau of Land Management. Memos: Marion L. England, Land Report for State Selection F-026841, April 17, 1980; Jules Tileston, Chief, Division of Resources, c. June 26, 1980.

U.S., Bureau of Land Management. Memos: Marion L. England, Land Report for State Selection F-44031, December 21, 1981; J. David Dorris, Acting Chief, Division of Resources, to State Director, March 16, 1982.

U.S., Bureau of Land Management. Memos: Marion L. England, Land Report for State Selection F-028883, April 17, 1980; Jules Tileston, Chief, Division of Resources, to State Director, May 21, 1980. Navigability determination for State land selection F-028883.

U.S., Bureau of Land Management. Memos: Ben Robinson, Land Report for F-44020, April 30, 1980; Jules Tileston, Chief, Division of Resources, to State Director, August 21, 1980.

U.S., Bureau of Land Management. Memos: James F. Sizemore, Acting Chief, Division of Resources, to State Director, January 16, 1980. Navigability determinations for State of Alaska land selections.

Muddy River (FF-094610)

Arctic Environmental Information and Data Center. Water Body Historical Data, June 10, 1979, pp. 2337 and 2338. Abstracts re: Muddy River.

Arctic Environmental Information and Data Center. "A Study of the Historical Use and Physical Characteristics of Alaska's Inlet Water Bodies." Report for the U.S. Bureau of Land Management. Vol. 10, Southeast Region, Summary Report. Anchorage, 1979. page 62 re boating on Kantishna and Muddy Rivers.

Brown, C. Michael. "Alaska's Kuskokwim River Region: A History (Draft)," 1983. pp. 303-316. Re North Fork Kuskokwim River and Minchumina Portage.

Gudgel-Holmes, Dianne. *Ethnohistory of Four Interior Alaskan Water bodies*, 1979, 2 pp re Muddy River boating.

U.S., Bureau of Land Management. Memos: C. M. Wheeler, "Mt. McKinley #1, FY83," December 13, 1982; and Robert D. Arnold, Assistant to the State Director for Conveyance Management, to Chief, Division of ANCSA and State Conveyances, December 28, 1982. (Portions of Muddy River, Deep Creek, Lake Minchumina and Jim Lake were determined navigable.)

U.S., Bureau of Land Management. Memos: Robert W. Arndorfer, Deputy State Director for Conveyance Management, to Chief, Branch of State Adjudication, May 29, 1984, file FF-023477. Muddy River is navigable in T. 11 S., R. 21 W., FM.

U.S., Bureau of Land Management. "Navigable and Nonnavigable Waters in the Upper Kuskokwim Basin," (1980), pp. 62-70, re the North Fork Kuskokwim River.

Lake Minchumina (FF-094611)

Arctic Environmental Information and Data Center. Water Body Historical Data, June 10, 1979. pp. 2017-2024.

Brown, C. Michael. "Alaska's Kuskokwim River Region: A History (Draft)," 1983. pp. 303-316. Re North Fork Kuskokwim River and Minchumina Portage.

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Gudgel-Holmes, Dianne. *Ethnohistory of Four Interior Alaskan Water bodies*, 1979, 13 pp. re Kantishna River drainage area.

Grumman Ecosystems Corp. *Report on Navigability of Streams Tributary to the Tanana River, Alaska*. Prepared for U.S. Army Engineer District, Alaska (April 1975), p. 3-22.

Schneider, William, Dianne Gudgel-Holmes, and John Dalle-Molle. *Land Use in the North Additions of Denali National Park and Preserve: An Historical Perspective*. National Park Service Research/Resources Management Report AR-9 (1984), pp. 18, 25, 27, 57,58, 60.

U.S., Bureau of Land Management. Memos: C. M. Wheeler, "Mt. McKinley #1, FY83," December 13, 1982; and Robert D. Arnold, Assistant to the State Director for Conveyance Management, to Chief, Division of ANCSA and State Conveyances, December 28, 1982. (Portions of Muddy River, Deep Creek, Lake Minchumina and Jim Lake were determined navigable.)

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U.S., Bureau of Land Management, 40-Mile Area Staff. Navigability Determinations for the Tanana River Drainage, Vol. I, p. 85.

Deep Creek (FF-094609)

Gudgel-Holmes, Dianne. *Ethnohistory of Four Interior Alaskan Waterbodies* (August 1979). 2 pp. regarding Lake Minchumina and Deep Creek.

U.S., Bureau of Land Management. Memos: C. M. Wheeler, "Mt. McKinley #1, FY83," December 13, 1982; and Robert D. Arnold, Assistant to the State Director for Conveyance Management, to Chief, Division of ANCSA and State Conveyances, December 28, 1982. (Portions of Muddy River, Deep Creek, Lake Minchumina and Jim Lake were determined navigable.)

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