Ketchikan Creek Watershed Control Plan

February 3, 2022

Ketchikan Public Utilities

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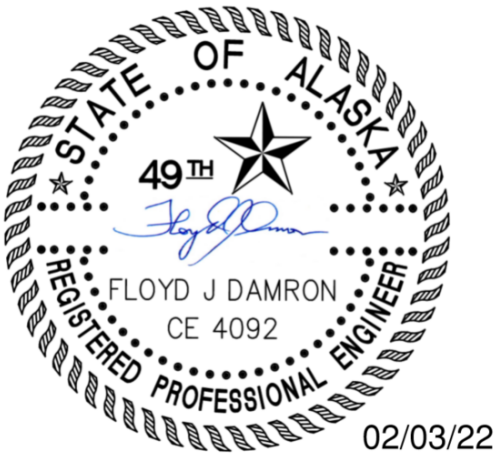

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Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved

Contents

Abbreviations and Acronyms

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
APUC	Alaska Public Utilities Commission
BLM	U.S. Bureau of Land Management
CFR	*U.S. Code of Federal Regulations*
cfs	cubic feet per second
cfu	colony-forming unit
COBC	Compliance Order by Consent
CT	chlorine contact time
DBP	disinfection byproducts
EAP	emergency action plan
FERC	Federal Energy Regulatory Commission
GPS	Global Positioning System
HAA5	haloacetic acids
KPU	Ketchikan Public Utilities
LAF	limited alternative to filtration
LT1ESWTR	Long Term 1 Enhanced Surface Water Treatment Rule
LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
LUD	Land Use Designation
mL	milliliter
MOA	Memograndum of Agreement
msl	mean sea level
MST	microbial source tracking
NTU	nephelometric turbidity units
RMP	Ring of Fire Management Plan
SCADA	supervisory control and data acquisition
SDWA	Safe Drinking Water Act
SOC	synthetic organic chemicals
SOP	standard operating procedure
SWTR	Surface Water Treatment Rule
TTHM	total trihalomethanes
TM	technical memorandum
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
UV	ultraviolet light
UVT	UV transmittance
WDOH	Washington State Department of Health
WTP	water treatment plant

1. Watershed Control Plan Overview

Ketchikan Public Utilities (KPU) relies on the Ketchikan Creek watershed for its primary source of domestic water. The watershed is comprised of the Ketchikan Lakes, Fawn Lake, and Granite Basin drainage areas. Water from Ketchikan Lakes and Granite Basin is diverted by dams and penstocks to Fawn Lake. Water from Fawn Lake supplies the municipal water system and the hydroelectric power generation system. KPU operates the dam, pipelines, and related appurtenances.

The watershed is primarily on federally owned land within the Tongass National Forest. A small fraction of the watershed is on U.S. Bureau of Land Management (BLM) land. Through a special act of Congress in 1939, KPU was given the authority to control activities and access to the watershed. KPU owns 10 acres near the Ketchikan Lakes dam. Aside from the water system infrastructure within the watershed, the watershed is undeveloped and well protected from most human activity by its steep slopes and rugged mountainous terrain. Signage that bans public access is displayed at the watershed access points, which are blocked by locked gates and fencing.

1.1 Regulatory Framework

This Watershed Control Plan describes the control program to protect KPU's unfiltered surface water supply source in the KPU Watershed. This plan has been developed using the guidelines in Appendix J Watershed Control Program of the U.S. Environmental Protection Agency's (USEPA) *Guidance Manual for Compliance with the Filtration and Disinfection Requirement for Public Water Systems Using Surface Water Sources* (USEPA 1991). A copy of these guidelines is located in Appendix A of this plan.

This plan includes the following sections:

- Watershed description
- Watershed characteristics and activities detrimental to water quality
- Control of detrimental activities and events
- Monitoring
- Management and operations
- Agreements and land ownership

2. Watershed Description

2.1 Geographical location and physical features of the watershed

The Ketchikan Lakes water supply consists of drainage from Ketchikan Lakes and Granite Basin. The two drainage basins feed Fawn Lake, where the intake is located to a tunnel system that supplies water to the KPU's water supply system and hydroelectric generation system. There are numerous small unnamed streams that flow into Ketchikan Lakes and Granite Basin. Figure 2-1 shows a topographic map of the watershed boundary which includes Ketchikan Lakes, Fawn Lake, and Granite Basin. Figure 2-2 shows a 3D map of the watershed.

The drainage areas of Ketchikan Lakes and Granite Basin are approximately 8.2 and 2.3 square miles, respectively (KPU Electric Division 2016). The drainage area above Ketchikan Lakes and Granite Basin consists of ruggedly mountainous terrain. The basins are steeply sloped with most slopes close to or exceeding 50 percent grade, with much of the watershed being rock face. The terrain adjacent to Fawn Lake is relatively flat with dense vegetation. Watershed elevations range from 350 to 3,310 feet above sea level. Mean elevations of the Ketchikan Lakes and Granite Basin drainages are 1,270 and 1,310 feet, respectively (USFS 1985). The maximum controlled reservoir elevation of Ketchikan Lakes is 350 feet. Ketchikan Lakes reservoir elevations fluctuate between 320 and 350 feet for power-generating purposes and fish habitat purposes (KPU Electric Division 2016). The Fawn Lake reservoir pool elevation varies between 349 and 315 feet (PEI 1992).

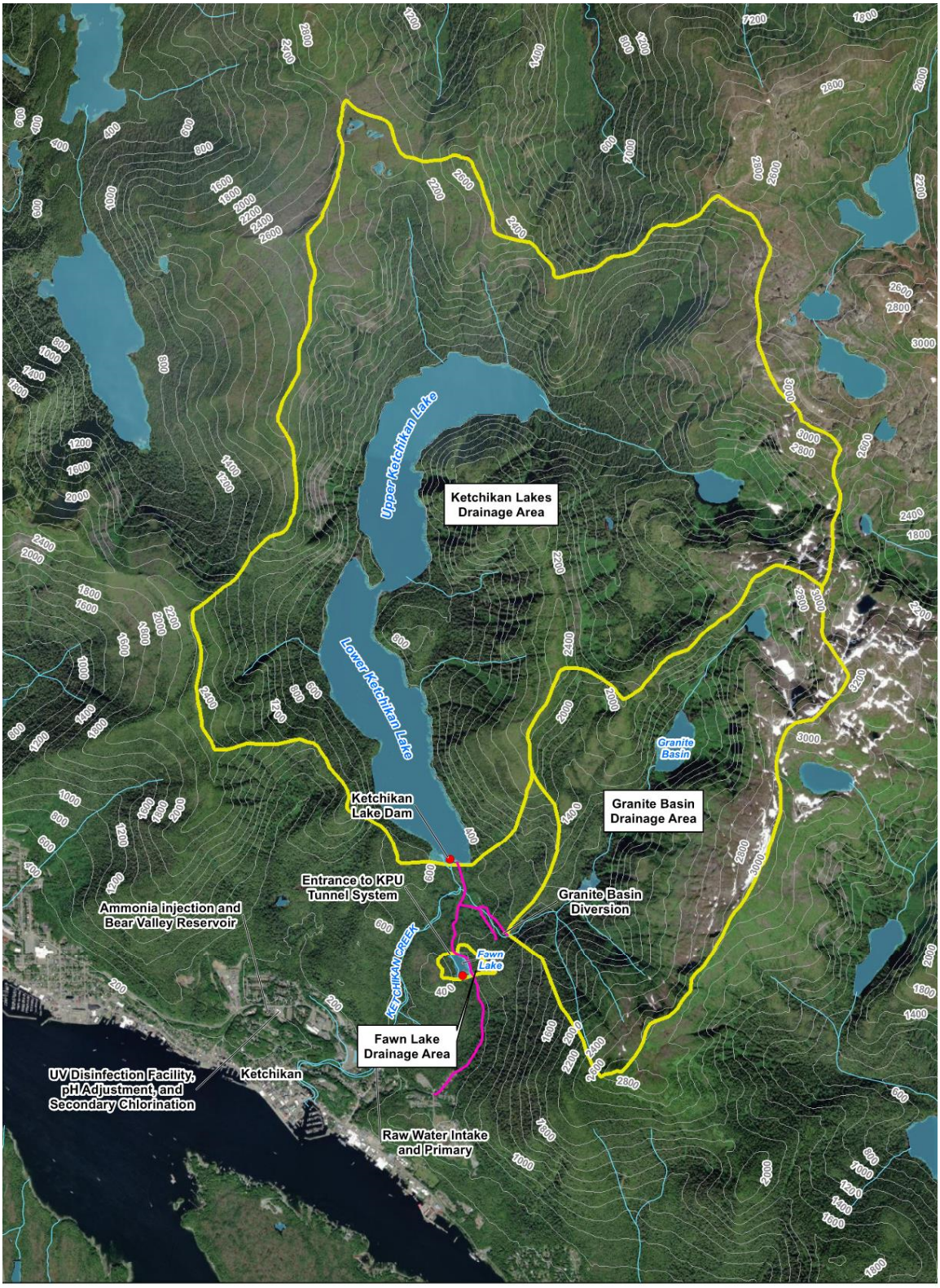


Figure 2-1
Ketchikan Creek Watershed Boundary 2D
Ketchikan, Alaska

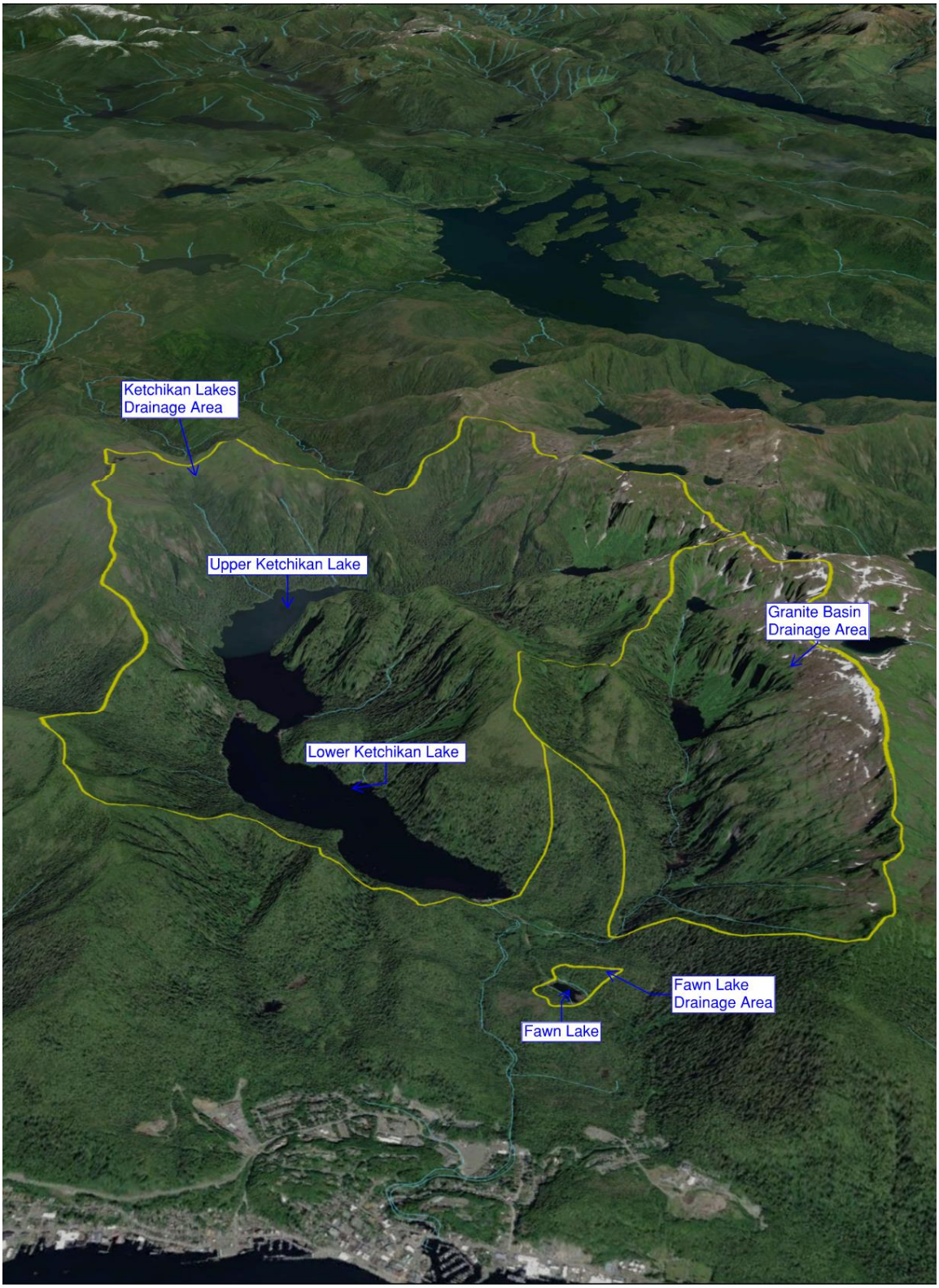


Figure 2-2
Ketchikan Creek Watershed Boundary 3D
Ketchikan, Alaska

2.2 Location of major water system components in relationship to the watershed

The Ketchikan Lakes watershed drains into Upper and Lower Ketchikan Lakes, which are two lakes connected by a narrow channel in the middle. The lakes are impounded by a rock filled dam at the lower end of Lower Ketchikan Lake. The Ketchikan Lakes Dam has a spillway that is an ungated concrete ogee crest structure that discharges water into a bedrock channel that flows into Ketchikan Creek. Lower Ketchikan Lake has intakes at two different locations upstream of the dam. One intake supplies tunnel #1 (an unlined tunnel 4 feet by 6 feet in dimension and approximately 300 feet long). Tunnel #1 then transitions to a 54 inch diameter concrete pipe, one of the two penstocks leading to Fawn Lake The second Lower Ketchikan Lake intake supplies tunnel #2 (an unlined tunnel 4 feet by 6 feet in dimension and approximately 280 feet long). Tunnel #2 then transitions into a 54 inch diameter ductile iron pipe, the second penstock leading to Fawn Lake. These two penstocks travel side by side for approximately 1,820 feet and then join via a concrete structure into a single tunnel. This tunnel, known as tunnel #5, is unlined with 7 feet by 8 feet interior dimensions, and is approximately 1,127 feet in length. After traveling through tunnel #5, the water empties into Fawn Lake.

The Granite Basin watershed drains to Granite Creek. Granite Creek is then intercepted by the Granite Basin Diversion Structure. This structure is made of concrete with three steel knife gates that, when closed, route Granite Creek water into a single intake. This intake supplies a rock tunnel, known as tunnel #6, which is unlined with 5 feet by 6 feet interior dimensions and is approximately 1,056 feet in length. Tunnel #6 discharges into a steep open channel that flows approximately 350 feet before flowing into Fawn Lake.

The Fawn Lake watershed drains the vicinity around Fawn Lake. Fawn Lake is formed by two rock filled dams. The northern Fawn Lake dam has an ungated spillway that discharges into an open channel that flows to Ketchikan Creek. Fawn Lake has one intake. This intake supplies a rock tunnel, known as tunnel #4, which is Gunite lined with 7 feet by 8 feet interior dimensions and is approximately 725 feet in length. It then transitions into a vertical shaft with 7 feet by 8 feet interior dimensions and approximately 427 feet in length. It then transitions into a tunnel, known as tunnel #3, with 7 feet by 8 feet interior dimensions and approximately 2,600 feet in length. At a concrete tunnel plug at the end of tunnel #3 there are two water system intakes.

From the water system intakes, the water is piped to the Chlorination Building where the raw surface water begins the disinfection process when thoroughly mixed with chlorine. It then travels a mile along Schoenbar Road to the Ultraviolet Light (UV) Disinfection Facility for additional disinfection. From the UV Facility, an additional amount of chlorine is added immediately downstream of the UV reactors. Just prior to the water entering the Bear Valley Reservoir, a small amount of ammonium hydroxide is added. Within the 3-million gallon reservoir, ammonia combines with the unreacted chlorine to form the final chloramine disinfectant and is distributed throughout Ketchikan's municipal water system.

2.3 Hydrology

The Ketchikan Creek drainage basin forms a dendritic drainage pattern in a generally westerly direction. Approximately 34 percent of the KPU watershed is above tree line. The slope of the drainage basin's main channel is 77 vertical feet per 1,000 feet of horizontal run, or 7.7 percent. The part of the Ketchikan Lakes drainage basin comprised of the lakes and the active creek channel is 12 percent slope. The average elevation of KPU watershed is 1,270 feet mean sea level (msl). Approximately 57 percent of the Granite Basin drainage is above tree line. The drainage basin's main channel slope is 170 vertical feet per 1,000 feet of horizontal sun, or 1.7 percent. The part of the basin comprised of the Granite Creek main channel is 2 percent slope. The average elevation of the basin is 1,310 feet msl (USFS 1985). The average annual precipitation at Fawn Lake is 147.5 inches based on precipitation data collected by KPU Electric at the Ketchikan Lakes powerhouse. Basin hydrologic data is summarized in Table 2-1 (KPU Electric Division 2016).

Table 2-1. Basin Hydrologic Data

Ketchikan Lakes	
Drainage Area (square miles)	8.2
Highest Elevation (feet msl)	3220
Granite Basin	
Drainage Area (square miles)	2.3
Highest Elevation (feet msl)	3310
Fawn Lake	
Drainage Area (square miles)	0.05
Highest Elevation (feet msl)	600

Table 2-2 shows estimated annual and monthly flow data for Ketchikan Creek, including upper and lower deviations (KPU Electric Division 2016). Table 2-3 shows estimated annual and monthly flow of Granite Creek including upper and lower deviations (KPU Electric Division 2016). During low elevations at Fawn Lake, power production is curtailed to provide adequate water supplies for domestic, fish habitat, and fire use.

Table 2-2. Ketchikan Creek Monthly Flow (cfs)

Month	90% Lower Limit	Mean Estimate	90% Upper Limit
January	34.9	69.6	138.7
February	33.0	55.8	90.7
March	22.1	38.9	68.6
April	49.5	57.3	66.3
May	84.9	127.9	192.7
June	108.8	166.2	248.2
July	75.7	119.7	189.5
August	75.8	116.6	179.4
September	99.6	138.8	193.4
October	146.3	201.6	277.9
November	92.0	131.8	188.9
December	42.1	77.0	141.0

Table 2-3. Granite Creek Monthly Flow (cfs)

Month	90% Lower Limit	Mean Estimate	90% Upper Limit
January	8.1	16.4	32.85
February	10.8	18.0	29.93
March	7.1	12.9	23.26
April	16.0	18.6	21.70
May	40.7	62.0	94.54
June	48.3	75.4	117.54
July	36.3	58.8	95.13
August	32.0	49.8	77.48
September	39.2	55.0	77.35
October	53.4	74.2	103.19
November	33.0	47.8	69.17
December	12.7	23.8	44.90

The Ketchikan Lake Hydroelectric Project operates under Federal Energy Regulatory Commission (FERC) license number 420. The project boundary encompasses the lakes, dams, diversion, pipes and penstocks, access road, tunnels, and powerhouse. Per the 2000 FERC license, the minimum instream flow release for fish habitat is 47 cubic feet per second (cfs) of water below the powerhouse. In the event of a plant trip, the minimum instream flow release is 30 cfs. The minimum flow discharge is measured by flow meters installed on the penstocks and deviations to this are reported.

2.4 Agreements and delineation of land use and ownership

The watershed area for the water system source is under shared ownership between the City of Ketchikan, the United States Forest Service (USFS), and the BLM. The KPU watershed has institutional controls such as this watershed control plan to assess potential sources of pollution and strategies to address these problems, a city ordinance which prohibits trespassing within the watershed, and a United States Department of Agriculture (USDA) municipal watershed designation which prioritizes the protection of the watershed by the USFS. In addition, the City of Ketchikan reached out to both the USFS and the BLM to request confirmation that they are fully committed to protecting the KPU watershed by following the requirements of the 1939 Act of Congress for watershed protection. Executive order from President Woodrow Wilson, and an enactment of Congress, House Resolution No. 2413, dated July 27, 1939, set aside the lands of the watershed as a municipal watershed, thereby limiting the lands from any use that would degrade water quality.

Both the USFS and BLM provided letters of acknowledgements to KPU in 2021 on their continued commitment to protecting Ketchikan's water supply watershed. On paper, this makes the KPU watershed one of the most protected public water systems in Alaska. Copies of the city ordinance, USDA municipal watershed designation, 1939 Act of Congress, and acknowledgements from USFS and BLM are located in Appendix B. Additional information relating to the agreement and delineation of land use and ownership is elaborated in Section 7 of this plan.

3. Watershed Characteristics and Activities Detrimental to Water Quality

This section identifies naturally occurring and man-made characteristics with potential to affect raw water quality. KPU watershed vulnerability to these activities and characteristics is evaluated and described below.

3.1 Naturally Occurring Characteristics and Effects

3.1.1 Precipitation, Terrain, Soil Types, and Land Cover

The City of Ketchikan holds one of the highest precipitation records in the United States at 203 inches in 1949. The average annual precipitation in Ketchikan is 147.5 inches. Ketchikan Lakes receive water from the surrounding steep mountains with a vast rain-catchment area. Both Fawn Lake and Ketchikan Lake levels are constantly monitored with instrumentation installed in secure vaults. These instruments report to the Bailey Power House operators 24-hours per day through the supervisory control and data acquisition (SCADA) system.

The mountainsides of the Ketchikan Lakes area consist of primarily exposed bedrock or bedrock covered by a thin vegetative layer. The areas surrounding Fawn Lake consists of sand and gravel. The organic layers of soils composed of fresh and partially decomposed organic material. Below the organic layer is the first of the mineral solid layers, which generally consists of resistant materials such as quartz. The mineral solid layers typically are thin and poorly developed. Below these horizons lie a layer of unconsolidated material, usually a glacial till. Below the glacial till lies bedrock. The Ketchikan Creek watershed was completely covered by ice for many thousands of years, during several different glacial periods. Evidence of glacial abrasion is in the founded slopes, U-shaped valleys, and exposed smooth bedrock. The Ketchikan Lakes trough was sculpted by ice whose melt overflowed its brim and ran into the Tongass Narrows. Bedrock is often exposed at the surface of Ketchikan Creek watershed's steep slopes. The bedrock extends to the water of Ketchikan Lakes along much of the shoreline.

The temperate rain forest of the Ketchikan Creek watershed primarily consists of undisturbed old-growth stands. Differences in external appearances are due to age, species composition, and tree vigor. Tree species include western hemlock (*Tsuga heterophylla*), Sitka spruce (*Picea sitchensis*), western red cedar (*Thuja plicata*) and Alaska cedar (*Chamecyparis nootkatensis*). Other common species of vegetation are red alder (*Alnus rubra*) and Sitka alder (*Alnus sinuata*) (Martinson et al. 1987). Vegetation covers the majority of the landscape. Approximately 34 percent of the Ketchikan Lakes drainage is above tree line; approximately 57 percent of the Granite Basin drainage area is above tree line (USFS 1985).

The potential effects to raw water quality include naturally occurring events such as heavy rainfall induced erosion, landslides, and avalanches in the watershed. Minimal rainfall followed by a sudden storm with heavy rainfall have correlated to raw water samples with high numbers of fecal coliform colonies from the Granite Basin watershed into Fawn Lake. Landslides have occurred upstream and at the Granite Basin diversion dam. Silt and organics have washed downstream and resulted in a significant short-term increase in raw water turbidity. Avalanches in the vicinity of the reservoir may deposit sediments directly on ice cover which then thaws in spring. Due to the absent or very shallow soil cover in the steep sloped watershed areas, the type of landslide most likely to occur is a rockslide. Fine-grained materials on the mountainsides reduces the threat of substantial sediment being pushed into the reservoir. The contamination threat lies primarily in potential introduction of sediment, either directly into the reservoir or by eroded surface areas leaving soils exposed.

Since the Granite Basin landslide of 2005, KPU has had three high turbidity events and one official turbidity event in the past 10 years (ADEC 2020). In 2011, two landslides occurred within two weeks of each other in the same area. The 2011 events were classified as "Unusual and Unpredictable" by Alaska Department of Environmental Conservation (ADEC). The most recent turbidity event, caused by heavy rain, occurred at the end of 2013. In each

incident, the Water Division personnel cleaned filters and instruments, collected raw and treated water samples for laboratory coliform analysis, and increased the chlorine addition rate. In response to these turbidity events, KPU has implemented standard operating procedures (SOPs) discussed in Section 4 of this plan.

3.1.2 Wildlife Populations

Based on information from previous studies such as the *Ketchikan Watershed Mammal Monitoring Program 1995 Report* (CH2M Hill 1995), KPU Coliform Desktop Study (Jacobs 2021), and email communication with Alaska Department of Fish and Game (ADF&G), there are several wildlife species in the watershed that may negatively impact water quality. These species range from larger mammals such as mountain goat (*Oreamnos americanus*), Sitka blacktailed deer (*Odocoileus hemionus sitkens*), black bear (*Ursus americanus*), and wolf (Canis lupus) to smaller rodents such as marten (*Martes americana*), mink (*Mustela vison*), and weasel (*Mustela erminea*). Mammals associated with aquatic habitats such as beaver (*Castor canadensis*) and river otter (*Lutra canadensis*) and migratory birds such as cackling goose (*Branta hutchinsii*), common merganser (*Mergus merganser*), and greater white-fronted goose (*Anser albifrons*) directly deposit excrement into the water.

The presence of different animals in the KPU watershed could affect water quality adversely. Several animals are known to carry pathogens such as protozoans and bacteria. Viruses do not live long outside of the host. Wildlife may carry and transmit *Cryptosporidium*. *Giardia lamblia* is capable of infecting many species of animals that may be present in the watershed, and the excrement of these host animals may come in contact with the water supply.

While these species may negatively impact water quality through fecal matter, the impact is relatively low because KPU's source water treatment systems are designed and operated to effectively kill or inactivate microbes.

3.1.3 Other Activities

There are no additional naturally occurring activities that can adversely affect water quality.

3.2 Human Made Characteristics and Effects

3.2.1 Flow Diversion and Power Generation

The Ketchikan Lakes Project operating criteria are based on domestic water supply requirements and electrical energy production. The water supply is taken from the penstock just ahead of the hydroelectric powerhouse. The City of Ketchikan holds senior appropriated water rights for Ketchikan Creek at 136 cfs. The FERC License No. 420 for the Ketchikan Lakes hydroelectric project recognizes that this project has water rights for 126 cfs for electric power generation and 10 cfs specifically reserved for the municipal water supply. Ketchikan Creek provides important fish spawning habitat thus License No. 420 requires that a stream flow of 47 cfs below the powerhouse must be met at all times. If needed, the License also allows this flow to be reduced to 35 cfs for the purpose of protecting the municipal water supply.

The KPU Water Division and the KPU Electric Division have a partnership in working together to maintain water supply requirements and electrical energy production respectively. In the event of a water shortage, KPU Water will request KPU Electric to adjust operations to protect the water supply. Electric power generation may pose a threat to water quality if Fawn Lake water levels are drawn down too low and lead to increased turbidity. During situations of high turbidity, KPU Water will coordinate with KPU Electric as described in Section 4 of this plan to mitigate water quality degradation.

3.2.2 Contamination Point Sources

There are no contamination point sources of from wastewater treatment, industrial, barnyard, feedlots, or private septic systems discharge into the watershed, as the watershed is entirely uninhabited and undeveloped.

3.2.3 Nonpoint Sources of Contamination

3.2.3.1 Roads

Figure 3-1 shows existing roads in the watershed. There are no highways nor railroads within the watershed. The access road leading to Fawn Lake, Granite Basin and Ketchikan Lakes must pass through a series of manually opened vehicle gates that are locked by chain and padlock. The first gate is constructed of pipe and blocks motor vehicles as shown in Figure 3-2. The second gate is chain-link perimeter fence which encompasses the entire perimeter of Fawn Lake which blocks foot traffic as shown in Figures 3-3 and 3-4. Signage that prohibits trespassing per City Ordinance 11.20.010 has been posted at known access points to the watershed, as seen in Figures 3-3 and 3-5. Signage is monitored for vandalism and will be promptly replaced as needed.

The presence of access roads in the watershed potentially could affect waters of Fawn Lake. Erosion of sediment from road surfaces would be detrimental near the water system intake at Fawn Lake. The imported gravel surfacing along Fawn Lake when the road was rebuilt was specifically selected by analysis to be low in both arsenic and selenium. While erosion of sediment from road surfaces is a possibility, it is minimized by the nature of the drainage that generally flows away from the road. In addition, access to the watershed is controlled and restricted.

The limited access road is used only by KPU staff who are patrolling the area and staff who are performing dam, water intakes, penstocks, and other infrastructure maintenance or patrolling the area. Water quality impacts are minimal or non-existent because of the limited use of roads and their position relative to the reservoir. There are no indications that the road system serving the maintenance activities on the water system is causing adverse water quality impacts.

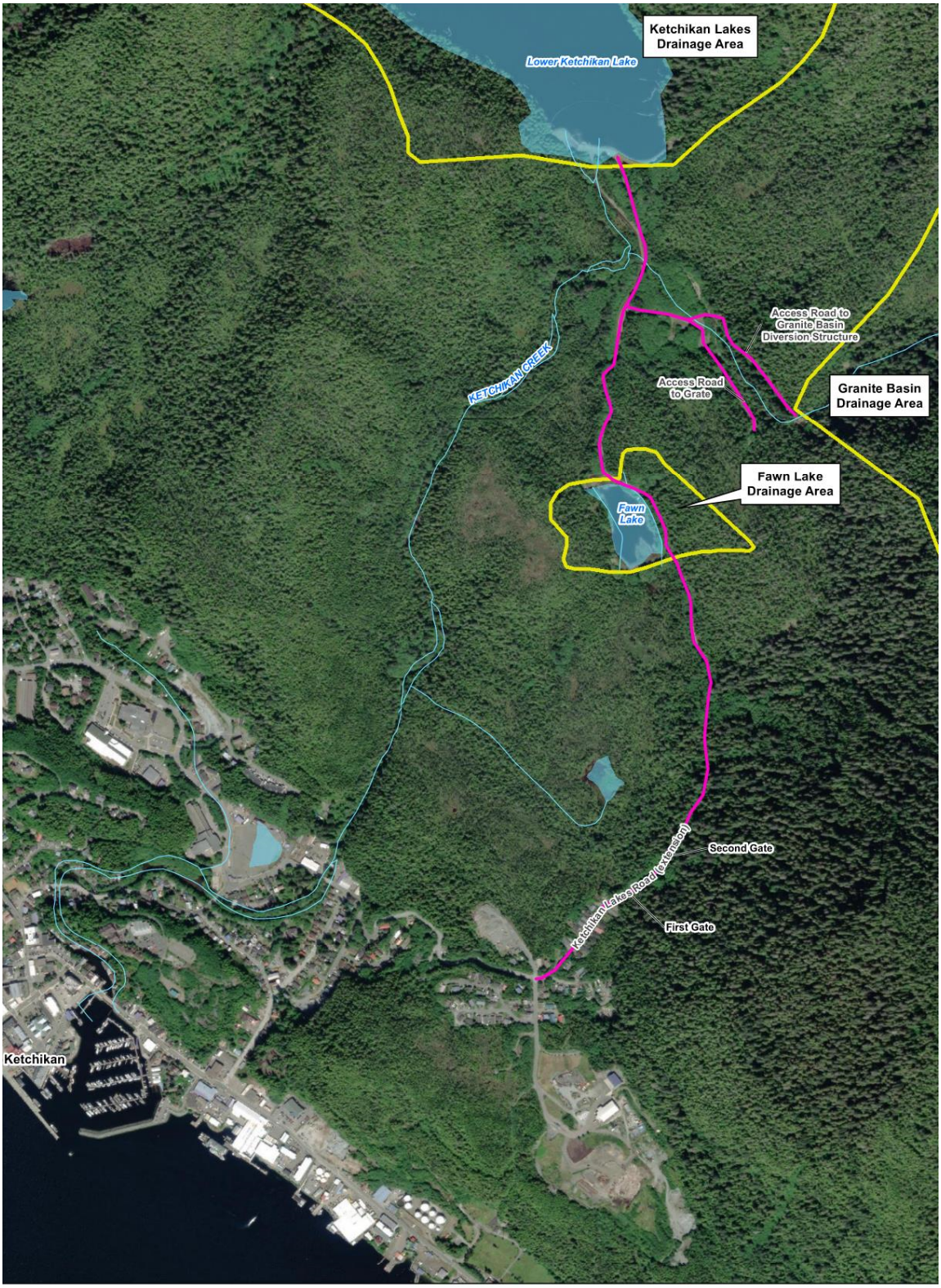


Figure 3-1
Ketchikan Public Utilities Access Road
Ketchikan, Alaska

Figure 3-2. First secured gate on access road to Ketchikan Lakes

Figure 3-3. Fence and second secured gate on access road with No Trespassing signage

Figure 3-4. Fencing surrounds Fawn Lake

Figure 3-5. Second No Trespassing Signage behind the Secured Gate and Fencing

3.2.3.2 Pesticide usage

There is no pesticide usage within the watershed.

3.2.3.3 Logging

There is no logging authorized within the watershed.

3.2.3.4 Grazing animals

There are no grazing animals such as livestock within the watershed.

3.2.3.5 Discharge to groundwater

There is no discharge into groundwater that recharges surface water.

3.2.3.6 Recreational activities

Public access is not allowed in the watershed. As previously mentioned in Section 2 of this plan, the City of Ketchikan maintains a no trespassing ordinance for the KPU watershed. The 1939 Act of Congress sets aside land in the watershed as a municipal watershed, thereby limiting the lands from any use that would degrade water quality. Copies of the city ordinance and the 1939 Act of Congress are located in Appendix B. Watershed road access is restricted to KPU staff and emergency service vehicles. Figures 3-2, 3-3, 3-4, and 3-5 demonstrate control measures that reduce risk of unauthorized activities by blocking and locking multiple access gates. The entire perimeter of Fawn Lake is enclosed behind chain-link fencing topped with barbed wire to block foot traffic from entering the area.

Recreational activities in the Ketchikan area include hiking and hunting. Figure 3-6 shows the locations of USFS trailheads and trails in the greater Ketchikan area. There is one trail, the Deer Mountain Trail, that has a few short segments that cross over the watershed boundary at very high elevations along the ridge at the eastern most edge of the watershed. However, as shown in Figure 3-7, the short segments of the Deer Mountain Trail that overlap with the watershed boundaries are over 5,000 feet away from Fawn Lake. The small amount of foot traffic has no effect on water quality. The trail begins outside the perimeter of the watershed at the Deer Mountain trail parking lot near the intersection of Nordstrom Drive and Ketchikan Lakes Road, as shown in orange in Figure 3-7. The Deer Mountain trail is 6.7 miles with an elevation gain of 2,801 feet and takes an average of 4 hours and 36 minutes to complete. The hiking website, AllTrails.com, rates this hike as difficult given the steep switchbacks, uneven terrain, and loose rocks.

There have been incidents where hikers get lost or fall at steep areas. The Ketchikan Visitor Information Center will loan hikers a personal locator beacon in the event that they need to send a distress signal and GPS location to the Ketchikan Volunteer Rescue Squad. Outside of the watershed, the Deer Mountain trail has a short side spur to the Deer Mountain Shelter, a small A-Frame structure constructed and maintained by the Forest Service. The shelter is lightly used because of its remote and difficult to reach location, but does offer a safe place for injured hikers to shelter. The Forest Service estimates 365 day hikers and 99 overnight hikers per year use the trail. The Forest Service hiker policy is: "Visitors are to leave no trace when they use the trail or visit/stay at the shelter". The Deer Mountain trail also connects to Silvis Lakes Trail to create the Deer Mountain-Silvis Lakes Traverse; however, because of the extreme difficulty of the hike the use of this traverse is low.

KPU employees patrol the watershed area multiple times per week to monitor activity. If hikers or hunters are found past the locked gates and perimeter fencing, the KPU employees will instruct the trespassers to leave. Unpermitted recreational activities are potential sources of watershed contamination. Such recreational uses

have the potential to introduce microbial contamination from human and pet excrement, as well as turbidity-causing sediment from exposed road surfaces.

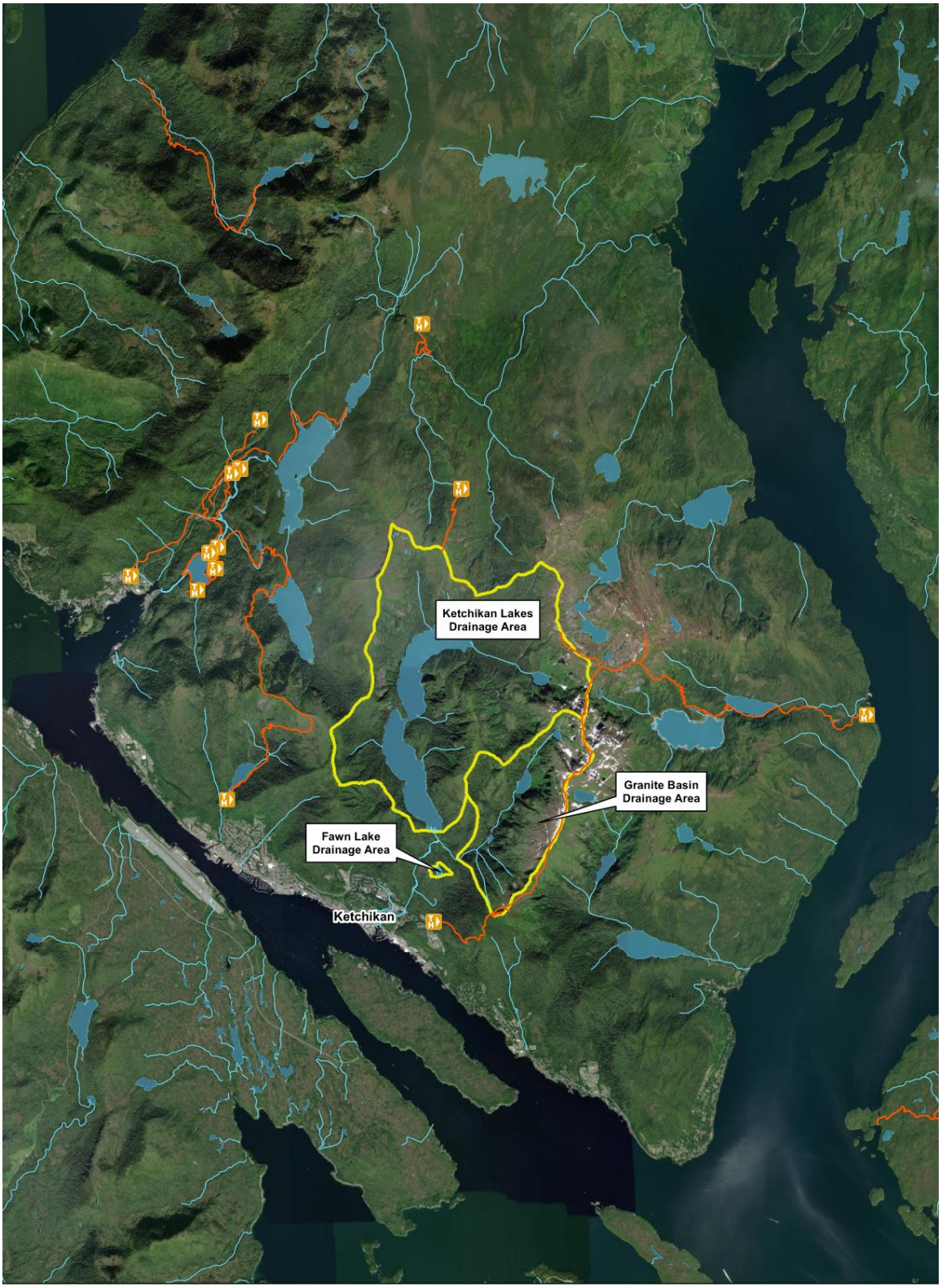


Figure 3-6
Ketchikan Area Hiking Trails
Ketchikan, Alaska

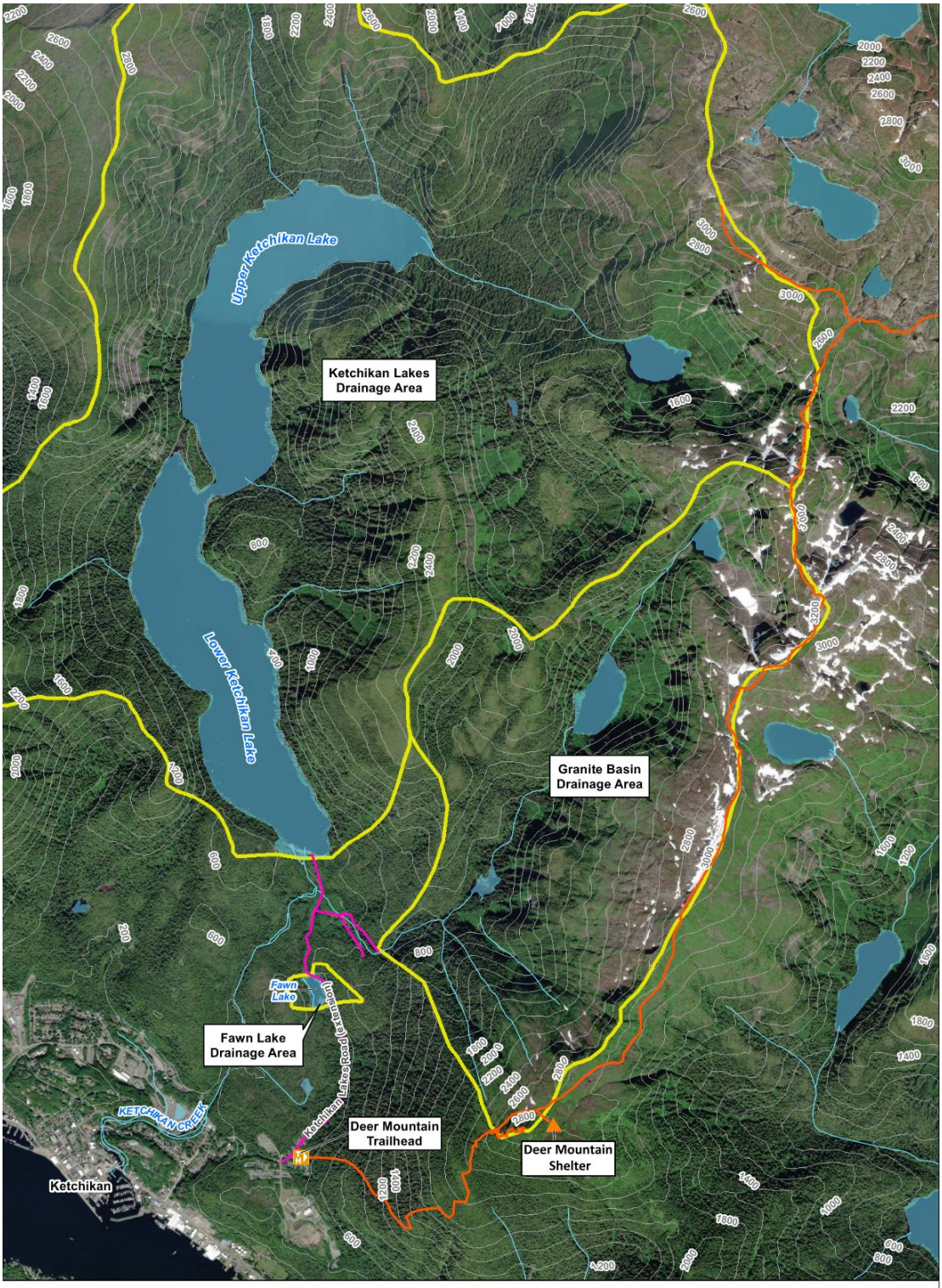


Figure 3-7
Deer Mountain Trail Location
Ketchikan, Alaska

3.2.3.7 Potential for unauthorized activity in the watershed

There is potential for trespassing incidents to occur in the watershed. The major factor that mitigates the effects of illegal watershed trespassing is the infrequency of occurrences. KPU staff regularly monitor the watershed and the water system infrastructure by patrolling the area several times per week on a random schedule to monitor activity. Trespassing in the watershed has historically been infrequent. In those few events, trespassers immediately left the watershed area after being instructed by KPU staff. There are no indicators that illegal activities in the watershed have created negative water quality impacts.

3.2.3.8 Any other human activity in the watershed

There are no additional human activities in the watershed that were not previously mentioned. During the 2019 inspection, a drone was used to view areas of the watershed that are not easily seen from either Ketchikan Lake dam or Granite Basin intake. No conditions detrimental to water quality in the watershed were observed with the drone.

4. Control and Mitigation of Detrimental Activities and Events

This section describes the techniques used to control and mitigate the effect of activities previously identified in Section 3 of this plan. Consistent with the current filtration waiver criteria, KPU has effective controls on activities that could have adverse effect on source water microbiological quality. These controls apply to the entire watershed regardless of its ownership status based on written concurrence with respective land owners in conformance with the 1939 act of Congress.

4.1 Potentially Detrimental Characteristics and Activities and Events

Activities and events in the watershed with potential impacts to water quality and quantity for the Ketchikan Lakes, Fawn Lake, and Granite Basin drainage areas include the following:

- Precipitation, landslide, and avalanche
- Wildlife
- Power generation
- Roads and recreation

The following is a detailed discussion of detrimental activities and characteristics identified above. The control measure descriptions follow the format laid out by the USEPA guidelines in Appendix J Watershed Control Program of the *Guidance Manual for Compliance with the Filtration and Disinfection Requirement for Public Water Systems Using Surface Water Sources* (USEPA 1991), also located in Appendix A of this plan. The text is structured to identify these concerns:

- Activity
- Management Decision
- Procedure
- Monitoring

4.2 Precipitation, Landslide, and Avalanche

Activity: Heavy precipitation, landslide and avalanche events in the watershed may increase raw water turbidity. Periods of comparatively minimal rainfall followed by a sudden storm with heavy rainfall may result in concentrated fecal coliform colonies in raw water samples from the Granite Basin watershed into Fawn Lake.

Management Decision: There are no feasible alternatives to prevent the risk of these naturally occurring events. KPU staff have standard operating procedures in place to minimize an increase in turbidity. The standard allowable raw water turbidity for Ketchikan's unfiltered water system is 5 Nephelometric Turbidity Units (NTU). The normal turbidity levels in raw water supply from Ketchikan Lakes ranges between 0.2 and 1.0 NTU.

Procedure: In the event of high turbidity, KPU shuts down treatment and uses stored water until turbidity levels drop to operable limits. KPU requests the KPU Electric to increase flow to the hydroelectric plant to exhaust the high turbidity water trapped in Fawn Lake and discharge it to Ketchikan Creek. Raw and treated water samples are collected any time turbidity is greater than 1 NTU. Most turbidity events are only a few hours in duration. Once the turbidity drops below 5 NTU or the Bear Valley water storage tank has fallen below 35 feet, KPU operators re-start the treatment system.

KPU has implemented four different SOPs on how to handle turbidity or low UV transmittance (UVT) alarms for Ketchikan Lake, Granite Basin, and Fawn Lake respectively. There are procedures to isolate the drinking water supply from high turbidity events by closing the valve on the pipeline feeding the Bear Valley disinfection and storage facilities. There are procedures for increasing the flow through the power generation facilities to flush the higher turbidity water through Fawn Lake and the tunnel. Typically, turbidity events are short in duration, allowing KPU to utilize the water stored in the distribution storage system while waiting for the turbidity event to pass.

When heavy storms are predicted with 2 to 3 inches of rain and wind speeds greater than 40 mph, KPU staff plan for the diversion of flow from Granite Basin. These storm conditions have been observed to cause sudden increases in coliform colonies, *E. coli*, and turbidity from Granite Basin, and also reduce the incoming UVT almost to or below the minimum value of the UV system.

Monitoring: The SOP details the alarm, monitoring, and shut-down criteria to isolate each basin as well as criteria for shutting off the raw water intake and treatment system. Analyzers are connected to SCADA which are monitored at the Bailey Powerhouse. When SCADA alarms are triggered, the Bailey Operator will immediately contact KPU Water.

As raw water turbidity continues to increase, KPU staff monitor the levels in order to be prepared to immediately close the raw water intake if the turbidity reaches 5 NTU. Once a turbidity event has been established, for the next 24 hours, KPU staff collect additional raw water samples for laboratory coliform analysis. KPU staff also monitor the water levels at Fawn Lake as the Ketchikan Plant hydroelectric generators pull more water out of Fawn Lake to flush the high turbidity water out as soon as possible. If the water level is less than expected, KPU staff check the Granite Basin diversion dam for debris overtopping the diversion dam. Monitoring continues until turbidity decreases down into the 5 NTU range and under as noted in the SOPs.

4.3 Wildlife

Activity: Wild animal excrement has the potential to create raw water microbial contamination. Water quality concerns related to wildlife are generally associated with microbial contamination from viruses and protozoan pathogens *Giardia lamblia* and *Cryptosporidium*.

Management Decision: KPU's source water treatment systems are designed and operated to eliminate microbes in fecal matter. In addition, KPU has been proactive in monitoring for changes in the watershed and identifying potential measures to further reduce risk of source water microbial contamination.

Procedure: For wildlife species that were identified to be increasing the fecal coliform levels in the raw water, KPU applied for trapping permits and provided written or verbal reports of the number of animals taken, date taken, and method of take to the Ketchikan ADF&G office. From 2019 to 2021, KPU utilized a trapper to remove 4 beavers, 15 squirrels, 18 marten, 7 mice, and 2 wolves from the watershed.

An additional *KPU Coliform Desktop Study* (Jacobs 2021) reviewed 10 years of wildlife data in relation to the watershed to analyze potential causes for increased coliforms. Higher coliform counts in source water appeared to be correlated to higher air temperatures and possibly higher number of migratory birds during the autumn. After reviewing the study results KPU began experimenting with methods to deter geese from grassy flats near Fawn Lake to eliminate the increase in goose scat as shown in Figure 4-1.

Figure 4-1. Installed Colored Lines to Deter Geese Landings at Fawn Lake

In the event of fecal coliform exceedances contributed by wildlife activity, KPU may collect further wildlife data to determine reasonable measures to reduce and mitigate these events in a case-by-case scenario.

Monitoring: KPU staff regularly monitors the watershed through visual site inspections and through water quality samples. KPU has periodically completed studies to identify and address potential animal populations of concern. For example, a mammal monitoring program was developed to summarize the data on mammal species using the watershed using field surveys conducted in August 1993, 1994, and 1995 respectively. The *Ketchikan Watershed Mammal Monitoring Program 1995 Report* (CH2M Hill 1995) evaluates the relationship between mammal densities in the watershed and the water quality in the watershed. In addition, the *Watershed Coliform Study Results* was a Microbial Source Tracking (MST) study in 2013 (CH2M 2014)which was developed to determine the source of increased microbial contamination in the raw water, by comparing collected water samples and scat samples to known animal sources in the Master Institute for Environmental Health library. The MST study indicated that the water source coliform contamination is due to a variety of animals and birds inhabiting the watershed.

KPU routinely collects and monitors raw water and treated water samples for laboratory coliform analysis as part of standard monitoring. KPU staff regularly patrol the watershed for unauthorized access and to observe natural changes such as increased sightings of wildlife, if any.

4.4 Flow Diversion/Power Generation

Activity: Water is diverted from Fawn Lake to generate hydroelectric power. If Fawn Lake is drawn down too far, there may be increased turbidity and impacts to water quality from exposed banks of the lake.

Management Decision: The water supply objective is to maintain adequate pressure in the power tunnel to meet water distribution system needs and maintain good water quality. This is achieved by maintaining a stable water level in Fawn Lake which avoids turbidity from turbulence in the reservoir. There have not been problems

concerning water quantity to the water system in the past since the KPU power plant has the ability to control the water flow used in generating power.

Procedure: KPU Electric has the ability to control the flow of water used in generating power. In the event that water in Fawn Lake is drawn too far down for hydroelectric power generation, KPU Water staff can contact and request KPU Electric to decrease flow. Domestic water has a priority over hydroelectric power generation. Ketchikan has access to several other hydrogeneration facilities at Beaver Falls, Upper and Lower Lake Silvis, Whitman Lake and Swan Lake, and has 23.8 megawatts of standby diesel generation available. The diesel generators will operate until weather conditions improve to ensure they will no longer be needed for emergency generating capacity.

In the event of high turbidity, KPU will follow the procedures described in the Precipitation, Landslide, and Avalanche control and mitigation section above respectively.

Monitoring: KPU personnel regularly monitor the watershed and the water system infrastructure. For high turbidity, KPU will follow the monitoring practices described in the Precipitation, Landslide, and Avalanche control and mitigation section above respectively.

4.5 Roads and Recreation

Activity: Unauthorized vehicle traffic on the single-lane gravel road in the watershed may lead to increased turbidity from road runoff. Unauthorized recreational activities such as hunting or hiking in the watershed may contribute to turbidity and microbial contamination from humans and dogs in and around the Fawn Lake water intake and the watershed in general.

Management Decision: Prevent all trespassing into the watershed, with special emphasis on Fawn Lake and the immediate area around the water intake of Fawn Lake. The single-lane access road has two locked gates which prevents public use of the access road to the watershed. Only KPU personnel and emergency response agencies are issued keys to the gates to prevent all unnecessary traffic from driving in the watershed. Increased public education at the Deer Mountain trailhead will be provided by KPU with information for hikers to protect water quality by carrying out all waste materials and to not start campfires to avoid the possibility of a forest fire. Forest fire risk is low due to the very high annual precipitation in the Ketchikan.

Procedure: The single access road to the watershed is restricted by locked gates and fencing which prevents access to the public. No trespassing signage is posted before and after the second secured gate and fencing. Unauthorized vehicles and individuals are not allowed in the watershed under the city ordinance which prohibits trespassing in the watershed. In the event that trespassers are observed on the road or within the watershed, enforcement of the current no trespassing ordinance will continue. If the trespassers refuse to leave, KPU staff will take photos as evidence of trespassing, which may be turned over to the Police Department and District Attorney as a notice of violation. The no trespassing ordinance will be enforced by local law enforcement agencies, which will issue citations as appropriate. Trespassers that post evidence of trespassing the watershed on social media will also be reprimanded. To date trespassing activity has been very low to non-existent.

Monitoring: As previously mentioned, KPU personnel patrol the area several times per week on a random schedule to monitor activity within the watershed, this includes monitoring for unauthorized vehicles and trespassers. As a future project, there are plans to install power and communication lines up to Ketchikan Lake Dam, at which point there would be the potential for the addition of remote video monitoring.

5. Monitoring

KPU regularly monitors the watershed and reviews routine data. This allows KPU to quickly recognize changes to water quality that may threaten the raw water supply. Procedures to address these changes will be implemented as previously discussed in Section 4 of this plan above. A consistent monitoring plan contributes to a successful watershed protection plan. This section reviews routine monitoring and specific monitoring occasions.

5.1 Routine Monitoring

The USEPA *Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems Using Surface Water Sources* lists specific monitoring requirements that must be met for filtration avoidance surface water systems. The Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) requires unfiltered surface water sources demonstrate enforceable standards within their watershed management plans to protect the public health from *Cryptosporidium* oocysts in addition to *Giardia lamblia*. The same total or fecal coliform monitoring will be used as a surrogate for *Cryptosporidium* monitoring.

KPU conducts routine water quality monitoring required for filtration avoidance under the Surface Water Treatment Rule (SWTR). KPU has instituted a monitoring program to meet all requirements for unfiltered surface water systems for the Ketchikan Lakes and Fawn Lake supply. The data for source water turbidity, entry point chlorine and disinfection (CT) are documented in Ketchikan's daily operator reports which are submitted to ADEC at the end of each month. Table 5-1 lists the water-quality monitoring activities that are performed to meet mandates of the Safe Drinking Water Act (SDWA) for avoiding filtration.

Table 5-1. Routine Water Quality Monitoring

Sample	Parameter	Location	Reason	Frequency
For Filtration Avoidance				
Raw water	Fecal	Water treatment plant (WTP), before chlorination	Routine	3 per week
Raw water	Fecal	WTP, before chlorination	Turbidity >1 NTU	Taken within 24 hours, 1 per day
Raw water	Turbidity	WTP, before chlorination	Routine	Continuous recording
Raw water	Turbidity validation	WTP, before chlorination	Validate continuous turbidity monitoring equipment	1 per month
Finished water	Flow rate	Leaving Bear Valley Reservoir	Routine to calculate CT values	Continuous recording
Finished water	Temperature	Leaving Bear Valley Reservoir	Routine to calculate CT values	Continuous recording
Finished water	Free residual chlorine	Leaving Bear Valley Reservoir and before the first service connection	Routine to calculate CT values	Continuous recording

Sample	Parameter	Location	Reason	Frequency
Finished water	Free residual chlorine	Based on sample siting plan	Routine	9 per month minimum
Finished water	pH	Leaving Bear Valley Reservoir and before the first service connection	Routine to calculate CT values	Continuous recording
Finished water	Fecal coliform	Near first service connection	Turbidity >1 NTU	Taken within 24 hours, one/day
Total Coliform Rule				
Finished water	Total coliform	Based on sample siting plan	Routine, Total Coliform Rule	9 per month
Finished water	Total coliform	Based on positive sample location	Any positive samples from the routing testing per Total Coliform Rule	Within 24 hours of a positive test
Finished water	Fecal coliform or *E. coli*	Based on positive sample location	Test conducted on any positive samples of above two	As needed
Miscellaneous				
Raw water	UVT	UV influent	Routine	Continuous recording
Finished water	TTHM & HAA5 (DBP2)	Standard Monitoring Site #8 Fire Station #2 and Standard Monitoring Site #5 Buren & Bailey	Routine	Quarterly (February, May, August, and November)
Finished water	Lead and Copper	Rotates between Tier 1 Residences	Routine	20 samples every 3 years
Finished water	Synthetic Organic Chemicals (SOC)	Distribution system point of entry	Routine	1 sample quarterly or SOC Monitoring Waiver Renewal
Finished water	Nitrate	Distribution system point of entry	Routine	1 sample annually
Finished water	Volatile Organic Compounds	Distribution system point of entry	Routine	1 sample annually
Finished water	Inorganics	Distribution system point of entry	Routine	1 sample per 9 year cycle
Finished water	Arsenic	Distribution system point of entry	Routine	1 sample per 9 year cycle

Sample	Parameter	Location	Reason	Frequency
Finished water	Radium 226 and 228	Distribution system point of entry	Routine	1 sample per 9 year cycle
Finished water	Total Gross Alpha	Distribution system point of entry	Routine	1 sample per 9 year cycle

5.2 Specific Monitoring

Specific monitoring is conducted as necessary to aid KPU in identifying changes to source water quality. Under the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), KPU conducted initial monitoring for *Cryptosporidium* from 2015 to 2016. Samples were also analyzed for *Giardia lamblia*. Systems are required to conduct a second round of monitoring six years after completing the initial round. In between rounds, KPU will sample for *Cryptosporidium* if their *E. coli* results exceeds specified concentration levels.

Additional types of specific monitoring samples are collected on a case-by-case basis if contaminants are suspected of being present. This additional monitoring is useful to assess the effectiveness of specifical control techniques, and to audit procedures or operational requirements instituted within the watershed. KPU has been proactive to conducting specific monitoring for additional sampling.

For example, in 2011, KPU began to experience periodic elevated levels of total coliforms, which are used as an indicator of microbial contamination in the water. This pattern of elevated coliforms during the summer and fall continued again in 2012 and 2013. In 2013, KPU undertook a study to try to determine the source of microbial contamination. The *Watershed Coliform Study Results TM* (CH2M 2014) reviewed the most significant contributors of contamination in the water for a better understanding of the watershed ecosystem. An *Additional Coliform Sampling 2014 Study Results TM* (CH2M 2015) was prepared to evaluate whether closing off the flume that directs Granite Basin flow into Fawn Lake could allow KPU to reach compliance with the filtration avoidance criteria.

As a result of the 2014 Compliance Order By Consent (COBC) process, KPU revised the raw water sample in 2016 from total to fecal coliforms to reestablish compliance with the raw water coliform limits for filtration avoidance systems and regained compliance with the SWTR.

In autumn of 2019, KPU experienced another short-term increase of fecal coliforms. This may have been the result of an area-wide drought that allowed fecal coliforms to accumulate in the watershed. In 2020, KPU began collecting additional samples around Fawn Lake and Granite Basin for potential trends. At the end of September, three samples were above the fecal coliform limits. As a result, KPU started taking special purpose samples at multiple locations in the watershed with the goal of establishing the source. No additional fecal coliform tests exceeded the 20 count limit in October. Historically, KPU has not had fecal coliform exceedances in the raw water during November or December.

As previously mentioned in Section 4 of this report, in 2021, the *KPU Coliform Desktop Study* (Jacobs 2021) reviewed 10 years of wildlife data, hunting records, literature studies, tributary information, and weather and temporal data to analyze the potential causes and trends for increased coliforms in the water source. The study considered migratory birds such as cackling geese, which have been frequently observed by KPU staff during the autumn migration season as a fecal coliform source. Higher coliform counts in source water appeared to correlate to higher air temperatures and possibly higher numbers of migratory birds during the autumn. After

reviewing the results of this study, KPU began experimenting with methods to protect the grassy flats at Fawn Lake to eliminate the increase in geese activity at Fawn Lake by deterring geese as shown in Figure 4-1.

6. Management and Operations

6.1 Management

Watershed protection program implementation is under the responsibility of the KPU Water Division which is responsible for all aspects of water treatment and distribution.

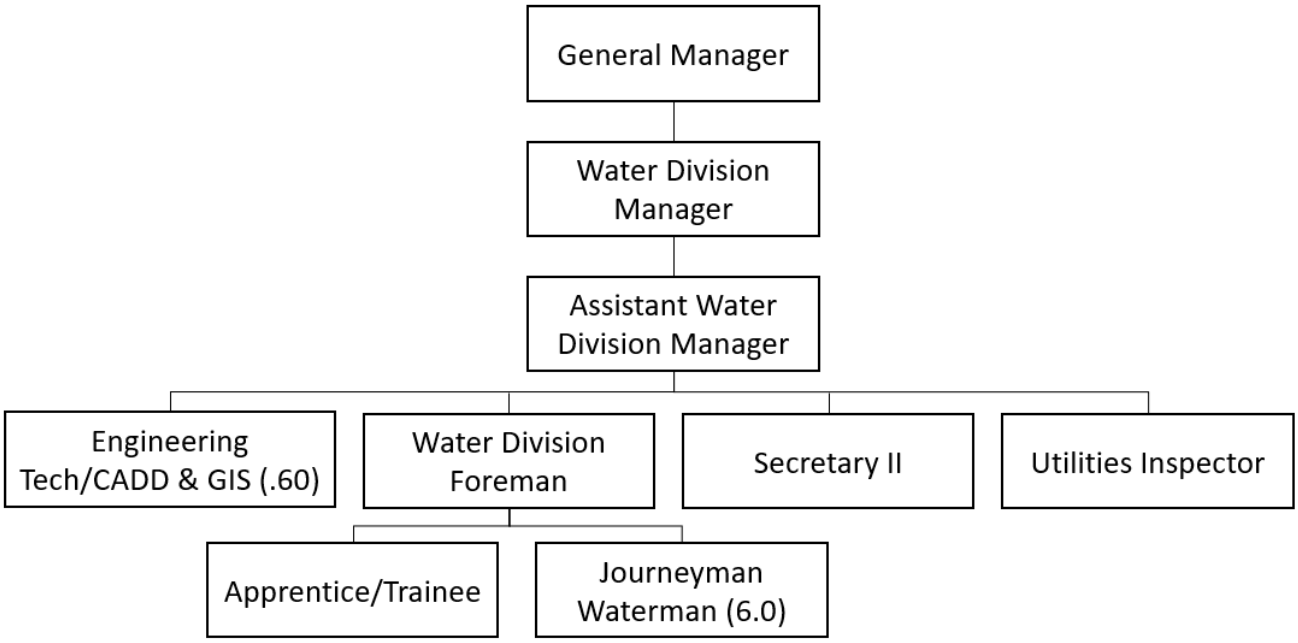
6.1.1 Organizational structure

The City of Ketchikan, a municipal corporation and home rule municipality of the State of Alaska, was incorporated in 1900 and is governed by a mayor and a seven-member council. The City is governed pursuant to the Charter of the City (the "Charter") and the Ketchikan Municipal Code (the "Code"). KPU provides electric, water, and telephone services to the residents of the City and to some residents of the Ketchikan Gateway Borough. In accordance with Alaska Statute 42.05, the Alaska Public Utilities Commission (APUC) has issued a Certificate of Public Convenience and Necessity for each of KPU's utilities, establishing legal descriptions of their respective service areas. There are no competing utilities in or adjacent to KPU's service area.

The Water Division Manager is responsible for coordinating the emergency response effort. In addition, the Water Division Manager is responsible for public notifications of water quality violations as required by the SDWA.

Routine emergencies, such as broken water mains, are the responsibility of the Water Department Foreman. During these instances the routine chain of command will be maintained. As the degree of emergency demands increases, the Foreman may choose to call on assistance of other segments of city government. These requests will be made through the routine management structure. The KPU Water Division organizational chart is presented in Figure 6-1.

Figure 6-1. KPU Water Department Organization Chart



6.1.2 Personnel and education/certification requirements

Ketchikan is classified by the State of Alaska as a Class 3 Water Distribution System and a Class 2 Water Treatment system. The Alaska Administrative code 18 AAC 74.010 requires that the supervising operator of a system must be certified at a level equal to or greater than the classification of the system under that operator's control. The Water Division Foreman holds Class 4 Water Distribution Certification and Class 3 Water Treatment Certification. Additional staff who qualify as relief supervisors each hold Class 3 Water Distribution and Class 3 Water Treatment Certifications.

Employees hired by the Water Division are hired as apprentices. From the apprentice position, the employee works on obtaining experience necessary to obtain the State of Alaska water system license. Responsibilities for maintenance of the water system are split equally among the employees. The department is set up in this manner to ensure that all employees understand all aspects of the water system. This eliminates problems when some of the staff is on vacation or out sick.

6.2 Operations

6.2.1 System operations and design flexibility

Watershed system operations include controlling gate access and diversions. KPU is able to bypass Granite Basin and prevent it from draining into Fawn Lake as needed. This system operation flexibility is important during fall months when dry weather followed by heavy rainfall flushes additional fecal coliforms into the stream flowing out of Granite Basin.

6.2.2 Ongoing watershed review

By regularly monitoring for changes in the watershed, KPU is able to proactively identify and address potential impacts to source water quality as noted in Section 5 of this plan above. The adequacy of the program is based on the comprehensiveness of the watershed review and the effectiveness of the program to monitor and control detrimental activities occurring in the watershed. This is demonstrated by ADEC's annual on-site inspection and KPU's annual Watershed Control Report which is further elaborated in the Annual Reports section below.

6.2.3 Operational changes to adjust for water quality changes

KPU has operational controls in place to adjust for water quality changes as needed and documented in SOPs and emergency action plans (EAPs). This includes shutting down water treatment and using stored water for short durations, increasing the level of disinfection, and activating emergency response plans.

Naturally occurring organics increases the presence of source water volatile organic contaminants. These dissolved organics when combined with chlorine solution form disinfection byproducts (DBPs) such as Total Trihalomethanes (TTHM) and Haloacetic acids (HAA5). In 2014, the EPA's Stage 2 Disinfection Byproducts Rule went into effect which resulted in the need to reduce HAA5 formation in KPU's delivered water. To reduce the previously high amounts of HAA5 present, KPU began using both chlorine and UV as primary disinfectants followed by ammonia injection to create chloramines for secondary (distribution system residual) disinfection. In 2016, KPU made additional system changes to begin a two-step chlorine injection approach to reduce the amount of chlorine disinfectant injected at the raw water intake in the chlorination building. This reduction in the initial chlorine dose, followed by long contact in the approximate one mile of transmission main has been effective in reducing DBP formation in that transmission main. Following UV disinfection a second dose of chlorine is injected to make sure adequate log inactivation of viruses has occurred and adequate chlorine residual is in the system before the free chlorine is converted to chloramines to stop DBP formation in the Bear Valley

Reservoir and water distribution system. The treatment change adding two-step chlorination and conversion to chloramines has been effective in controlling DBP formation.

In the event of increased turbidity, KPU has four separate SOPs to address turbidity excursions depending on the situation. For additional information, refer to the control and mitigation procedures described in "Precipitation, Landslide, and Avalanche" under Section 4 of this plan.

When KPU has detected increased fecal coliform in source water, KPU conducted specific monitoring and collected additional water samples around Fawn Lake, Granite Basin, and tributary streams. The results of the sample testing informed whether or not to bypass Granite Basin. KPU's existing use of chlorine and UV light as dual disinfectants provides the water treatment system with ample disinfection. Disinfected, treated water samples are collected weekly throughout the municipal distribution system and have reported zero coliform bacteria colonies results.

In the event of a complete and sudden disruption of the Ketchikan Lake raw water source, Carlanna Lake could be used as an alternative for source water. This would require additional efforts to connect Carlanna Lake to the water system. Raw water supplied from Carlanna Lake cannot be readily disinfected so a "boil water" notice would be required. For other emergencies where short-term or long-term provision of potable water is needed, refer to the KPU Emergency Response Plan.

6.3 Annual Report

Filtration Avoidance Criteria noted in the State of Alaska Drinking Water Regulations, 18 AAC 80, and SDWA 40 CFR 141.71 requires annual reports to review the events during that year, to evaluate the effectiveness of the control programs, and to prepare for activities anticipated during the next year. KPU submits an annual watershed control program report to ADEC that:

- Identifies any special concerns about the watershed and how they are being addressed by KPU
- Describes activities in the watershed that affect water quality; and
- Projects what adverse activities are expected to occur in the future and describes how they expect to address them

As part of the filtration avoidance criteria inspection, Alaskan public water systems approved to avoid filtration are subject to an annual onsite inspection conducted by ADEC staff. During the COVID-19 pandemic, KPU staff have conducted the inspection on behalf of ADEC. The inspection is defined by the USEPA's *Guidance Manual* to include:

1. Source Evaluation
    a) Review the effectiveness of the watershed control program.
    b) Review the physical condition and protection of the source intake.
2. Treatment Evaluation
    a) Review changes to the disinfection system.
    b) Inspect the physical condition of the disinfection equipment.
    c) Review operating procedures.

d) Review records to ensure that all required tests are being performed and recorded and that proper disinfection is being practiced.

e) Identify needed improvements for the system equipment, maintenance, operation, and data collection.

f) Review the maintenance program of the disinfection equipment.

Recent copies of the 2021 annual watershed control program report and annual onsite inspection report are located in Appendix C for reference.

7. Agreements and Land Ownership

At the request of the City of Ketchikan, the watershed consolidated ownership documentation required by the COBC is incorporated in the Watershed Control Plan in this section. All paragraphs in Section 7 were prepared by the law firm of Perkins Coie for the City of Ketchikan. Perkins Coie's full report and attachments are included in Appendix D.

7.1 Introduction

The following report has been developed on behalf of the City of Ketchikan and Ketchikan Public Utilities (collectively, "KPU") pursuant to the May 21, 2021 Compliance Order by Consent ("COBC") entered into by KPU and the Alaska Department of Environmental Conservation ("ADEC"). Specifically, the report and its accompanying attachments outline the ownership and management status of the Ketchikan Lakes area, the Granite Basin area, and the Fawn Lake drainage area (collectively, the "Ketchikan Watershed") as required by Paragraph 4.B. of the COBC. As explained below, KPU believes this status supports a determination by both ADEC and the U.S. Environmental Protection Agency ("EPA") that KPU's community public water system meets the criteria for a limited alternative to filtration under the Federal Safe Drinking Water Act[1] ("SDWA") by demonstrating that the system is under "consolidated ownership."

7.2 Limited Alternative to Filtration and "Consolidated Ownership"

The SDWA provides that, as an alternative to filtration requirements or filtration avoidance criteria, a State may establish treatment requirements for certain public water systems.[2] In order for a public water system to qualify for this "limited alternative to filtration" ("LAF"), the system must meet certain statutory criteria, including

> having uninhabited, undeveloped watersheds in *consolidated ownership*, and having control over access to, and activities in, those watersheds . . .[3]

The phrase "consolidated ownership" is not defined by the SDWA or its implementing regulations. This statutory criteria was addressed by the EPA's Region 10 in a Memorandum of Agreement ("MOA") with the Washington State Department of Health ("WDOH").[4] The MOA established the process and information EPA would require "to concur with the WDOH's determination to provide the Seattle Cedar River Supply (Cedar Supply) with a Limited Alternative to Filtration (LAF)."[5] KPU recognizes that EPA's conclusions in the MOA apply only to the City of Seattle's community public water system; however, EPA acknowledged that "much of the information needed to evaluate whether a system should be provided a LAF is included in [the] MOA."[6] KPU therefore relies on the information in the MOA it finds relevant to the "consolidated ownership" statutory criteria in assessing its system's eligibility for a LAF.

In the MOA, EPA relies on legislative history to interpret the "consolidated ownership" requirement—a House Committee Report at the time the SDWA was amended to include LAF criteria.[7] The report provides

> The bill requires as a condition of using alternative treatment measures that the watershed of the affected utility be in "consolidated ownership." *By this the Committee does not mean to imply that there must be only one owner of the total watershed*.[8]

[1] Safe Drinking Water Act of 1974, Pub. L. No. 93-523, 88 Stat. 1660.
[2] 42 U.S.C. § 300g-1(b)(6)(C)(v).
[3] *Id.* (emphasis added).
[4] Memorandum of Agreement, Environmental Protection Agency and Washington State Department of Health, Limited Alternative to Filtration for the Seattle Cedar River Supply (executed October 15, 2002), at 9.
[5] *Id.* at 3.
[6] *Id*. at 6.
[7] *Id.* at 9.
[8] MOA at 9 (emphasis added).

Later, where EPA addresses the statutory criteria concerning control over access to the watershed, the same report provides

> Further, *consistent with the current filtration waiver criteria*, the utility must be able to demonstrate that there are effective controls on human activities that may have an adverse effect on the microbiological quality of the source water and that the controls apply to all land in the watershed, *no matter what its ownership status*. Such controls may be exercised through *statute*, *regulation*, or written agreements with land owners.[9]

Taken together, KPU believes the legislative history of the LAF criteria makes clear that a showing of "consolidated ownership" does not require a community public water system to be the sole owner of the land in the watershed, nor does it even require the system to demonstrate it owns a significant portion of land in the area. Instead, a system must demonstrate that, whatever the ownership status of the watershed, the ownership is cohesive—unified in its ability to control human activities that may have an adverse effect on the quality of the source water, consistent with the controls required for filtration avoidance under the SDWA.

Here, the ownership of the Ketchikan Watershed is consolidated among the City of Ketchikan, the U.S. Bureau of Land Management (BLM), and the U.S. Forest Service (USFS). Pursuant to a congressional act that reserved the relevant area as a municipal water supply, all three entities manage their respective lands in the Ketchikan Watershed to ensure source water quality protection for the benefit of the City of Ketchikan. The ownership status and resulting management has remained virtually unchanged for the past three decades, during which KPU has met the watershed control criteria for filtration avoidance under 40 CFR 141.71.[10] The ownership and management of the watershed is further discussed below, and KPU believes this sufficiently demonstrates that the Ketchikan Watershed is under "consolidated ownership" as required by the SDWA.

7.3 Ownership and Management of the Ketchikan Watershed

The Ketchikan Watershed is comprised by two tracts of land. The first tract contains two major water basins located northeast of the city in the Tongass National Forest.[11] The water basins are Ketchikan Lakes, which includes both Upper and Lower Ketchikan Lakes, and Granite Basin, which consists of a smaller lake and mountain stream. Runoff from both basins is routed south into the second tract of land, the Fawn Lake drainage area, and water from Fawn Lake travels through a piping and tunnel system to KPU's water treatment plant. The first tract of land consists of approximately 7,152 acres and is owned almost entirely by the USFS[12]; the City of Ketchikan owns approximately 10 acres of land in this area, directly south of Lower Ketchikan Lake where the KPU dam is located.[13] The second tract of land is approximately 198 acres and is owned entirely by BLM.[14] The boundaries of these two tracts were established by the Ketchikan Townsite Exclusion Act of July 27, 1939.[15] A map outlining these two tracts of land that compose the Ketchikan Watershed, as well as the respective areas of ownership among USFS, the City of Ketchikan, and BLM, is included as Attachment E to this report.

Under the Ketchikan Townsite Exclusion Act, the abovementioned tracts of land are

[9] MOA at 10 (emphasis added).
[10] *See* 40 CFR 141.72(b)(2).
[11] *See* Proclamation No. 846 (35 Stat. 2226) (Feb. 16, 1909) (enlarging the boundaries of the Tongass National Forest to include areas referenced in this report), included as Attachment A to this report.
[12] *See id.*
[13] *See* Ketchikan Gateway Borough, Assessment Department, Parcel No. 307591000000 (assessment information of relevant KPU parcel), included as Attachment B to this report.
[14] *See* Ketchikan Gateway Borough, Assessment Department, Parcel Nos. 309800008000, 019800011000, 309800012000, 309800013000, 302120001000, 702120001000 (assessment information of relevant BLM parcels) included as Attachment C to this report.
[15] Act of July 27, 1939 (53 Stat. 1131), Sec. 1, included as Attachment D to this report.

> reserved from all forms of location, entry, or appropriation, whether under the mineral or nonmineral land laws of the United States, and set aside as municipal water-supply reserves for the use and benefit of the people of the city of Ketchikan . . .[16]

The Act also established BLM and USFS's administration of the Ketchikan Watershed for the purpose of

> storing, conserving, and protecting from pollution the said water supply . . . and to that end said municipality shall have the right, subject to the approval of [BLM and USFS], to the use of any and all parts of the lands reserved for the storage and conveying of water and construction and maintenance thereon of all improvements for such purposes . . .[17]

The effect of the Act is twofold: the lands within the Ketchikan Watershed are withdrawn and reserved as the City of Ketchikan's municipal water supply, and the City has the right to use the lands to develop and maintain a community public water system. The City's right to use the land exists until it is demonstrated that the City has abandoned this use for a period of two years.[18] USFS and BLM have confirmed with KPU, in 1992 and in May 2021, the reservations in the Act remain in place and the tracts of land are set aside as the City's municipal water supply.[19] These confirmations also highlight the agencies' continued management obligations of the Ketchikan Watershed. These obligations and the City's management of the area are discussed below.

7.3.1 USFS Management

The May 2021 USFS letter provides that "[l]and use [in USFS lands within the Ketchikan Watershed] is limited to the protection and maintenance of natural conditions and preservation of water quality and water supply to meet the provisions of the Safe Drinking Water Act and Alaska Drinking Water Regulations and Water Quality Standards."[20] This protection and maintenance of the City of Ketchikan's source water stems from USFS regulations[21] and the management directives of the Tongass Land and Resource Management Plan ("Forest Plan").[22]

Under the Forest Plan, USFS was required to allocate the area as a "Municipal Watershed" Land Use Designation (LUD) given the Ketchikan Townsite Exclusion Act of July 27, 1939.[23] The Forest Plan outlines the management for this area via "management prescriptions," which give general direction on what may occur within the area, the standards for accomplishing each activity, and guidelines on how to accomplish those standards.[24] The management prescriptions for a Municipal Watershed LUD include standards and guidelines that are specific to the LUD as well as those that apply forest-wide.[25] The overarching objectives of the management prescriptions are to: manage the area as a municipal water supply reserve consistent with federal and state law, limit most management activities to the protection and maintenance of natural resources, to maintain the natural condition

[16] *Id*.
[17] *Id*. at Sec. 2.
[18] *Id.*
[19] *See* Nov. 12, 1992 letter from David Rittenhouse, USFS, to Richard Trimble, KPU; Dec. 9, 1992 letter from Edward Sprang, BLM, to Richard Trimble, KPU; May 24, 2021 letter from Earl Stewart, USFS, to Karl Amylon, KPU; May 21, 2021 letter from Chad Padgett, BLM, to Karl Amylon, KPU. These letters are included as Attachments F, G, H, and I to this report, respectively. Also included as Attachment J is a September 8, 2021 letter from USFS confirming its May 2021 assessment.
[20] Attachment H.
[21] *See* 36 C.F.R. § 251.9(a) (requiring USFS to "manage National Forest watersheds that supply municipal water under multiple use prescriptions in forest plans . . .").
[22] *See* United States Department of Agriculture, Tongass National Forest, Land and Resource Management Plan (Dec. 2016) (hereinafter, "Forest Plan"), at 3-51 (providing that the overarching management goal of the relevant area is to maintain the municipal water supply reserves in a manner consistent with the federal Safe Drinking Water Act, as well as State of Alaska drinking water regulations and water quality standards). A relevant section of the Forest Plan (3-51 – 3-57) has been included with this report as Attachment K, and the full plan is available at https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd527907.pdf.
[23] *See id.* at 1-2 (providing that "[s]ome LUD allocations are for congressionally designated areas . . . and these areas must be managed in accordance with LUD direction that was developed from the congressional legislation that designated the area . . ."); *see* Attachment G (explaining LUD for relevant area).
[24] *See* Forest Plan at 1-2.
[25] Forest Plan at 1-4.

of the relevant area, and to prohibit uses or activities that could adversely affect water quality and supply.[26] A list of applicable management prescriptions is set out in the Forest Plan at pages 3-53 – 3-57, included as Attachment K, and includes:

- Restrictions on construction and development unless compatible with municipal water supply objectives,[27] and prohibition of timber production;[28]
- Directives to maintain and improve forest health and watershed resources,[29] and;
- Management measures and limitations on activities and uses to ensure consistency with legislation establishing watershed and maintenance of source water quality.[30]

The May 2021 USFS letter also provides that certain acreage of the Ketchikan Watershed was acquired by the agency in 2019 as part of a land exchange with the Alaska Mental Health Trust Authority.[31] As KPU understands, this area—approximately 52 acres of a 707-acre parcel identified as "K-2"[32] under the enacting legislation—was originally owned by BLM and granted via land patent to the State of Alaska in 1990 under the Alaska Mental Health Enabling Act of July 28, 1956.[33] The conveyances of this area did not affect its reserved status under the Ketchikan Townsite Exclusion Act of July 27, 1939,[34] and USFS must abide by the same congressional directives in this area. The management direction established in the Forest Plan, explained above, remains applicable because the land exchange's enacting legislation requires the USFS to administer the parcel in accordance with National Forest System regulations.[35] Further, the enacting legislation itself provides that the parcel is to be managed to preserve the natural condition of the lands as well as the watershed.[36]

7.3.2 BLM Management

The May 2021 BLM letter provides that Ketchikan Townsite Exclusion Act of July 27, 1939 "sets the [BLM lands within the relevant area] aside for a watershed and [BLM] cannot permit other uses of the land which would interfere with that primary use."[37] BLM is required under statute, "where a tract of such public land has been dedicated to specific uses according to any other provisions of law," to manage that land "in accordance with such law."[38] BLM cannot revoke or modify the reservation of its lands as a municipal water supply reserve,[39] and BLM can only authorize uses in accordance with the lands' reserved status.[40] This management direction is further outlined in BLM's Ring of Fire Management Plan ("RMP"), the land use applicable to the area.[41]

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[26] Forest Plan at 3-51.
[27] *See* Forest Plan at 3-53 (discussing facility improvements and fish habitat planning); 3-56 (discussing trails and transportation operations).
[28] *See* Forest Plan at 3-56 (discussing timber resource planning).
[29] *See* Forest Plan at 3-53 (discussing forest health management); 3-55 – 3-56 (discussing watershed resource planning and improvement).
[30] *See* Forest Plan at 3-54 (discussing cave management program and non-recreation use administration); 3-55 (discussing recreation use administration); 3-56 (discussing wildlife habitat planning).
[31] Attachment H; Consolidated Appropriations Act, 2017, Public Law 115-31, Appendix B—S.131.
[32] *Id.* at Sec. 3(4)(B).
[33] Patent No. 50-90-0157 (Feb. 13, 1990), included as Attachment L to this report; *compare* Act of July 27, 1939 (53 Stat. 1131), Sec. 1 (establishing areas reserved as municipal water supply), Attachment B, *to* U.S. Survey No. 3835 (Aug. 12, 1986), at 1, 4 (depicting BLM-owned "Lot 6," which overlaps the area reserved as municipal water supply, that was granted via land patent), included as Attachment M to this report.
[34] *See* Alaska Mental Health Enabling Act at Sec. 202(a) (providing that "nothing herein contained shall affect any existing rights"); Consolidated Appropriations Act at Sec.4(c) (same); *see also* 43 U.S.C. § 1714(j) (providing that BLM cannot "make, modify, or revoke any withdrawal created by Act of Congress").
[35] Consolidated Appropriations Act at Sec. 5(b)(1)(B).
[36] *Id.* at Sec. 5(b)(3).
[37] Attachment I.
[38] *See* 43 U.S.C. § 1732(a) (requiring such management as an exception to the general mandate that BLM manage public lands under "principles of multiple use and sustained yield").
[39] 43 U.S.C. § 1714(j).
[40] *See* 43 C.F.R. § 2920.1-1 (providing that BLM may only authorize uses "not specifically forbidden by law").
[41] Bureau of Land Management, Ring of Fire - Record of Decision and Approved Management Plan (March 2008) (hereinafter "RMP"); *available at* https://eplanning.blm.gov/public_projects/lup/66969/84102/100707/Ring_of_Fire_Record_of_Decision.pdf. *See also* 43 U.S.C. § 1712(a) (requiring development of land use plans that provide for use of public lands, even for lands that are withdrawn).

The RMP sets out goals and management actions for the Ketchikan Watershed, which includes protection of water resources and ensuring activities on BLM lands within the planning area comply with applicable water quality standards.[42] Further, even if BLM permits activities in Ketchikan Watershed because they do not interfere with the area's primary use, the RMP nonetheless requires operating procedures that would apply to any permits that are issued; these required operating procedures include requirements and procedures relevant to the protection of water resources.[43]

7.3.3 City of Ketchikan Management

Finally, the City of Ketchikan has local laws in place to effectuate its right to use the Ketchikan Watershed as a municipal water supply reserve. Persons are prohibited by city code from recreating or otherwise trespassing

> within or upon the watersheds draining, either naturally or artificially, into Ketchikan Lake, Fawn Lake, or Carlanna Lake, all located near Ketchikan, Alaska, and constituting the several reservoirs which supply the city with drinking water.[44]

The City can also exercise enforcement authority and impose penalties for violations of this ordinance.[45]

7.4 Conclusion

The ownership of the undeveloped, uninhabited Ketchikan Watershed is consolidated among the USFS, BLM, and the City of Ketchikan as a result of the Ketchikan Townsite Exclusion Act of July 27, 1939, which reserves the area for the City as its municipal water supply reserve and directed the federal agencies to act as stewards of the area for the benefit of the City. Given this ownership, which demonstrates that there are effective controls applicable to all lands in the area that maintain and protect the quality of the source water for KPU's community public water system, KPU believes that the LAF criteria of "consolidated ownership" is met for purposes of the SDWA.

[42] RMP at Approved RMP - 18.
[43] *See id.* at Appendix A, A-5 – A-7 (outlining required operating procedures for riparian areas and water resources).
[44] KMC § 11.20.010.
[45] KMC § 11.20.020.

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Appendix A. USEPA Watershed Control Program Guidelines Checklist

Appendix A. USEPA Watershed Control Program Guidelines Checklist

Guidance Manual for Compliance with the Filtration and Disinfection Requirement for Public Water Systems Using Surface Water Sources Appendix J. Watershed Control Program	**Section in the *Ketchikan Creek Watershed Control Plan***	**Checkbox**
A. Watershed Description	Section 2	☑
1. Geographical location and physical features of the watershed	Section 2.1	☑
2. Location of major components of the water system in relationship to the watershed.	Section 2.2	☑
3. Hydrology: annual precipitation patterns, stream flow characteristics, etc.	Section 2.3	☑
4. Agreements and delineation of land use/ownership.	Section 2.4	☑
B. Identification of the Watershed Characteristics and Activities Detrimental to Water Quality	Section 3	☑
1. Naturally Occurring:	Section 3.1	☑
a. effect of precipitation, terrain, soil types and land cover	Section 3.1.1	☑
b. animal populations– include a discussion of the Giardia contamination potential, any other microbial contamination transmitted by animals.	Section 3.1.2	☑
c. other – any other activity which can adversely affect water quality.	Section 3.1.3	☑
2. Man-Made:	Section 3.2	☑
a. Point sources of contamination such as wastewater treatment plant, industrial discharged, barnyard, feedlots, or private septic systems	Section 3.2.2	☑
b. Nonpoint Source of Contamination:	Section 3.2.3	☑
1) Road Construction – Major highways, railroads	Section 3.2.3.1	☑
2) Pesticide usage	Section 3.2.3.2	☑
3) Logging	Section 3.2.3.3	☑
4) Grazing animals	Section 3.2.3.4	☑
5) Discharge to ground water which recharges the surface source	Section 3.2.3.5	☑
6) Recreation activities	Section 3.2.3.6	☑
7) Potential for unauthorized activity in the watershed	Section 3.2.3.7	☑
8) Describe any other human activity in the watershed and its potential impact on water quality	Section 3.2.3.8	☑
C. Control of Detrimental Activities/Events	Section 4	☑
Describe the techniques are being used to control the effect of activities/events identified in 8.1. and 2. in its yearly report. Example: Activity, Management Decision, Procedure, and Monitoring.	Section 4.1, 4.2, 4.3, 4.4, and 4.5	☑
D. Monitoring	Section 5	☑

Appendix A. USEPA Watershed Control Program Guidelines Checklist

Guidance Manual for Compliance with the Filtration and Disinfection Requirement for Public Water Systems Using Surface Water Sources Appendix J. Watershed Control Program	**Section in the *Ketchikan Creek Watershed Control Plan***	**Checkbox**
1. Routine Monitoring. Minimum specifications for monitoring several raw water quality parameters are listed in Section 3.1. Describe when, where and how these samples will be collected.	Section 5.1	☑
2. Specific Monitoring. Routine monitoring may not provide information about all parameters of interest.	Section 5.2	☑
E. Management/Operations	Section 6	☑
1. Management	Section 6.1	☑
a. Organizational structure	Section 6.1.1	☑
b. Personnel and education/certification requirements	Section 6.1.2	☑
2. Operations	Section 6.2	☑
a. Describe system operations and design flexibility.	Section 6.2.1	☑
b. The utility should conduct some form of ongoing review or survey in the watershed to identify and react to potential impacts on water quality.	Section 6.2.2	☑
c. Specifically describe operational changes which can be made to adjust for changes in water quality. Discuss what triggers, and who decides to make, those changes.	Section 6.2.3	☑
3. Annual Report: As part of the watershed program, an annual report should be submitted to the Primacy Agency	Section 6.3	☑
F. Agreements/Land Ownership	Section 7	☑
The utility will have maximum opportunity to realize this goal if they have complete ownership of the watershed. Describe efforts to obtain ownership, such as any special programs or budget. When complete ownership of the watershed is not practical, efforts should be taken to gain ownership of critical elements, such as, reservoir or stream shoreline, highly erodible land, and access areas to water system facilities.	Section 7.3	☑
Where ownership of land is not possible, written agreements should be obtained recognizing the watershed as part of a public water supply. Maximum flexibility should be given to the utility to control land uses which could have adverse effect on the water quality. Describe such agreements.	Section 7.3	☑
Describe how the utility ensures that the landowner complies with these agreements.	Section 7.3	☑

Appendix B. Land Use

District of Columbia, the specific tract of land to be more fully described by metes and bounds at the time of transfer.

Rochester Harbor Lighthouse property, Charlotte, N. Y.
License for right-of-way across, granted the N. Y. Central R. R. Co.

SEC. 5. The Secretary of the Treasury is authorized and empowered to lease for a period not to exceed twenty-five years to the New York Central Railroad Company, a corporation organized and existing under and by virtue of the laws of the State of New York and other States, its successors and assigns, for railroad track purposes, that portion of the Rochester Harbor Lighthouse property at Charlotte, New York, now occupied by wye track of said railroad company under the terms and provisions of a revocable license granted by the Department of Commerce, which license expires by limitation during 1939, or such modification thereof as may be deemed to be in the public interest. The New York Central Railroad Company for such use of the property in question shall pay the same yearly rental as stipulated in stated existing revocable license or such yearly rental as may be hereafter determined by the Secretary of the Treasury, at his discretion: *Provided*, That nothing herein contained shall grant or convey or be held to grant or convey to said railroad company, its successors or assigns, during such time as it or they may hold, said land under the lease hereby authorized, nor any right or privilege to take or remove any of such land or structures other than the property of the said railroad company: *Provided further*, That the Secretary of the Treasury may at any time during the said lease period of twenty-five years, at his discretion, terminate and cancel said lease, in case said company shall fail to comply with the stipulated terms or conditions. It shall also be stipulated in the lease hereby authorized that upon termination or expiration the said railroad company shall promptly remove from the land all of its property and restore the same to the condition when first taken or condition otherwise satisfactory to the Government.

Yearly rental.

Provisos.
Restrictions.

Termination of lease upon failure to comply.

Restoration of property.

Stony Point Light Station Reservation, N. Y., exchange of properties.

SEC. 6. Section 1 of the Act entitled "An Act to authorize the Secretary of Commerce to convey to the Commissioners of the Palisades Interstate Park, a body politic of the State of New York, certain portions of the Stony Point Light Station Reservation, Rockland County, New York, including certain appurtenant structures, and for other purposes", approved July 30, 1937 (50 Stat. 549), is amended by striking out "the Commissioners of the Palisades Interstate Park" and inserting in lieu thereof "the Palisades Interstate Park Commission, a body corporate and politic established by compact between the States of New York and New Jersey, authorized by joint resolution of Congress approved August 19, 1937 (50 Stat. 719)"; and section 2 of such Act of July 30, 1937, is amended by striking out "In exchange for the property to be transferred the Commissioners of the Palisades Interstate Park shall transfer title to the United States to" and inserting in lieu thereof "The Secretary of the Treasury is also authorized to accept on behalf of the United States".

50 Stat. 549.

50 Stat. 719.

Approved, July 27, 1939.

[CHAPTER 389]

AN ACT

For the protection of the water supply of the city of Ketchikan, Alaska.

July 27, 1939
[H. R. 2413]
[Public, No. 240]

Ketchikan, Alaska.
Designated lands set aside as municipal water-supply reserves.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the two tracts of public lands within the areas hereinafter described, situated in the Territory of Alaska, are hereby reserved from all forms of location, entry, or appropriation, whether under the mineral or nonmineral land laws of the United States, and set aside as municipal water-supply reserves for the use and benefit

Description.

of the people of the city of Ketchikan, a municipal corporation of the Territory of Alaska, as follows, to wit: (a) Starting at the east end of the Ketchikan Public Utilities Dam, situated at lower end of the lower Ketchikan Lake, and extending thence in a northwesterly direction, following the divide to the summit of Minerva Mountain; thence in a northerly direction along the divide to the summit of Diana Mountain; thence following the high divide around the Ketchikan Lakes and Granite Basin over the summits of Dude Mountain and John Mountain; and thence in a southerly direction along the divide to the summit of Sylvis Mountain to the summit of Deer Mountain; thence in a westerly direction along the small divide to Ketchikan Creek at a point approximately four thousand eight hundred feet below the dam; thence along Ketchikan Creek to the dam, the place of beginning; said area being the drainage area of Ketchikan Lakes and Granite Basin above the Ketchikan city water supply. (b) And starting at the east end of the Ketchikan Public Utilities Dam at lower end of Carlanna Lake, and extending thence along the small divide in a northerly direction to the summit of Ward Mountain; thence along the high divide in an easterly direction to the summit of Juno Mountain; thence along the same divide in a southeasterly direction to the summit of Minerva Mountain; thence in a southerly direction along the small divide to the eastern side line of United States Survey 1229, of E. A. Heath, approximately two thousand eight hundred and fifty feet from the northeast corner of said survey; thence along said side line to the northeast corner; thence in a westerly direction along the northern boundary line to the northwest corner of said survey; thence in a northerly direction along the divide to Carlanna Lake Dam, the point of beginning; said area being the drainage area of Carlanna Lake and Hoadley Creek above the Ketchikan city water supply.

Jurisdiction and administration.

SEC. 2. The public lands heretofore described and reserved for municipal water-supply purposes, not a part of the Tongass National Forest, shall be administered by the Secretary of the Interior, and those within the Tongass National Forest shall be administered by the Secretary of Agriculture, for the purpose of storing, conserving, and protecting from pollution the said water supply, and preserving, improving, and increasing the timber growth on said lands, to more fully accomplish such purposes; and to that end said municipality shall have the right, subject to the approval of the Secretary of the Interior and the Secretary of Agriculture, to the use of any and all parts of the lands reserved for the storage and conveying of water and construction and maintenance thereon of all improvements for such purposes: *Provided*, That the merchantable timber on the land to be used by the said municipality which is under the jurisdiction of the Secretary of the Interior may be sold by the said Secretary under rules and regulations to be prescribed by him: *And provided further*, That the right to the use by the city of Ketchikan of the lands reserved by this Act shall terminate upon the abandonment of the use by such municipality in accordance with the terms of this Act, and upon a finding of such nonuse or abandonment, for a period of two years, by the head of the department having jurisdiction over the land involved, whereupon the reservation created by this Act shall terminate to the extent of such lands involved.

Provisos.
Sale of timber.

Reversionary provision.

Regulations to be prescribed and enforced.

SEC. 3. The Secretary of the Interior and the Secretary of Agriculture are hereby authorized to prescribe and enforce such regulations as may be found necessary to carry out the purpose of this Act, including the right to forbid persons other than those authorized

by them and the municipal authorities of said municipal corporation from entering or otherwise trespassing upon these lands, and any violation of this Act or of regulations issued thereunder shall be a misdemeanor and shall be punishable as is provided for in section 5050, Compiled Laws of Alaska, 1933.

Penalty for violation.

SEC. 4. Nothing herein contained shall affect any valid right or claim to any part of said lands heretofore acquired under any law of the United States.

Existing rights not impaired.

Approved, July 27, 1939.

[CHAPTER 390]

AN ACT

To provide means by which certain Filipinos can emigrate from the United States.

July 27, 1939
[H. R. 4646]
[Public, No. 241]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That any native Filipino residing in any State or Territory or the District of Columbia on the effective date of this Act, who desires to return to the Philippine Islands, may apply to the Secretary of Labor, upon such form as the Secretary may prescribe, through any officer of the Immigration Service for the benefits of this Act. Upon approval of such application, the Secretary of Labor shall notify such Filipino forthwith, and shall certify to the Secretary of the Navy and the Secretary of War that such Filipino is eligible to be returned to the Philippine Islands under the terms of this Act. Every Filipino who is so certified shall be entitled, at the expense of the United States, to transportation and maintenance from his present residence to a port on the west coast of the United States, or in the case of a Filipino residing in Hawaii, to a port in that Territory, and from such port, to passage and maintenance to the port of Manila, Philippine Islands, on either Navy or Army transports, whenever space on such transports is available, or on any ship of United States registry operated by a commercial steamship company which has a contract with the Secretary of Labor as provided in section 2.

Native Filipinos residing in United States.

Application for return to Philippine Islands.

Notification upon approval.

Transportation and maintenance expense.

SEC. 2. The Secretary of Labor is hereby authorized and directed to enter into contracts with any railroad or other transportation company, for the transportation from their present residences to a port on the west coast of the United States or, in the cases of residents of Hawaii, to a port in that Territory, of Filipinos eligible under section 1 to receive such transportation, and with any commercial steamship company, controlled by citizens of the United States and operating ships under United States registry, for transportation and maintenance of such Filipinos from such ports to the port of Manila, Philippine Islands, at such rates as may be agreed upon between the Secretary and such steamship, railroad, or other transportation company.

Contracts for transportation.

SEC. 3. The Secretary of Labor is authorized and directed to prescribe such rules and regulations as may be necessary to carry out this Act, to enter into the necessary arrangements with the Secretary of War and the Secretary of the Navy, to fix the ports on the west coast of the United States and in Hawaii from which any Filipinos shall be transported and the dates upon which transportation shall be available from such ports, to provide for the identification of the Filipinos entitled to the benefits of this Act, and to prevent voluntary interruption of the journey between the port of embarkation in the United States or Hawaii and the port of Manila, Philippine Islands.

Rules and regulations.

Title 11

PUBLIC UTILITIES

Chapter 11.20

WATER RESERVOIRS

Sections:

11.20.010 Trespassing on lake watersheds prohibited. All persons are prohibited from skating, picnicking, trapping, or otherwise trespassing within or upon the watersheds draining, either naturly or artificially, into Ketchikan Lake, Fawn Lake, or Carlanna Lake, all located near Ketchkan, Alaska, and constituting the several reservoirs which supply the city with drinking water(Prior code §17-18)

11.20.020 Penalty. Any person who violates any provision of this chapter is guilty of a misdmeanor, and for each conviction thereof before the magistrate, shall be punished by a fine in any sm not exceeding three hundred dollars. (Ord. 744 §8, 1971; prior code §17-19)

11.20.030 Fine schedule. Pursuant to 1.02.120 of this code the following fine schedule is estabshed for violations of this title and of the codes and regulations as adopted by this title:

Subsection:	Fine:
11.20.010	$150.00

(Ord. 19 §10, 1993)

BLM Acknowledgement

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Alaska State Office
222 West Seventh Avenue, #13
Anchorage, Alaska 99513-7504
www.blm.gov/alaska

In Reply Refer To:
232111 (AK940)

MAY 19 2021

Ketchikan Public Utilities
Karl R. Amylon, General Manager
334 Front Street
Ketchikan, Alaska 99901

Dear Mr. Amylon:

This letter is in response to your inquiry of April 22, 2021, concerning the withdrawal created by the Act of July 27, 1939 (53 Stat. 1131), for the Ketchikan watershed. We have researched this and can find no subsequent amendments of the Act which would affect the withdrawal. The land is still withdrawn for use as a watershed for the City of Ketchikan and will remain so unless the City abandons its use for a period of two years.

The withdrawal sets the lands aside for a watershed and the Bureau of Land Management cannot permit other uses of the land which would interfere with that primary use. Should I receive applications from other than the City of Ketchikan, I will request your review and comment before taking any action that could affect the watershed use.

If you have any questions please contact Marnie Graham, Glennallen Field Office Manager at (907) 822-3217 or mgraham@blm.gov.

Sincerely,

Chad B. Padgett
State Director

MUNICIPAL WATERSHED

Land Use Designation MW

The emphasis of this Land Use Designation is to provide protection of municipal water supplies for the following incorporated cities and boroughs: Ketchikan, Petersburg, Sitka, Juneau, Wrangell, Kake, Klawock, Craig, and Hydaburg.

Goals

To maintain these watersheds as municipal water supply reserves, in a manner that meets State of Alaska Drinking Water Regulations and Water Quality Standards for water supply.

Objectives

Limit most management activities to the protection and maintenance of natural resources. Fish habitat enhancements, and watershed and wildlife habitat improvements, may occur if they are compatible with the municipality's watershed management objectives.

Classify forested land as unsuitable for timber production. Salvage logging will only occur after consultation with the municipality.

Recreation uses will be authorized by the Forest Service officer with delegated authority, in consultation with the municipality and will be limited to those that will protect water quality and flow.

Desired Condition

Lands managed as Municipal Watersheds are generally in a natural condition. Facilities or structures to provide municipal water supplies may be present. Uses or activities that could adversely affect water quality or supply do not occur. These watersheds provide municipal water that meets all State Drinking Water Regulations and Water Quality Standards for water supply.

Apply the following Land Use Designation Standards & Guidelines:

FACILITIES

Facilities Improvements: FAC2

Construct no Forest Service administrative facilities. Facilities such as dams, reservoirs, and pipelines are consistent with Land Use Designation objectives.

FIRE

Fire Suppression: FIRE12

Suppression Action

A. Suppress wildfires using the suppression option identified in the Southeast Alaska/Prince William Sound Fire Management Plan. An Escaped Fire Situation Analysis (EFSA) of expected fire behavior, time of year, and locations, with respect to private land and adjacent Land Use Designations, may lead to a lower strategy. If an EFSA discloses no adverse effects and it is more cost-efficient, the lower strategy will be used.

B. Emphasize suppression tactics which result in the least possible disturbance or evidence of human presence.
   1. Use of mechanized equipment should be kept to a minimum.
   2. Rehabilitation of all suppression lines and other evidence of human presence will occur as soon as safe, and no more than one year after the fire occurs.

Fuel Improvements: FIRE2

Prescribed fire

A. As appropriate, normally use management-ignited prescribed fire rather than mechanical treatment to reduce the fire hazard from timber salvage. Management-ignited prescribed fire may also be used to maintain or improve watershed characteristics as long as there is no adverse impact to water quality.

B. As a general management practice, do not use prescribed natural fire. Should it become necessary to consider the use of prescribed natural fire, the Forest Plan must be amended to analyze, justify, and approve prescribed natural fire programs. (Consult FSM 5142).

FISH

Fish Habitat Planning: FISH112

A. Plan the construction and maintenance of fish improvement projects only if they are compatible with the municipal watershed objectives.
   1. Restrict fish habitat improvements which result in reduced water quality for a municipality using the water from the affected stream.
   2. When planning fish habitat improvement projects, consider the effects of anticipated municipal water withdrawals.

FOREST HEALTH

Forest Health Management: HEALTH1

A. Maintain or improve forest health. Implement insect and disease management measures to protect the watershed and adjacent resources.

B. Timber may be salvaged at the request of municipality.

Forest Insect and Disease Survey and Inventory: HEALTH2

A. Survey and inventory visible outbreaks.

Management Prescriptions

HERITAGE

Heritage Resource Activities: HER

Inventory/Evaluation

A. Develop priorities and schedule management activities to implement heritage resource inventory, evaluation, protection, and interpretation.
   1. Identify, classify, and evaluate known Heritage Resources.
   2. Identify heritage properties to be nominated to the National Register of Historic Places.
   3. Identify heritage properties that require stabilization or other protective measures.
   4. Identify opportunities for interpretation of Heritage Resources for public education and enjoyment. Interpretation will generally occur outside the municipal watershed.

KARST AND CAVE

Cave Management Program: CAVES

A. Caves may be made available for general public recreation and education uses, only when compatible with watershed objectives and in consultation with the municipality.

B. Identify opportunities for interpretation of caves for public education and enjoyment. Interpretation will generally occur outside this Land Use Designation.

LANDS

Special Use Administration (Non-Recreation): LAND122

A. Manage special uses in accordance with the legislation establishing the watershed (if any) and to safeguard the quality and quantity of municipal water supplies. Limit special uses to those which support development activities. Coordinate all proposals with affected municipalities and obtain written concurrence before issuing special-use authorizations. (Consult 36 CFR 251.9, 36 CFR 251.35, and FSM 2700.)
   1. Analyze special-use proposals on a case-by-case basis, using an interdisciplinary process, to determine probable effects.
   2. Do not permit any activities which would lead to violation of State Drinking Water Regulations or degradation of water quality below State of Alaska Water Quality Standards for water supply.
   3. Terminate or bring into conformance, existing uses which are causing violation of State Drinking Water Regulations or degradation of water quality below State of Alaska Water Quality Standards for water supply.

B. This Land Use Designation represents a Transportation and Utility System (TUS) "Avoidance" Area. Transportation and utility sites and corridors may be located in this Land Use Designation only after an analysis of potential TUS corridors has been completed and no feasible alternatives exist outside this Land Use Designation.

Land Ownership Adjustments: LAND26

A. Protect municipal interests in land adjustment decisions. Unless otherwise prohibited by law, encourage actions which result in the affected municipality owning the land.
   1. Dispose of lands only when allowed to by applicable legislation.
   2. When disposal is contemplated, involve the affected municipality early in the process.
   3. Encourage state land selections under the Statehood Act for subsequent transfer to the municipal governing body.

4. If legislation allows, consider exchange of these lands with the affected municipality.
5. Do not acquire National Forest System lands for municipal watershed purposes.

MINERALS AND GEOLOGY

Minerals and Geology Resource Preparation: MG11

Resource Preparation

A. Interpret geologic, paleontologic, and historic mining for municipal watersheds where appropriate.

Minerals and Geology Administration: MG12

Mineral withdrawals

A. Municipal watersheds may be withdrawn from mineral entry on a case-by-case basis after consultation with the municipality, subject to valid existing rights.

B. Permit reasonable access to mining claims with valid existing rights in accordance with the provisions of an approved Plan of operations.

Plan of operations

A. Work with claimants to develop a Plan of operations that adequately mitigates adverse impacts to Land Use Designation objectives. Include mitigation measures that are compatible with the scale of proposed development and commensurate with potential resource impacts.

B. Apply Transportation Forest-wide Standards & Guidelines to the location and construction of mining roads and facilities.

C. Manage mineral exploration and development activities to be compatible with the emphasis of this Land Use Designation. Apply the following management practices to reduce resource impacts.
   1. Manage mineral activities to maintain the present and continued productivity of anadromous fish and other foodfish habitat to the maximum extent feasible. (Consult ANILCA, Section 505 (a).)
   2. Take maximum advantage of topographic and vegetative screening when locating drill rigs and pumps, roads, rock quarries, structures, and marine transfer facilities.
   3. Locate material sites and marine transfer facilities outside this Land Use Designation if reasonable alternatives exist.
   4. Ensure that vegetation removed from the project area is hauled away, buried, burned, or scattered.
   5. Minimize the scale of spoil/disposal areas to the surrounding landscape as seen from sensitive view points.
   6. Approve use of colors that simulate those found in the characteristic landscape. Avoid use of reflective materials in project facilities.
   7. Approve reclamation plans in which minerals activities leave a natural-appearing condition.
   8. Ensure that landform modifications simulate naturally-occurring forms.
   9. Ensure that disturbed areas are revegetated in accordance with project plans.

RECREATION AND TOURISM

Recreation Use Administration: REC122

Recreation Management and Operation

A. Provide only for those activities and recreation use levels that can be accommodated without detriment to water quality and flow.

B. Issue appropriate orders for regulating public use within the watershed, in cooperation with the municipality.

Recreation Special Uses

A. Major and minor developments are generally not consistent with objectives for this Land Use Designation. Proposals for development will require scrutiny of the magnitude and scope of the project to see if they meet Land Use Designation objectives. Refer to the Recreation and Tourism Forest-wide Standards & Guidelines.

SCENERY

Scenery Operations: VIS1

A. Considerations for the visual resource will be secondary to the objectives of the municipal watershed. Visual quality conditions are the result of the municipality's watershed management objectives.
   1. Design management activities within the watershed to minimize visual impacts as seen from Visual Priority Travel Routes and Use Areas (See Appendix F).

SOIL AND WATER

Watershed Resource Planning: S&W112

A. Comply with the State of Alaska's Drinking Water Regulations and Water Quality Standards for water supply.
B. Develop written agreements with municipalities consistent with 36 CFR 251.9, 18 AAC 80.520(c)(3), and FSM 2718.4, as applicable.

Watershed Resource Improvement: S&W2

A. Soil and water protective measures are applied to protect the watersheds and water resources for municipal water use. Soil and water improvement will occur on all disturbances that threaten the watershed values.
B. Coordinate soil and water improvement projects with the affected municipality.

SUBSISTENCE

Subsistence: SUB

A. Permit subsistence activities in accordance with the Federal, state, and local laws.

TIMBER

Timber Resource Planning: TIM112

A. Forested land is classified as unsuitable for timber production.
B. No timber harvest is scheduled. Salvage may be considered on a case-by-case basis in consultation with the municipality.
C. Personal use wood and Christmas tree cutting activities are usually incompatible with Land Use Designation objectives.

TRAILS

Trails: TRAI1

A. Trail systems are limited to those that can be accommodated without detriment to water quality and flow . Trails may be considered on a case-by-case basis in consultation with the municipality. (For the Petersburg watershed, consult 36 CFR 251.35.)

TRANSPORTATION

Transportation Operations: TRAN1

A. Allow roads needed for the routine operation, maintenance, and improvement of the municipal water system and watershed. Allow roads to provide for timber salvage operations if they are permitted by the watershed's establishing legislation (if any) and after consultation with the affected municipality. If no feasible alternative exists, roads may occur in this area.

1. Conduct a transportation analysis to determine optimum road location and design standards to ensure minimum adverse impacts to the watershed.
2. Coordinate road management with the affected municipality. Manage access in accordance with the legislation establishing the watershed (if any).
3. Road construction may occur if it is consistent with legislation establishing the watershed (if any) and it can be done without unacceptable degradation of water quality.

WILDLIFE

Wildlife Habitat Planning: WILD112

A. Manage wildlife habitats for uses compatible with the watershed management objectives.

Kathleen's copy

and all doors secured fully

aters south of 60° N. lat., crab
aken only from June 1–Janu-

waters south of 60° N. lat., the
and possession limit is 12
ner crab.

E DATE NOTE: At 60 FR 31593, June
42.27 was revised, effective July 1,
gh December 31, 1996.

ART 251—LAND USES

rt A—Miscellaneous Land Uses

ATURAL RESOURCES CONTROL

nagement of municipal watersheds.
ohibition of location of mining
s within certain areas in the
ck Wildlife Preserve, South Da-

verning mining locations under the
g laws of the United States within
portion of the Black Hills National
t, State of South Dakota, des-
ed as the Norbeck Wildlife Preserve.
nditions, rules, and regulations to
n exercise of timber rights reserved
nveyance to the United States.
nditions, rules, and regulations to
n exercise of mineral rights re-
d in conveyances to the United
s.

RIGHTS OF GRANTORS

rantor's right to occupy and use
conveyed to the United States.
ights-of-way reserved by the grant-
n lands conveyed to the United
es.
xercise of water rights reserved by
grantor of lands conveyed to the
ed States.

DESIGNATION OF AREAS

Experimental areas and research nat-
areas.

PETERSBURG WATERSHED

Petersburg watershed.

Subpart B—Special Uses

Special uses.
Definitions.
Delegation of authority.
Authorities.
Special use applications.
Nature of interest.
Terms and conditions.
Rental fees.
Cost reimbursement. [Reserved]

Subpart C—Appeal of Decisions Relating to Occupancy and Use of National Forest System Lands

Subpart D—Access to Non-Federal Lands

AUTHORITY: 16 U.S.C. 472, 551, 1134, 3170, 3210; 30 U.S.C. 185; and 43 U.S.C. 1740, unless otherwise noted.

Subpart A—Miscellaneous Land Uses

AUTHORITY: 7 U.S.C. 1011; 16 U.S.C. 518, 551, 678a; Pub. L. 76–867, 54 Stat. 1197.

NATURAL RESOURCES CONTROL

§ 251.9 Management of Municipal Watersheds.

(a) The Forest Service shall manage National Forest watersheds that supply municipal water under multiple use prescriptions in forest plans (36 CFR part 219). When a municipality desires protective actions or restrictions of use not specified in the forest plan, within agreements, and/or special use authorizations, the municipality must apply to the Forest Service for consideration of these needs.

(b) When deemed appropriate by the Regional Forester, requested restrictions and/or requirements shall be incorporated in the forest plan without written agreements. Written agreements with municipalities to assure protection of water supplies are appropriate when requested by the municipality and deemed necessary by the Regional Forester. A special use authorization may be needed to effect these agreements.

(c) In preparing any municipal watershed agreement for approval by the Regional Forester or issuing special use authorization to protect municipal water supplies, the authorized forest officer shall specify the types of uses, if any, to be restricted; the nature and extent of any restrictions; any special land management protective measures and/or any necesary standards and guidelines needed to protect water quality or quantity; and any resources that are to be provided by the municipality.

(d) A special use authorization (36 CFR 251.54) is required if the municipality is to use the subject lands, restrict public access, or control resource uses within the watershed. Special use authorizations issued pursuant to this section are subject to the same fee waivers, conditions, and procedures applicable to all other special uses as set forth in subpart B of this part.

(e) Any municipal wateshed management agreements, special use authorizations, requirements, and/or restrictions shall be consistent with forest plans, or amendments and revisions thereto.

[53 FR 27685, July 22, 1988]

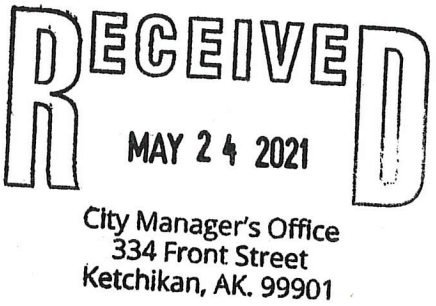
§ 251.10 Prohibition of location of mining claims within certain areas in the Norbeck Wildlife Preserve, South Dakota.

The location of mining claims in such areas within 660 feet of any Federal, State or county road and within such other areas where the location of mining claims would not be in the public interest, as may be designated by

USFS Acknowledgement

United States Department of Agriculture
Forest Service
Tongass National Forest
Alaska Region
648 Mission Street
Ketchikan, AK 99901
907-225-3101

File Code: 2760; 5590
Date: May 21, 2021



Mr. Karl R. Amylon
General Manager
334 Front Street
Ketchikan, AK 99901

Dear Mr. Amylon:

In response to your letter dated April 22, 2021, the Forest Service can confirm that Forest Service lands located within the Ketchikan Municipal Water Supply Watershed referenced in your letter are reserved as a municipal watershed pursuant to the Ketchikan Townsite Exclusion Act of 1939. Land use is limited to the protection and maintenance of natural conditions and preservation of water quality and water supply to meet the provisions of Safe Drinking Water Act and Alaska Drinking Water Regulations and Water Quality Standards.

These lands are designated in the Tongass Land and Resource Management Plan (Forest Plan) with the Municipal Watershed Land Use Designation (LUD). Management direction for Municipal Watersheds, described on pages 3-51 through 3-57 of the Forest Plan, includes an emphasis "to provide protection of municipal water supplies" and limits management activities. There may be structures or facilities within the watershed to support the municipal water supply, but uses or activities that adversely affect water quality or supply will not occur. Forested lands within the Municipal Watershed LUD are not suitable for timber production and roads are only allowed for routine operation, maintenance, or improvement of the municipal water system. The Forest Plan is publicly available on our website at https://www.fs.usda.gov/detail/tongass/landmanagement/?cid=stelprd3801708.

The Forest Service acquired additional acres within the watershed in 2019 as part of a land exchange with the Alaska Mental Health Trust Authority (Consolidated Appropriations Act, 2017, Public Law 115-31, see Appendix B—S. 131). The acquired land, Parcel K2, will be managed in accordance with the enacting legislation. In particular, SEC. 5(b)(1)(C)(i) states that the acquired non-Federal parcels shall be managed "to preserve the undeveloped natural character" and "the wildlife, watershed, and scenic values" of those lands, with the exception of recreational trails (SEC. 5(b)(3)).

If you would like further assistance or have additional questions, please contact Deputy Forest Supervisor Frank Sherman at 907-228-6282 or via email at francis.sherman@usda.gov.

Sincerely,

for

M. EARL STEWART
Forest Supervisor, Tongass NF

cc: Mayor Bob Sivertsen - City of Ketchikan; Laurie Cooper - Forest Service legislative affairs; Dawn Collinsworth - Forest Service lands team; Shane Walker - District Ranger

Appendix C. Annual Reports

City of Ketchikan
Ketchikan Public Utilities (KPU)
Public Water System ID # 120232
Community Water System Avoiding Filtration

2021 Annual Onsite Inspection Summary

KETCHIKAN LAKE

Inspection by Ketchikan Public Utilities Staff
Inspection Review by Alaska Department of Environmental Conservation
Drinking Water Program Staff Charity Bare and Stephen Erdman

Date of Inspection: October 30, 2021

Table of Contents

Introduction:

Ketchikan Public Utilities (KPU) operates the community water system serving the City of Ketchikan and was conditionally approved under a provision (40.CFR.141.71) of the Safe Drinking Water Act (SDWA) to serve surface water without providing filtration from the sources known as Ketchikan Lakes, Granite Basin, and Fawn Lake. In lieu of filtration, KPU was required to comply with the criteria for filtration avoidance, one of which is an annual inspection conducted by the State of Alaska. (40CFR 141.71(b)(3) and 18 AAC 80.620).

The 2021 inspection was conducted on October 30, 2021, by Ketchikan Public Utilities (KPU) staff, with the inspection checklists and photographic documentation being reviewed by Alaska Department of Environmental Conservation (ADEC) Drinking Water Staff.

Requirements of Filtration Avoidance Criteria Inspection

Public water systems approved to avoid filtration are subject to an annual onsite inspection completed by the State of Alaska. Due to the COVID-19 pandemic, the Drinking Water Program did not conduct onsite filtration avoidance inspections during 2021, but rather fulfilled the annual inspection requirement through the use of operator/owner submitted information and photographic documentation. The State of Alaska Drinking Water Regulations and the Safe Drinking Water Act contain specific requirements for this inspection. The inspection must include:

1. A review of the effectiveness of the watershed control program;
2. A review of the physical condition of the source intake and how well it is protected;
3. A review of the system's equipment maintenance program to ensure there is a low probability for failure of the disinfection process;
4. An inspection of the disinfection equipment for physical deterioration;
5. A review of operating procedures;
6. A review of data records to ensure that all required tests are being conducted and recorded and disinfection is effectively practiced; and
7. Identification of any improvements which are needed in the equipment, system maintenance and operation, or data collection.

Evaluation of these requirements is summarized in the following sections.

1: <u>Effectiveness of the watershed control program</u>

Requirement: *Review of the effectiveness of the watershed control program*

KPU is required to maintain a watershed control program that**:**

- minimizes the potential for contamination by *Giardia lamblia*, *Cryptosporidium,* and viruses in the source water;
- characterizes the watershed hydrology and land ownership;
- identifies watershed characteristics and activities that may have an adverse effect on source water quality; and
- monitors the occurrence of activities that may have an adverse effect on source water quality.

The adequacy of the program must be based on:

- The comprehensiveness of the watershed review;
- The effectiveness of the program to monitor and control detrimental activities occurring in the watershed; and
- The extent to which the system has maximized land ownership and/or controlled land use within the watershed.

KPU must submit an annual watershed control program report to the State that:

- Identifies any special concerns about the watershed and how they are being handled;
- Describes activities in the watershed that affect water quality; and
- Projects what adverse activities are expected to occur in the future and describes how the they expect to address them.

Evaluation and Finding: Access to the watersheds and sources is controlled and restricted. The road leading to Fawn Lake, Granite Basin and Ketchikan Lakes has two locked gates. The first gate is constructed of pipe and blocks motor vehicles. The second gate is chain-link with fencing extending laterally from the roadway and blocks foot traffic. Access to Fawn Lake is also controlled with a chain-link perimeter fence with two locked gates.

Ketchikan Lakes receive water from the surrounding steep mountains with a vast rain-catchment area. Using two large diameter penstocks, the Ketchikan Lakes' water is drained into the Fawn Lake which also receives surface flow from a smaller lake in the Granite Basin. Through a piping and tunnel system, water travels from the Fawn Lake to the water treatment plant where it is chlorinated using onsite generated sodium hypochlorite. The Watershed Control Program was updated to include Cryptosporidium oocysts as a potential contaminant, and to limit and monitor activities that could result in Cryptosporidium contamination. Special purpose samples for raw water fecal coliform collected in 2020 and 2021 showed that a small rivulet in the Fawn Lake area had higher fecal coliform results. This rivulet flowed from off the hillside and into a grate that drained into the tunnel between Granite Basin and Fawn Lake. On September 10, 2021, a 24-inch culvert was installed to route that small surface water rivulet into its former natural drainage course, and away from the drinking water source.

The watershed area for the water system source is under shared ownership:

1) United States Forest Service;
2) United States Bureau of Land Management; and
3) City of Ketchikan.

Watershed is vast, remote, rocky, mountainous, and wooded. Recreation activities are not permitted in the watershed area and the only access road is controlled by the KPU using two padlocked gates. Hikers may access remote portions of the watershed from public use areas adjacent to the watersheds, but there was no evidence observed during the inspection. Activity is monitored by KPU employees patrolling the watershed area multiple times a week to ensure there is no change or new activity.

The map of the watershed is included in the appendices, but may also be viewed at: https://www.arcgis.com/apps/mapviewer/index.html?webmap=778048eb6bde4954b3e0f186c5f5da78

The watershed control program is effective and meets requirements.

First Secured Gate on Access Road to Ketchikan Lakes

Fence and Second Secured Gate on Access Road

Watershed Signage

2: <u>Physical condition of the source intake</u>

Requirement: *A review of the physical condition of the source intake and how well it is protected.*

Evaluation and Finding: Water intake structures are located in Ketchikan Lake near the dam, at the Granite Basin dam and in Fawn Lake. Ketchikan Lakes has four intakes at two different elevations. One high elevation and one low elevation intake are paired and the paired intakes each feed one of the two penstocks leading to Fawn Lake. Granite Basin and Fawn Lake each have one intake.

Floating plastic booms create a protective barrier from floating debris such as logs or branches for the intake structures at Ketchikan Lakes. Each intake at Ketchikan Lakes, Fawn Lake, and Granite Basin is protected with bar grating. A butterfly valve on each of the two penstocks at Ketchikan Lake controls intake, while knife gate valves control the intakes at Fawn Lake and Granite Basin.

The intakes are submerged and were not directly observed during the last onsite inspection by State of Alaska personnel in 2019. KPU staff inspect the intake areas on a regular basis, and no changes to the source intakes were noted by KPU staff since the 2019 inspection.

Landslides and avalanches in the watershed are noted to affect water quality and the area is monitored for these events. Per KPU staff, no such events have been detected within the watershed since the 2020 report. KPU employees patrol the watershed area multiple times per week to monitor for the occurrence of activities which may have an adverse effect on source water quality.

One of Ketchikan Lakes Intakes

Granite Basin Dam

Creek from Granite Basin upstream of roadway prior to Fawn Lake

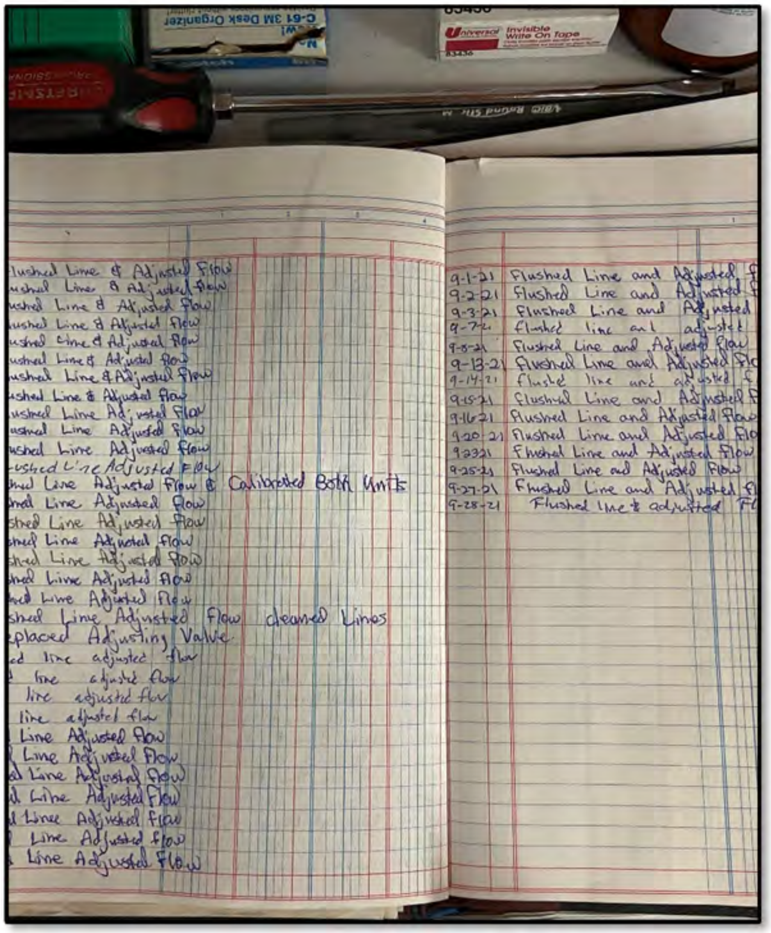
Fawn Lake

3: <u>System's equipment maintenance program</u>

Requirement: *A review of the system's equipment maintenance program to ensure there is low probability for failure of the disinfection process.*

Evaluation and Finding: Disinfection equipment includes onsite sodium hypochlorite generation and ultraviolet (UV) irradiation, as well as ammonia addition to create chloramines for distribution system residual maintenance. Equipment is well maintained.

To reduce the probability of equipment failure, operators conduct regular inspections and maintenance. The UV reference sensors are factory calibrated on a yearly schedule. These activities are logged on forms maintained at the equipment. SCADA continuously monitors the system and notifies operators of issues.



Turbidimeter Maintenance Log

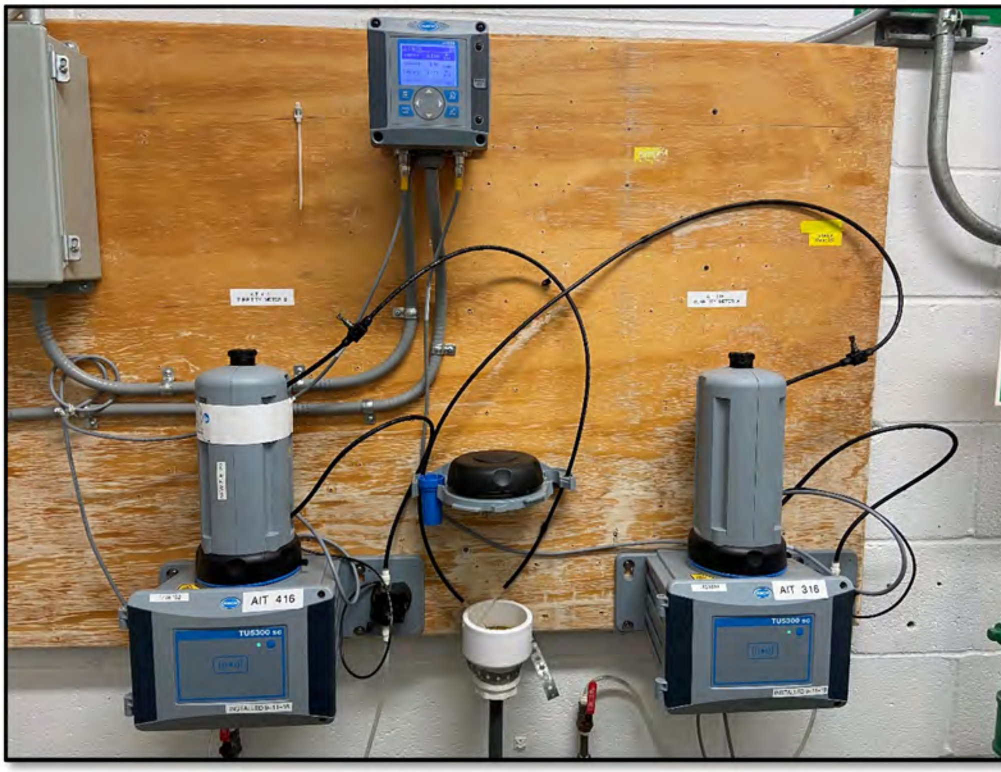
4: <u>Inspection of the disinfection equipment</u>

Requirement: *An inspection of the disinfection equipment for physical deterioration.*

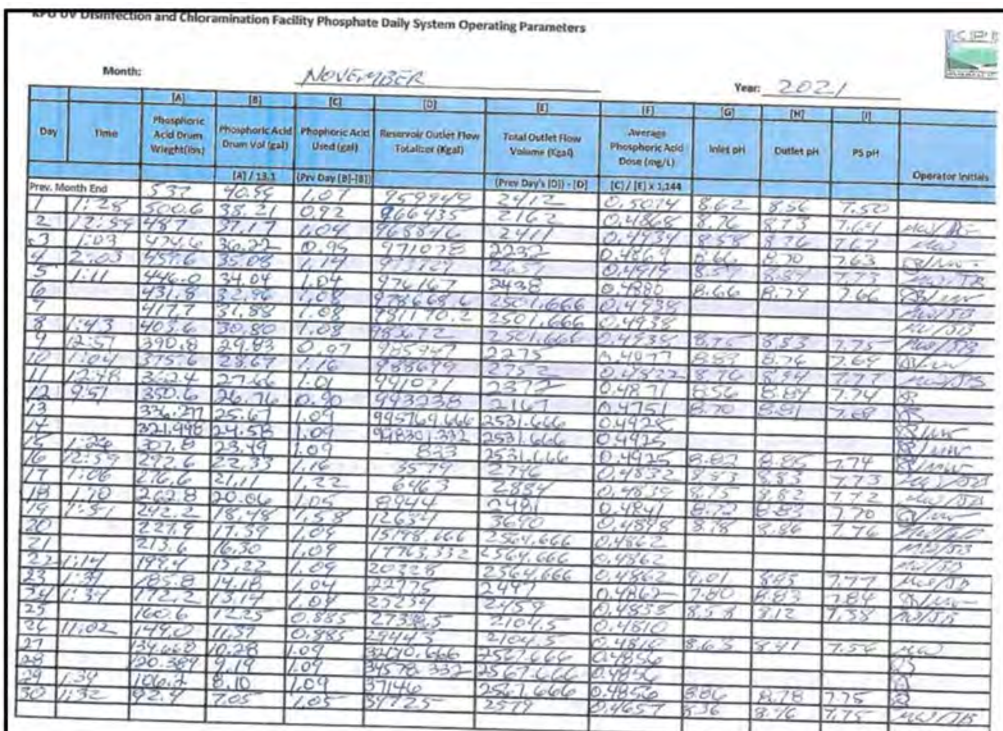
Evaluation and Finding: On previous inspections predating 2020, the onsite sodium hypochlorite generators at the primary chlorination point showed that the cells replaced in the recent past have experienced cracking that necessitates replacement. At the time of this inspection, no cells were in need of replacement. The facility has redundant units for many aspects of treatment and monitoring, including turbidity, chlorine generation and UV treatment.

Hypochlorite Generation

Redundant Hypochlorite Injection Systems - Primary Chlorination Facility



Turbidimeters for Line A and B – Chlorination Facility



KPU UV Disinfection and Chloramination Facility Phosphate Daily System Operating Parameters

Month: NOVEMBER Year: 2021

Day	Time	[A] Phosphoric Acid Drum Wieght(lbs)	[B] Phosphoric Acid Drum Vol (gal) [A] / 13.1	[C] Phophoric Acid Used (gal) (Prv Day [B]-[B])	[D] Reservoir Outlet Flow Totalizer (Kgal)	[E] Total Outlet Flow Volume (Kgal) (Prev Day's [D]) - [D]	[F] Average Phosphoric Acid Dose (mg/L) [C] / [E] x 1,144	[G] Inlet pH	[H] Outlet pH	[I] PS pH	Operator Initials
Prev. Month End		537	40.99	1.07	959949	2412	0.5074	8.62	8.56	7.50	
1	1:28	500.6	38.21	0.92	966435	2162	0.4868	8.76	8.73	7.65	[illegible]
2	12:59	487	37.17	1.04	968846	2411	0.4934	8.58	8.76	7.67	[illegible]
3	1:03	474.6	36.22	0.95	971078	2232	0.4869	8.66	8.70	7.63	[illegible]
4	2:03	457.6	35.08	1.14	973727	2657	0.4919	8.57	8.89	7.73	[illegible]
5	1:11	446.0	34.04	1.04	976167	2438	0.4880	8.66	8.79	7.66	[illegible]
6		431.8	32.96	1.08	978668.6	2501.666	0.4938				[illegible]
7		417.7	31.88	1.08	981170.2	2501.666	0.4938				[illegible]
8	1:43	403.6	30.80	1.08	983672	2501.666	0.4938	8.76	8.53	7.75	[illegible]
9	12:57	390.8	29.83	0.97	985947	2275	0.4077	8.89	8.76	7.69	[illegible]
10	1:04	375.6	28.67	1.16	988699	2752	0.4822	8.70	8.94	7.77	[illegible]
11	12:48	362.4	27.66	1.01	991071	2372	0.4871	8.56	8.84	7.74	[illegible]
12	9:51	350.6	26.76	0.90	993238	2167	0.4751	8.70	8.91	7.68	[illegible]
13		336.277	25.67	1.09	995769.666	2531.666	0.4928				[illegible]
14		321.948	24.58	1.09	998301.332	2531.666	0.4925				[illegible]
15	1:26	307.8	23.49	1.09	833	2531.666	0.4925	8.82	8.86	7.74	[illegible]
16	12:59	292.6	22.33	1.16	3579	2746	0.4832	8.83	8.53	7.73	[illegible]
17	1:06	276.6	21.11	1.22	6463	2884	0.4839	8.75	8.82	7.72	[illegible]
18	1:10	262.8	20.06	1.05	8944	2491	0.4841	8.72	8.83	7.70	[illegible]
19	1:51	242.2	18.48	1.58	12634	3690	0.4898	8.78	8.86	7.76	[illegible]
20		227.9	17.39	1.09	15198.666	2564.666	0.4862				[illegible]
21		213.6	16.30	1.09	17763.332	2564.666	0.4862				[illegible]
22	1:14	199.4	15.22	1.09	20228	2564.666	0.4862	9.01	8.85	7.77	[illegible]
23	1:39	185.8	14.18	1.04	22775	2447	0.4862	7.80	8.83	7.84	[illegible]
24	1:34	172.2	13.14	1.04	25234	2459	0.4853	8.58	8.12	7.58	[illegible]
25		160.6	12.25	0.885	27398.5	2104.5	0.4810				
26	11:02	149.0	11.37	0.885	29443	2104.5	0.4810	8.63	8.41	7.56	[illegible]
27		134.668	10.28	1.09	32070.666	2567.666	0.4856				[illegible]
28		120.389	9.19	1.09	34578.332	2567.666	0.4856				[illegible]
29	1:39	106.2	8.10	1.09	37146	2567.666	0.4856	8.86	8.78	7.75	[illegible]
30	1:32	92.9	7.05	1.05	37725	2579	0.4657	8.36	8.76	7.75	MG/TS

UV Unit Operating Parameters

Secondary Chlorination Facility Hypochlorite Generation Systems

Secondary Chlorination Facility Pump Apparatus

The remaining disinfection-related equipment at the primary and secondary chlorination facilities, the UV water treatment facility and the ammonia building all appeared to be in good condition with no observed deterioration at the time of the inspection.

5: <u>Operating procedures</u>

Requirement: *A review of the operating procedures.*

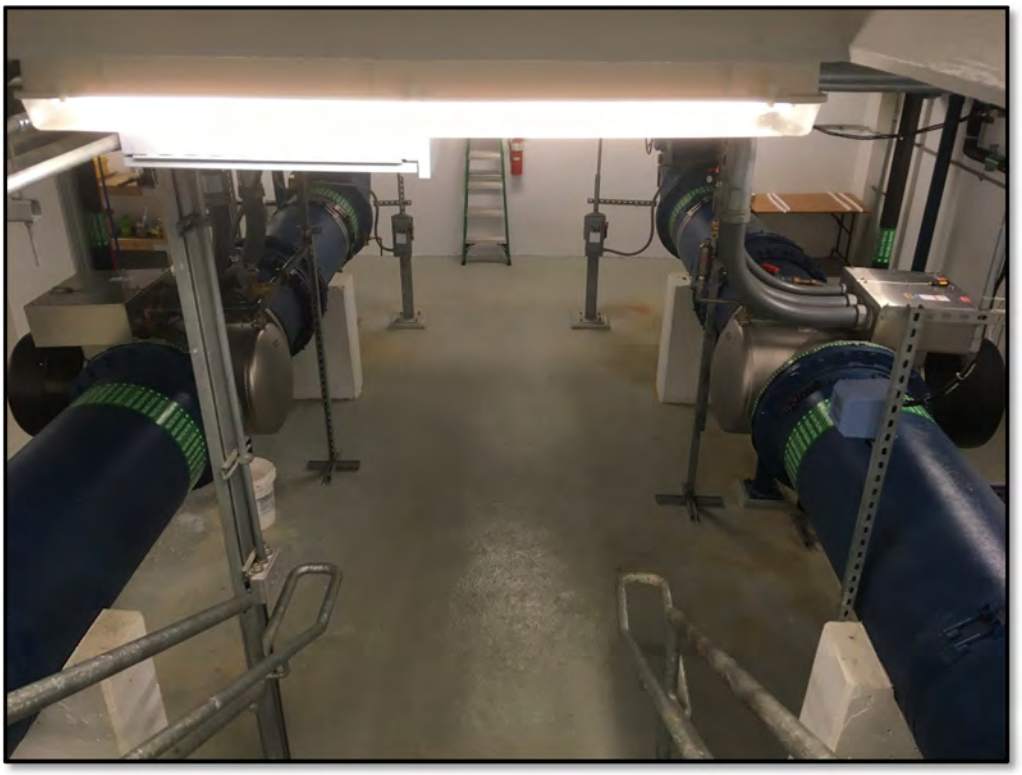
Evaluation and Finding: Standard operating procedures are generally well established and thorough. Equipment operations and process control and monitoring meet requirements. Operators are certified as required.

6: <u>Data records pertaining to disinfection effectiveness</u>

Requirement: *A review of data records to ensure that all required tests are being conducted and recorded and disinfection is properly practiced.*

Evaluation and Finding: KPU generally completes more than the minimum required number of water analyses. Based on a review of the KPU data records by Christina Mielke, Environmental Program Specialist, KPU met all monitoring requirements between December 2020 and September 2021. Ketchikan did not meet the criteria for fecal counts in October and November 2019 (less than 90% of fecal bacteria density counts in the source water were equal to or less than 20 per 100 ml sample).

The data parameters for calculating CT are collected at the UV facility before the UV reactors. Temperature measurements are collected at this location through SCADA, and redundant temperature readings are taken at a nearby sink.



UV Reactors

7: <u>Equipment, system maintenance and operation, or data collection improvement</u>

Requirement: *Identification of any improvements which are needed in the equipment, system maintenance and operation, or data collection.*

- KPU proactively maintains and improves equipment. KPU did not make or propose any equipment improvements during this review period.

Conclusion

Based on the provided inspection information and a review of monitoring records, KPU meets the criteria listed in the introduction for systems approved to avoid filtration. KPU currently meets the 90% criterion for fecal bacteria density counts as stipulated in 40 CFR 141.71 (a)(1); however, fecal counts in October and November of 2019 were 89% and 88% respectively, exceeding the permissible limit. During the review period from October 2020 to September 2021, no turbidity events occurred, and the source water did not exceed 1.49 NTU. KPU has continued to meet the disinfection and sampling requirements. Although KPU previously exceeded the criteria for remaining a filtration avoidance system, KPU is currently operating in compliance with all filtration avoidance criteria.

Appendices

2021 Watershed Control Report by Ketchikan Public Utilities
Water Quality Data Summary Spreadsheets
2021 Filtration Avoidance Inspection Checklists
Filtration Avoidance Monitoring Requirements Summary Report
Source Water Assessment Protection Area Maps

KPU
Your Community, Your Utility

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January 19, 2022

Charity Bare, P.E., Engineering Supervisor
Mat-Su Region, Kenai Peninsula Borough and Southeast Region
State of Alaska Drinking Water Program
Department of Environmental Conservation
43335 Kalifornsky Beach Road, Suite 11
Soldotna, Alaska 99669

Reference: Revised Annual Watershed Control Program Maintenance Report - State of Alaska Drinking Water Regulation 18 AAC 80.620(2) Criteria for Avoiding Filtration

Dear Ms. Bare:

Appended below is a revised annual report for the 2021 calendar year describing Ketchikan's on-going watershed control program for your review and approval. This revision replaces the report previously submitted on December 9, 2021.

Best regards,

Seth A. Brakke
for
John C. Kleinegger
Water Division Manager/ Project Engineer

cc: Seth Brakke, Asst. Water Division Manager
David Johnston, Water Division Foreman

2021 Ketchikan Municipal
Watershed Protection Program

As required by the Alaska Department of Environmental Conservation (ADEC) regulations, this report presents an annual review of the following criterions; (1) identification of special concerns about the watershed and how they are being handled, (2) describe the activities in the watershed that affect water quality, and (3) describe adverse activities expected to occur in the future and how Ketchikan expects to address them.

Identification of special concerns about the watershed and how they are being handled:

The watershed is located in a remote area on the outskirts of Ketchikan and there are no permitted recreational activities allowed. An Act of Congress in 1939 set aside the lands of the watershed as municipal watershed; thereby removing the lands from recreational use. The only road access is through a series of manually opened vehicle gates that are locked by chain and padlock. However, the vastness of the watershed area precludes complete exclusion of unauthorized individuals from this area. Trespassing in the watershed is against municipal ordinances, trespassing prohibited signs are posted both within the watershed and adjacent to Ketchikan Creek, the main tributary leaving the watershed. In addition, at random times KPU employees are patrolling the area several times per week. The volume of water contained in the lake and the chlorination that occurs after the water leaves this area negates most contamination threats by small quantities of chemical contaminants but not higher-level threats like weapons grade biological contaminants or use of a substantial amount of explosives.

Fawn Lake is located within the watershed and receives water from Ketchikan Lakes and Granite Basin. The raw water is then conveyed from the lake through a series of tunnels and penstocks to the Chlorination Building where disinfection begins through the addition of sodium hypochlorite solution. The entire perimeter of Fawn Lake is enclosed behind chain-link fencing topped with barbed wire. The fencing is in good repair. Vehicle access gates are locked by chain and padlock. A small fence with barbed wire blocks access to the intake structure and the hand wheel on the intake valve has been removed. As with Ketchikan Lake, the volume of water contained in the lake and the chlorination that occurs after the water leaves this area negates most contamination threats by small quantities of chemical contaminants but not higher-level threats like weapons grade biological contaminants or a substantial amount of explosives.

The same also applies to coliform contamination resulting from animals living within the watershed. In addition to previously identified mammals including mice, voles, wolves, bears, feral cats and dogs, mountain goats were transplanted onto Revillagigedo Island in 1983 and 1991 by the Alaska Department of Fish & Game. Since then, they have thrived and live at the higher elevations surrounding the municipal watershed and are only hunted through a limited authorized permit system.

In prior years ADEC representatives have conducted the annual Onsite Watershed Inspection which is one of the necessary criteria that Ketchikan must meet in order to continue being allowed to remain as an unfiltered water system. As part of each year's ADEC's inspection, they have

reviewed the effectiveness of the watershed control program and the physical condition of the source intake and how well it is protected. However, because of coronavirus travel restrictions in 2021, ADEC is unable to make their annual Onsite Water Inspection. Instead, they have requested KPU to complete the inspection documents and review Ketchikan's water system to ensure that it continues to meet the requirements of the Filtration Avoidance Criteria for 2021. As before, this continued evaluation is required to assess the factors that are affecting source water quality and the implementation of any additional improvement plans may be needed to ensure that KPU is permitted to continue avoiding filtration. This task has been completed and the report with photographs sent to ADEC on November 8th.

The most recent annual inspection by representatives of the Alaska Department of Environmental Conservation (ADEC) was conducted on October 22, 2019. This annual Onsite Watershed Inspection is one of the necessary criteria that Ketchikan must meet in order to continue being allowed to remain as an unfiltered water system. As part of ADEC's inspection, they reviewed the effectiveness of the watershed control program and the physical condition of the source intake and how well it is protected. It concluded that Ketchikan's water system meets the requirements of the Filtration Avoidance Criteria for 2019. As before, continued evaluation is needed of the factors affecting source water quality and the implementation of additional improvement plans may be needed to ensure that KPU will be permitted to continue avoiding filtration. The most recent Compliance Order by Consent (COBC) improvement plans were completed on May 24, 2017 and are described in further detail in a subsequent section of this report entitled "Adverse activities expected to occur in the future and how Ketchikan expects to address them."

The 2008 Onsite Watershed Inspection also recommended that an underwater inspection be performed to confirm the condition of the intake screens. However, with the exception of the August 2016 inspection, all of ADEC's recent inspections since 2008 have been made in either October or November. Since the fall months are some of Ketchikan's rainiest months, the result has been that the source intakes have always been completely submerged.

Even the August 2016 inspection found the Fawn Lake intake was still completely submerged. This was due to reduced hydrogeneration from the Ketchikan Lake system that summer which thereby increased the amount of electrical generation from Southeast Alaska Power Authority's (SEAPA) Swan Lake Dam. SEAPA operates both the Swan Lake and Tyee Lake hydrogeneration facilities and maintains the electrical intertie connecting Ketchikan, Wrangell, and Petersburg. Beginning early in the summer, the level of Swan Lake had to be lowered to well below its overflow level to avoid interfering while contractors worked raising the existing concrete arch dam another 10-feet to provide increased water storage capacity.

As noted in prior Watershed Protection Program Reports, only two of the five intakes listed are actually screened, the entire intake at Fawn Lake and one of the high elevation intakes on Ketchikan Lake. Instead, during the summer of 2008, while the level in Fawn Lake was low, a skiff was launched and employees checked the intake that is protected by a three-sided screen of vertical bars separated about 3-inches apart for debris or damage. The one Ketchikan Lake high level screened intake is merely screened with railroad iron acting as a grizzly with the iron bars separated about 6-inches apart. This inspection of these two screened intakes is repeated annually and both screened intakes have remained in good condition and undamaged.

Activities in the watershed that affect water quality

The presence of the access road could potentially affect the waters of Fawn Lake. Although erosion of sediment from road surfaces is a possibility, it is minimized by the nature of the drainage that generally flows away from the road. Only a single vehicle traverses the road while patrolling, generally about three times per week. In addition, the imported gravel surfacing along Fawn Lake when the road was rebuilt was specifically selected by analysis to be low in both arsenic and selenium.

Landslides and avalanches can affect the water quality. The few landslides that anyone recalls that seriously affected our water quality have occurred in the Granite Basin portion of the watershed. The Granite Basin diversion dam collects all of the rainfall from this area and sends the water through a series of tunnels into Fawn Lake and thence to Ketchikan. Although landslides have occurred upstream of the Granite Basin diversion dam as well as at the diversion dam itself, enough silt and organics are washed downstream and increase the incoming raw water turbidity significantly. Turbidity is a measure of the cloudiness of water – the cloudier the water, the greater the turbidity.

Since the initial Granite Basin landslide of 2005, there have been three other similar occurrences in this same area, two occurring within two weeks of each other in 2011. The first occurred August 20th at about 7:50 pm when the turbidity began to suddenly rise reaching 6.8 NTU's over a period of about 4 hours with a peak reading of 7.4 NTU's. The cause was a landslide into Granite Basin Creek. As before, Water Division personnel also came in to clean filters and instruments, collect raw and treated water samples for laboratory coliform analysis, and to substantially increase the chlorine addition rate. For the next 24 hours, everything was monitored closely and additional samples taken for analysis. Through everyone's prompt response, the treated water entering Ketchikan's municipal water system remained completely disinfected and contained a normal amount of unreacted chlorine residual.

The second landslide occurred on September 8th at about 7:00 pm. and completely obscured the dam that diverts the Granite Basin Creek into Fawn Lake. By the time Water Division employees reached the Chlorination Plant at 7:30 pm, the turbidity had already risen to 17 NTU's. The raw water intake was closed and the community was then supplied by only the thoroughly disinfected water already stored in our reservoirs. The fish processing industry was still operating at full capacity and by 9:35 pm, the level of the Bear Valley Chlorine Contact Time Reservoir had fallen to a critical level. The decision had to be made to open the raw water intake again despite the high 7.7 NTU turbidity at that time. At the same time, the chlorine residual at the Chlorination Plant was strongly increased to ensure adequate disinfection. Water Division personnel continued cleaning filters and instruments and collected raw and treated water samples for laboratory coliform analysis.

The turbidity continued to fall and at 10:00 pm, it was 5.63 NTU's and an hour later, at 11:00 pm, it was only 2.60 NTU's and continuing to fall. For the next 24 hours, everything was monitored closely and additional samples taken for analysis. All of the treated water samples collected during this period reported zero (0) colonies so the water was thoroughly disinfected during this period despite the incoming raw water's high turbidity and coliform content.

Another Granite Basin landslide occurred in 2014 on Sunday, September 29th at 3:36 am. There had been several low UVT (ultraviolet transmittance) alarms beginning Saturday afternoon as the weather continued to deteriorate all day with heavy rainfall. The first raw water turbidity alarm 0.7 NTU (nephelometric turbidity units) occurred that afternoon while rainfall became increasingly heavy and raw water turbidity continued to climb. By 11:00 pm, it reached 1.4 NTU and an employee was called in to take raw water samples for coliform analysis. Another employee was called in at 12:30 am Sunday, as the raw water turbidity continuing to rise and already at 3.5 NTU's. KPU has to be prepared to immediately close the raw water intake off if the turbidity reaches 5 NTU's. While the employee continued to monitor the situation through the early morning hours, the turbidity suddenly increased beyond 5 NTU's due to the Granite Basin landslide that occurred at 3:36 am. He immediately shut down the UV system, and closed all control valves which immediately isolated any high-turbidity raw water from entering the Chlorination Plant, and called for further assistance.

The S.W. Bailey Power House began ramping up the Ketchikan Plant hydrogenerators to pull more water out of Fawn Lake flushing the high turbidity water out of the lake as quickly as possible. Two employees went to Fawn Lake to assess the situation. They found much less water than expected coming down the creek from Granite Basin. They then went up to the Granite Basin diversion dam, found the diversion dam completely plugged with debris and water overtopping the diversion dam up to above the middle yellow handrail. Fortunately, by overtopping the diversion dam, most of the very muddy water was now running directly into Ketchikan Creek rather than Fawn Lake. Although the raw water turbidity was slowly falling as the Ketchikan hydrogenerators lowered the lake level below that of Ketchikan Lakes and clean water began flowing into Fawn Lake, the Bear Valley and Jefferson Reservoirs continued to be the main community water supply since 3:36 am and were continuing to fall.

ADEC was notified of the incident early Sunday morning with a follow-up progress message later as the turbidity began to fall. KPU also asked the fish processors who are our major water consumers early in the morning to back off as much as they could to conserve water, sent out a flash alert out to the community, etc. Finally, by about 12:00 noon Sunday the turbidity was decreasing down into the 5 NTU range and continuing to fall, the 3-million gallon Bear Valley Reservoir now only had about 20-feet of water storage remaining to supply the community, and KPU slowly started the system up again.

Not all turbidity events are caused by landslides; sustained periods of heavy rainfall can have the same effect. An example of this occurred in 2013 during the afternoon of December 22nd where there was a sudden increase in the raw water turbidity in two steps. Despite periodic intervals of rainfall squalls all morning, the turbidity which had been running 0.5 NTU's until about 1:00 pm, suddenly began to climb into the 3 - 3.3 NTU range by 1:50 pm. An alarm was automatically sent to the Bailey Power House and Water Division personnel were called in to clean the lamp chambers and the lenses of both of the Hach NTU instruments running in parallel, flush the inlet and set the sample flow at about 600 milliliters/ minute and continue monitoring the incoming turbidity. The raw water flow into the system was manually reduced to 1600 gpm while the turbidity remained in the 3 to 3.3 NTU range and was beginning to show a slight downward trend.

Suddenly at about 4:20 pm, the second turbidity spike occurred, reaching as high as 8 NTU's for a moment at about 5:00 pm. Again the lamp chambers and lenses were cleaned and the sample flows recalibrated and a few minutes later were indicating 6 NTU's. The raw water flow into the

system was simultaneously reduced to the minimum of 1000 gpm while the Ketchikan Plant hydrogenerators, which are also supplied from this same series of tunnels from Fawn Lake, were sped up to flush out this second high turbidity spike. The turbidity continued to slowly fall so that by 5:40 pm, the raw water turbidity was less than 5.0 NTU's. By 7:30 pm it was down to 3.8 NTU's and by 8:00 pm, it was down to 3.0 NTU's and falling. Water flow control was returned to automatic control. Raw and treated water samples were collected that evening for laboratory coliform analysis the next day. Limited inspection the following morning of the Granite Basin portion of Ketchikan's watershed this morning did not show any additional landslide debris down at the diversion dam that sends Granite Basin's runoff into Fawn Lake.

Although examination of the Ketchikan Lakes rainfall chart recorded at the Bailey Power House for that date only totaled 2.2 inches and the peak hour rainfall of only 0.3 inches, this is not abnormal for fall storms. There is quite a microclimate in the heavily forested and rocky bowl surrounding the Ketchikan's watershed, particularly around the Granite Basin portion. From stream flow records, Granite Basin is the major source contributing about one-third when compared to Ketchikan Creek's measurements. Together, they likely exceed the City's rainfall records down at tidewater which are some of the highest in the United States. The National Weather Service's website lists the annual record for the highest precipitation in Ketchikan at 202.55 inches, set in 1949, and the average annual total at 153.24 inches.

For future high turbidity events, KPU has implemented standard operating procedures (SOP's) to isolate the drinking water supply from high turbidity events by closing the valve on the pipeline feeding the Bear Valley disinfection and storage facilities whenever there is a high turbidity event. Included in these SOP's is the planned diversion of flow from Granite Basin when heavy storms are predicted with 2 - 3 inches of rain and wind speeds greater than 40 mph, since these storm conditions have been observed to cause sudden increases in coliform colonies, *E. coli* and turbidity, These storm conditions have also been observed to reduce the incoming UV transmittance (UVT) almost to the minimum point or even below 70% UVT where the UV disinfection equipment is not certified to operate.

It is also important to note that the turbidity events which occurred on August 20 and September 8, 2011, happened over 120 months ago. As provided in 40 CFR 141.71 subpart (a)(2)– Criteria for avoiding filtration; these two events are no longer required to be included in the Turbidity Criteria portion of Table 6-6, Monthly Report to Primacy Agency For Compliance Determination – Unfiltered Systems, which is sent monthly to ADEC. Beginning with October 2021's report, those two events were removed from Table 6-6.

The SOP's detail the alarm, monitoring, and shut-down criteria to isolate each basin as well as criteria for shutting off the raw water intake and treatment system when turbidity exceeds 4.0 NTU at the chlorination building. The SOP also calls for increased flow through the power generation facilities to flush the higher turbidity water through Fawn Lake and the tunnel. Since turbidity events are typically of short duration, KPU is able to utilize the water stored in the distribution system while waiting for the turbidity event to pass. Once the turbidity drops below 3.5 NTU or the Bear Valley water storage tank has fallen below 35 feet, KPU operators re-start the treatment system.

Both Fawn Lake and Ketchikan Lake levels are constantly monitored with instrumentation that is installed in secure vaults. These instruments report to the operators at the Bailey Power House 24-

hours per day through KPU's SCADA system. As these lakes are remote sites without direct electrical service, a number of various backup electrical generation sources have been tried in the past including solar panels, wind turbine generators, and propane fueled thermopiles which are necessary to charge the battery systems. All have been unsuccessful for a variety of reasons. Instead, each now has a small 3.8 kW propane fired generator installed that charges the battery bank. The engine's crankcase contains about one quart of oil and there is a drip pan installed beneath each engine with a sorb-oil pad to collect any oil drips or leaks. Drip pans are also installed beneath the battery banks.

Adverse activities expected to occur in the future and how Ketchikan expects to address them.

On December 23, 2014 KPU entered into a Compliance Order by Consent (COBC) with the Alaska Department of Environmental Conservation (ADEC). Within the COBC was the requirement that by December 31, 2015 KPU is to complete watershed studies to evaluate management alternatives including intermittent isolation of Granite Basin and alternate intake locations. This action is to address elevated total coliform bacteria and elevated turbidity levels. This and all other tasks that were identified in the COBC have been completed or were given Approval to Operate by ADEC on May 24, 2017.

Both ADEC and EPA are very concerned about the present coliform ambiguities in our source water supply which, should our new UV and chloramine disinfection process fail for any reason, would expose the entire community to a number of pathogens that have a high degree of probability to cause a significant waterborne disease outbreak. An illustrative example is the failure in 1984 to thoroughly disinfect Carlanna Lake water which caused a severe gastrointestinal illness outbreak affecting over 200 people, primarily in the Carlanna area. 48 of these cases became seriously ill and were confirmed as *Cryptosporidium* and *Giardia*. This is one of the reasons that Carlanna Lake was abandoned as a raw water source in 1987 and is no longer connected to the municipal water supply.

Another EPA regulation affecting unfiltered water systems is the maximum permissible limit of 20 fecal coliform colonies that can be present in an incoming raw water source sample. At least 90% of the samples collected must be at or below this maximum permissible limit on a 6-month rolling average. October 2019's computed 6-month rolling average was that just 89% of these raw water samples met the EPA regulation. This failure to meet the minimum permissible resulted in ADEC's November 20, 2019 letter which notified Ketchikan that it had failed to meet the criteria for avoiding filtration regulations as specified in the Safe Drinking Water Act and that 40 CFR 141.71(a)(1) and 40 CFR 141.73 require that filtration be installed within 18 months.

As discovered in 2020, after a period of comparatively minimal rainfall followed by a sudden storm with heavy rainfall, the raw water sluices high numbers of fecal coliform colonies from the Granite Basin watershed into Fawn Lake. Several samples collected in 2020 from the Granite Basin stream identified as Granite Creek were found to be in the 30 – 40 colony range with one sample was identified as "too numerous to count" (something over 200 colonies).

Consequently, beginning the last week of August 2021, multiple raw water samples were collected throughout the watershed on 3 separate days each week to identify any contaminating sources with

particular emphasis on the raw water samples collected from Granite Creek. As high numbers of raw water fecal colonies from this source began appearing the first week of September, the gates on Granite Basin's concrete diversion dam were closed, the streamflow diverted into Ketchikan Creek and no longer entering Fawn Lake. However, the following week, a tributary stream below the Granite Creek Diversion Dam identified as Grate Creek was also discovered to be contributing high fecal coliform colonies into Fawn Lake. One analysis was over 200 colonies (too numerous to count). It too was bypassed so that it no longer flowed into the downstream portion of Granite Creek entering Fawn Lake.

Both Granite Creek and Grate Creek continued to be diverted into Ketchikan Creek for the remainder of September and all of October. Granite Creek was not restored as a tributary into Fawn Lake until the second week of November, 2021 and Grate Creek continues to be purposely diverted. The volume it provides is quite small and can contain surprisingly high amounts of fecal coliform colonies.

In addition to collecting additional raw water samples, KPU installed multiple parallel strands of orange twine over the grassy flats around Fawn Lake to duplicate what Kodiak had found to be helpful in keeping seagulls out of their reservoir. Numerous long strips of plastic ribbons were tied onto the orange twine to provide additional motion in every breeze and intended to scare any waterfowl. However, once the fall storms began, we found the plastic ribbons were being torn into smaller pieces and had to be removed before any fragments could enter the water distribution system. As a substitute, shimmering salmon trolling flashers were hung on the orange twine but weren't as effective. Scarecrows with flapping yellow rain suits and wind chimes were also installed.

As mentioned earlier, analysis of the next three successive raw water samples collected on September 29th, October 5th and 6th found each had exceeded the maximum permissible fecal coliform amount. Immediate inspection of Fawn Lake's grassy flats confirmed that migratory waterfowl had become accustomed to our earlier disruptive devices and were no longer being deterred from the area. Plentiful goose fecal deposits were found even around the scarecrows with yellow rain suits. Immediately, our employees continued making daily inspections of the surrounding vulnerable areas with careful cleanup where needed. Together, these efforts helped to ensure that no further high raw water samples exceeded the permissible limits for the remainder of October. Although the 6-month running average is now slightly lower, Ketchikan still remains in compliance with EPA requirements with a running 6-month average of 94.9%.

With the concurrence of the Electric Division, Granite Basin was bypassed several times before the arrival of the next November storm. This permitted all three of October and November's raw water samples that are collected each week to remain below the maximum permissible fecal level. As a result, based on November's computed 6-month rolling average, 95.0% of these raw water samples have continued to meet the EPA regulation and Ketchikan has remained in compliance.

2021 has been a comparatively average rainfall year for Ketchikan. A total of 140.95_inches of rain has already fallen through November 30th and the total by the end of the year should reach or exceed Ketchikan's annual average of 153.42 inches. This is unlike the drier weather that occurred in 2018 and 2019. For those years, the amount of rainfall was only 96.62 inches and 125.46 inches by the same date, respectively.

At their meeting of May 20, 2021 the City Council approved the draft Compliance Order by Consent (COBC) prepared by the Alaska Department of Environmental Conservation (ADEC). It contains provisions that KPU must demonstrate in order to qualify for a Limited Alternative to Filtration (LAF). They are:

a. The system has "uninhabited, undeveloped watersheds in consolidated ownership."
b. The system has control over both "access to, and activities in, those watersheds."
c. The system's source water quality and the alternative treatment requirements established by the state must ensure greater removal or inactivation efficiencies of pathogens than would otherwise result from the treatment requirements stipulated by regulations.

Jacobs Engineering's proposal for an amendment to their existing Contract 19-44 for professional services supporting Ketchikan attaining a LAF has been approved by the City Council. This proposal summarizes the necessary documentation that will meet the requirements of four of the tasks that are described in the COBC. They include preparations of a Watershed Control Program, a Source Water Control Study, the Provisions for Public Involvement in the COBC as set out by the EPA, and a report demonstrating how Ketchikan's present disinfection process already exceeds the requirements of national drinking water regulations. The fifth task, Consolidated Ownership Status of the Watershed, is felt to be entirely a legal matter and best handled by the municipal attorney with support as needed provided by Perkins-Coie, a legal firm who are already familiar with the consolidated property ownership that has been questioned earlier by the EPA.

Extensive research including collection of all the necessary documentation continues as individual responses are being prepared for each of the five identified COBC Action Items. The Public Involvement Meeting was held on October 20th at the Ted Ferry Civic Center, broadcast on KPUtv, Channel 675, and live-streamed on the City of Ketchikan's Facebook page. It was also presented to the City Council at their meeting the following evening. As a result, all of the COBC Action Items' studies and reports should be completed and delivered to ADEC well before the specified date of May 31, 2022 which is identified in the COBC document.

This document incorporating all of the five tasks described in the COBC will be sent to ADEC for their review and comment. After incorporating their review comments, it will be ready for ADEC to send to the EPA for their review along with a request for issuance of a formal Limited Alternative to Filtration (LAF).

As the effects of global warming are becoming more apparent throughout the planet, low rainfall conditions may occur again just as they did in 2018 and 2019. Until the rainy season began in September, 2019 was one of the most adverse water storage conditions of record. All of Ketchikan's other available hydrogeneration facilities (Beaver Falls, Upper and Lower Lake Silvis, Whitman Lake and Swan Lake) were all affected by low water reservoir levels. As a consequence, in addition to KPU's 23.8 megawatts of installed standby diesel generation, an additional 6.4 megawatts of diesel electric power generation units were also rented and operated when needed. Two of these rental generators remained in Ketchikan during winter months adding a total capacity of 3.2MW to the KPU system and provided emergency generating capacity for KPU. They

remained in place until the following spring of 2020 when weather conditions improved and they were no longer necessary for emergency generating capacity.

Because domestic water and water for electric power generation originate from the same source, the two uses could conceivably conflict during a water shortage. Since before 1939, the City of Ketchikan has held the senior appropriated water rights for Ketchikan Creek at 136 cfs. The Federal Energy Regulatory Commission (FERC) License No. 420 for the Ketchikan Lakes hydroelectric project recognizes that this project has water rights for 126 cubic feet per second (cfs) for electric power generation and 10.4 cfs specifically reserved for the municipal water supply. Because Ketchikan Creek provides important fish spawning habitat including a former hatchery directly supplied from the tailrace of the hydrogenerators, License No. 420 requires that a stream flow of 47 cfs downstream of the hydrogenerators must be met at all times. If needed, the License also allows this flow to be reduced to 35 cfs for the purpose of protecting the municipal water supply.

Report Certification:

The owners of the watershed include the United States Forest Service, the Bureau of Land Management, and the City of Ketchikan. Public Law H.R. 2413, an Act of Congress, designated the lands to be set-aside as the municipal water-supply reservoir. The Act defines the limits of the watershed and the administration of the lands. The Act also gives the City of Ketchikan authority to regulate persons entering the watershed and gives the City of Ketchikan the authority to prevent trespassing in the watershed.

Ketchikan Public Utilities, a department of the City of Ketchikan which is a political subdivision of the State of Alaska, is the operator of the municipal water system. I hereby certify the contents of this report to be true and correct to the best of my knowledge.

Signature _____ Date 1.19.2022

Ketchikan Water Quality Data Review

		(RAW) Fecal Coliform							(Raw) Water Turbidity							
Date	Were 3 source water samples collected each week while this source was in operation (Y/N)	Number of monthly source water samples tested for Fecal Coliform*	Number of monthly source water samples where Fecal Coliform is <=20 / 100ml	Percentage of monthly source water samples with <=20 Fecal Coliform	Number of source water samples tested for Fecal Coliform **in the last six month period**	Number of source water samples with <= 20 Fecal coliform per 100 ml during the last **six month period**	% of source water samples that had <= 20 Fecal coliform per 100 ml **for last six month period (must be at least 90%)**		Highest raw water turbidity reading during month (NTU)	Number of days per month Turbidity exceeded 1.49 NTU	Was raw water tested for TC/FC when raw water Turbidity > 1.49 NTU	Number of turbidity 'events' per month (greater than 5 NTU - see note below)	Total number of Turbidity 'events' in the last 12 months (cannot be more than 2 in a 12 month period.)	Number of Turbidity 'events' reported in the last 10 years (cannot be more than 5 events in the last 120 months period)	Date	Comments
May-2019	Y	13	13	100%	78	78	100%		0.14	0	N/A	0	0	1	May-2019	
Jun-2019	Y	12	10	83%	78	76	97%		0.44	0	N/A	0	0	1	Jun-2019	Two fecal coliform samples over 20 colonies per 100ml limit (**36** on 6/10/19 & **33** on 6/11/19)
Jul-2019	Y	14	14	100%	77	75	97%		0.46	0	N/A	0	0	1	Jul-2019	
Aug-2019	Y	13	11	85%	78	74	95%		0.76	0	N/A	0	0	1	Aug-2019	Two fecal coliform samples over 20 colonies per 100ml limit (**41** on 8/20/19 & **21** on 8/21/19)
Sep-2019	Y	13	10	77%	79	72	91%		0.34	0	N/A	0	0	1	Sep-2019	Three fecal coliform samples over 20 colonies per 100ml limit (**31** on 9/17/19, **189** on 9/23/19, & **23** on 9/24/19)
Oct-2019	Y	14	12	86%	79	70	89%		0.60	0	N/A	0	0	1	Oct-2019	Two fecal coliform samples over 20 colonies per 100ml limit (**23** on 10/16/19 & 42 on 10/17/19). SDWIS is missing one raw water sample (only has record of 13 of 14 samples 10/30 or 10/31 sample is missing).
Nov-2019	Y	12	12	100%	78	69	88%		0.40	0	N/A	0	0	1	Nov-2019	Sample on 11/12/19 was at threshold of 20 colonies per 100ml. All others were below.
Dec-2019	Y	14	14	100%	80	73	91%		0.34	0	N/A	0	0	1	Dec-2019	Highest fecal count for the month was 14 on 12/30/19. All other results were single digit.
Jan-2020	Y	13	13	100%	79	72	91%		0.58	0	N/A	0	0	1	Jan-2020	
Feb-2020	Y	12	12	100%	78	73	94%		0.27	0	N/A	0	0	1	Feb-2020	
Mar-2020	Y	13	13	100%	78	76	97%		0.70	0	N/A	0	0	1	Mar-2020	
Apr-2020	Y	14	14	100%	78	78	100%		0.79	0	N/A	0	0	1	Apr-2020	
May-2020	Y	12	12	100%	78	78	100%		0.56	0	N/A	0	0	1	May-2020	
Jun-2020	Y	14	14	100%	78	78	100%		0.95	0	N/A	0	0	1	Jun-2020	
Jul-2020	Y	13	13	100%	78	78	100%		0.41	0	N/A	0	0	1	Jul-2020	
Aug-2020	Y	13	11	85%	79	77	97%		1.23	0	N/A	0	0	1	Aug-2020	Two fecal coliform samples over 20 colonies per 100ml limit (87 on 8/05/20 & 46 on 8/17/20)
Sep-2020	Y	14	11	79%	80	75	94%		0.61	0	N/A	0	0	1	Sep-2020	Three fecal coliform samples over 20 colonies per 100ml limit (89 on 9/21/20, 33 on 9/22/20, & 98 on 9/23/20)
Oct-2020	Y	12	12	100%	78	73	94%		0.47	0	N/A	0	0	1	Oct-2020	
Nov-2020	Y	13	13	100%	79	74	94%		0.49	0	N/A	0	0	1	Nov-2020	
Dec-2020	Y	14	14	100%	79	74	94%		0.90	0	N/A	0	0	1	Dec-2020	
Jan-2021	Y	12	12	100%	78	73	94%		0.57	0	N/A	0	0	1	Jan-2021	
Feb-2021	Y	12	12	100%	77	74	96%		0.33	0	N/A	0	0	1	Feb-2021	
Mar-2021	Y	14	14	100%	77	77	100%		0.34	0	N/A	0	0	1	Mar-2021	
Apr-2021	Y	13	13	100%	78	78	100%		1.31	0	N/A	0	0	1	Apr-2021	
May-2021	Y	12	12	100%	77	77	100%		0.86	0	N/A	0	0	1	May-2021	
Jun-2021	Y	15	14	93%	78	77	99%		0.55	0	N/A	0	0	1	Jun-2021	One fecal coliform sample over 20 colonies per 100ml limit, 32 on 6/1/2021
Jul-2021	Y	12	12	100%	78	77	99%		0.33	0	N/A	0	0	1	Jul-2021	
Aug-2021	Y	13	13	100%	79	78	99%		0.85	0	N/A	0	0	1	Aug-2021	
Sep-2021	Y	14	13	93%	79	77	97%		0.41	0	N/A	0	0	1	Sep-2021	One fecal coliform sample over 20 colonies per 100ml limit, 45 on 9/29/21
Oct-2021	Y	12	10	83%	78	74	95%		0.54	0	N/A	0	0	1	Oct-2021	Two fecal coliform samples over 20 colonies per 100 ml limit; 27 on 10/5/21 & 33 on 10/6/21
Nov-2021	Y	13	13	100%	79	75	95%		0.42	0	N/A	0	0	1	Nov-2021	
Dec-2021				#DIV/0!			#DIV/0!								Dec-2021	
Jan-2022				#DIV/0!			#DIV/0!								Jan-2022	
Feb-2022				#DIV/0!			#DIV/0!								Feb-2022	
Mar-2022				#DIV/0!			#DIV/0!								Mar-2022	
Apr-2022				#DIV/0!			#DIV/0!								Apr-2022	
May-2022				#DIV/0!			#DIV/0!								May-2022	
Compliance																

NOTES:

The data reported in this spreadsheet is based on Ketchikan operator reports and the SDWIS database.

A turbidity 'event' is one or more consecutive days during which at least one turbidity measurement each day exceeds 5 NTU.

*Ketchikan switced from TC/E.Coli monitoring to Fecal Coliform monitoring in August 2016. Based on Ketchikan's estimated population of approximately 8600 residents they are taking the required number of source water samples each month.

**High turbidity unusual and unpredictable, related to August & Septmeber 2011 landslide (see report)

5 NTU Exceedance History

Beginning Date	Duration (Days)	Date Reported	Notes
11/8/2005	0.167 (4 hours)	11/9/2005	Turbidity event
6/27/2008	0.104 (2 1/2 hours)	6/28/2008	Turbidity event
8/20/2011	0.167 (4 hours)	8/21/2011	Deemed U&U due to land slide.
9/8/2011	0.056 (1.36 hours)	9/8/2011	Deemed U&U due to land slide.
12/22/2013	0.104 (2 1/2 hours)	12/24/2013	Turbidity event

Alaska Department of Environmental Conservation
Division of Environmental Health
Drinking Water Program

Filtration Avoidance Criteria Inspection
Watershed Control Program Evaluation

(40 CFR 141.71(b)(3)(i): A review of the effectiveness of the watershed control program.)

System Name:	Ketchikan Public Utilities	**PWSID:**	120232
Source Name:	Ketchikan Lakes, Granite Basin, and Fawn Lake	**Source Type:**	Surface
Inspector Name:	KPU	**Inspection Date:**	10/30/2021

Inspection Criteria

1. Was the *Annual Watershed Control Report* submitted to the State by July 1? *(18AAC80.620(2)(A))*

The report must:
- Identify any special concerns about the watershed and how they are being handled;
- Describe activities in the watershed that affect water quality; and
- Project what adverse activities are expected to occur in the future and describes how the public water system expects to address them?

2. Was the Watershed Control Program updated for LT1 to include Cryptosporidium oocysts as a potential contaminant, and to limit and monitor activities that could result in Cryptosporidium contamination? *(141.520)*

3. Describe watershed access control (e.g. signage, gates, fencing, permits) and note any deficiencies:

4. Have there been any changes in watershed hydrology or land ownership?

Inspection Criteria

5. Identify watershed characteristics and activities which may have an adverse effect on source water quality. *(141.521(a))*

6. Describe the monitoring of the occurrence of activities which may have an adverse effect on source water quality. *(141.521(b))*

Alaska Department of Environmental Conservation
Division of Environmental Health
Drinking Water Program

Filtration Avoidance Criteria Inspection Data Records Evaluation

(40 CFR 141.71(b)(3)(vi): A review of data records to ensure that all required tests are being conducted and recorded and disinfection is effectively practiced.)

System Name:	Ketchikan Public Utilities	**PWSID:**	120232
Source Name:	Ketchikan Lakes, Granite Basin, and Fawn Lake	**Source Type:**	Surface
Inspector Name:	KPU	**Inspection Date:**	10-30-2021

Inspection Criteria

1. *Ensure all required tests are being conducted and recorded and disinfection is effectively practiced. This field evaluation is to confirm that the information submitted in Monthly Operator Reports and as routine water quality monitoring is accurate and representative.:*

Alaska Department of Environmental Conservation
Division of Environmental Health
Drinking Water Program

Filtration Avoidance Criteria Inspection Operating Procedures Evaluation

(40 CFR 141.71(b)(3)(v): A review of operating procedures.)

System Name:	Ketchikan Public Utilities	**PWSID:**	120232
Source Name:	Ketchikan Lakes, Granite Basin, and Fawn Lake	**Source Type:**	Surface
Inspector Name:	KPU	**Inspection Date:**	10/30/2021

Inspection Criteria

1. Monitoring procedures:

Raw Water Turbidity:

Raw Water Coliform:

Treated Water Coliform:

Chlorine residual measurements:

Temperature measurements:

pH measurements:

Flow measurements:

CT ratio calculation:

Calibration logs:

Alaska Department of Environmental Conservation
Division of Environmental Health
Drinking Water Program

Filtration Avoidance Criteria Inspection
Source Intake Evaluation

(40 CFR 141.71(b)(3)(ii): A review of the physical condition of the source intake and how well it is protected.)

System Name:	Ketchikan Public Utilities	**PWSID:**	120232
Source Name:	Ketchikan Lakes, Granite Basin, and Fawn Lake	**Source Type:**	Surface
Inspector Name:	KPU	**Inspection Date:**	10/30/2021

Inspection Criteria

1. Describe the intake structures:
- Number:
- Location:
- Depth (fixed or variable):
- Elevation:
- Type (screened or open end):
- Protection:

2. Date of last inspection:

3. Date of last cleaning:

4. Describe intake valving.

5. Observations or comments regarding source intake:

Alaska Department of Environmental Conservation
Division of Environmental Health
Drinking Water Program

Filtration Avoidance Criteria Inspection
Equipment Maintenance Program Evaluation

(40 CFR 141.71(b)(3)(iii): A review of the system's equipment maintenance progress to ensure there is a low probability for failure of the disinfection process.

System Name: Ketchikan Public Utilities **PWSID:** 120232

Source Name: Ketchikan Lakes, Granite Basin, and Fawn Lake **Source Type:** Surface

Inspector Name: KPU **Inspection Date:** 10/30/2021

Inspection Criteria

1. Disinfection process equipment requiring maintenance:

- Hypochlorite systems:
  - Bulk solution / Prepared Solution (granule) / Onsite Generation
  -
- Gas chlorine systems:
- UV systems:
- Chloramination systems:
- Ozone systems:
- Chlorine dioxide systems:

2. Online chlorine analyzers inspection:

Make & Model	Location	Purpose	Calibration Method	Calibration Date	Accuracy Check Method	Accuracy Check Date
Seimens Depolox 3	First CL2 bldg.	cl2 analyzer	DR300 Grab	1 Per Month Min.	DR300 Grab	1 every other day
Seimens Depolox 3	First CL2 bldg	cl2 analyzer	DR300 Grab	1 Per Month Min.	DR300 Grab	1 every other day
Seimens Depolox 3	Ammonia bldg.	cl2 analyzer	DR300 Grab	1 Per Month Min.	DR300 Grab	1 every other day
Seimens Depolox 3	Ammonia bldg.	cl2 analyzer	DR300 Grab	1 Per Month Min.	DR300 Grab	1 every other day
Seimens Depolox3	x2 UV bldg	cl2analyzer	DR300 Grab	1 Per Month Min.	DR300 Grab	1 every other day

Reagent expiration date:

Inspection Criteria

3. Online turbidimeters inspection:

Make & Model	Location	Purpose	Calibration Method	Calibration Date	Accuracy Check Method	Accuracy Check Date
Hach TU5300	First cl2 bldg	measure turbidity	StablCal	1 Per Month Min	StablCal	1 Per Week Min.
Hach TU5300	First cl2 bldg	measure turbidity	StablCal	1 Per Month Min	StablCal	1 Per Week Min.

Calibration standards expiration date:

4. Handheld chlorine analyzers inspection:

Make & Model	Location	Purpose	Calibration Method	Calibration Date	Accuracy Check Method	Accuracy Check Date
Hach Pocket colorimeterII	UV bldg	cl2 analyzer	DPD-Chlorine-LR	1 Per Month Min.	DPD-Chlorine-LR	1 Per Week Min.
Hach Pocket colorimeterII	Ammonia Bldg	cl2 analyzer	DPD-Chlorine-LR	1 Per Month Min.	DPD-Chlorine-LR	1 Per Week Min.

Calibration standard expiration date:

Filtration Avoidance Criteria Inspection
Equipment Maintenance Program Evaluation (continued)

Inspection Criteria

5. Handheld turbidimeters inspection:

Make & Model	Location	Purpose	Calibration Method	Calibration Date	Accuracy Check Method	Accuracy Check Date
Hach 2100Q	First Cl2 Plant	Field testing when needed	StablCal	Every Time Used	StablCal	Every Time Used

Calibration standards expiration date:

6. pH meter inspection:

Make & Model	Location	Purpose	Calibration Method	Calibration Date	Accuracy Check Method	Accuracy Check Date
Seimens Depolox 3	x2 first Cl2 bldg	pH analyzer	pH Buffer Solution	1 Per Month Min.	pH Buffer Solution	1 Per Week Min.
Seimens Depolox 3	x2 UV bldg	pH analyzer	pH Buffer Solution	1 Per Month Min.	pH Buffer Solution	1 Per Week Min.
Seimens Depolox 3	x2 ammonia bldg	pH analyzer	pH Buffer Solution	1 Per Month Min.	pH Buffer Solution	1 Per Week Min.

7. Thermometer inspection:

Make & Model	Location	Purpose	Calibration Method	Calibration Date	Accuracy Check Method	Accuracy Check Date
Smart Sensor Inc 1080SE	UV Building	CT Calculation	N/A	N/A	Comparison with other Temp Probes	1 Per Month Min.
Smart Inc 1080SE	Ammonia Building	CT Calculation	N/A	N/A	Comparison with other Temp Probes	1 Per Month Min.

Filtration Avoidance Criteria Inspection
Equipment Maintenance Program Evaluation (continued)

Inspection Criteria

8. Flow meter inspection:

Make & Model	Location	Purpose	Calibration Method	Calibration Date	Accuracy Check Method	Accuracy Check Date
Sensus	First Cl2 bldg	flow measurement	Factory & Manufacturer field tech.*	At initial startup	Comparison Between Meters	1 Month Min.
McCrometer	UV bldg	flow measurement	Factory & Manufacturer field tech.*	At initial startup	Comparison Between Meters	Daily
McCrometer	UV bldg	flow measurement	Factory & Manufacturer field tech.*	At initial startup	Comparison Between Meters	Daily

Alaska Department of Environmental Conservation
Division of Environmental Health
Drinking Water Program

Filtration Avoidance Criteria Inspection
Disinfection Equipment Evaluation

(40 CFR 141.71(b)(3)(iv): An inspection of the disinfection equipment for physical deterioration.)

System Name:	Ketchikan Public Utilities	**PWSID:**	120232
Source Name:	Ketchikan Lakes, Granite Basin, and Fawn Lake	**Source Type:**	Surface
Inspector Name:	KPU	**Inspection Date:**	10/30/2021

Inspection Criteria

1. Disinfection process equipment with physical deterioration:

Alaska Department of Environmental Conservation
Division of Environmental Health
Drinking Water Program

Filtration Avoidance Criteria Inspection Improvements Needed

(40 CFR 141.71(b)(3)(vii): Identification of any improvements which are needed in the equipment, system maintenance and operation, or data collection.)

System Name:	Ketchikan Public Utilities	**PWSID:**	120232
Source Name:	Ketchikan Lakes, Granite Basin, and Fawn Lake	**Source Type:**	Surface
Inspector Name:	KPU	**Inspection Date:**	10/30/2021

Inspection Criteria

1. Equipment improvements needed:

2. System maintenance and operation improvements needed:

3. Data collection improvements needed:

KETCHIKAN PUBLIC UTILITIES
WATER QUALITY DATA SUMMARY
FOR FILTRATION AVOIDANCE REVIEW
October 2020 – November 2021

The following is a summary of Ketchikan's compliance with the filtration avoidance (FA) criteria that pertain to source water and treated water quality. The data that was reviewed for source water turbidity, entry point chlorine and disinfection (CT) were obtained from Ketchikan's daily operator reports, which are submitted to DEC at the end of each month. Total coliform bacteria data were reviewed using the data submitted to DEC's electronic data reporting system (EDRS) by the certified lab, as well as the hard copy lab data provided with the operator reports.

1. **Source water fecal coliform concentration** [40 CFR 141.71 (a)(1)]: In at least 90 percent of the measurements taken in any six-month period, fecal bacteria density counts in the source water must be equal to or less than 20 per 100 ml sample

   Ketchikan meets this requirement.
   During this review period, Ketchikan met the 90% criterion for fecal counts during all months for this review period.

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2. **Source water sampling requirements based on population requirement.** [40 CFR 141.74(b)(1)]: Based on a population of approximately 8980, Ketchikan must test the source water for fecal or total coliform at least 3 times each week. The source water must also be tested for fecal or total coliform when the source water exceeds 1.49 NTU.

   Ketchikan meets both requirements.
   Ketchikan has complied by having the source water tested for total coliform at least 3 times per week. Raw water samples for the month of December 2020 and for November 2, 2021 were not received in SDWIS but are accounted for in the associated monthly operator reports which include official lab reports documenting these samples.

   Ketchikan is also required to test the source water for total coliform and/or fecal bacteria when the source water turbidity is above 1.49 NTU. **During this review period, Ketchikan did not exceed 1.49 NTU**.

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3. **Source water turbidity** [40 CFR 141.71(a)(2)]: The source cannot have more than 2 turbidity 'events' in a 12-month period, or more than 5 'events' during a 120-month period. An 'event' is anytime turbidity exceeds 5 NTU.

   Ketchikan meets this requirement.
   No turbidity events have occurred during this review period.
   A total of 1 official turbidity event(s) have occurred in the last 120 months. The most recent turbidity event occurred on December 22, 2013. The 2011 events were classified as "Unusual and Unpredictable" by the department in a letter dated April 22, 2013.

See table below:

Turbidity Criteria: 120 months prior to the reporting month of **September 2020**

Dates of 5 NTU Exceedances Since Latest Month Recorded Above				
Beginning Date	Duration days	Date Reported	DEC Classification	Reason
8/20/2011	0.1 hrs	8/21/2011	U & U Non-event	Landslides
/8/2011	0.05 1.3 hrs	/8/2011	U & U Non-event	Landslides
12/22/2013	0.10 2.5 hrs	12/2 /2013	Turbidity Event	Heavy rain

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4. **Disinfection, CT requirements** [40 CFR141.71 (b)(1)(i)/§141.72(a)(1)]: In at least 11 of 12 months, the system must meet CT requirements. Water must have disinfection sufficient to ensure at least 99.9 percent (3-log) inactivation of Giardia lamblia cysts and 99.99 (4 log) inactivation of viruses each day the system serves water to the public. CT must be calculated and recorded each day. System cannot fail to meet CT more than one day per month.

   Ketchikan meets this requirement.
   Ketchikan includes their CT calculations in their monthly operator reports. During the last 12 months, the operator reports indicate that the CT ratio was met every day.

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5. **Entry point disinfectant residual** [40 CFR 141.71 (b)(1)(iii)/ §141.72(a)(3)]: The entry point disinfection residual cannot be less than 0.2 mg/l for more than four hours.

   Ketchikan meets this requirement.
   Based on monthly operator reports, entry point residual has not been below 0.2 mg/l for more than four hours during anytime throughout the last 12 months.

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6. **Disinfectant residual in distribution system** [40 CFR 141.71 (b)(1)(iv)/§141.72(a)(4)]: The disinfection residual cannot be undetectable in more than 5 percent of samples taken each month, (during any two consecutive months that the system serves water to the public). Samples taken from the distribution system with a heterotrophic plate count (HPC) less than or equal to 500/ml is deemed to have a detectable disinfectant residual for purposes of determining compliance.

   Ketchikan meets this requirement.
   During the review period, Ketchikan had zero months in which the residual was undetectable in more than 5 percent of the routine sampling (routine sampling is considered to be when the disinfection residual is measured at the same time and place as the routine coliform sample is collected).

   It is noted that Ketchikan completes additional distribution chlorine testing on a regular basis as a best management practice. When the distribution chlorine levels are non-detectable, they test for HPC. Ketchikan did not have an undetectable level of chlorine in more than 5% of the routine samples in any two consecutive months.

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7. **<u>The system must be below the maximum contaminant level (MCL) for coliform bacteria in the distribution system eleven months of the year</u>** [40 CFR 141.71 (b)(5)]: For a small water system such as Ketchikan, a total coliform MCL violation occurs if more than one distribution sample per month tests positive for coliform bacteria.

   <u>Ketchikan meets this requirement</u>
   No Total Coliform MCL violations occurred during this review period. Ketchikan did not have any routine samples test positive for total coliform during this review period.

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8. **Distribution coliform sampling with elevated turbidity** [40 CFR 141.21 (a)(5)]: A public water system that uses surface water or ground water under the direct influence of surface water, and does not practice filtration, must collect at least one sample near the first service connection each day the turbidity level of the source water exceeds 1 NTU.

   <u>Ketchikan meets this requirement</u>
   During this review period, Ketchikan's turbidity levels did not exceed 1.49 NTU.

<u>Internal Notes</u>

Additional filtration avoidance criteria that directly or indirectly pertain to water quality monitoring:

<u>Disinfection byproducts</u> [40 CFR 141.71 (b)(6)]: A system must comply with 40 CFR Subpart L, which pertains to the monitoring and control of disinfection by-products (total trihalomethanes and haloacetic acids) in the distribution system, which occurs as a result of organic matter reacting with chlorine.

Ketchikan is currently ***passing the LRAA for TTHM*** *at both SM5 and SM8 sample sites in 4th qtr 2021 (0.029 mg/L and 0.026 mg/L respectively).*

Ketchikan is currently ***passing the LRAA for HAA5*** *at both SM5 and SM8 sample sites in 4th qtr 2021 (0.041 mg/L and 0.036 mg/L respectively).*

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Long-Term 1 Enhanced Surface Water Treatment Rule: Minimize the potential for contamination by *Cryptosporidium* oocysts in the source water [40 CRF 141.171(a)]: This Rule enhances the requirements of the watershed control program to include *Cryptosporidium* oocysts as a potential contaminant, and to require the watershed control program to limit and monitor activities that could result in *Cryptosporidium* contamination.

See Ketchikan's Watershed Control Program Report for details. The 2020 report was received on January 4, 2021.

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Long-Term 2 Enhanced Surface Water Treatment Rule [40 CFR 141 and 142]: Systems avoiding filtration are required to monitor for *Cryptosporidium* following a prescribed protocol or declare to EPA and the State that they intend to install maximum treatment.

Final Approval to Operate (FATO) was granted December 29, 2016 for the Ultraviolet (UV), ammonia, and phosphoric acid treatment systems.

Final Approval to Operate (FATO) was granted March 21, 2017 for the two-point chlorination facility.

Alaska DEC Drinking Water Protection Areas

12/7/2021

1:144,448

0 0.5 1 2 mi

0 1 2 4 km

be Alaska Department of Environmental Conservation – Division of

Appendix D. Consolidated Ownership Report

PERKINSCOIE

January 25, 2022

TO: Alaska Department of Environmental Conservation

FROM: Perkins Coie LLP on behalf of Ketchikan Public Utilities/City of Ketchikan

RE: **Consolidated Ownership Report**

I. Introduction

The following report has been developed on behalf of the City of Ketchikan and Ketchikan Public Utilities (collectively, "KPU") pursuant to the May 21, 2021 Compliance Order by Consent ("COBC") entered into by KPU and the Alaska Department of Environmental Conservation ("ADEC"). Specifically, the report and its accompanying attachments outline the ownership and management status of the Ketchikan Lakes area, the Granite Basin area, and the Fawn Lake drainage area (collectively, the "Ketchikan Watershed") as required by Paragraph 4.B. of the COBC. As explained below, KPU believes this status supports a determination by both ADEC and the U.S. Environmental Protection Agency ("EPA") that KPU's community public water system meets the criteria for a limited alternative to filtration under the Federal Safe Drinking Water Act[1] ("SDWA") by demonstrating that the system is under "consolidated ownership."

II. Limited Alternative to Filtration and "Consolidated Ownership"

The SDWA provides that, as an alternative to filtration requirements or filtration avoidance criteria, a State may establish treatment requirements for certain public water systems.[2] In order for a public water system to qualify for this "limited alternative to filtration" ("LAF"), the system must meet certain statutory criteria, including

> having uninhabited, undeveloped watersheds in *consolidated ownership*, and having control over access to, and activities in, those watersheds . . .[3]

The phrase "consolidated ownership" is not defined by the SDWA or its implementing regulations. This statutory criteria was addressed by the EPA's Region 10 in a Memorandum of Agreement ("MOA") with the Washington State Department of Health ("WDOH").[4] The MOA

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[1] Safe Drinking Water Act of 1974, Pub. L. No. 93-523, 88 Stat. 1660.
[2] 42 U.S.C. § 300g-1(b)(6)(C)(v).
[3] *Id.* (emphasis added).
[4] Memorandum of Agreement, Environmental Protection Agency and Washington State Department of Health, Limited Alternative to Filtration for the Seattle Cedar River Supply (executed October 15, 2002), at 9.

established the process and information EPA would require "to concur with the WDOH's determination to provide the Seattle Cedar River Supply (Cedar Supply) with a Limited Alternative to Filtration (LAF)."[5] KPU recognizes that EPA's conclusions in the MOA apply only to the City of Seattle's community public water system; however, EPA acknowledged that "much of the information needed to evaluate whether a system should be provided a LAF is included in [the] MOA."[6] KPU therefore relies on the information in the MOA it finds relevant to the "consolidated ownership" statutory criteria in assessing its system's eligibility for a LAF.

In the MOA, EPA relies on legislative history to interpret the "consolidated ownership" requirement—a House Committee Report at the time the SDWA was amended to include LAF criteria.[7] The report provides

> The bill requires as a condition of using alternative treatment measures that the watershed of the affected utility be in "consolidated ownership." *By this the Committee does not mean to imply that there must be only one owner of the total watershed*.[8]

Later, where EPA addresses the statutory criteria concerning control over access to the watershed, the same report provides

> Further, *consistent with the current filtration waiver criteria*, the utility must be able to demonstrate that there are effective controls on human activities that may have an adverse effect on the microbiological quality of the source water and that the controls apply to all land in the watershed, *no matter what its ownership status*. Such controls may be exercised through *statute*, *regulation*, or written agreements with land owners.[9]

Taken together, KPU believes the legislative history of the LAF criteria makes clear that a showing of "consolidated ownership" does not require a community public water system to be the sole owner of the land in the watershed, nor does it even require the system to demonstrate it owns a significant portion of land in the area. Instead, a system must demonstrate that, whatever the ownership status of the watershed, the ownership is cohesive—unified in its ability to control human activities that may have an adverse effect on the quality of the source water, consistent with the controls required for filtration avoidance under the SDWA.

Here, the ownership of the Ketchikan Watershed is consolidated among the City of Ketchikan, the U.S. Bureau of Land Management (BLM), and the U.S. Forest Service (USFS). Pursuant to a congressional act that reserved the relevant area as a municipal water supply, all three entities manage their respective lands in the Ketchikan Watershed to ensure source water quality

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[5] *Id.* at 3.
[6] *Id*. at 6.
[7] *Id.* at 9.
[8] MOA at 9 (emphasis added).
[9] MOA at 10 (emphasis added).

protection for the benefit of the City of Ketchikan. The ownership status and resulting management has remained virtually unchanged for the past three decades, during which KPU has met the watershed control criteria for filtration avoidance under 40 CFR 141.71.[10] The ownership and management of the watershed is further discussed below, and KPU believes this sufficiently demonstrates that the Ketchikan Watershed is under "consolidated ownership" as required by the SDWA.

III. Ownership and Management of the Ketchikan Watershed

The Ketchikan Watershed is comprised by two tracts of land. The first tract contains two major water basins located northeast of the city in the Tongass National Forest.[11] The water basins are Ketchikan Lakes, which includes both Upper and Lower Ketchikan Lakes, and Granite Basin, which consists of a smaller lake and mountain stream. Runoff from both basins is routed south into the second tract of land, the Fawn Lake drainage area, and water from Fawn Lake travels through a piping and tunnel system to KPU's water treatment plant. The first tract of land consists of approximately 7,152 acres and is owned almost entirely by the USFS[12]; the City of Ketchikan owns approximately 10 acres of land in this area, directly south of Lower Ketchikan Lake where the KPU dam is located.[13] The second tract of land is approximately 198 acres and is owned entirely by BLM.[14] The boundaries of these two tracts were established by the Ketchikan Townsite Exclusion Act of July 27, 1939.[15] A map outlining these two tracts of land that compose the Ketchikan Watershed, as well as the respective areas of ownership among USFS, the City of Ketchikan, and BLM, is included as Attachment E to this report.

Under the Ketchikan Townsite Exclusion Act, the abovementioned tracts of land are

> reserved from all forms of location, entry, or appropriation, whether under the mineral or nonmineral land laws of the United States, and set aside as municipal water-supply reserves for the use and benefit of the people of the city of Ketchikan . . .[16]

The Act also established BLM and USFS's administration of the Ketchikan Watershed for the purpose of

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[10] *See* 40 CFR 141.72(b)(2).
[11] *See* Proclamation No. 846 (35 Stat. 2226) (Feb. 16, 1909) (enlarging the boundaries of the Tongass National Forest to include areas referenced in this report), included as Attachment A to this report.
[12] *See id*.
[13] *See* Ketchikan Gateway Borough, Assessment Department, Parcel No. 307591000000 (assessment information of relevant KPU parcel), included as Attachment B to this report.
[14] *See* Ketchikan Gateway Borough, Assessment Department, Parcel Nos. 309800008000, 019800011000, 309800012000, 309800013000, 302120001000, 702120001000 (assessment information of relevant BLM parcels) included as Attachment C to this report.
[15] Act of July 27, 1939 (53 Stat. 1131), Sec. 1, included as Attachment D to this report.
[16] *Id*.

> storing, conserving, and protecting from pollution the said water supply . . . and to that end said municipality shall have the right, subject to the approval of [BLM and USFS], to the use of any and all parts of the lands reserved for the storage and conveying of water and construction and maintenance thereon of all improvements for such purposes . . .[17]

The effect of the Act is twofold: the lands within the Ketchikan Watershed are withdrawn and reserved as the City of Ketchikan's municipal water supply, and the City has the right to use the lands to develop and maintain a community public water system. The City's right to use the land exists until it is demonstrated that the City has abandoned this use for a period of two years.[18] USFS and BLM have confirmed with KPU, in 1992 and in May 2021, the reservations in the Act remain in place and the tracts of land are set aside as the City's municipal water supply.[19] These confirmations also highlight the agencies' continued management obligations of the Ketchikan Watershed. These obligations and the City's management of the area are discussed below.

a. USFS Management

The May 2021 USFS letter provides that "[l]and use [in USFS lands within the Ketchikan Watershed] is limited to the protection and maintenance of natural conditions and preservation of water quality and water supply to meet the provisions of the Safe Drinking Water Act and Alaska Drinking Water Regulations and Water Quality Standards."[20] This protection and maintenance of the City of Ketchikan's source water stems from USFS regulations[21] and the management directives of the Tongass Land and Resource Management Plan ("Forest Plan").[22]

Under the Forest Plan, USFS was required to allocate the area as a "Municipal Watershed" Land Use Designation (LUD) given the Ketchikan Townsite Exclusion Act of July 27, 1939.[23] The Forest Plan outlines the management for this area via "management prescriptions," which give

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[17] *Id*. at Sec. 2.
[18] *Id.*
[19] *See* Nov. 12, 1992 letter from David Rittenhouse, USFS, to Richard Trimble, KPU; Dec. 9, 1992 letter from Edward Sprang, BLM, to Richard Trimble, KPU; May 24, 2021 letter from Earl Stewart, USFS, to Karl Amylon, KPU; May 21, 2021 letter from Chad Padgett, BLM, to Karl Amylon, KPU. These letters are included as Attachments F, G, H, and I to this report, respectively. Also included as Attachment J is a September 8, 2021 letter from USFS confirming its May 2021 assessment.
[20] Attachment H.
[21] *See* 36 C.F.R. § 251.9(a) (requiring USFS to "manage National Forest watersheds that supply municipal water under multiple use prescriptions in forest plans . . .").
[22] *See* United States Department of Agriculture, Tongass National Forest, Land and Resource Management Plan (Dec. 2016) (hereinafter, "Forest Plan"), at 3-51 (providing that the overarching management goal of the relevant area is to maintain the municipal water supply reserves in a manner consistent with the federal Safe Drinking Water Act, as well as State of Alaska drinking water regulations and water quality standards). A relevant section of the Forest Plan (3-51 – 3-57) has been included with this report as Attachment K, and the full plan is available at https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd527907.pdf.
[23] *See id.* at 1-2 (providing that "[s]ome LUD allocations are for congressionally designated areas . . . and these areas must be managed in accordance with LUD direction that was developed from the congressional legislation that designated the area . . ."); *see* Attachment G (explaining LUD for relevant area).

general direction on what may occur within the area, the standards for accomplishing each activity, and guidelines on how to accomplish those standards.[24] The management prescriptions for a Municipal Watershed LUD include standards and guidelines that are specific to the LUD as well as those that apply forest-wide.[25] The overarching objectives of the management prescriptions are to: manage the area as a municipal water supply reserve consistent with federal and state law, limit most management activities to the protection and maintenance of natural resources, to maintain the natural condition of the relevant area, and to prohibit uses or activities that could adversely affect water quality and supply.[26] A list of applicable management prescriptions is set out in the Forest Plan at pages 3-53 – 3-57, included as Attachment K, and includes:

- Restrictions on construction and development unless compatible with municipal water supply objectives,[27] and prohibition of timber production;[28]
- Directives to maintain and improve forest health and watershed resources,[29] and;
- Management measures and limitations on activities and uses to ensure consistency with legislation establishing watershed and maintenance of source water quality.[30]

The May 2021 USFS letter also provides that certain acreage of the Ketchikan Watershed was acquired by the agency in 2019 as part of a land exchange with the Alaska Mental Health Trust Authority.[31] As KPU understands, this area—approximately 52 acres of a 707-acre parcel identified as "K-2"[32] under the enacting legislation—was originally owned by BLM and granted via land patent to the State of Alaska in 1990 under the Alaska Mental Health Enabling Act of July 28, 1956.[33] The conveyances of this area did not affect its reserved status under the Ketchikan Townsite Exclusion Act of July 27, 1939,[34] and USFS must abide by the same congressional directives in this area. The management direction established in the Forest Plan, explained above, remains applicable because the land exchange's enacting legislation requires

[24] *See* Forest Plan at 1-2.
[25] Forest Plan at 1-4.
[26] Forest Plan at 3-51.
[27] *See* Forest Plan at 3-53 (discussing facility improvements and fish habitat planning); 3-56 (discussing trails and transportation operations).
[28] *See* Forest Plan at 3-56 (discussing timber resource planning).
[29] *See* Forest Plan at 3-53 (discussing forest health management); 3-55 – 3-56 (discussing watershed resource planning and improvement).
[30] *See* Forest Plan at 3-54 (discussing cave management program and non-recreation use administration); 3-55 (discussing recreation use administration); 3-56 (discussing wildlife habitat planning).
[31] Attachment H; Consolidated Appropriations Act, 2017, Public Law 115-31, Appendix B—S.131.
[32] *Id.* at Sec. 3(4)(B).
[33] Patent No. 50-90-0157 (Feb. 13, 1990), included as Attachment L to this report; *compare* Act of July 27, 1939 (53 Stat. 1131), Sec. 1 (establishing areas reserved as municipal water supply), Attachment B, *to* U.S. Survey No. 3835 (Aug. 12, 1986), at 1, 4 (depicting BLM-owned "Lot 6," which overlaps the area reserved as municipal water supply, that was granted via land patent), included as Attachment M to this report.
[34] *See* Alaska Mental Health Enabling Act at Sec. 202(a) (providing that "nothing herein contained shall affect any existing rights"); Consolidated Appropriations Act at Sec.4(c) (same); *see also* 43 U.S.C. § 1714(j) (providing that BLM cannot "make, modify, or revoke any withdrawal created by Act of Congress").

the USFS to administer the parcel in accordance with National Forest System regulations.[35] Further, the enacting legislation itself provides that the parcel is to be managed to preserve the natural condition of the lands as well as the watershed.[36]

b. BLM Management

The May 2021 BLM letter provides that Ketchikan Townsite Exclusion Act of July 27, 1939 "sets the [BLM lands within the relevant area] aside for a watershed and [BLM] cannot permit other uses of the land which would interfere with that primary use."[37] BLM is required under statute, "where a tract of such public land has been dedicated to specific uses according to any other provisions of law," to manage that land "in accordance with such law."[38] BLM cannot revoke or modify the reservation of its lands as a municipal water supply reserve,[39] and BLM can only authorize uses in accordance with the lands' reserved status.[40] This management direction is further outlined in BLM's Ring of Fire Management Plan ("RMP"), the land use applicable to the area.[41]

The RMP sets out goals and management actions for the Ketchikan Watershed, which includes protection of water resources and ensuring activities on BLM lands within the planning area comply with applicable water quality standards.[42] Further, even if BLM permits activities in Ketchikan Watershed because they do not interfere with the area's primary use, the RMP nonetheless requires operating procedures that would apply to any permits that are issued; these required operating procedures include requirements and procedures relevant to the protection of water resources.[43]

c. City of Ketchikan Management

Finally, the City of Ketchikan has local laws in place to effectuate its right to use the Ketchikan Watershed as a municipal water supply reserve. Persons are prohibited by city code from recreating or otherwise trespassing

> within or upon the watersheds draining, either naturally or artificially, into Ketchikan Lake, Fawn Lake, or Carlanna Lake, all located near Ketchikan,

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[35] Consolidated Appropriations Act at Sec. 5(b)(1)(B).
[36] *Id.* at Sec. 5(b)(3).
[37] Attachment I.
[38] *See* 43 U.S.C. § 1732(a) (requiring such management as an exception to the general mandate that BLM manage public lands under "principles of multiple use and sustained yield").
[39] 43 U.S.C. § 1714(j).
[40] *See* 43 C.F.R. § 2920.1-1 (providing that BLM may only authorize uses "not specifically forbidden by law").
[41] Bureau of Land Management, Ring of Fire - Record of Decision and Approved Management Plan (March 2008) (hereinafter "RMP"); *available at* https://eplanning.blm.gov/public_projects/lup/66969/84102/100707/Ring_of_Fire_Record_of_Decision.pdf. *See also* 43 U.S.C. § 1712(a) (requiring development of land use plans that provide for use of public lands, even for lands that are withdrawn).
[42] RMP at Approved RMP - 18.
[43] *See id.* at Appendix A, A-5 – A-7 (outlining required operating procedures for riparian areas and water resources).

> Alaska, and constituting the several reservoirs which supply the city with drinking water.[44]

The City can also exercise enforcement authority and impose penalties for violations of this ordinance.[45]

IV. Conclusion

The ownership of the undeveloped, uninhabited Ketchikan Watershed is consolidated among the USFS, BLM, and the City of Ketchikan as a result of the Ketchikan Townsite Exclusion Act of July 27, 1939, which reserves the area for the City as its municipal water supply reserve and directed the federal agencies to act as stewards of the area for the benefit of the City. Given this ownership, which demonstrates that there are effective controls applicable to all lands in the area that maintain and protect the quality of the source water for KPU's community public water system, KPU believes that the LAF criteria of "consolidated ownership" is met for purposes of the SDWA.

[44] KMC § 11.20.010.
[45] KMC § 11.20.020.

ATTACHMENT A

Reference No. 111

PROCLAMATION No. 846
35 STAT. 2226
Date Signed: 2/16/09

February 16, 1909.

BY THE PRESIDENT OF THE UNITED STATES OF AMERICA

A PROCLAMATION

Tongass National Forest, Alaska. Preamble. *Ante*, pp. 2148, 2152.

WHEREAS, an Executive Order dated July second, nineteen hundred and eight, consolidated the Alexander Archipelago and Tongass National Forests under the name of the Tongass National Forest;

And whereas, it appears that the public good would be promoted by adding to the Tongass National Forest certain lands within the Territory of Alaska, which are in part covered with timber;

Boundaries enlarged. Vol. 30, p. 36.

Now, therefore, I, Theodore Roosevelt, President of the United States of America, by virtue of the power in me vested by the Act of Congress, approved June fourth, eighteen hundred and ninety-seven, entitled, "An Act Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-eight, and for other purposes," do proclaim that

the Tongass National Forest is hereby enlarged and that its boundaries are as shown on the two parts of the diagram forming a part hereof, and further described as follows:

Description.

All of the public land lying within boundaries described as follows: Beginning at the point where the International Boundary Line between the Territory of Alaska and the Dominion of Canada intersects the left bank of the Skagway River; thence southwesterly down the left bank of the said river to a point five miles above the center of the town of Skagway; thence in a southeasterly and southwesterly direction, at a distance of five miles from the center of said town, to the east shore of Chilkoot Inlet; thence southerly along said shore to Lynn Canal; thence southeasterly through Lynn Canal and Favorite Channel to a point on the shore of Young Bay due east of the head of Hawk Inlet; thence westerly to the head of Hawk Inlet; thence in a general southwesterly, northwesterly and southwesterly direction through Hawk Inlet, Icy Strait, passing between Pleasant Island and Lemesurier Island, through Inian Passage, and Cross Sound to a point due west of Cape Bingham; thence southeasterly to a point sixty miles west of Cape Muzon; thence easterly to Cape Muzon; thence in a general easterly, northerly, northeasterly, and northwesterly direction along the said International Boundary Line to the summit of Elbow Mount, at an elevation of 4,235 feet; thence northwesterly to the summit of the most westerly of Twin Peaks, at an elevation of 7,180 feet; thence northwesterly to the summit of a Peak, having an elevation of 5,821 feet, on the said International Boundary Line; thence in a general northwesterly direction along the said International Boundary Line to the summit of a peak known as Devils Paw, having an elevation of 8,000 feet; thence in a southwesterly direction to the summit of a peak, having an elevation of 5,977 feet, in Mendenhall Glacier; thence northwesterly to the summit of a peak, having an elevation of 6,550 feet, on the said International Boundary Line; thence in a general northwesterly direction along the said International Boundary Line to the point where it intersects the left bank of the Skagway River, the place of beginning; and embracing all islands within said described boundaries;

Also all of the public land lying within boundaries described as follows: Beginning at the point where the sixtieth parallel of latitude intersects the International Boundary Line between the Territory of Alaska and the Dominion of Canada; thence due west along the said parallel to the middle of the channel of Yakutat Bay; thence in a southwesterly direction along the middle of the channel of said bay to a point due west of Ocean Cape; thence in a southeasterly direction to a point on the fifty-ninth parallel of latitude opposite the mouth of the Alsek River; thence easterly along said parallel to its intersection with the shore of Dry Bay; thence in a northwesterly direction along the shore of said bay to the left bank of the most easterly outlet of Alsek River; thence in a general northerly direction along the left bank of said river to a point midway between the mouth of the river and the intersection of the river with the said International Boundary Line; thence in a northwesterly direction to the foot of Yakutat Glacier; thence in a northerly direction to the summit of Mount Ruhamah on the said International Boundary Line; thence in a northwesterly direction along the said International Boundary Line to its intersection with the sixtieth parallel of latitude, the place of beginning; and embracing all islands within said described boundaries;

Lands excepted.

Excepting from the force and effect of this proclamation the several areas contained within boundaries formed by circles described with a radius of five miles, each, from the centers of the following named towns and settlements, to wit: Juneau, Douglas, Treadwell and

Sitka; also the several areas contained within boundaries formed by circles described with a radius of one mile, each, from the centers of the following named towns and settlements, to wit: Snettishan, Sumdum, Windham, and Loring; also the areas contained within boundaries formed by circles described with a radius of two miles, each, from the centers of the towns of Petersburg and Wrangell; also Annette and Pennock Islands; also all the northern portion of Gravina Island which lies above a line running from the head of Vallenar Bay southeasterly to the head of Blank Inlet; also all that portion of Revillagigedo Island lying southwest of a line beginning at a point at the head of Wards Cove; and running thence in a southeasterly direction, at a distance of two miles from the shores of Tongass Narrows to a point on Carroll Inlet; and also all that portion of Kasaan Peninsula, forming a part of Prince of Wales Island, which lies southeast of a line beginning at a point on Kasaan Bay due west of the United States Location Monument Number 5, and running thence, north 44° 42′ east, 6,996 feet (approximately) to the most southwesterly point on the bay known as Lyman Anchorage:

Proviso.

Valid rights not affected.

Provided, that this proclamation shall not be so construed as to deprive any person of any valid right possessed under the Treaty for the cession of the Russian possessions in North America to the United States, concluded at Washington on the thirtieth day of March, eighteen hundred and sixty-seven, or acquired under any act of Congress relating to the Territory of Alaska.

Vol. 15, p. 539.

Prior rights not affected.

The withdrawal made by this proclamation shall, as to all lands which are at this date legally appropriated under the public land laws or reserved for any public purpose, be subject to, and shall not interfere with or defeat legal rights under such appropriation, nor prevent the use for such public purpose of lands so reserved, so long as such appropriation is legally maintained, or such reservation remains in force.

Agricultural lands.

Vol. 34, p. 233.

This proclamation shall not prevent the settlement and entry of any lands heretofore opened to settlement and entry under the Act of Congress approved June eleventh, nineteen hundred and six, entitled, "An Act to provide for the entry of Agricultural lands within forest reserves."

IN WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the United States to be affixed.

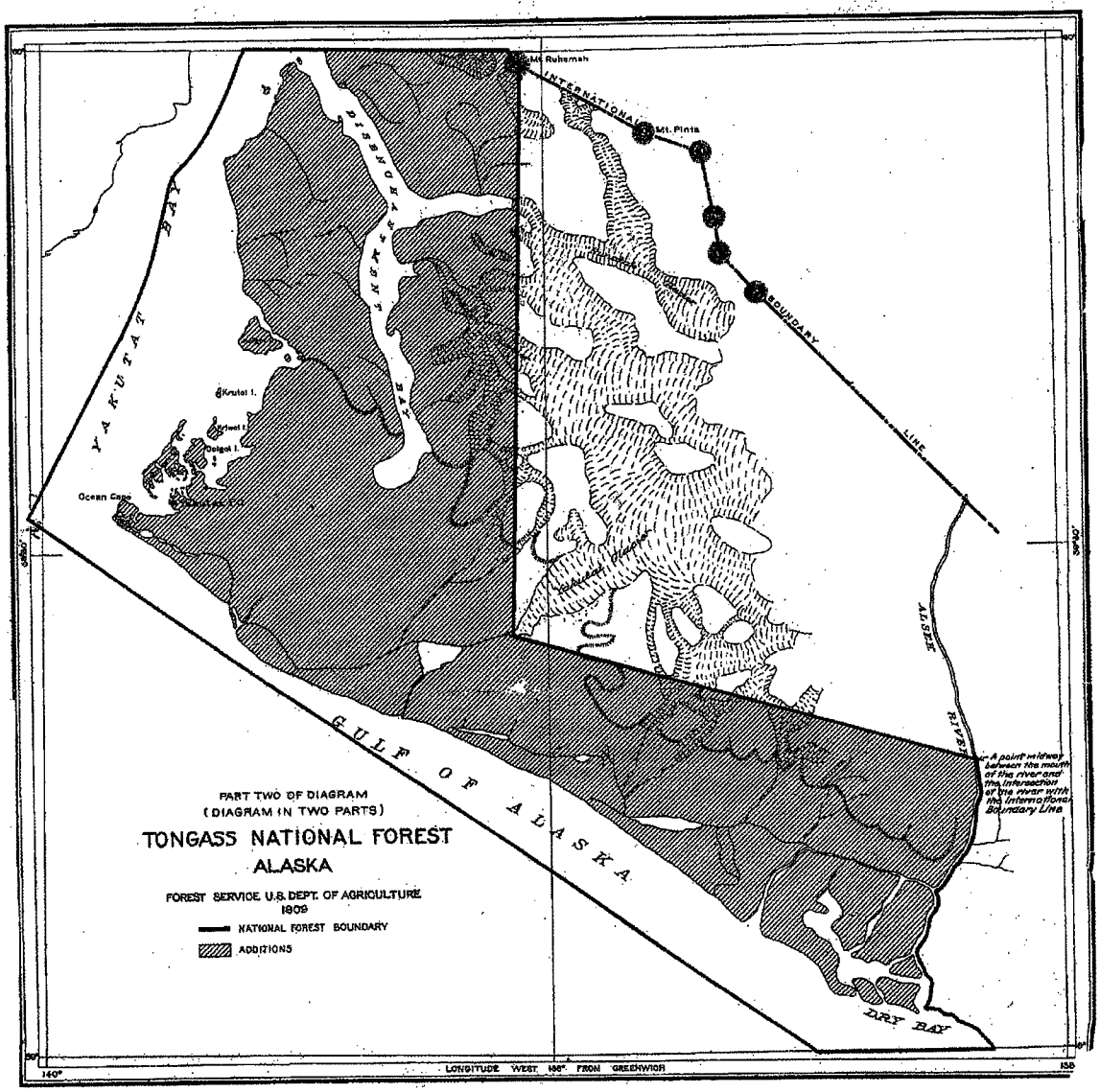
Done at the City of Washington this 16th day of February, in the year of our Lord one thousand nine hundred and nine, [SEAL.] and of the Independence of the United States the one hundred and thirty-third.

THEODORE ROOSEVELT

By the President:
ROBERT BACON
Secretary of State.

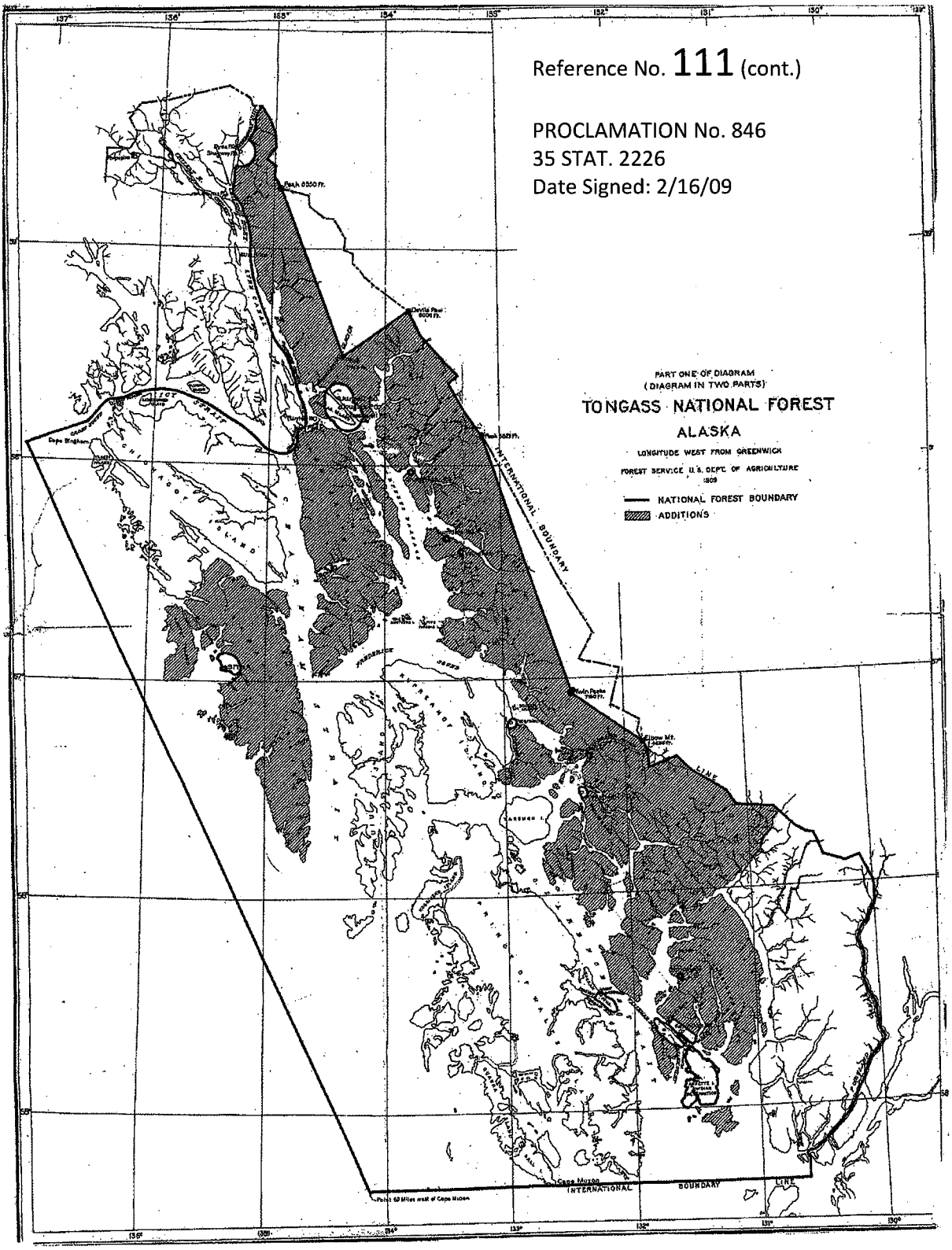
Reference No. 111 (cont.)

PROCLAMATION No. 846
35 STAT. 2226



Reference No. 111 (cont.)

PROCLAMATION No. 846
35 STAT. 2226
Date Signed: 2/16/09



ATTACHMENT B

KETCHIKAN GATEWAY BOROUGH
ASSESSMENT DEPARTMENT
1900 FIRST AVENUE, SUITE 219
KETCHIKAN ALASKA 99901

PHONE 907-228-6640
FAX 907-228-6655
EMAIL assessment@kgbak.us

Owner and Account Data

Owner Name	CITY OF KETCHIKAN	Parcel Number	307591000000
Owner 2	DBA KETCHIKAN PUBLIC UTILITIES WATE	Customer No	606885
Location	KETCHIKAN LAKE		
		Deed Ref	D 62/118
Mail Address	334 FRONT ST	Ref Date	6/25/1955
	KETCHIKAN, AK		
	99901	Prop Use	REMOTE VACANT

Legal Description:

Legal description shown is per assessment records and should not be used for other purposes.

Current Assessed and Exempt Value

	EXEMPTION TYPE	LAND VALUES	IMPROVEMENT VALUES	TOTAL VALUES
Appraised		0	0	0
Exemption 1	KetPubU	0	0	0
Exemption 2	None	0	0	0
Exemption 3	None	0	0	0
Total Exemption		0	0	0
			TOTAL ASSESSED	0

Assessed Values History

Parcel Number 307591000000

Year	Apr Land	Apr Imps	Total Apr Value	Total Exempt	Total Asd	Owner 1
2021	$70,800	$0	$70,800	$70,800	$0	CITY OF KETCHIKAN
2020	$70,800	$0	$70,800	$70,800	$0	CITY OF KETCHIKAN
2019	$70,800	$0	$70,800	$70,800	$0	CITY OF KETCHIKAN
2018	$70,800	$0	$70,800	$70,800	$0	CITY OF KETCHIKAN
2017	$70,800	$0	$70,800	$70,800	$0	CITY OF KETCHIKAN

Land Data

Land Sq Ft	Land Acres	Water Frontage	Zoning Type
432,986	9.94	0	FD

Main Structure Data

Bldg Type	No Data	Bedrooms	0	Bsmnt Area	0	Garage1 SF	0
Year Built	0	Bathrooms	0	Bsmnt Finish	0	Garage2 SF	0
No Units	0					Garage3 SF	0
Total Area	0						

ATTACHMENT C

KETCHIKAN GATEWAY BOROUGH
ASSESSMENT DEPARTMENT
1900 FIRST AVENUE, SUITE 219
KETCHIKAN ALASKA 99901

PHONE 907-228-6640
FAX 907-228-6655
EMAIL assessment@kgbak.us

Owner and Account Data

Owner Name	U S BUREAU OF LAND MANAGEMENT	Parcel Number	309800008000
Owner 2		Customer No	605287
Location	REVILLA		
		Deed Ref	
Mail Address	222 W 7TH SUITE 13	Ref Date	
	ANCHORAGE, AK		
	99503	Prop Use	REMOTE VACANT

Legal Description:

Legal description shown is per assessment records and should not be used for other purposes.

Current Assessed and Exempt Value

	EXEMPTION TYPE	LAND VALUES	IMPROVEMENT VALUES	TOTAL VALUES
Appraised		0	0	0
Exemption 1	FedGovt	0	0	0
Exemption 2	None	0	0	0
Exemption 3	None	0	0	0
Total Exemption		0	0	0
			TOTAL ASSESSED	0

Assessed Values History

Parcel Number 309800008000

Year	Apr Land	Apr Imps	Total Apr Value	Total Exempt	Total Asd	Owner 1
2021	$36,500	$0	$36,500	$36,500	$0	U S BUREAU OF LAND MANAGEMENT
2020	$36,500	$0	$36,500	$36,500	$0	U S BUREAU OF LAND MANAGEMENT
2019	$36,500	$0	$36,500	$36,500	$0	U S BUREAU OF LAND MANAGEMENT
2018	$36,500	$0	$36,500	$36,500	$0	U S BUREAU OF LAND MANAGEMENT
2017	$36,500	$0	$36,500	$36,500	$0	U S BUREAU OF LAND MANAGEMENT

Land Data

Land Sq Ft	Land Acres	Water Frontage	Zoning Type
192,970	4.43	0	FD

Main Structure Data

Bldg Type	No Data	Bedrooms	0	Bsmnt Area	0	Garage1 SF	0
Year Built	0	Bathrooms	0	Bsmnt Finish	0	Garage2 SF	0
No Units	0					Garage3 SF	0
Total Area	0						

KETCHIKAN GATEWAY BOROUGH
ASSESSMENT DEPARTMENT
1900 FIRST AVENUE, SUITE 219
KETCHIKAN ALASKA 99901

PHONE 907-228-6640
FAX 907-228-6655
EMAIL assessment@kgbak.us

Owner and Account Data

Owner Name	U S BUREAU OF LAND MANAGEMENT	Parcel Number	019800011000
Owner 2		Customer No	609150
Location	REVILLA		
		Deed Ref	
Mail Address	222 W 7TH SUITE 13	Ref Date	
	ANCHORAGE, AK		
	99513	Prop Use	VACANT

Legal Description:

Legal description shown is per assessment records and should not be used for other purposes.

Current Assessed and Exempt Value

	EXEMPTION TYPE	LAND VALUES	IMPROVEMENT VALUES	TOTAL VALUES
Appraised		0	0	0
Exemption 1	FedGovt	0	0	0
Exemption 2	None	0	0	0
Exemption 3	None	0	0	0
Total Exemption		0	0	0
			TOTAL ASSESSED	0

Assessed Values History

Parcel Number 019800011000

Year	Apr Land	Apr Imps	Total Apr Value	Total Exempt	Total Asd	Owner 1
2021	$58,200	$0	$58,200	$58,200	$0	U S BUREAU OF LAND MANAGEMENT
2020	$58,200	$0	$58,200	$58,200	$0	U S BUREAU OF LAND MANAGEMENT
2019	$58,200	$0	$58,200	$58,200	$0	U S BUREAU OF LAND MANAGEMENT
2018	$58,200	$0	$58,200	$58,200	$0	U S BUREAU OF LAND MANAGEMENT
2017	$58,200	$0	$58,200	$58,200	$0	U S BUREAU OF LAND MANAGEMENT

Land Data

Land Sq Ft	Land Acres	Water Frontage	Zoning Type
1,003,281	23.0322	0	FD

Main Structure Data

Bldg Type	No Data	Bedrooms	0	Bsmnt Area	0	Garage1 SF	0
Year Built	0	Bathrooms	0	Bsmnt Finish	0	Garage2 SF	0
No Units	0					Garage3 SF	0
Total Area	0						

KETCHIKAN GATEWAY BOROUGH
ASSESSMENT DEPARTMENT
1900 FIRST AVENUE, SUITE 219
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Owner and Account Data

Owner Name	U S BUREAU OF LAND MANAGEMENT	Parcel Number	309800012000
Owner 2		Customer No	605291
Location	REVILLA		
		Deed Ref	
Mail Address	222 W 7TH SUITE 13	Ref Date	
	ANCHORAGE, AK		
	99513	Prop Use	REMOTE VACANT

Legal Description:

Legal description shown is per assessment records and should not be used for other purposes.

Current Assessed and Exempt Value

	EXEMPTION TYPE	LAND VALUES	IMPROVEMENT VALUES	TOTAL VALUES
Appraised		0	0	0
Exemption 1	FedGovt	0	0	0
Exemption 2	None	0	0	0
Exemption 3	None	0	0	0
Total Exemption		0	0	0
			TOTAL ASSESSED	0

Assessed Values History

Parcel Number 309800012000

Year	Apr Land	Apr Imps	Total Apr Value	Total Exempt	Total Asd	Owner 1
2021	$60,000	$0	$60,000	$60,000	$0	U S BUREAU OF LAND MANAGEMENT
2020	$60,000	$0	$60,000	$60,000	$0	U S BUREAU OF LAND MANAGEMENT
2019	$60,000	$0	$60,000	$60,000	$0	U S BUREAU OF LAND MANAGEMENT
2018	$60,000	$0	$60,000	$60,000	$0	U S BUREAU OF LAND MANAGEMENT
2017	$60,000	$0	$60,000	$60,000	$0	U S BUREAU OF LAND MANAGEMENT

Land Data

Land Sq Ft	Land Acres	Water Frontage	Zoning Type
815,880	18.73	0	FD

Main Structure Data

Bldg Type	No Data	Bedrooms	0	Bsmnt Area	0	Garage1 SF	0
Year Built	0	Bathrooms	0	Bsmnt Finish	0	Garage2 SF	0
No Units	0					Garage3 SF	0
Total Area	0						

KETCHIKAN GATEWAY BOROUGH
ASSESSMENT DEPARTMENT
1900 FIRST AVENUE, SUITE 219
KETCHIKAN ALASKA 99901

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FAX 907-228-6655
EMAIL assessment@kgbak.us

Owner and Account Data

Owner Name	U S BUREAU OF LAND MANAGEMENT	Parcel Number	309800013000
Owner 2		Customer No	605292
Location	REVILLA		
		Deed Ref	
Mail Address	222 W 7TH SUITE 13	Ref Date	
	ANCHORAGE, AK		
	99513	Prop Use	REMOTE VACANT

Legal Description:

Legal description shown is per assessment records and should not be used for other purposes.

Current Assessed and Exempt Value

	EXEMPTION TYPE	LAND VALUES	IMPROVEMENT VALUES	TOTAL VALUES
Appraised		0	0	0
Exemption 1	FedGovt	0	0	0
Exemption 2	None	0	0	0
Exemption 3	None	0	0	0
Total Exemption		0	0	0
			TOTAL ASSESSED	0

Assessed Values History

Parcel Number 309800013000

Year	Apr Land	Apr Imps	Total Apr Value	Total Exempt	Total Asd	Owner 1
2021	$40,000	$0	$40,000	$40,000	$0	U S BUREAU OF LAND MANAGEMENT
2020	$40,000	$0	$40,000	$40,000	$0	U S BUREAU OF LAND MANAGEMENT
2019	$40,000	$0	$40,000	$40,000	$0	U S BUREAU OF LAND MANAGEMENT
2018	$40,000	$0	$40,000	$40,000	$0	U S BUREAU OF LAND MANAGEMENT
2017	$40,000	$0	$40,000	$40,000	$0	U S BUREAU OF LAND MANAGEMENT

Land Data

Land Sq Ft	Land Acres	Water Frontage	Zoning Type
236,095	5.42	0	FD

Main Structure Data

Bldg Type	No Data	Bedrooms	0	Bsmnt Area	0	Garage1 SF	0
Year Built	0	Bathrooms	0	Bsmnt Finish	0	Garage2 SF	0
No Units	0					Garage3 SF	0
Total Area	0						

KETCHIKAN GATEWAY BOROUGH
ASSESSMENT DEPARTMENT
1900 FIRST AVENUE, SUITE 219
KETCHIKAN ALASKA 99901

PHONE 907-228-6640
FAX 907-228-6655
EMAIL assessment@kgbak.us

Owner and Account Data

Owner Name	U S BUREAU OF LAND MANAGEMENT	Parcel Number	302120001000
Owner 2		Customer No	604611
Location	REVILLA		
		Deed Ref	
Mail Address	222 W 7TH SUITE 13	Ref Date	
	ANCHORAGE, AK		
	99503	Prop Use	REMOTE VACANT

Legal Description:

Legal description shown is per assessment records and should not be used for other purposes.

Current Assessed and Exempt Value

	EXEMPTION TYPE	LAND VALUES	IMPROVEMENT VALUES	TOTAL VALUES
Appraised		0	0	0
Exemption 1	FedGovt	0	0	0
Exemption 2	None	0	0	0
Exemption 3	None	0	0	0
Total Exemption		0	0	0
			TOTAL ASSESSED	0

Assessed Values History

Parcel Number 302120001000

Year	Apr Land	Apr Imps	Total Apr Value	Total Exempt	Total Asd	Owner 1
2021	$130,500	$0	$130,500	$130,500	$0	U S BUREAU OF LAND MANAGEMENT
2020	$130,500	$0	$130,500	$130,500	$0	U S BUREAU OF LAND MANAGEMENT
2019	$130,500	$0	$130,500	$130,500	$0	U S BUREAU OF LAND MANAGEMENT
2018	$130,500	$0	$130,500	$130,500	$0	U S BUREAU OF LAND MANAGEMENT
2017	$130,500	$0	$130,500	$130,500	$0	U S BUREAU OF LAND MANAGEMENT

Land Data

Land Sq Ft	11,505,388	Land Acres	264.127	Water Frontage	0	Zoning Type	FD

Main Structure Data

Bldg Type	No Data	Bedrooms	0	Bsmnt Area	0	Garage1 SF	0
Year Built	0	Bathrooms	0	Bsmnt Finish	0	Garage2 SF	0
No Units	0					Garage3 SF	0
Total Area	0						

KETCHIKAN GATEWAY BOROUGH
ASSESSMENT DEPARTMENT
1900 FIRST AVENUE, SUITE 219
KETCHIKAN ALASKA 99901

PHONE 907-228-6640
FAX 907-228-6655
EMAIL assessment@kgbak.us

Owner and Account Data

Owner Name	U S BUREAU OF LAND MANAGEMENT	Parcel Number	702120001000
Owner 2		Customer No	609350
Location	REVILLA		
		Deed Ref	
Mail Address	222 W 7TH SUITE 13	Ref Date	
	ANCHORAGE, AK		
	99503	Prop Use	VACANT

Legal Description:

Legal description shown is per assessment records and should not be used for other purposes.

Current Assessed and Exempt Value

	EXEMPTION TYPE	LAND VALUES	IMPROVEMENT VALUES	TOTAL VALUES
Appraised		0	0	0
Exemption 1	FedGovt	0	0	0
Exemption 2	None	0	0	0
Exemption 3	None	0	0	0
Total Exemption		0	0	0
			TOTAL ASSESSED	0

Assessed Values History

Parcel Number 702120001000

Year	Apr Land	Apr Imps	Total Apr Value	Total Exempt	Total Asd	Owner 1
2021	$29,600	$0	$29,600	$29,600	$0	U S BUREAU OF LAND MANAGEMENT
2020	$29,600	$0	$29,600	$29,600	$0	U S BUREAU OF LAND MANAGEMENT
2019	$29,600	$0	$29,600	$29,600	$0	U S BUREAU OF LAND MANAGEMENT
2018	$29,600	$0	$29,600	$29,600	$0	U S BUREAU OF LAND MANAGEMENT
2017	$29,600	$0	$29,600	$29,600	$0	U S BUREAU OF LAND MANAGEMENT

Land Data

Land Sq Ft	Land Acres	Water Frontage	Zoning Type
451,117	10.356	0	FD

Main Structure Data

Bldg Type	No Data	Bedrooms	0	Bsmnt Area	0	Garage1 SF	0
Year Built	0	Bathrooms	0	Bsmnt Finish	0	Garage2 SF	0
No Units	0					Garage3 SF	0
Total Area	0						

ATTACHMENT D

Reference No. 540

ACT OF CONGRESS
PUBLIC, No. 240, H. R. 2413
76th CONGRESS - 53 Stat. 1132 - 1133
Date Approved: 7/27/39

[CHAPTER 389]

AN ACT

For the protection of the water supply of the city of Ketchikan, Alaska.

July 27, 1939
[H. R. 2413]
[Public, No. 240]

Ketchikan, Alaska.
Designated lands set aside as municipal water-supply reserves.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the two tracts of public lands within the areas hereinafter described, situated in the Territory of Alaska, are hereby reserved from all forms of location, entry, or appropriation, whether under the mineral or nonmineral land laws of the United States, and set aside as municipal water-supply reserves for the use and benefit of the people of the city of Ketchikan, a municipal corporation of the Territory of Alaska, as follows, to wit: (a) Starting at the east end of the Ketchikan Public Utilities Dam, situated at lower end of the lower Ketchikan Lake, and extending thence in a northwesterly direction, following the divide to the summit of Minerva Mountain; thence in a northerly direction along the divide to the summit of Diana Mountain; thence following the high divide around the Ketchikan Lakes and Granite Basin over the summits of Dude Mountain and John Mountain; and thence in a southerly direction along the divide to the summit of Sylvis Mountain to the summit of Deer Mountain; thence in a westerly direction along the small divide to Ketchikan Creek at a point approximately four thousand eight hundred feet below the dam; thence along Ketchikan Creek to the dam, the place of beginning; said area being the drainage area of Ketchikan Lakes and Granite Basin above the Ketchikan city water supply. (b) And starting at the east end of the Ketchikan Public Utilities Dam at lower end of Carlanna Lake, and extending thence along the small divide in a northerly direction to the summit of Ward Mountain; thence along the high divide in an easterly direction to the summit of Juno Mountain; thence along the same divide in a southeasterly direction to the summit of Minerva Mountain; thence in a southerly direction along the small divide to the eastern side line of United States Survey 1229, of E. A. Heath, approximately two thousand eight hundred and fifty feet from the northeast corner of said survey; thence along said side line to the northeast corner; thence in a westerly direction along the northern boundary line to the northwest corner of said survey; thence in a northerly direction along the divide to Carlanna Lake Dam, the point of beginning; said area being the drainage area of Carlanna Lake and Hoadley Creek above the Ketchikan city water supply.

Description.

ACT OF CONGRESS
PUBLIC, No. 240, H. R. 2413
76th CONGRESS - 53 Stat. 1132 - 1133
Date Approved: 7/27/39

Jurisdiction and administration.

SEC. 2. The public lands heretofore described and reserved for municipal water-supply purposes, not a part of the Tongass National Forest, shall be administered by the Secretary of the Interior, and those within the Tongass National Forest shall be administered by the Secretary of Agriculture, for the purpose of storing, conserving, and protecting from pollution the said water supply, and preserving, improving, and increasing the timber growth on said lands, to more fully accomplish such purposes; and to that end said municipality shall have the right, subject to the approval of the Secretary of the Interior and the Secretary of Agriculture, to the use of any and all parts of the lands reserved for the storage and conveying of water and construction and maintenance thereon of all improvements for such purposes: *Provided*, That the merchantable timber on the land to be used by the said municipality which is under the jurisdiction of the Secretary of the Interior may be sold by the said Secretary under rules and regulations to be prescribed by him: *And provided further*, That the right to the use by the city of Ketchikan of the lands reserved by this Act shall terminate upon the abandonment of the use by such municipality in accordance with the terms of this Act, and upon a finding of such nonuse or abandonment, for a period of two years, by the head of the department having jurisdiction over the land involved, whereupon the reservation created by this Act shall terminate to the extent of such lands involved.

Provisos.
Sale of timber.

Reversionary provision.

Regulations to be prescribed and enforced.

SEC. 3. The Secretary of the Interior and the Secretary of Agriculture are hereby authorized to prescribe and enforce such regulations as may be found necessary to carry out the purpose of this Act, including the right to forbid persons other than those authorized by them and the municipal authorities of said municipal corporation from entering or otherwise trespassing upon these lands, and any violation of this Act or of regulations issued thereunder shall be a misdemeanor and shall be punishable as is provided for in section 5050, Compiled Laws of Alaska, 1933.

Penalty for violation.

SEC. 4. Nothing herein contained shall affect any valid right or claim to any part of said lands heretofore acquired under any law of the United States.

Existing rights not impaired.

Approved, July 27, 1939.

ATTACHMENT E

KPU Water

Ketchikan Municipal Watershed

Drainage Area Ownership Map

Ketchikan Public Utilities 3.30.2021

Brown Mountain

Dude Mountain

Diana Mountain

John Mountain

US Forest Service
~7,152 Acres
~97.17%

Upper Ketchikan Lake

Minerva Mountain

Lower Ketchikan Lake

1939 Act of Congress Watershed Boundary

City of Ketchikan
~10 Acres
~0.14%

Deer Mountain

Ketchikan International Airport

City of Ketchikan

Tongass Narrows

US Bureau of Land Management
~198 Acres
~2.69%

W E S

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

0 2,700 5,400 10,800 16,200 21,600 Feet

1 inch = 4,000 feet

For informational purposes only, not a legal document

Date: Tuesday, March 30, 2021
Time: 6:03:20 PM

ATTACHMENT F

Rich T
John K.
Bud W.
Steve S.

United States Department of Agriculture | Forest Service | Region 10 | Tongass National Forest, Ketchikan Area, Federal Building, Ketchikan, AK 99901

Reply To: 5510

Date: NOV 12 1992

RECEIVED
NOV 17 1992
KPU Manager's Office
KETCHIKAN PUBLIC UTILITIES

Mr. Richard D. Trimble
Ketchikan Public Utilities
2930 Tongass Avenue
Ketchikan, AK 99901

Dear Mr. Trimble:

In response to your letter of October 29, the Ketchikan Lakes Municipal Watershed is reserved as a municipal watershed by the Ketchikan Townsite Exclusion Act of July 27, 1939. A copy of the proposed Tongass National Forest Plan management prescriptions for enacted municipal watersheds is attached. If you would like further assistance please contact Steve Segovia, the Ketchikan District Ranger at 225-2148.

Sincerely,

DAVID D. RITTENHOUSE
Forest Supervisor

cc:
S. Segovia, KRD

ATTACHMENT G

12-18-1992 11:24 907 225 1555

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
ALASKA STATE OFFICE
222 W. 7th Avenue, #13
ANCHORAGE, ALASKA 99513-7599

RECEIVED
DEC 17 1992
KPU Manager's Office
KETCHIKAN PUBLIC UTILITIES

2300 (932)

DEC 9 1992

cc: Rich T
Rich Z
John K
Bud W

Mr. Richard D. Trimble
Engineering Division Manager
Ketchikan Public Utilities
Ketchikan, Alaska 99901

Dear Mr. Trimble

In response to your inquiry of October 29, 1992, concerning the withdrawal created by the Act of July 27, 1939 (53 Stat. 1131), for the Ketchikan watershed, we have researched this withdrawal and can find no subsequent amendments of the Act which would affect the withdrawal. The land is still withdrawn for use as a watershed for the City of Ketchikan and will remain so unless the City abandons its use for a period of two years.

The withdrawal sets the lands aside for use for watershed purposes and the Bureau of Land Management can not permit other uses of the land which would interfere with the primary use of the land for the purposes specified in the withdrawal. Should we receive applications from other than the City of Ketchikan, we would request your review and comment before taking any action to assure that any proposed use would not affect use of the land for the watershed.

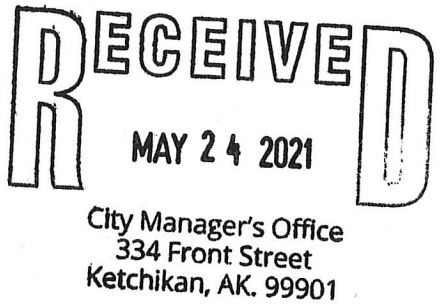
Sincerely,

for Edward F. Spang
State Director, Alaska

ATTACHMENT H

USDA United States Department of Agriculture | Forest Service | Tongass National Forest Alaska Region | 648 Mission Street Ketchikan, AK 99901 907-225-3101

File Code: 2760; 5590
Date: May 21, 2021



Mr. Karl R. Amylon
General Manager
334 Front Street
Ketchikan, AK 99901

Dear Mr. Amylon:

In response to your letter dated April 22, 2021, the Forest Service can confirm that Forest Service lands located within the Ketchikan Municipal Water Supply Watershed referenced in your letter are reserved as a municipal watershed pursuant to the Ketchikan Townsite Exclusion Act of 1939. Land use is limited to the protection and maintenance of natural conditions and preservation of water quality and water supply to meet the provisions of Safe Drinking Water Act and Alaska Drinking Water Regulations and Water Quality Standards.

These lands are designated in the Tongass Land and Resource Management Plan (Forest Plan) with the Municipal Watershed Land Use Designation (LUD). Management direction for Municipal Watersheds, described on pages 3-51 through 3-57 of the Forest Plan, includes an emphasis "to provide protection of municipal water supplies" and limits management activities. There may be structures or facilities within the watershed to support the municipal water supply, but uses or activities that adversely affect water quality or supply will not occur. Forested lands within the Municipal Watershed LUD are not suitable for timber production and roads are only allowed for routine operation, maintenance, or improvement of the municipal water system. The Forest Plan is publicly available on our website at https://www.fs.usda.gov/detail/tongass/landmanagement/?cid=stelprd3801708.

The Forest Service acquired additional acres within the watershed in 2019 as part of a land exchange with the Alaska Mental Health Trust Authority (Consolidated Appropriations Act, 2017, Public Law 115-31, see Appendix B—S. 131). The acquired land, Parcel K2, will be managed in accordance with the enacting legislation. In particular, SEC. 5(b)(1)(C)(i) states that the acquired non-Federal parcels shall be managed "to preserve the undeveloped natural character" and "the wildlife, watershed, and scenic values" of those lands, with the exception of recreational trails (SEC. 5(b)(3)).

If you would like further assistance or have additional questions, please contact Deputy Forest Supervisor Frank Sherman at 907-228-6282 or via email at francis.sherman@usda.gov.

Sincerely,

for

M. EARL STEWART
Forest Supervisor, Tongass NF

cc: Mayor Bob Sivertsen - City of Ketchikan; Laurie Cooper - Forest Service legislative affairs; Dawn Collinsworth - Forest Service lands team; Shane Walker - District Ranger

ATTACHMENT I

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Alaska State Office
222 West Seventh Avenue, #13
Anchorage, Alaska 99513-7504
www.blm.gov/alaska

In Reply Refer To:
232111 (AK940)

Ketchikan Public Utilities
Karl R. Amylon, General Manager
334 Front Street
Ketchikan, Alaska 99901

Dear Mr. Amylon:

This letter is in response to your inquiry of April 22, 2021, concerning the withdrawal created by the Act of July 27, 1939 (53 Stat. 1131), for the Ketchikan watershed. We have researched this and can find no subsequent amendments of the Act which would affect the withdrawal. The land is still withdrawn for use as a watershed for the City of Ketchikan and will remain so unless the City abandons its use for a period of two years.

The withdrawal sets the lands aside for a watershed and the Bureau of Land Management cannot permit other uses of the land which would interfere with that primary use. Should I receive applications from other than the City of Ketchikan, I will request your review and comment before taking any action that could affect the watershed use.

If you have any questions please contact Marnie Graham, Glennallen Field Office Manager at (907) 822-3217 or mgraham@blm.gov.

Sincerely,

Chad B. Padgett
State Director

ATTACHMENT J

USDA United States Department of Agriculture | Forest Service | Washington Office | 1400 Independence Avenue, SW Washington, D.C. 20250

File Code: 2400 (8739031)
Date: September 8, 2021

Mr. Karl R. Amylon
General Manager
City of Ketchikan
334 Front Street
Ketchikan, Alaska 99901

Dear Mr. Amylon:

Thank you for your letter of April 22, 2021, to U.S. Department of Agriculture's Forest Service former Chief Victoria Christiansen regarding the management of lands surrounding the City of Ketchikan. I apologize for the delayed response.

I encourage you to see the letter from the Tongass National Forest confirming the Forest Service land located within the Ketchikan Municipal Water Supply Watershed is reserved as a municipal watershed. Under this designation, land use is limited to the protection and maintenance of natural conditions and preservation of water quality and supply.

Again, thank you for writing. If you have additional questions, please contact Frank Sherman, Deputy Forest Supervisor, at (907) 228-6282 or francis.sherman@usda.gov.

Sincerely,

X

Signed by: RANDY MOORE
RANDY MOORE
Chief

Enclosure (1)

cc: David Schmid Regional Forester; M. Earl Stewart, Forest Supervisor, Tongass National Forest; Frank Sherman, Deputy Forest Supervisor, Tongass National Forest; James King, Regional Director of Recreation, Lands, Minerals, and Heritage

ATTACHMENT K

MUNICIPAL WATERSHED

The emphasis of this LUD is to provide protection of municipal water supplies for the following incorporated cities and boroughs: Ketchikan, Petersburg, Sitka, Juneau, Wrangell, Kake, Klawock, Craig, and Hydaburg. For the Petersburg watershed, consult 36 CFR 251.35. See Forest-wide Soil and Water Standards and Guidelines for state-classified public water supply source watershed protection outside of the Municipal Watershed LUDs.

Goals

To maintain these watersheds as municipal water supply reserves, in a manner that meets provisions of the Safe Drinking Water Act and State of Alaska Drinking Water Regulations and Water Quality Standards, in accordance with Forest Service Manual (FSM) 2542 and 36 CFR 251.9.

Objectives

Limit most management activities to the protection and maintenance of natural resources. Consult with Alaska Department of Environmental Conservation and affected municipalities prior to authorizing activities that are likely to cause pollution.

Desired Condition

Lands managed as Municipal Watersheds are generally in a natural condition. Facilities or structures to provide municipal water supplies may be present. Uses or activities that could adversely affect water quality or supply do not occur. These watersheds provide municipal water that meets State of Alaska Drinking Water Regulations and Water Quality Standards.

Municipal Watershed Land Use Designation
Apply the following Forest-wide Standards and Guidelines located in Chapter 4:

Category	Section	Subsections
Air	AIR	All
Beach and Estuary Fringe	BEACH1	All
	BEACH2	All
Facilities	FAC	All
Fire	FIRE	All
Fish	FISH	All
Forest Health	HEALTH	All
Heritage Resources/Sacred Sites	HSS	All
Invasive Species	INV	All
Karst and Cave Resources	KC	All
Lands	LAND	All
Minerals and Geology	MG	All
Plants	PLA	All
Recreation and Tourism	REC	All
Riparian	RIP	All
Rural Community Assistance	RUR	All
Scenery	SCENE	All
Soil and Water	SW1, 2, 4	All
	SW3	I(A1-4,6-7),II
Subsistence	SUB	All
Timber	TIM1	All
	TIM4	VII(A,C)
	TIM6	I(A-C,E),III
Trails	TRAI	All
Transportation	TRAN1, 2, 3, 4, 5, 6,	All
Wetlands	WET	All
Wildlife	WILD	All

Apply the following Plan Content located in Chapter 5:

Category	Section	Plan Component
Young-growth Direction	All	None
Renewable Energy Direction	All	All except S-RE-LAND-01 and S-RE-TRAN-01
Transportation Systems Corridors Direction	All	All except S-TSC-LAND-01
Forest-wide Plan Components	All	All

Apply the following LUD Standards and Guidelines:

FACILITIES

Facilities Improvements: FAC2 and FAC3

A. Construct no Forest Service administrative facilities. Facilities such as dams, reservoirs, and pipelines are consistent with municipal watershed objectives.

FIRE

Fire Suppression: FIRE1

Suppression Action

A. Suppress wildfires using the suppression option identified in the Alaska Interagency Wildland Fire Management Plan.
B. Emphasize suppression tactics that result in the least possible disturbance or evidence of human presence.
    1. Use of mechanized equipment should be kept to a minimum.
    2. Rehabilitation of all suppression lines and other evidence of human presence will occur as part of rehabilitation, no more than one year after the fire occurs.

Fuel Improvements: FIRE2

Prescribed Fire

A. As appropriate, normally use management-ignited prescribed fire rather than mechanical treatment to reduce the fire hazard from timber salvage. Management-ignited prescribed fire may also be used to maintain or improve watershed characteristics as long as there is no adverse impact to water quality.
B. As a general management practice, do not use prescribed natural fire. (Consult FSM 5142).

FISH

Fish Habitat Planning: FISH2

A. Plan the construction and maintenance of fish improvement projects only if they are compatible with the municipal watershed objectives.
    1. Restrict fish habitat improvements that result in reduced water quality for a municipality using the water from the affected stream.
    2. When planning fish habitat improvement projects, consider the effects of anticipated municipal water withdrawals.

FOREST HEALTH

Forest Health Management: HEALTH1

A. Maintain or improve forest health. Implement insect and disease management measures to protect the watershed and adjacent resources.
B. Timber may be salvaged at the request of municipality.

Forest Insect and Disease Survey and Inventory: HEALTH2

A. Survey and inventory visible outbreaks.

HERITAGE

Heritage Resource Activities: HSS1

Inventory/Evaluation

A. Develop priorities and schedule management activities to implement heritage resource inventory, evaluation, protection, and interpretation.
    1. Identify, classify, and evaluate known heritage resources.
    2. Identify heritage properties to be nominated to the National Register of Historic Places.

3. Identify heritage properties that require stabilization or other protective measures.
4. Identify opportunities for interpretation of heritage resources for public education and enjoyment. Interpretation will generally occur outside the municipal watershed.

KARST AND CAVES

Cave Management Program: KC2

A. Caves may be made available for general public recreation and education uses, only when compatible with watershed objectives and in consultation with the municipality.
B. Identify opportunities for interpretation of caves for public education and enjoyment. Interpretation will generally occur outside this LUD.

LANDS

Special Use Administration (Non-Recreation): LAND2

A. Manage special uses in accordance with the legislation establishing the watershed (if any) and to safeguard the quality and quantity of municipal water supplies. Limit special uses to those that support development activities. Coordinate all proposals with affected municipalities and obtain written concurrence before issuing special-use authorizations. (Consult 36 CFR 251.9, 36 CFR 251.35, and FSM 2700.)
    1. Analyze special-use proposals on a case-by-case basis, using an interdisciplinary process, to determine probable effects.
    2. Do not permit any activities that would lead to violation of State of Alaska Drinking Water Regulations.
    3. Terminate or bring into conformance, existing uses that are causing violation of State of Alaska Drinking Water Regulations or degradation of water quality.
B. Conduct watershed analysis (Appendix C) and consult with Alaska Department of Environmental Conservation and affected municipalities prior to authorizing activities that are likely to cause pollution.

Land Ownership Adjustments: LAND6

A. Protect municipal interests in land adjustment decisions. Unless otherwise prohibited by law, encourage actions that result in the affected municipality owning the land.
    1. Dispose of lands only when allowed to by applicable legislation.
    2. When disposal is contemplated, involve the affected municipality early in the process.
    3. Encourage state land selections under the Statehood Act for subsequent transfer to the municipal governing body.
    4. If legislation allows, consider exchange of these lands with the affected municipality.
    5. Do not acquire National Forest System lands for municipal watershed purposes.

MINERALS AND GEOLOGY

Minerals and Geology Resource Preparation: MG1

Resource Preparation

A. Interpret geologic, paleontologic, and historic mining for municipal watersheds, where appropriate.
B. Maintain inventory of surficial geology, geomorphic features, geologic hazards, and paleontological resources. Maintain reports of municipal watershed assessments.

Minerals and Geology Administration: MG2

Mineral Withdrawals

A. Municipal watersheds may be withdrawn from mineral entry on a case-by-case basis after consultation with the municipality, subject to valid existing rights.
B. Assure claimants with valid and existing rights are allowed ingress and egress granted under the General Mining Law of 1872, the Alaska National Interest Lands Conservation Act of 1980 (ANILCA), and Forest Service Minerals Regulations under 36 CFR 228.
C. Permit reasonable access to mining claims, leases, and material sites and authorization of orderly mineral resource development with the provisions of an approved Plan of Operations in accordance with Forest Service Minerals Regulations 36 CFR 228 and FSM 2800.
D. Conduct watershed analysis (Appendix C) and consult with Alaska Department of Environmental Conservation and affected municipalities prior to authorizing activities that are likely to cause pollution.

RECREATION AND TOURISM

Recreation Use Administration: REC3

Recreation Management and Operation

A. Provide only for those activities and recreation use levels that can be accommodated without detriment to water quality and flow.
B. Issue appropriate orders for regulating public use within the watershed, in cooperation with the municipality.
C. Designation of motorized routes for off-highway vehicles in Municipal Watersheds is generally not allowed. Designation may only occur where documented local traditional use has occurred and the route does not degrade water quality or flow.
D. Conduct watershed analysis (Appendix C) and consult with Alaska Department of Environmental Conservation and affected municipalities prior to authorizing activities that are likely to cause pollution.

Recreation Special Uses

A. Major and minor developments are generally not consistent with objectives for this LUD. Proposals for development will require scrutiny of the magnitude and scope of the project to see if they meet LUD objectives. Refer to the Recreation and Tourism Forest-wide Standards and Guidelines.
B. Conduct watershed analysis (Appendix C) and consult with Alaska Department of Environmental Conservation and affected municipalities prior to authorizing activities that are likely to cause pollution.

SCENERY

Scenery Operations: SCENE1

A. Considerations for the scenery resource will be secondary to the objectives of the municipal watershed. Scenic quality conditions are the result of the municipality's watershed management objectives.
    1. Design management activities within the watershed to minimize scenery impacts as seen from Visual Priority Travel Routes and Use Areas (see Appendix F).

SOIL AND WATER

Watershed Resource Planning: SW3

A. Maintain water quality consistent with Alaska Water Quality Standards (18 AAC 70) and protect source watersheds consistent with the federal

Safe Drinking Water Act and the Alaska Drinking Water Regulations (18 AAC 80)

B. Do not authorize activities that create or maintain a condition that has a significant potential to cause or allow the pollution or contamination of a public water system.

C. Conduct watershed analysis (Appendix C) and consult with Alaska Department of Environmental Conservation and affected municipalities prior to authorizing activities that are likely to cause pollution. Refer to FSM 2542 and 36 CFR 251.9 for guidance. Refer to 18 AAC 80.620(c)(3) for systems that seek to avoid filtration.

D. Develop site-specific Best Management Practices (BMPs) for any authorized activity. Consider at a minimum BMPs that limit ground disturbance, restrict public access (in consultation with municipality), and restrict hazardous materials and hazardous waste.

Watershed Resource Improvement: SW4

A. Soil and water protective measures are applied to protect the watersheds and water resources for municipal water use. Soil and water improvement will occur on all disturbances that threaten the watershed values.

B. Conduct watershed analysis (Appendix C) and consult with Alaska Department of Environmental Conservation and affected municipalities prior to authorizing activities that are likely to cause pollution.

SUBSISTENCE

Subsistence: SUB

A. Allow subsistence activities in accordance with the federal, state, municipal, and other local laws.

TIMBER

Timber Resource Planning: TIM4

A. Forested land is classified as not suitable for timber production.

B. No timber harvest is scheduled. Salvage may be considered on a case-by-case basis in consultation with the municipality.

C. Avoid Municipal Watersheds when other feasible locations for personal use wood and Christmas tree cutting are available. If personal (free) use timber harvest is allowed, personal permit requirements must satisfy the Municipal Watershed's objectives (refer to Chapter 4, Personal Use Program, Section TIM6). Personal use timber harvest will be regulated and its cumulative effects monitored in LUDs that are not suitable for timber harvest to ensure that the LUD objectives are fulfilled.

C. Allow administrative use of timber if LUD objectives are met.

TRAILS

Trails: TRAI1

A. Trail systems are limited to those that can be accommodated without detriment to water quality and flow. Trails may be considered on a case-by-case basis in consultation with the municipality. For the Petersburg watershed, consult 36 CFR 251.35.

TRANSPORTATION

Transportation Operations: TRAN

A. Allow roads needed for the routine operation, maintenance, and improvement of the municipal water system and watershed. Allow roads to provide for timber salvage operations if they are permitted by the watershed's establishing legislation (if any) and after consultation with

the affected municipality. If no feasible alternative exists, roads may occur in this area.

1. Conduct a transportation analysis to determine optimum road location and design standards to ensure minimum adverse impacts to the watershed.
2. Coordinate road management with the affected municipality. Manage access in accordance with the legislation establishing the watershed (if any).
3. Road construction may occur if it is consistent with legislation establishing the watershed (if any), and if it can be done without unacceptable degradation of water quality.

WILDLIFE

Wildlife Habitat Planning: WILD1

A. Manage wildlife habitats for uses compatible with the watershed management objectives. Prioritize treatment needs and scheduling.

ATTACHMENT L

Form 1860-9
(January 1988)

The United States of America

To all to whom these presents shall come, Greeting:

Anchorage 060967

WHEREAS

State of Alaska

is entitled to a Land Patent pursuant to the Alaska Statehood Act of July 7, 1958, Pub. L. 85-508, 72 Stat. 339, as amended, confirming a grant under the Alaska Mental Health Enabling Act of July 28, 1956, 70 Stat. 709, for the following described lands:

Lots 1, 4, 6, and 15, U.S. Survey No. 3835, Alaska.

Containing 4,123.79 acres, as shown on plat of survey officially filed September 8, 1986.

NOW KNOW YE, that there is, therefore, granted by the UNITED STATES, unto the above-named claimant the land above described; TO HAVE AND TO HOLD the said land with all the rights, privileges, immunities, and appurtenances, of whatsoever nature, thereunto belonging, unto the said claimant, forever;

EXCEPTING AND RESERVING TO THE UNITED STATES:

1. A right-of-way thereon for ditches or canals constructed by the authority of the United States. Act of August 30, 1890, 26 Stat. 391, 43 U.S.C. 945;

2. As to lot 1, U.S. Survey No. 3835, Alaska, that right-of-way for U.S. Forest Service Ward Lake Road, No. 5151, A-061036 (previously J-012124), sixty-six (66) feet in width, noted under the principles of 44 LD 513, and all appurtenances thereto, constructed by the United States through, over, or upon the land herein described and the right of the United States, its agents, or employees to maintain, operate, repair, or improve the same so long as needed or used for or by the United States;

3. As to lot 15, U.S. Survey No. 3835, Alaska, that right-of-way for U.S. Forest Service Deer Mountain Trail, No. 106, A-061031 (previously J-012115), twenty (20) feet in width, noted under the principles of 44 LD 513, and all appurtenances thereto, constructed by the United States through, over, or upon the land herein described and the right of the United States, its agents, or employees to maintain, operate, repair, or improve the same so long as needed or used for or by the United States; and

Patent Number 50-90-0157

Form 1860-10
(April 1988)

Anchorage 060967

4. As to lot 15, U.S. Survey No. 3835, Alaska, the right to itself, its permittees or licensees, to enter upon, occupy, and use, any part or all of said land lying within fifty (50) feet of the center line of the transmission line right-of-way of the City of Ketchikan, Power Project No. 1922 (AA-57746), for the purposes set forth in and subject to the conditions and limitations of Section 24 of the Federal Power Act of August 26, 1935, as amended, 41 Stat. 1075, as amended, 16 U.S.C. 818.

IN TESTIMONY WHEREOF, the undersigned authorized officer of the Bureau of Land Management, in accordance with the provisions of the Act of June 17, 1948 (62 Stat. 476), has, in the name of the United States, caused these letters to be made Patent, and the Seal of the Bureau to be hereunto affixed.

[SEAL]

GIVEN under my hand, in ANCHORAGE, ALASKA
the THIRTEENTH day of FEBRUARY
in the year of our Lord one thousand nine hundred and
NINETY and of the Independence of the
United States the two hundred and FOURTEENTH.

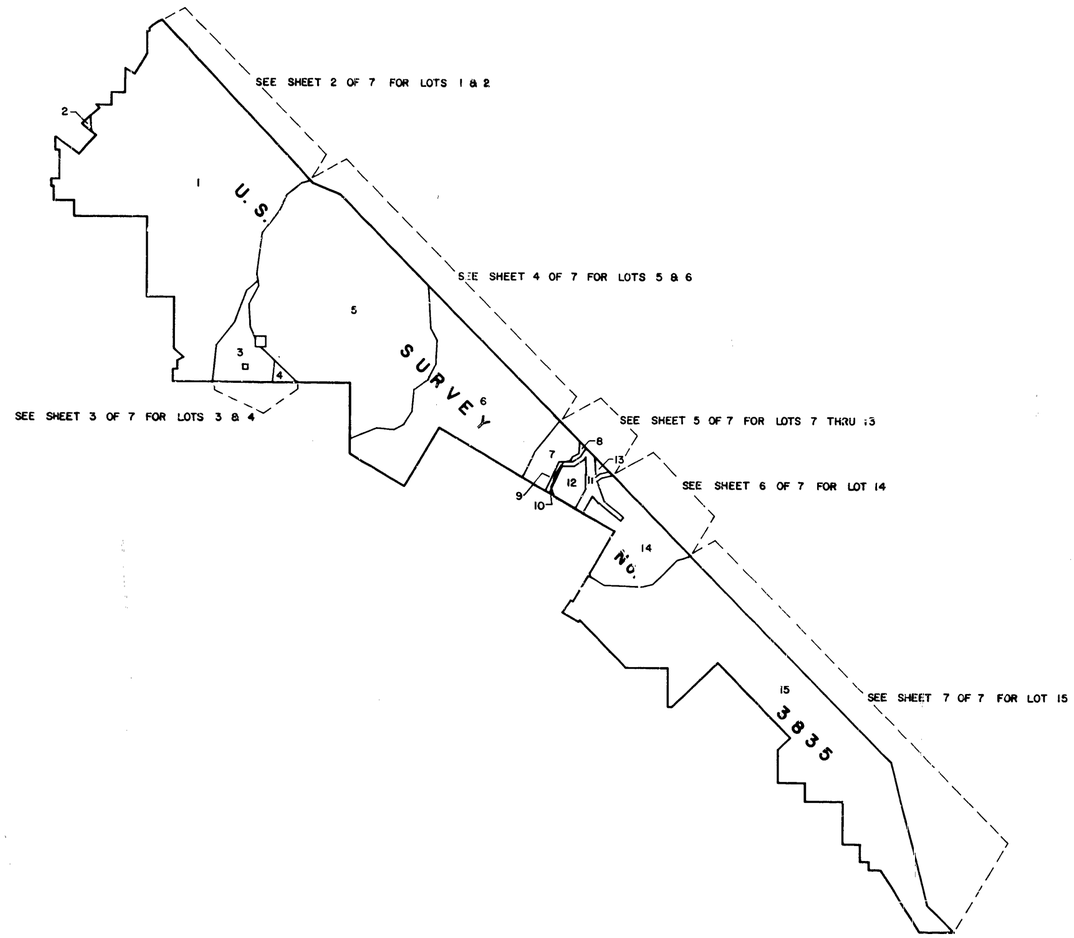
By /s/ TERRY R. HASSETT
Terry R. Hassett
Chief, Branch of KCS Adjudication

Patent Number 50-90-0157

ATTACHMENT M

Officially Filed
DATE SEPTEMBER 8, 1986

ORIGINAL



U.S. SURVEY No. 3835, ALASKA

The history of earlier surveys is contained in the field notes.

This plat and the field notes represent the survey of Lots 1 through 15, U.S. Survey No. 3835; the dependent resurvey of portions of U.S. Survey Nos. 1281, 1404, and 1587; the retracement of portions of Mineral Survey Nos. 769 and 1413; and the retracement of portions of U.S. Survey Nos. 1207, 1229, 1281, 1417, 1761, 1781, 1833, 2090, 2632, 2635, and 2796, Alaska.

Where indicated on this plat, record bearing and distances are shown.

This survey was executed by David J. Clark, Cadastral Surveyor, May 28 through September 17, 1984, in accordance with the specifications set forth in the Manual of Surveying Instructions, 1973, and Amended Special Instructions for U.S. Survey No. 3835, Alaska, dated August 8, 1983, approved May 16, 1984.

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Francis D. Eichbaum — August 12, 1986
Date

Deputy State Director for Cadastral Survey, Alaska

ST/J.E.F.

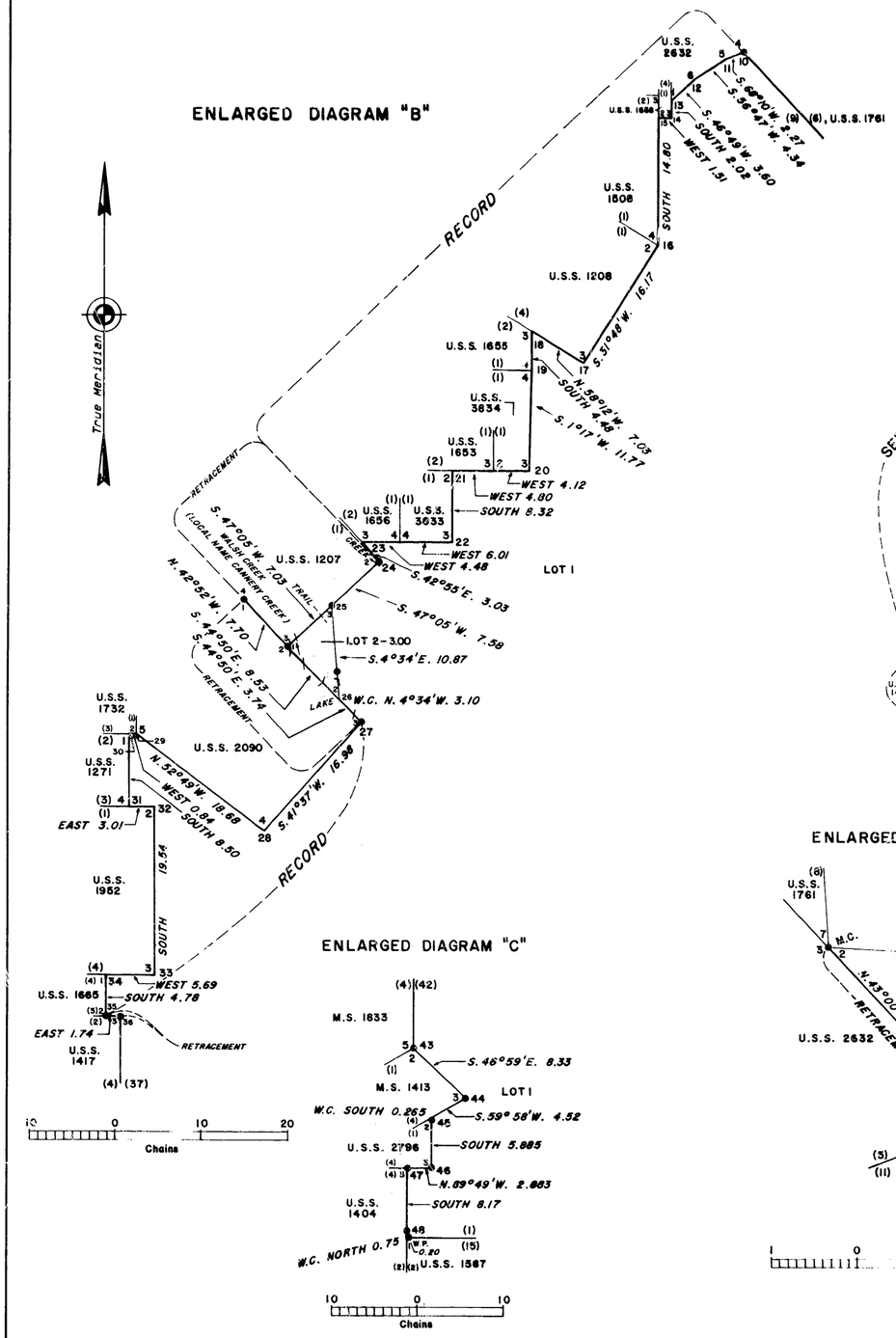
Officially Filed
DATE SEPTEMBER 8, 1986

ORIGINAL

Sheet 2 of 7 Sheets

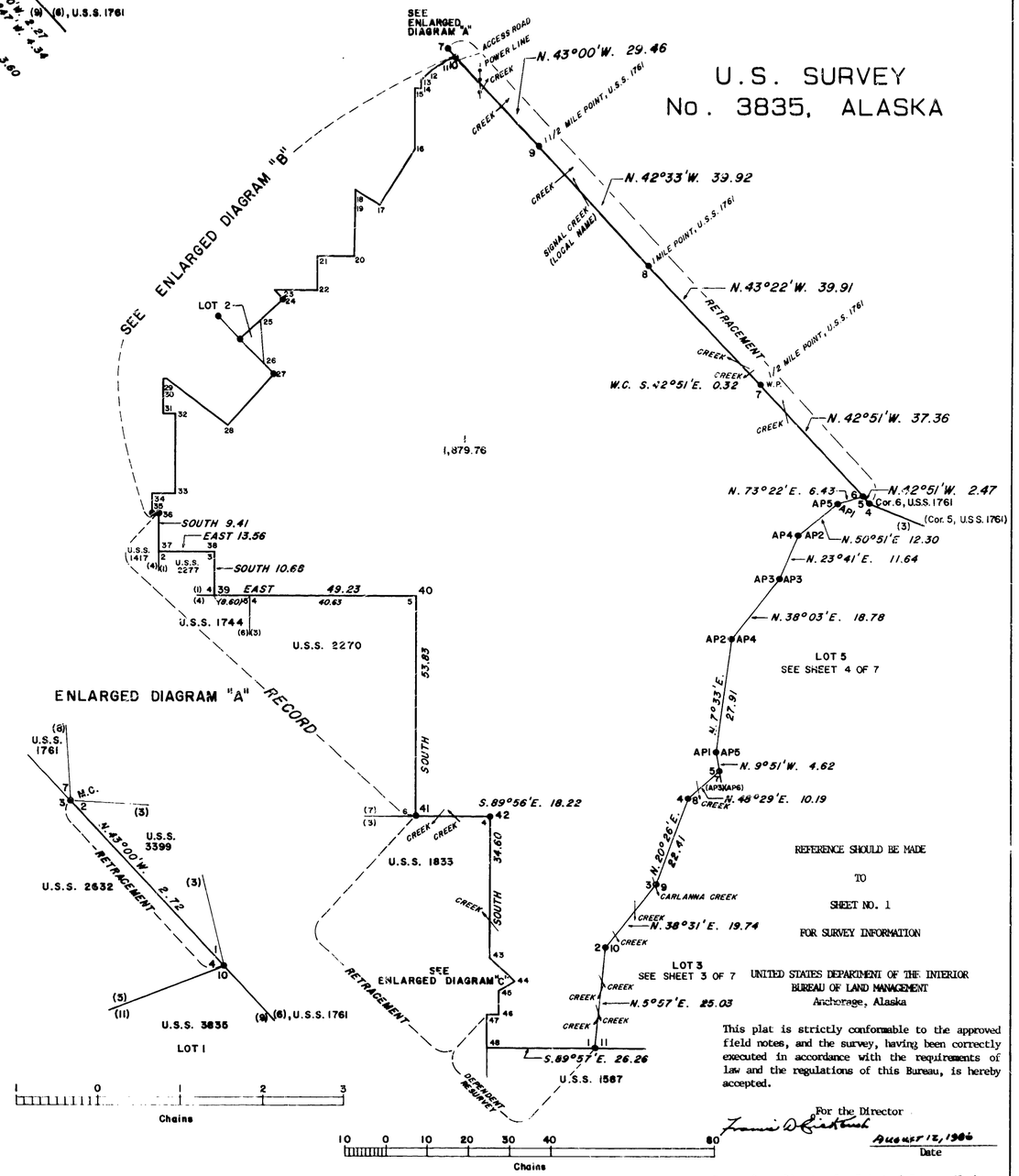
U. S. SURVEY
No. 3835, ALASKA

ENLARGED DIAGRAM "B"



ENLARGED DIAGRAM "C"

ENLARGED DIAGRAM "A"



REFERENCE SHOULD BE MADE

TO

SHEET NO. 1

FOR SURVEY INFORMATION

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Francis D. Gladieux

August 12, 1986
Date

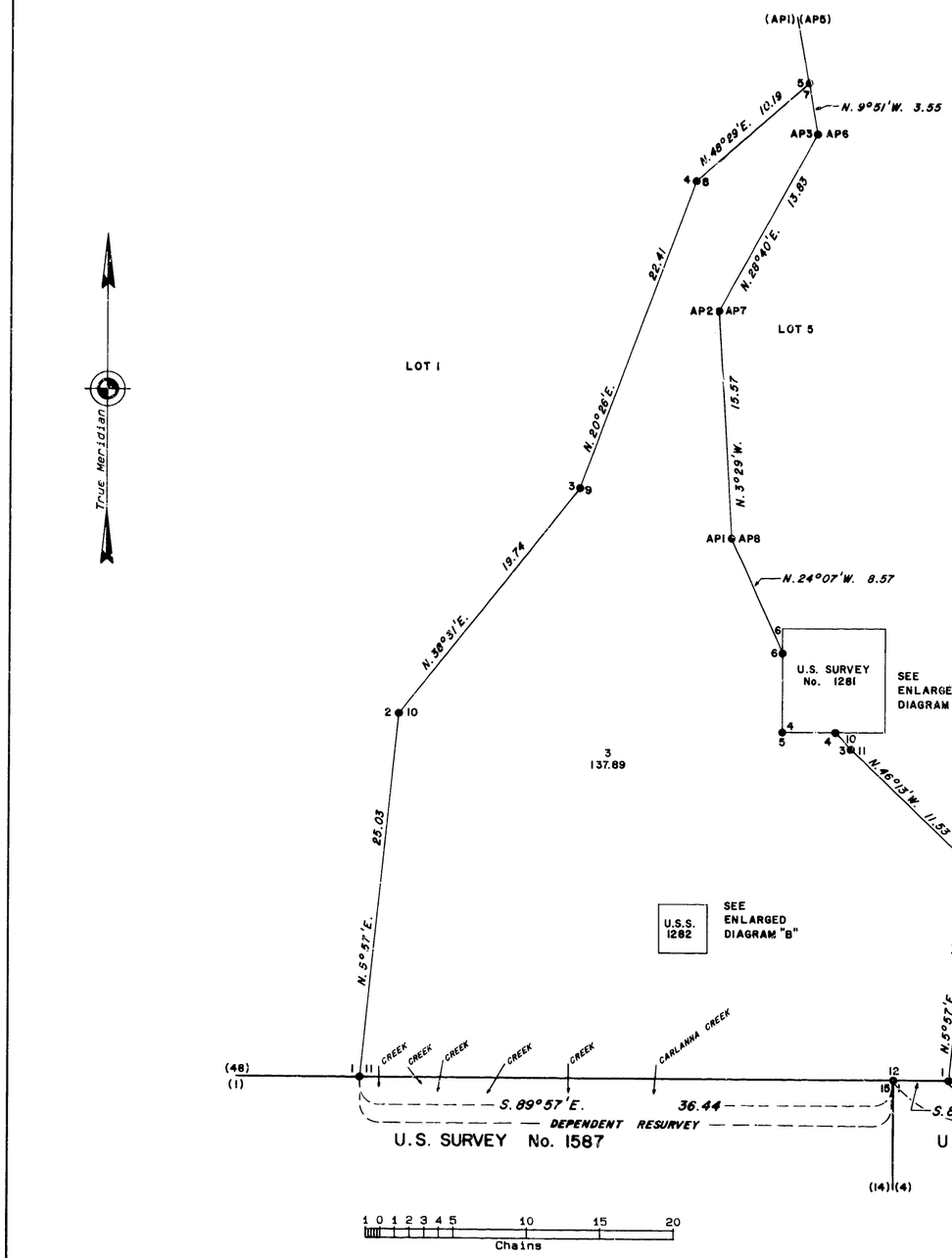
Deputy State Director for Cadastral Survey, Alaska

ST/J.E.F.

Officially Filed
DATE SEPTEMBER 8, 1986

ORIGINAL

Sheet 3 of 7 Sheets



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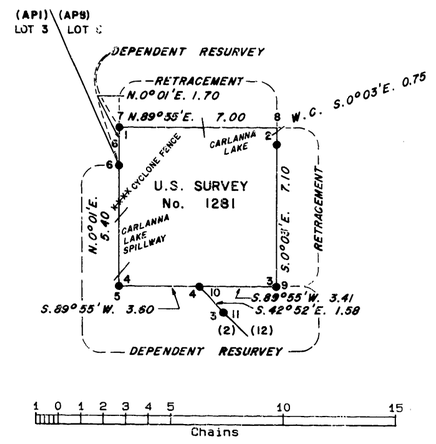


ENLARGED DIAGRAM "B"

U.S. SURVEY
No. 3835, ALASKA

REFERENCE SHOULD BE MADE

TO

SHEET NO. 1

FOR SURVEY INFORMATION

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Francis O. Eichbaum
August 12, 1986
Date

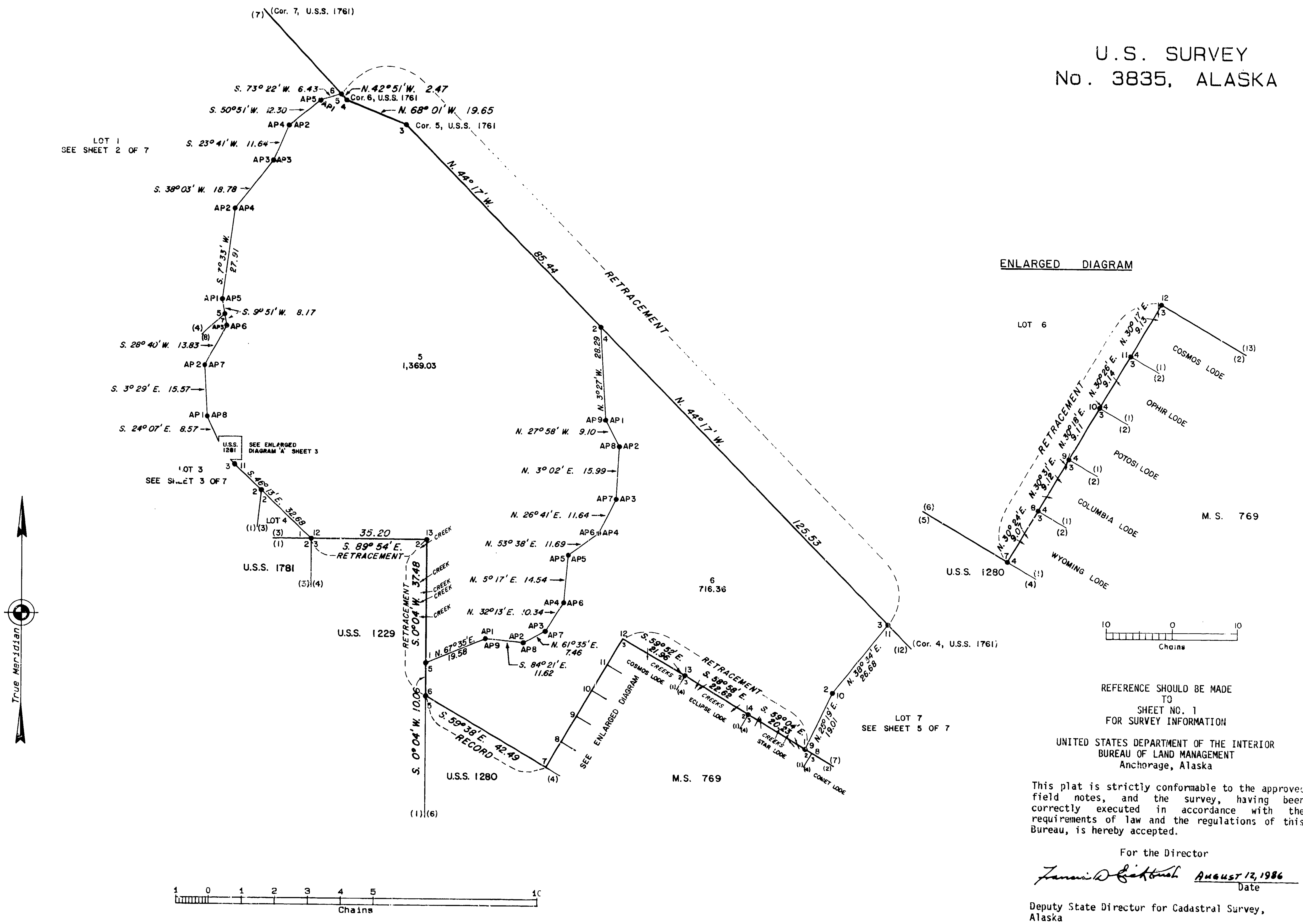
Deputy State Director for Cadastral Survey, Alaska

ST/J.E.F.

Officially Filed
DATE SEPTEMBER 8, 1986

ORIGINAL

U.S. SURVEY
No. 3835, ALASKA



REFERENCE SHOULD BE MADE
TO
SHEET NO. 1
FOR SURVEY INFORMATION

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

[signature] AUGUST 12, 1986
Date

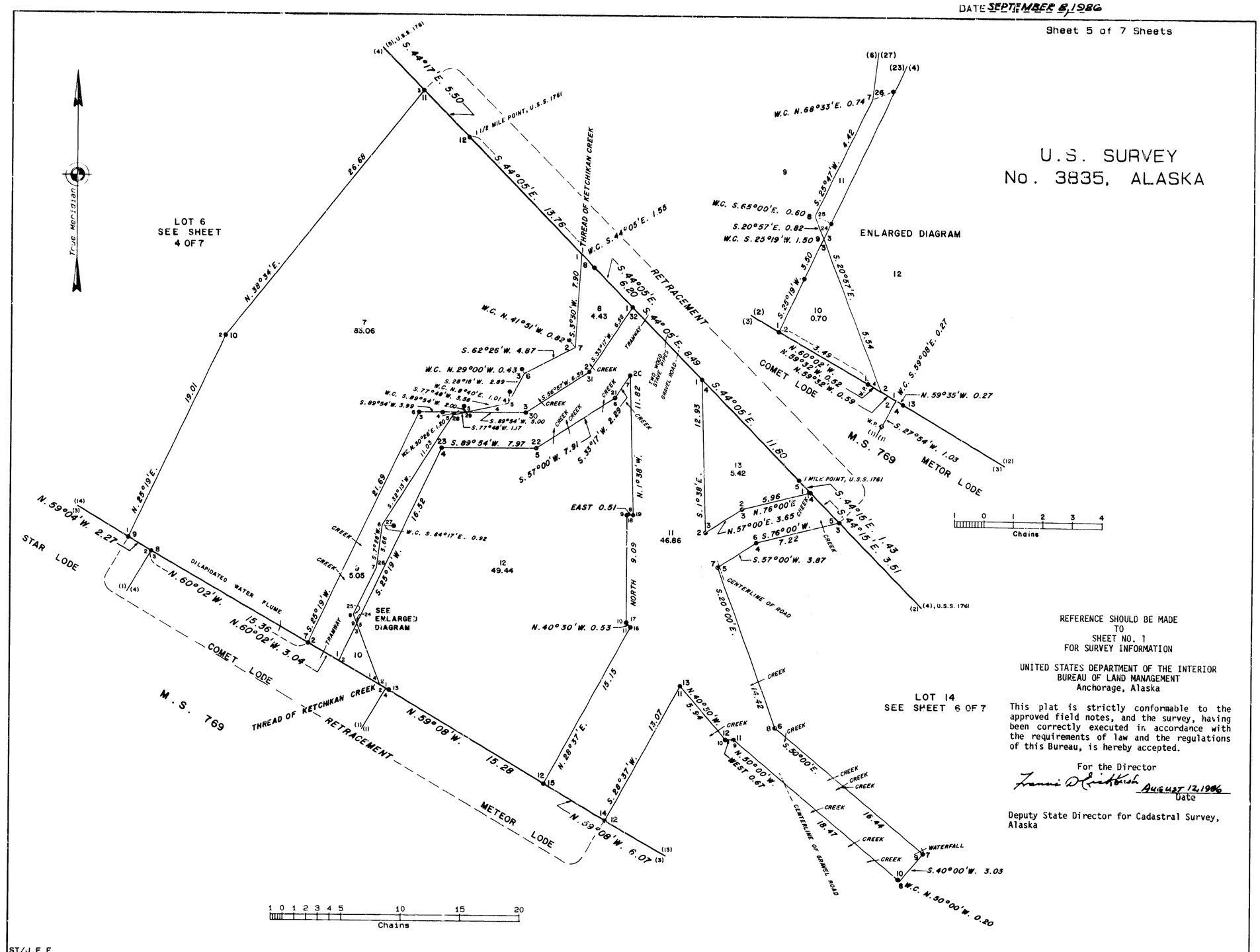
Deputy State Director for Cadastral Survey, Alaska

Officially Filed
DATE SEPTEMBER 8, 1986

ORIGINAL

Sheet 5 of 7 Sheets

U.S. SURVEY
No. 3835, ALASKA



REFERENCE SHOULD BE MADE
TO
SHEET NO. 1
FOR SURVEY INFORMATION

LOT 14
SEE SHEET 6 OF 7

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Francis D. Rickbusch — AUGUST 12, 1986
Date

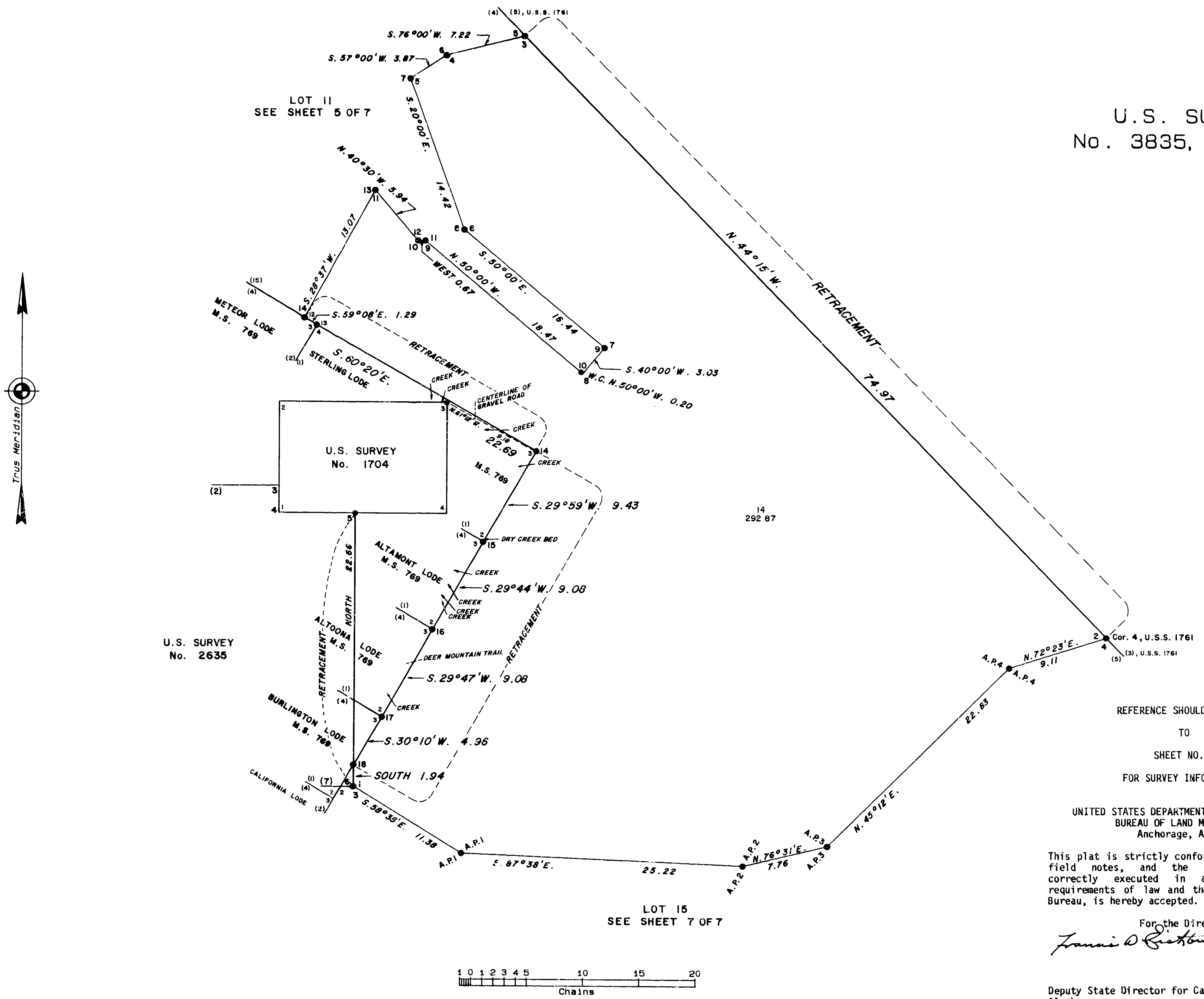
Deputy State Director for Cadastral Survey, Alaska

ST/J.E.F.

Officially Filed
DATE SEPTEMBER 8, 1986

ORIGINAL

U.S. SURVEY No. 3835, ALASKA



REFERENCE SHOULD BE MADE

TO

SHEET NO. 1

FOR SURVEY INFORMATION

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Francis D. Eickbush

August 12, 1986
Date

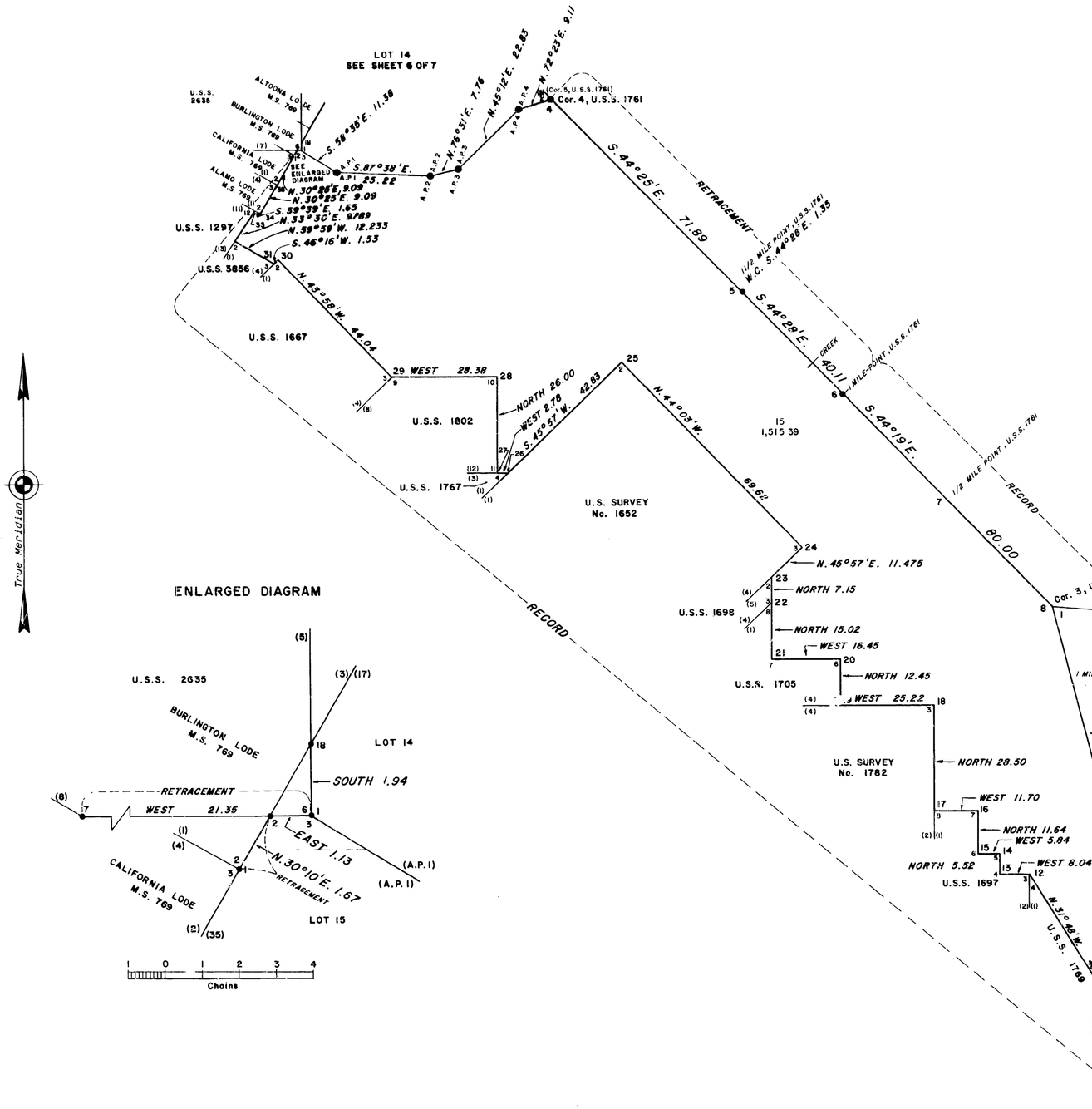
Deputy State Director for Cadastral Survey, Alaska

ST/J.E.F.

Officially Filed
DATE SEPTEMBER 8, 1986

ORIGINAL

Sheet 7 of 7 Sheets



U.S. SURVEY
No. 3835, ALASKA

REFERENCE SHOULD BE MADE

TO

SHEET NO. 1

FOR SURVEY INFORMATION

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

This plat is strictly conformable to the approved field notes, and the survey, having been correctly executed in accordance with the requirements of law and the regulations of this Bureau, is hereby accepted.

For the Director

Francis D. Lichtbach
AUGUST 12, 1986
Date

Deputy State Director for Cadastral Survey,
Alaska

ST/J.E.F.

ORIGINAL 276

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

1153

FIELD NOTES

OF

U.S. SURVEY NO. 3835

COMPRISING LOTS 1 THROUGH 15

THE DEPENDENT RESURVEY

OF PORTIONS OF U.S. SURVEY NOS. 1281, 1404 AND 1587,

THE RETRACEMENT OF PORTIONS OF MINERAL SURVEY NOS. 769 AND 1413

AND THE RETRACEMENT OF PORTIONS OF U.S. SURVEY NOS. 1207,

1229, 1281, 1417, 1761, 1781, 1833, 2090, 2632, 2635 AND 2796,

LOCATED ON REVILLAGIGEDO ISLAND, NEAR KETCHIKAN

GEOGRAPHIC POSITION OF

CORNER NO. 8, LOT 15, IDENTICAL WITH CORNER NO. 3,

U.S. SURVEY NO. 1761 AND IDENTICAL WITH CORNER NO. 1,

U.S. SURVEY NO. 6983, IS:

LATITUDE: 55°19'06.31" NORTH, LONGITUDE: 131°33'19.94" WEST

Of the _____ Meridian,

In the State of ALASKA

EXECUTED BY

David J. Clark, Cadastral Surveyor

Under amended special instructions dated August 8, 1983, approved May 16, 1984, which provided for the surveys included under U.S. Survey Number 3835, and assignment instructions dated May 21, 1984.

Survey commenced: May 28, 1984

Survey completed: September 17, 1984

U.S Survey No. 3835, Alaska

CHAINS	
	The following field notes are those of U.S. Survey No. 3835, comprising lots 1 through 15, the dependent resurvey of portions of U.S. Survey Nos. 1281, 1404 and 1587, the retracement of portions of Mineral Survey Nos. 769 and 1413, and the retracement of portions of U.S. Survey Nos. 1207, 1229, 1281, 1417, 1761, 1781, 1833, 2090, 2632, 2635 and 2796.
	Mineral Survey No. 769, was surveyed by Nathan B. Whitfield, U.S. Deputy Mineral Surveyor, in 1907.
	U.S. Survey Nos. 1207 and 1208, were surveyed by H.P. Crowther, U.S. Deputy Surveyor, in 1916.
	U.S. Survey Nos. 1229 and 1280, were surveyed by F.W. Williamson, U.S. Cadastral Engineer, in 1919.
	U.S. Survey Nos. 1271, 1281 and 1282, were surveyed by H.P. Crowther, U.S. Deputy Surveyor, in 1919.
	U.S. Survey No. 1297, was surveyed by F.W. Williamson, U.S. Cadastral Engineer, in 1920.
	U.S. Survey Nos. 1404 and 1417, were surveyed by H.P. Crowther, U.S. Deputy Surveyor, in 1922.
	Mineral Survey No. 1413, was surveyed by H.P. Crowther, U.S. Mineral Surveyor, in 1920.
	U.S. Survey No. 1508, was surveyed by H.P. Crowther, U.S. Deputy Surveyor, in 1923.
	U.S. Survey Nos. 1587, 1653, 1655, 1656 and 1658, were surveyed by H.P. Crowther, U.S. Deputy Surveyor, in 1925.
	U.S. Survey Nos. 1627, 1652, 1667, 1698, 1704, 1705 and 1744, were surveyed by Fred Dalhquist, Cadastral Engineer, in 1926.
	The subdivisional survey of U.S. Survey No. 1627, into lots 1 through 3, was surveyed by Clifford L. McKay, in 1963.
	The dependent resurvey and subdivision of lot 2, U.S. Survey No. 1627, was surveyed by Edward T. Prendergast, Supervisory Cadastral Surveyor, in 1972.
	U.S. Survey No. 1652A, was surveyed by John M. Short, Cartographer, in 1955.
	U.S. Survey No. 1665, was surveyed by Frank A. Metcalf, U.S. Deputy Surveyor, in 1926.
	U.S. Survey Nos. 1697 and 1732, were surveyed by Harold H. Waller, U.S. Deputy Surveyor, in 1926.
	U.S. Survey Nos. 1761, 1781 and 1782, were surveyed by Chas. P. Seelye, U.S. Transitman, in 1927.
	U.S. Survey No. 1767, was surveyed by Frank A. Metcalf, U.S. Deputy Surveyor, in 1927.
	U.S. Survey No. 1769, was surveyed by Harold H. Waller, U.S. Deputy Surveyor, in 1927.
	U.S. Survey No. 1802, was surveyed by Fred Dahlquist, U.S. Cadastral Engineer, in 1928.
	U.S. Survey Nos. 1833 and 1952, were surveyed by Floyd G. Betts, U.S. Cadastral Engineer, in 1930.

U.S. Survey No. 3835, Alaska

CHAINS

U.S. Survey No. 2090, was surveyed by Chas. P. Seelye, U.S. Transitman, in 1932.

U.S. Survey Nos. 2270 and 2277, were surveyed by Chas. P. Seelye, U.S. Transitman, in 1935.

U.S. Survey No. 2632, was surveyed by F.W. Williamson, Associate Cadastral Engineer, in 1945.

U.S. Survey No. 2635, was surveyed by F.W. Williamson, Associate Cadastral Engineer, in 1944.

U.S. Survey No. 2796, was surveyed by Leonard M. Berlin, Cadastral Engineer, in 1948.

U.S. Survey No. 3833, was surveyed by Clifford L. McKay, Cadastral Surveyor, in 1960.

U.S. Survey No. 3834 and 3856, were surveyed by Clifford L. McKay, Supervisory Cadastral Surveyor, in 1961.

U.S. Survey No. 6983, was surveyed by James T. Meek, Alfred D. Pons and Carl B. Lyon, Cadastral Surveyors, in 1982.

This survey, the dependent resurvey and retracement were executed in accordance with the specifications set forth in the Manual of Surveying Instructions, 1973, and amemded special instructions dated August 8, 1983.

Azimuth was obtained from direct observations of the sun and refer to the true meridian.

The geographic position of corner No. 8, Lot 15, identical with corner No. 3, U.S. Survey No. 1761 and identical with corner No. 1, U.S. Survey No. 6983, as computed from U.S. Survey No. 6983, is:

Latitude 55°19'06.31" N., Longitude 131°33'19.94" W.

The mean declination observed during the execution of this survey was 29° East, with deviations of 0 to 5°.

Preliminary Statement

Prior to the execution of this survey, it was necessary to dependently resurvey portions of U.S. Survey Nos. 1281, 1404 and 1587; and retrace portions of Mineral Survey Nos. 769 and 1413; and retrace portions of U.S. Survey Nos. 1207, 1229, 1281, 1417, 1761, 1781, 1833, 2090, 2632, 2635 and 2796.

The record of the dependent resurveys and retracements are incorporated into the body of these notes.

Lot 1

Beginning at the point for cor. No. 1, Lot 1, identical with cor. No. 11, Lot 3, on line 1-15, U.S. Survey No. 1587.

Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd.

Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
	S3835 L1 | L3 C1 | C11 S1587 1984
	from which
	A spruce, 22 ins. diam., bears N. 22° E., 54 lks. dist., mkd. C11 L3 S3835 BT.
	A spruce, 56 ins. diam., bears N. 64 1/2° W., 79 lks. dist., mkd. C1 L1 S3835 BT.
	From the cor. point an alum. post., 2 1/2 ins. diam., firmly set, projecting 8 ins. above ground, bears N. 88°21' W., 2.35 chs. dist, with alum. cap mkd., KTN BYPASS MON 3384 1983.
	N. 5°57' E., on line 1-2, Lot 1, identical with line 11-10, Lot 3.
	Gradual ascent through windfall trees, with dense brush of huckleberry and devil's club.
4.25	Enter stand of old growth spruce, hemlock and cedar, with underbrush of devil's club and huckleberry. Edge bears east and west.
7.05	Creek, 4 lks. wide, course S. 8° W.
8.45	Same creek, 3 lks. wide, course S. 17° E.
8.60	Base of steep ascent on SW slope.
13.00	Top of steep ascent on SW slope; continue gradual ascent through old growth of spruce, hemlock and cedar.
14.35	Creek, 4 lks. wide, course S. 20° W.
16.95	Same creek, 4 lks. wide, course S. 26° E.
25.03	Point for cor. No. 2, Lot 1, identical with cor. No. 10, Lot 3.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd.
	C2 / C10 L1 / L3 S3835 1984
	from which
	A cedar, 18 ins. diam., bears S. 51° E., 46 lks. dist., mkd. C10 L3 S3835 BT.
	A pine, 13 ins. diam., bears S. 20 1/4° W., 28 lks. dist., mkd. C2 L1 S3835 BT.
	N. 38°31' E., on line 2-3, Lot 1, identical with line 10-9, Lot 3.

Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
	Gradual ascent through spruce, hemlock and cedar, with sparse underbrush.
3.90	Creek, 3 lks. ide, course S. 31° E.
9.50	Top of ascent over SW slope, begin gradual descent over NE slope.
11.70	Creek, 2 lks. wide, course South.
14.70	South rim of gorge, 300 ft. above Carlanna Creek, rim bears N. 60° E. and N. 4° W.
19.10	Carlanna Creek, 30 lks. wide, course S. 18° E.
19.30	Base of steep ascent over N. side of gorge.
19.74	Point for cor. No. 3, Lot 1, identical with cor. No. 9, Lot 3. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with alum. cap mkd. C3 / C9 L1 / L3 S3835 1984 from which A hemlock, 15 ins. diam., bears S. 67° E., 33 lks. dist., mkd. C9 L3 S3835 BT. A spruce, 26 ins. diam., bears N. 87° W., 27 lks. dist., mkd. C3 L1 S3835 BT.
	N. 20°26' E., on line 3-4, Lot 1, identical with line 9-8, Lot 3. Steep ascent over N. side of gorge through old growth of spruce, hemlock and cedar, with dense underbrush of devil's club.
5.10	North rim of gorge, 300 ft. above Carlanna Creek; begin gradual ascent over SW slope.
12.90	Base of steep ascent over SW slope.
15.10	Top of steep ascent; continue gradual ascent over SW slope.
22.41	Point for cor. No. 4, Lot 1, identical with cor. No. 8, Lot 3. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 27 ins. in the ground, with alum. cap mkd.

Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
	S3835 L1 C4 C8 L3 S3835 1984 from which A hemlock, 10 ins. diam., bears S. 6 1/2° E., 24 lks. dist., mkd. C8 L3 S3835 BT. A spruce, 15 ins. diam., bears N. 73 3/4° W., 40 lks. dist., mkd. C4 L1 S3835 BT.
	N. 48°29' E., on line 4-5, Lot 1, identical with line 8-7, lot 3. Gradual ascent through old growth of spruce, hemlock and cedar, with scattered windfalls and underbrush of devil's club.
1.30	Cliff, 18 ft. high, top bears S. 38° E. and N. 38° W.
3.85	Creek, 2 lks. wide, course S. 10° E.
10.19	Point for cor. No. 5, Lot 1, identical with cor. No. 7, Lot 3. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 27 ins. in the ground, with alum. cap mkd. S3835 L1 C5 L5 C7 L3 S3835 1984 from which A hemlock, 8 ins. diam., bears S. 30 3/4° W., 27 lks. dist., mkd C7 L3 S3835 BT. A cedar, 22 ins. diam., bears N. 54 1/2° W., 12 lks. dist., mkd C5 L1 S3835 BT. This cor. is located on the crest of a ridge which runs from Carlanna Lake Dam to the top of Ward Mountain.
	Thence on line 5-6, Lot 1, identical with a portion of line 6-5, Lot 5, along the crest of a ridge which runs from the top of Ward Mountain to the west end of Carlanna Lake Dam through Angle Point Nos. 1 through 5, Lot 1, identical with Angle Point Nos. 5 through 1, Lot 5. N. 9°51' W., along the general crest of the ridge.

Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
	Gradual ascent through old growth spruce, hemlock and cedar, with sparse underbrush.
4.62	Point for Angle Point No. 1, Lot 1, identical with Angle Point No. 5, Lot 5.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 2 ins. in the ground and in a mound of stone, 3 ft. base, to top, with alum. cap mkd.
	S3835 AP1 L1 / AP5 L5 1984
	from which
	A hemlock, 13 ins. diam., bears N. 72° E., 30 lks. dist., mkd. AP5 L5 S3835 BT.
	A cedar, 20 ins. diam., bears S. 25 1/4° W., 46 lks. dist., mkd. AP1 L1 S3835 BT.
	This Angle Point is located on the crest of a ridge.
	N. 7°33' E., along the general crest of a ridge.
	Gradual ascent through old growth of hemlock and cedar, with sparse underbrush.
27.91	Point for Angle Point No. 2, Lot 1, identical with Angle Point No. 4, Lot 5.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with alum. cap mkd.
	AP2 L1 / AP4 L5 S3835 1984
	from which
	A hemlock, 10 ins. diam., bears S. 57 3/4° E., 28 lks. dist., mkd. AP4 L5 S3835 BT.
	A hemlock, 14 ins. diam., bears N. 84 3/4° W., 35 lks. dist., mkd. AP2 L1 S3835 BT.
	This Angle Point is located on the crest of a ridge.
	N. 38°03' E., along the general crest of a ridge.
	Gradual ascent through old growth of hemlock with sparse underbrush.
18.78	Point for Angle Point No. 3, Lot 1, identical with Angle Point No. 3, Lot 5.

Lot 1, U.S. Survey No. 3835, Alaska

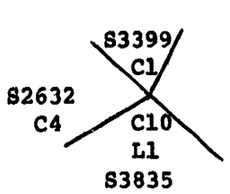
CHAINS	
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with alum. cap mkd. AP3 / AP3 L1 / L5 S3835 1984 from which A hemlock, 10 ins. diam., bears N. 12 1/2° E., 64 lks. dist., mkd. AP3 L1 S3835 BT. A hemlock, 8 ins. diam., bears S. 65° E., 30 lks. dist., mkd. AP3 L5 S3835 BT. This Angle Point is located on the crest of a ridge.
	N. 23°41' E., along the general crest of a ridge. Gradual ascent through smaller old growth of hemlock.
11.64	Point for Angle Point No. 4, Lot 1, identical with Angle Point No. 2, Lot 5. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 27 ins. in the ground, with alum. cap mkd. S3835 AP4 / AP2 L1 / L5 S3835 1984 from which A hemlock, 9 ins. diam., bears S. 85 1/2° E., 7 lks. dist., mkd. AP2 L5 S3835 BT. A hemlock, 7 ins. diam., bears S. 65° W., 48 lks. dist., mkd. AP4 L1 S3835 BT. This Angle Point is located on the crest of a ridge.
	N. 50°51' E., along the general crest of a ridge. Ascend through smaller old growth of hemlock with sparse underbrush.
12.30	Point for Angle Point No. 5, Lot 1, identical with Angle Point No. 1, Lot 5. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 27 ins. in the ground, with alum. cap mkd. S3835 L1 AP5 / AP1 L5 S3835 1984

CHAINS	
	from which A hemlock, 13 ins. diam., bears S. 56 1/2° E., 45 lks. dist., mkd. AP1 L5 S3835 BT. A hemlock, 8 ins. diam., bears S. 70 1/4° W., 21 lks. dist., mkd. AP5 L1 S3835 BT. This Angle Point is located on the crest of a ridge.
	N. 73°22' E., along the general crest of a ridge. Ascend through scrub hemlock with sparse underbrush.
6.43	Point for cor. No. 6, Lot 1, identical with cor. No. 5, Lot 5, on line 6-7, U.S. Survey No. 1761. Set an iron post, 28 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with brass cap mkd. S3835 L1 C6 C5 L5 S3835 1984 from which A hemlock, 8 ins. diam., bears N. 61° E., 28 lks. dist., mkd. X BT. A hemlock, 6 ins. diam., bears S. 7 1/2° E., 64 lks. dist., mkd. C5 L5 S3835 BT. From this point, cor. No. 4, Lot 5, identical with cor. No. 6, U.S. Survey No. 1761, bears S. 42°51' E., 2.47 chs. dist., hereinafter described.
	N. 42°51' W., on line 6-7, Lot 1, identical with a portion of line 6-7, U.S. Survey No. 1761.
4.60	Top of vertical cliff, 200 ft. high, edge bears N. 80° E. and S. 80° W.; from bottom of cliff descend over rocky ground with scattered scrub hemlock.
24.90	Enter dense stand of old growth spruce, hemlock and cedar, with dense underbrush of devil's club and huckleberry, edge bears N. 40° E. and S. 40° W.
27.90	Creek, 2 lks. wide, course N. 14° W.
37.04	The point selected for the witness cor. to cor. No. 7, Lot 1, identical with the witness point to the 1/2 Mi. point, line 6-7, U.S. Survey No. 1761, monumented with an iron post, 1 in. diam., firmly set, projecting 10 ins. above the ground, with brass cap mkd. WC FE S1761 1/2M 1927, from which the original bearing trees A hemlock, 17 ins. diam., bears S. 24 3/4° W., 16 lks. dist., with no visible scribing on a partially healed blaze. (Record, S. 18 1/2° W.)

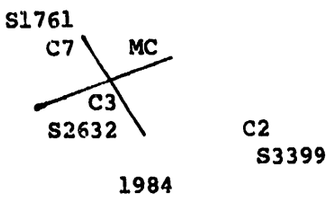
Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
	A hemlock, 23 ins. diam., bears S. 61 1/2° W., 28 lks. dist., mkd. S1761 WP 1/2. (Record, S. 57 1/4° W.)
	Add the marks 1984 on the brass cap.
	No new accessories taken.
37.36	True point for cor. No. 7, Lot 1, identical with the true point for the 1/2 Mi. point, line 6-7, U.S. Survey No. 1761; not monumented due to unsafe ground.
	N. 43°22' W., on line 7-8, Lot 1, identical with the line from the 1/2 Mi. point to the 1 Mi. point, U.S. Survey No. 1761.
	Descend through large old growth of hemlock, spruce and cedar, with medium dense underbrush of devil's club.
3.75	Creek, 6 lks. wide, course S. 53° W.
7.55	Creek, 7 lks. wide, course N. 63° W.
19.20	Leave timber enter fairly level marshy area with scattered scrub hemlock, edge bears North and South.
34.50	Enter heavy stand of old growth hemlock, spruce and cedar, with medium dense underbrush of huckleberry and devil's club, edge bears North and South. Begin sharp descent.
39.91	Point for cor. No. 8, Lot 1, identical with the 1 Mi. point, line 6-7, U.S. Survey No. 1761, monumented with an iron post, 2 ins. diam., firmly set, projecting 8 ins. above the ground with brass cap mkd. FE S1761 1M 1927, from which the remains of the original bearing trees
	A rotted hemlock stump, 36 ins. diam., bears S. 10 1/2° E., 12 lks. dist, no visible blaze. (Record, S. 1 1/2° E., 11 lks.)
	A hemlock snag, 27 ins. diam., bears N. 51° W., 27 lks. dist., with rotted out blaze. (Record, N. 51 3/4° W., 26 lks.)
	Add the marks 1984 on the brass cap.
	And a new bearing tree
	A hemlock, 10 ins. diam., bears S. 35 1/4° W., 9 lks. dist., mkd. C8 L1 S3835 BT.
	N. 42°33' W., on line 8-9, Lot 1, identical with the line from the 1 Mi. point to the 1 1/2 Mi. point, line 6-7, U.S. Survey No. 1761.
	Sharp descent through old growth of spruce, hemlock and cedar, with medium dense underbrush of devil's club and huckleberry.
23.30	Signal Creek (local name), 30 lks. wide, course N. 30° W.; sharp ascent over bluff.
25.20	Top of bluff above left bank of Signal Creek (local name), 70 ft. high, bears North and South.
28.90	More gradual ascent over NE slope.

Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
30.30	Creek, 1 lk. wide, course N. 50° E.
39.92	Point for cor. No. 9, Lot 1, identical with the 1 1/2 Mi. point, line 6-7, U.S. Survey No. 1761, monumented with an iron post, 1 in. diam, firmly set, flush with the ground, with brass cap mkd. FE S1761 1 1/2 M 1927, from which the original bearing tress A hemlock snag, 10 ins. diam., bears S. 7° E., 41 lks. dist., with a healed blaze. (Record, S. 60 1/2° E., 43 lks.) A cedar, 40 ins. diam., bears N. 67 3/4° W., 6 lks. dist., mkd. FE S1761 BT, on a partially healed blaze. (Record, N. 70° W., 7 lks.) Add the marks 1984 on the brass cap. And a new bearing tree A hemlock, 7 ins. diam., bears S. 4 3/4° E., 56 lks. dist., mkd. C9 L1 S3835 BT.
	N. 43°00' W., on line 9-10, Lot 1, identical with a portion of line 6-7, U.S. Survey No. 1761, from the 1 1/2 Mi. point to cor. No. 7. Sharp descent through old growth of spruce, hemlock and cedar, with medium dense undergrowth of devil's club and huckleberry.
7.20	Ground levels off.
13.10	Creek, 2 lks. wide, course N. 47° E.
19.70	Creek, 5 lks. wide, course N. 30° E.
20.43	Old power line, not in use, bears North and South.
28.95	Approximate center line of the access road to Ward Lake. 35 lks. wide, bears N. 72° E. and S. 72° W.
29.46	Point for cor. No. 10, Lot 1, identical with cor. No. 4, U.S. Survey No. 2632 and identical with cor. No. 1, U.S. Survey No. 3399, on line between the 1 1/2 Mi. point and cor. No. 7, line 6-7, U.S. Survey No. 1761, position determined from the remains of the original accessories. A stone Forest Service work marker, bears S. 43° E., 76 lks. dist. A hemlock stump, bears N. 71° W., 24 lks. dist., badly decayed, no scribing visible. (Record, West.) At the cor. point Set an iron post, 28 ins. long, 2 1/2 ins. diam., 25 ins. in the ground and in a collar of stone, 2 ft. diam. with brass cap mkd.  1984

Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
	And a new accessory A metal power pole, bears N. 86° W. 16 lks. dist. From the cor. point, cor. No. 7, U.S. Survey No. 1761, identical with cor. No. 3, U.S. Survey No. 2632, a meander cor. and identical with cor. No. 2, U.S. Survey No. 3399, a meander cor., bears N. 43°00' W., 2.72 chs. dist., the corner position being determined from the original bearing trees A spruce, 26 ins. diam., bears S. 61° E., 82 lks. dist., mkd. C7 FE S1761 BT S2632 MC C3 on partially healed blaze. A spruce stump, 36 ins. diam., bears S. 19 1/2° W., 10 lks. dist., badly decayed with no blaze. A hemlock, 14 ins. diam., bears N. 74° W., 39 1/2 lks. dist., with a healed blaze. At the cor. point Set an alum. rod, 18 ins. long, 3/4 in. diam., cemented in bedrock, 12 ins. in a drill hole, with alum. cap mkd.  1984 No new acessories taken.
	Thence with the record bearings and distances between cor. Nos. 10 through 24, Lot 1, which were not retraced and are ommitted from this field note record. Cor. Nos. 11 through 23 are designated as shown on the plat of this survey.
	From cor. No. 24, Lot 1, identical with cor. No. 2, U.S. Survey No. 1207, hereinafter described. S. 47°05' W., on line 24-25, Lot 1, identical with a portion of line 2-3, U.S. Survey No. 1207. Over rolling land, through scattered spruce, hemlock and cedar, with medium dense underbrush of huckleberry.
0.60	Creek, 10 lks. wide, course N. 52° W.
7.58	Point for cor, No. 25, Lot 1, identical with the point for cor. No. 3, Lot 2, hereinafter described.
	S. 4°34' E., on line 25-26, Lot 1, identical with line 3-2, Lot 2, hereinafter described.
7.77	Point selected for the witness cor. to cor. No. 26, Lot 1, identical with the witness cor. to cor. No. 2, Lot 2, hereinafter described.
8.57	Lake, shore bears S. 7° E. and N. 85° W.

Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
10.8	True point for cor. No. 26, Lot 1, identical with the true point for cor. No. 2, Lot 2, hereinafter described.
	S. 44°50' E., on line 26-27, Lot 1, identical with a portion of line 2-3, U.S. Survey No. 2090.
2.20	Leave lake, shore bears N. 14° E. and S. 14° W.
3.74	Point for cor. No. 27, Lot 1, identical with cor No. 3, U.S. Survey No. 2090, hereinafter described.
	Thence with the record bearings and distances between cor. Nos. 27 through 35, Lot 1, which were not retraced and are ommitted from this field note record. Cor. Nos. 28 through 34 are designated as shown on the plat of this survey.
	From cor. No. 35, Lot 1, identical with cor. No. 2, U.S. Survey No. 1665, on line 2-3, U.S. Survey No. 1417; the bedrock at the original cor. position has crumbled away, position determined from the remains of an original bearing tree A spruce stump, 36 ins. diam., bears S. 81° E., 25 lks. dist., badly decayed, no scribing visible. At the cor. point Set an alum. rod, 18 ins. long, 3/4 in. diam., cemented in bedrock, 7 ins. in a drillhole, with alum. cap mkd. S3835 L1 C35 | S1665 C2 S1417 1984 And new bearing trees A hemlock, 18 ins. diam., bears S. 71 1/4° E., 18 lks. dist., mkd. S1417 BT. A hemlock, 8 ins. diam., bears S. 69 3/4° W., 20 lks. dist., mkd. S1417 BT. East, on line 35-36, Lot 1, identical with a portion of line 2-3, U.S. Survey No. 1417. Sharp ascent through old growth of spruce, hemlock and cedar, with medium dense underbrush of devil's club and huckleberry.
0.40	Top of ascent, continue over fairly level benchland.
1.74	Point for cor. No. 36, Lot 1, identical with cor. No. 3, U.S. Survey No. 1417, monumented with a greenstone, 12 x 9 x 24 ins., firmly set, flush with the ground, mkd. 3 1417, with an X on top, from which the original bearing trees A hemlock, 23 ins. diam., bears N. 50°15' E., 24 lks. dist., mkd. 3 1417 on partially healed blaze.

Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
	A spruce, 17 ins. diam., bears S. 78°40' E., 30 lks. dist., mkd. 1417 on partially healed blaze.
	At the cor. point
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd.
	S3835 L1 C3 | C36 S1417 1984
	No new accessories taken.
	Bury the marked stone alongside the alum. post.

	Thence with the record bearings and distances between cor. Nos. 36 through 41, Lot 1, which were not retraced and are omitted from this field note record. Cor. Nos. 37 through 40 are designated as shown on the plat of this survey.

	From cor. No. 41, Lot 1, identical with cor. No. 6, U.S. Survey No. 2270, on line 3-4, U.S. Survey No. 1833, monumented with an iron post, 1 in. diam., firmly set, projecting 16 ins. above the ground, with brass cap mkd., S2270 C6 1935, from which the remains of the original bearing trees
	A rootwad, of a fallen tree, bears N. 20° E., 26 lks. dist., no markings visible.
	A rootwad, of a fallen tree, bears S. 2° E., 26 lks. dist., no markings visible.
	Add marks to read
	S3835 S2270 | L1 C6 | C41 S1833 1984 1935
	No new acessories available.
	The cor. falls in an area which was logged several years ago and is covered by dense brush of devil's club, thimbleberry and huckleberry, with some small spruce and hemlock.
	S. 89°56' E., on line 41-42, Lot 1, identical with a portion of line 3-4, U.S. Survey No. 1833.
	Sharp ascent over SW slope.
2.40	Enter stand of old growth spruce, hemlock and cedar, with medium dense underbrush of huckleberry and devil's club, edge bears North and South.
5.30	Top of sharp ascent; continue gradual ascent.

Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
5.90	Creek, 3 lks. wide, course S. 40° W.
9.10	Creek, 3 lks. wide, course N. 45° W.
18.22	Point for cor. No. 42, Lot 1, identical with cor. No. 4, U.S. Survey No. 1833, monumented with an iron post, 2 ins. diam., firmly set, projecting 10 ins. above the ground, with brass cap mkd., C4 S1833 1930, from which the original bearing trees A cedar, 16 ins. diam., bears S. 20° E., 42 1/2 lks. dist., mkd. C4 S1833 on partially healed blaze. A cedar, 18 ins. diam., bears N. 89° W., 25 1/2 lks. dist., mkd. C4 S1833 on partially healed blaze. (Record, N. 83° W.) Add marks to read S3835 L1 C4 | C42 S1833 1984 1930 No new accessories taken.

South, on line 42-43, Lot 1, identical with line 4-5, U.S. Survey No. 1833.

Gradual descent across West facing slope, through scattered cedar, hemlock and spruce, with medium dense underbrush of huckleberry.

17.00	Timber becomes larger and more dense.
21.10	Begin sharp descent over rocky, broken ground.
25.00	Creek, 4 lks. wide, course N. 40° W.; begin sharp ascent over NE slope.
28.00	Top of ascent, continue over fairly level ground.
31.00	Begin gradual descent over SW slope.
34.60	Point for cor. No. 43, Lot 1, identical with cor. No. 5, U.S. Survey No. 1833 and identical with cor. No. 2, M.S. No. 1413, position determined from the remaining original bearing trees A hemlock stump, 48 ins. diam., bears S. 41 1/4° W., 18 lks. dist., badly decayed, no marks visible. (Record, S. 26° W.) A hemlock snag, 18 ins. diam., bears N. 29 1/4° W., 28 lks. dist., mkd. C2 S1413 C5 on a nearly rotted blaze. (Record, N. 25 1/2° W.) From this point, the original monument, a granite stone, 10 x 10 x 28 ins., mkd. 5 S1833 2 S1413 with an X on top, was found lying down hill approximately 10 lks., in a disturbed position. At the cor. point

Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd. S3835 S1833 L1 C5 C43 C2 S1413 1984 And new bearing trees A hemlock, 15 ins. diam., bears S. 71° E., 24 lks. dist., mkd. C43 L1 S3835 BT. A hemlock, 15 ins. diam., bears S. 50° W., 39 lks. dist., mkd. C2 S1413 BT. Bury the marked stone alongside the alum. post. From the cor. point, an iron pipe, 1 1/2 ins. diam., firmly set, projecting 18 ins. above the ground, bears N. 88°05' E., 1.56 chs. dist.
	S. 46°59' E., on line 43-44, Lot 1, identical with line 2-3, M.S. No. 1413. Sharp ascent through old growth of spruce, hemlock and cedar, with medium dense underbrush of devil's club and huckleberry.
5.20	Top of sharp ascent, continue more gradual ascent.
8.33	Point for cor. No. 44, Lot 1, identical with cor. No. 3, M.S. 1413, monumented with an iron post, 2 1/2 ins. diam., firmly set, projecting 1 in. above the ground, with brass cap mkd., S1413 C3 1948, from which the original bearing trees A cedar, 48 ins. diam., bears S. 69°26' W., 21 lks. dist., mkd. S1413, with other fragmentary scribing on partially healed blaze. A hemlock, 8 ins. diam., bears N. 29° W. 11 lks. dist., with a healed blaze. Add marks to read S3835 S1413 L1 C3 C44 1984 1948 From the cor. point, an iron pipe, 1 1/2 ins. diam., firmly set, projecting 14 ins. above the ground, bears N. 79°32' E., 1.41 chs. dist.
	S. 59°58' W., on line 44-45, Lot 1, identical with a portion of line 3-4, M.S. No. 1413. Sharp descent through old growth of spruce, cedar and hemlock, with medium dense underbrush of devil's club and huckleberry.

Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
4.52	True point for cor. No. 45, Lot 1, identical with the true point point for cor. No. 2, U.S. Survey No. 2796, on line 3-4, M.S. No. 1413; not monumented, falls in creek.

South, on line 45-46, Lot 1, identical with line 2-3, U.S. Survey No. 2796.

0.265 The point selected for witness cor. to cor. No. 45, Lot 1, identical with the witness cor. to cor. No. 2, U.S. Survey No. 2796, monumented with an iron post, 2 1/2 ins. diam., firmly set, projecting 1 in. above the ground, with brass cap mkd. WC S1413 S2796 C2 1948, from which the original bearing trees

A hemlock, 33 ins. diam., bears N. 35°45' E., 11 lks. dist., mkd. WC S2796 C2 BT, on partially healed blaze.

A hemlock, 18 ins. diam., bears S. 22°30' W., 18 lks. dist., no markings visible on partially healed and rotted blaze.

Add marks to read

WC
S1413

S2796 | C45
C2 | L1
S3835

1984
1943

No new acessories taken.

Over rolling land, through old growth of spruce, hemlock and cedar, with medium dense underbrush of devil's club and huckleberry.

5.885 Point for cor. No. 46, Lot 1, identical with cor. No. 3, U.S. Survey No. 2796, monumented with an iron post, 2 1/2 ins. diam., firmly set, projecting 4 ins. above the ground, with brass cap mkd. S2796 C3 1948, from which the original bearing trees

A hemlock, 16 ins. diam., bears S. 23 1/2° E., 18 lks. dist., with a healed blaze.

A hemlock, 18 ins. diam., bears N. 43 1/2° W. 7 lks. dist., with a healed blaze.

Add marks to read

S3835
S2796 | L1
C3 | C46

1984
1948

No new acessories taken.

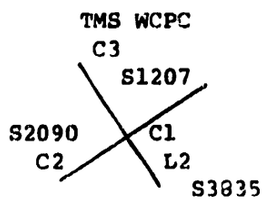
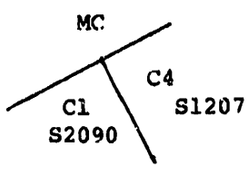
N. 89°49' W., on line 46-47, Lot 1, identical with a portion of line 3-4, U.S. Survey No. 2796.

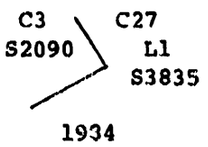
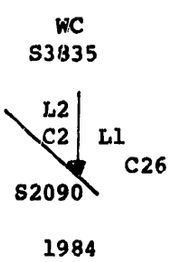
Lot 1, U.S. Survey No. 3835, Alaska

CHAINS	
	Over fairly level bench land, through old growth of spruce, hemlock and cedar, with medium dense underbrush of devil's club and huckleberry.
2.883	Point for cor. No. 47, Lot 1, identical with cor. No. 3, U.S. Survey No. 1404, on line 3-4, U.S. Survey No. 2796, monumented with a granite stone, 32 x 12 x 4 ins., firmly set, 24 ins. in the ground, mkd. 3 1404 with an X on top, from which the original bearing trees A spruce, 24 ins. diam., bears S. 58°45' E., 37 lks. dist., with a healed blaze. A spruce, 20 ins. diam., bears N. 85°52' W., 24 lks. dist., with a healed blaze. At the cor. point Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with alum. cap mkd. S2796 C3 | C47 S1404 | L1 | S3835 1984 No new acessories taken. Bury the marked stone alongside the alum. post.
	South, on line 47-48, Lot 1, identical with a portion of line 3-2, U.S. Survey No. 1404. Over fairly level bench land, through old growth of spruce, hemlock and cedar, with medium dense underbrush of devil's club and huckleberry.
3.20	Begin sharp descent over SW slope.
7.42	Point selected for the witness cor. to cor. No. 48, Lot 1, identical with the witness cor. to cor. No. 1, U.S. Survey No. 1587, on line 3-2, U.S. Survey No. 1404. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 25 ins. in the ground, with alum. cap mkd. WC | S3835 | L1 | C48 S1404 —— | C1 | S1587 1984 from which A hemlock, 8 ins. diam., bears N. 76° E., 17 lks. dist., mkd. X BT. A hemlock, 10 ins. diam., bears N. 27 1/4° W., 24 lks. dist., mkd. X BT.

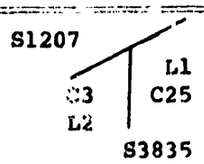
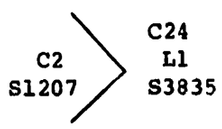
CHAINS	
0.17	True point for cor. No. 48, Lot 1, identical with the true point for cor. No. 1, U.S. Survey No. 1587, at the intersection of the record distances from cor. No. 3, U.S. Survey No. 1404, and cor. No. 15, U.S. Survey No. 1587, not monumented due to unsafe ground, there is no remaining evidence of the original corner. The true point for the cor. falls on a rock cut, 30 ft. high, on the northerly side of the Tongass Highway.
	S. 89°57' E., on line 48-1, Lot 1, identical with a portion of line 1-15, U.S. Survey No. 1587.
0.20	Point for a witness point on line 48-1, Lot 1, identical with the witness point for line 1-15, U.S. Survey No. 1587. Set an iron post, 2 1/2 ins. diam., 28 ins. long, 16 ins. in the ground and in a mound of stone, 3 ft. diam. base, to top, with brass cap mkd. WP S3835 L1 --- S1587 1984 from which A hemlock, 10 ins. diam., bears N. 44 1/4° E., 42 lks. dist., mkd. X BT. A spruce, 5 ins. diam., bears N. 61 3/4° W., 9 lks. dist., mkd. X BT. Gradual ascent across SW slope, through old growth of spruce, hemlock and cedar, with medium dense underbrush of devil's club and huckleberry.
16.70	Top of ascent; begin gradual descent.
26.26	Corner No. 1, Lot 1, identical with cor. No. 11, Lot 3, on line 1-15, U.S. Survey No. 1587 and point of beginning.
	Lot 2
	Beginning at the point for cor. No. 1, Lot 2, identical with cor. No. 2, U.S. Survey No. 2090 and identical with cor. No. 3, U.S. Survey No. 1207, monumented with an iron post, 2 1/2 ins. diam., firmly set, projecting 12 ins. above the ground, with brass cap mkd. TMS WCPC C3 S1207 S2090 C2 1915-61, from which the original bearing trees A cedar, 58 ins. diam., bears S. 27°10' E., 27 lks. dist., mkd. S2090 C2 BT on partially healed blaze. (Record, 30 lks.) A hemlock stump, 18 ins. diam., bears N. 4 3/4° W., 23 lks. dist., with no visible markings. (Record, N. 8°07' W.) Add marks to read

Lot 2, U.S. Survey No. 3835, Alaska

CHAINS	
	 1984 1915-61
	And a new bearing tree A hemlock, 7 ins. diam., bears S. 5 1/2° E., 56 lks. dist., mkd. X BT. From this point, cor. No. 1, U.S. Survey No. 2090, identical with cor. No. 4, U.S. Survey No. 1207, both of which are meander cor., bears N. 42°52' W., 7.70 chs. dist., monumented with a schistose boulder, 3 x 5 ft., firmly set, projecting 6 ins. above bedrock, mkd. MC1 S2090 TMS WCPC with an X on top, from which original bearing objects A schistose boulder, 10 x 10 x 7 ft., bears N. 38°08' E., 80 lks. dist., mkd. B+O 4M. TMS WCPC MC1 S2090. A schistose boulder, 2 x 3 ft., flush with beach surface, bears S. 47°40' W., 16 lks. dist, mkd. MC4 S2090 B+O. At the cor. point Set an alum. rod, 18 ins. long, 3/4 ins. diam., cemented 12 ins. in a drill hole, in original cor. stone, with alum. cap mkd.  1984 No new acessories taken. S. 44°50' E., on line 1-2, Lot 2, identical with a portion of line 2-3, U.S. Survey No. 2090. Over fairly level ground, through scattered old growth of spruce, hemlock, cedar and pine, with underbrush of huckleberry.
0.47	Left bank of Walsh Creek (local name Cannery Creek), bears N. 6° E. and S. 6° W.
2.62	Right bank of Walsh Creek, bears N. 4° W. and S. 4° E.
5.72	Lake, shore bears N. 18° E. and S. 52° W.
8.53	True point for cor. No. 2, Lot 2, on line 2-3, U.S. Survey No. 2090, not monumented; falls in lake. From the true point, cor. No. 27, Lot 1, identical with cor. No. 3, U.S. Survey No. 2090, bears S. 44°50' E., 3.74 chs. dist., monumented with a shcist stone, 2 1/2 x 1 1/2 x 1/2 ft., firmly set, 18 ins. in the

CHAINS	
	ground, mkd. C3 S2090, with an X on top, from which the original bearing trees A pine, 8 ins. diam., bears N. 21 1/2° E., 20 lks. dist., mkd. S2090 C3 BT on partially healed blaze. A pine, 14 ins. diam., bears N. 65° E., 32 lks. dist., mkd. S2090 C3 BT on partially healed blaze. At the cor. point Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd.  1934 No new accessories taken. Bury the marked stone alongside the alum. post.
	N. 4°34' W., on line 2-3, Lot 2, identical with line 26-25, Lot 1.
2.30	Leave lake, shoreline bears S. 7° E. and N. 85° W.
3.10	Point selected for the witness cor. to cor. No. 2, Lot 2, identical with the witness cor. to cor. No. 26, Lot 1. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd.  1984 from which A spruce, 10 ins. diam., bears N. 17 1/4° E., 73 lks. dist., mkd. X BT. A hemlock, 10 ins. diam., bears N. 15 3/4° W., 94 lks. dist., mkd. X BT. Over fairly level ground, through scattered old growth of spruce, hemlock, cedar and pine, with underbrush of huckleberry.
10.87	Point for cor. No. 3, Lot 2, identical with cor. No. 25, Lot 1, on line 2-3, U.S. Survey No. 1207. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd.

Lot 2, U.S. Survey No. 3835, Alaska

CHAINS	
	 1984
	from which
	A pine, 7 ins. diam., bears N. 87 1/4° E., 67 lks. dist., mkd. L1 S3835 BT.
	A spruce, 21 ins. diam., bears S. 15 1/2° W., 84 lks. dist., mkd. C3 L2 S3835 BT.
	A pine, 10 ins. diam., bears N. 85 1/4° W., 29 lks. dist., mkd. S1207 BT.
	From the cor. point, cor. No. 24, Lot 1, identical with cor. No. 2, U.S. Survey No. 1207, bears N. 47°05' E., 7.58 chs. dist., monumented with a schist stone, 2 x 1 x 1/2 ft., firmly set, 14 ins. in the ground, mkd. TMS WCPC, with an X on top, from which the original bearing trees
	A hemlock stump, 12 ins. diam., bears S. 77°23' E., 12 lks. dist., badly decayed with no visible blaze.
	A cedar, 20 ins. diam., bears N. 6°19' W., 15 lks. dist., with fragmentary scribing on a partially healed blaze.
	At the cor. point
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 20 ins. in the ground, with alum. cap mkd.
	 1984
	And a new bearing tree
	A hemlock, 7 ins. diam., bears S. 14 1/4° W., 37 lks. dist., mkd. L1 S3835 BT.
	Bury the marked stone alongside the alum. post.
	S. 47°05' W., on line 3-1, Lot 2, identical with a portion of line 2-3, U.S. Survey No. 1207.
	Over fairly level ground, through scattered old growth of spruce, hemlock and cedar, with underbrush of huckleberry.
1.70	Trail, bears S. 38° E. and N. 38° W.
5.50	Right bank of Walsh Creek (local name Cannery Creek), bears N. 19° W. and S. 19° E.
	Cross a log dam, 40 ft. high, 1.60 chs. long.
6.70	Left bank of Walsh Creek, bears N. 11° W. and S. 11° E.

Lot 2, U.S. Survey No. 3835, Alaska

CHAINS	
7.03	Corner No. 1, Lot 2, identical with cor. No. 2, U.S. Survey No. 2090 and identical with cor. No. 3, U.S. Survey No. 1207 and point of beginning.

Lot 3

Beginning at the point for cor. No. 1, Lot 3, identical with cor. No. 3, Lot 4, on line 1-2, U.S. Survey No. 1781.

Set an iron rod, 12 ins. long, 1/2 in. diam., 7 ins. in a hemlock root

from which

A hemlock, 8 ins. diam., bears S. 46 1/4° W., 34 lks. dist., mkd. S1781 BT.

A hemlock, 6 ins. diam., bears N. 64 1/4° W., 16 lks. dist., mkd. C1 L3 S3835 BT.

An alum. post, 30 ins. long, 2 1/2 ins. diam., set 27 ins. in the ground, for a reference monument, bears N. 55° E., 15 lks. dist., with alum. cap mkd.

RM

15 LKS

C3
L4
S3835

1984

From the cor. point, an alum. post, 2 1/2 ins. diam., firmly set, projecting 4 ins. above the ground, bears S. 72°22' W., 83 lks. dist., with alum cap mkd. 3248-S KTN BYPASS MON 3369 1983.

N. 5°57' E., on line 1-2, Lot 3, identical with line 3-2, Lot 4.

Steep ascent through tangled windfallen trees, with dense underbrush of devil's club, huckleberry and small hemlock.

4.50 Enter stand of old growth spruce and hemlock, with dense underbrush of devil's club and huckleberry and scattered windfallen trees, edge irregular; generally East and West.

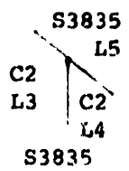
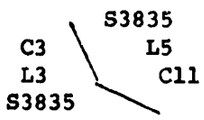
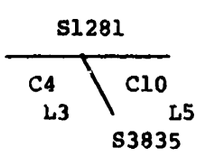
14.35 Top of rock bluff, 20 ft. high, bears S. 78° E. and N. 78° W., faces SW.

14.71 Point for cor. No. 2, Lot 3, identical with cor. No. 2, Lot 4, on line 11-12, Lot 5,

Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with alum. cap mkd.

GPO 834-634

Lot 3, U.S. Survey No. 3835, Alaska

CHAINS	
	 1984 from which A hemlock, 27 ins. diam., bears N. 84 1/2° E., 64 lks. dist., mkd. L5 S3835 BT. A hemlock, 6 ins. diam., bears N. 3 3/4° W., 27 lks. dist., mkd. L5 S3835 BT.
	N. 46°13' W., on line 2-3, Lot 3, identical with a portion of line 12-11, Lot 5. Sharp descent through old growth of spruce and hemlock, with medium dense underbrush of devil's club and huckleberry.
1.70	Top of cliff, 50 ft. high, faces westerly.
10.70	Leave timber, edge bears generally North and South.
11.53	Point for cor. No. 3, Lot 3, identical with cor. No. 11, Lot 5. Set a brass tablet, 3 1/4 ins. diam., 3 1/2 in. stem, cemented in a drill hole in concrete, with top mkd.
	 1984 No suitable acessories available. The cor. is located on the top of the SE end of Carlanna Lake Dam.
	N. 42°52' W., on line 3-4, Lot 3, identical with line 11-10, Lot 5. Along the top of Carlanna Lake Dam.
1.58	Point for cor. No. 4, Lot 3, identical with cor. No. 10, Lot 5, on line 3-4, U.S. Survey No. 1281. Set a brass tablet, 3 1/4 ins. diam., 2 1/2 in. stem, cemented in a drill hole in concrete, with top mkd.
	 1984 No suitable acessories available.

Lot 3, U.S. Survey No. 3835, Alaska

CHAINS	
	The cor. is located on the top of Carlanna Lake Dam.
	S. 89°55' W., on line 4-5, Lot 3, identical with a portion of line 3-4, U.S. Survey No. 1281.
	Descend over rock fill into spillway for Carlanna Lake.
3.60	Point for cor. No. 5, Lot 3, identical with cor. No. 1, U.S. Survey No. 1281, at the intersection of record distances from cor. No. 1, U.S. Survey No. 1281 and cor. No. 3, U.S. No. 1281, falls on easterly bank of spillway for Carlanna Lake Dam; there is no remaining evidence of the original cor.
	Set an alum. rod, 18 ins. long, 3/4 in. diam., cemented 12 ins. in a drillhole in bedrock, with alum. cap mkd.
	S1281 C5 C4 L3 S3835 1984
	from which
	The SW face of bedrock, bears N. 21 3/4° E. 16 lks. dist., mkd. X BO.
	N. 0°01' E., on line 5-6, Lot 3, identical with a portion of line 4-1, U.S. Survey No. 1281.
0.50	Southern edge of Carlanna Lake Spillway, bears S. 40° W. and N. 40° E., course S. 40° W.
3.10	Top of cliff, 30 ft. high, on northern bank of Carlanna Lake Spillway, bears S. 40° W. and N. 40° E.
3.75	Cyclone fence, 6 ft. high, bears N. 40° E. and S. 40° W.
5.40	Point for cor. No. 6, Lot 3, identical with cor. No. 6, Lot 5.
	Set an iron post, 28 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with brass cap mkd.
	S3835 L5 C6 S1281 C6 L3 S3835 1984
	from which
	A cedar, 10 ins. diam., bears N. 2 1/4° W., 28 lks. dist., mkd. C6 L5 S3835 BT.
	A hemlock, 8 ins. diam., bears N. 66 1/4° W., 11 lks. dist., mkd. C6 L5 S3835 BT.
	The cor. is located on the crest of a ridge which runs from the top of Ward Mountain to the western end of Carlanna Lake Dam.

CHAINS	
	Thence on line 6-7, Lot 3, identical with a portion of line 6-5, Lot 5, along the crest of a ridge which runs from the top of Ward Mountain to the western end of Carlanna Lake Dam, through Angle Point Nos. 1 through 3, Lot 3, identical with Angle Point Nos. 8 through 6, Lot 5.
	N. 24°07' W., along the general crest of a ridge.
	Over fairly level ground, through scattered hemlock, spruce and cedar, with medium dense under brush of huckleberry.
8.57	Point for Angle Point No. 1, Lot 3, identical with Angle Point No. 8, Lot 5.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 28 ins. in the ground, with alum. cap mkd.
	S3835 L3 | L5 AP1 | AP8 19
	from which
	A hemlock, 10 ins. diam., bears S. 50° E., 77 lks. dist., mkd. AP8 L5 S3835 BT.
	A hemlock, 12 ins. diam., bears N. 69 1/4° W., 36 lks. dist., mkd. AP1 L3 S3835 BT.
	This Angle Point is located on the crest of a ridge.
	N. 3°29' W., along the general crest of a ridge.
	Over fairly level ground, through scattered hemlock, spruce and cedar, with medium dense underbrush of huckleberry.
7.00	Base of ascent, through old growth of hemlock, spruce and cedar, with sparse under brush of huckleberry.
15.57	Point for Angle Point No. 2, Lot 3, identical with Angle Point No. 7, Lot 5.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with alum. cap mkd.
	S3835 L3 / L5 AP2 / AP7 1984
	from which
	A cedar, 48 ins. diam., bears N. 25 1/2° E., 85 lks. dist., mkd. AP2 L3 S3835 BT.
	A hemlock, 15 ins. diam., bears S. 19° E., 50 lks. dist., mkd. AP7 L5 S3835 BT.
	This Angle Point is located on the crest of a ridge.
	N. 28°40' E., along the general crest of a ridge.

Lot 3, U.S. Survey No. 3835, Alaska

CHAINS	
	Ascend through old growth of hemlock, cedar and scattered spruce, with sparse underbrush.
13.83	Point for Angle Point No. 3, Lot 3, identical with Angle Point No. 6, Lot 5. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 2 ins. in the ground and in a mound of stone, 3 1/2 ft. base, to top, with alum. cap mkd. S3835 L3 | L5 AP3 | AP6 1984 from which A hemlock, 10 ins. diam., bears S. 61 1/2° E., 33 lks. dist., mkd. AP6 L5 S3835 BT. A cedar, 20 ins. diam., bears S. 63 3/4° W., 38 lks. dist., mkd. AP3 L3 S3835 BT. This Angle Point is located on the crest of a ridge.
	N. 9°51' W., along the general crest of a ridge. Ascend through old growth of hemlock and cedar with sparse underbrush.
3.55	Corner No. 7, Lot 3, identical with cor. No. 5, Lot 1, hereinbefore described.
	Line 7-8, Lot 3, identical with line 5-4, Lot 1, through line 10-11, Lot 3, identical with line 2-1, Lot 1, are previously described in these notes for Lot 1.
	From cor. No. 11, Lot 3, identical with cor. No. 1, Lot 1, hereinbefore described. S. 89°57' E., on line 11-12, Lot 3, identical with a portion of line 1-15, U.S. Survey No. 1587. Across SW slope through logged off area, with windfallen trees and dense underbrush of devil's club, huckleberry and small trees.
1.30	Creek, 3 lks. wide, course South.
3.70	Creek, 2 lks. wide, course S. 40° E.
5.50	Creek, 3 lks. wide, course S. 10° W.
9.40	Creek, 2 lks. wide, course S. 30° W.
14.20	Creek, 1 lk. wide, course South.
17.70	Top of canyon, 170 ft. high, bears North and South.
20.20	Carlanna Creek, 35 lks. wide, course S. 5° W.
23.40	Top of canyon, 170 ft. high, bears North and South.

GPO 834-634

Lot 3, U.S. Survey No. 3835, Alaska

CHAINS	
36.44	Point for cor. No. 12, Lot 3, identical with cor. No. 15, U.S. Survey No. 1587 and identical with cor. No. 1, U.S. Survey No. 1781, monumented with an iron post, 2 ins. diam., firmly set, projecting 9 ins. above the ground, with broken off brass cap laying alongside mkd. C1 S1781 1927. Original bearing trees are gone. At the cor. point Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd. S3835 L3 C12 C15 | C1 S1587 | S1781 1984 And new bearing trees A spruce, 10 ins. diam., bears N. 66° E., 19 lks. dist., mkd. C12 L3 S3835 BT. A spruce, 16 ins. diam., bears S. 7 3/4° E., 44 lks. dist., mkd. C1 S1781 BT. Bury the original stone monument and iron post alongside. From the cor. point, an alum. post, 2 1/2 ins. diam., firmly set, projecting 6 ins. above the ground, bears N. 25°12' E., 1.01 chs. dist., with alum. cap mkd. 3248-S KTN BYPASS MON 3373 1983.
	S. 89°58' E., on line 12-1, Lot 3, identical with a portion of line 1-2, U.S. Survey No. 1781. Across SW slope through logged off area, with windfallen trees and dense underbrush of devil's club, huckleberry and small trees.
3.78	Corner No. 1, Lot 3, identical with cor No. 5, Lot 4, on line 1-2, U.S. Survey No. 1781 and point of beginning.
	Lot 4
	Beginning at the point for cor. No. 1, Lot 4, identical with cor. No. 12, Lot 5, and identical with cor. No. 2, U.S. Survey No. 1781 and identical with cor. No. 3, U.S. Survey No. 1229, monumented with a concrete filled iron post, 3 ins. diam., firmly set in a concrete base, projecting 12 ins. above the ground, mkd. H-3-EAH, on SE side, from which the original bearing trees A spruce stump, 48 ins. diam., bears N. 55°22' E., 35 lks. dist., with a B visible on a rotted blaze. A hemlock snag, 18 ins. diam., bears S. 10°51' E., 15 lks. dist., with a B visible on a rotted blaze. (Record, 14 lks.) A hemlock stump, 20 ins. diam., bears S. 30° W., 39 lks. dist., no markings or blaze left.

Lot 4, U.S. Survey No. 3835, Alaska

CHAINS	
	And a new bearing tree A hemlock, 10 ins. diam., bears S. 67 1/4° E., 38 lks. dist., mkd. C3 S1229 BT. The cor. is located in an area which has been logged, and is overgrown with dense brush of devil's club, thimbleberry, huckleberry and small hemlock and spruce.
	N. 46°13' W., on line 1-2, Lot 4, identical with a portion of line 12-11, Lot 5. Sharp ascent over SW slope.
12.00	Enter stand of old growth of spruce, hemlock and cedar, with medium dense underbrush of devil's club, thimbleberry and huckleberry, irregular edge generally East and West.
18.90	Top of ascent; begin sharp descent.
21.15	Corner No. 2, Lot 4, identical with cor. No. 2, Lot 3, hereinbefore described.
	S. 5°57' W., on line 2-3, Lot 4, identical with line 2-1, Lot 3, hereinbefore described.
14.71	Corner No. 3, Lot 4, identical with cor. No. 1, Lot 3, hereinbefore described.
	S. 89°58' E., on line 3-1, Lot 4, identical with a portion of line 1-2, U.S. Survey No. 1781. Across SW slope, through dense brush of devil's club, thimbleberry and huckleberry, with small spruce and hemlock.
16.79	Corner No. 1, Lot 4, identical with cor. No. 12, Lot 5, identical with cor. No. 2, U.S. Survey No. 1781 and identical with cor. No. 3, U.S. Survey No. 1229 and point of beginning.
	Lot 5
	Beginning at the point for cor. No. 1, Lot 5, identical with cor. No. 5, Lot 6, at the intesection of line 1-2, U.S. Survey No. 1229, with the crest of a ridge which runs southerly from the top of Minerva Mountain. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 27 ins. in the ground, with alum. cap mkd. S3835 L5 C1 S1229 C5 L6 S3835 1984 from which

Lot 5, U.S. Survey No. 3835, Alaska

CHAINS	
	A hemlock, 13 ins. diam., bears S. 9 1/4° E., 9 lks. dist., mkd. C5 L6 S3835 BT.
	A hemlock, 24 ins. diam., bears S. 68 1/4° W., 30 lks. dist., mkd. S1229 BT.
	From the cor. point, an iron post, 2 ins. diam., firmly set, projecting 16 ins. above the ground, with brass cap mkd. USS NO. 1229, bears N. 0°03' W., 13.15 chs. dist.; not a BLM monument.
	Thence on line 1-2, Lot 5, identical with line 5-4, Lot 6, along the crest of a ridge which runs southerly from the top of Minerva Mountain and along the crest of a ridge which runs from Minerva Mountain to Juno Mountain, through Angle Point Nos. 1 through 9, Lot 5, identical with Angle Point Nos. 9 through 1, Lot 6.
	N. 67°35' E., along the general crest of a ridge.
	Sharp ascent through dense old growth of spruce, hemlock and cedar, with medium dense underbrush of devil's club and huckleberry.
19.58	Point for Angle Point No. 1, Lot 5, identical with Angle Point No. 9, Lot 6.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 6 ins. in the ground, in a mound of stone, 3 ft. base, to top, with alum. cap mkd.
	S3835 L5 AP1  AP9 L6 S3835 1984
	from which
	A cedar, 6 ins. diam., bears S. 61 3/4° W., 7 lks. dist., mkd. AP9 L6 S3835 BT.
	A hemlock, 17 ins. diam., bears N. 29° W., 41 lks. dist., mkd. AP1 L5 S3835 BT.
	This Angle Point is located on the crest of a ridge.
	S. 84°21' E., along the general crest of a ridge.
	Sharp ascent over benches, through old growth of spruce, hemlock, cedar and scattered clearings with low underbrush of huckleberry and thimbleberry.
11.62	Point for Angle Point No. 2, Lot 5, identical with Angle Point No. 8, Lot 6.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 16 ins. in the ground and in a collar of stone, 2 ft. diam., with alum. cap mkd.

Lot 5, U.S. Survey No. 3835, Alaska

CHAINS	
	S3835 L5 AP2 AP8 L6 S3835 1984 A cedar, 15 ins. diam., bears S. 42 1/4° E., 62 lks. dist., mkd. X BT. A cedar, 14 ins. diam., bears S. 36° W., 61 lks. dist., mkd. AP8 L6 S3835 BT. This Angle Point is located on the crest of a ridge.
	N. 61°35' E., along the general crest of a ridge. Gradual ascent through old growth of spruce, hemlock, cedar and scattered clearings, with low undergrush of thimbleberry, and huckleberry.
7.46	Point for Angle Point No. 3, Lot , identical with Angle Point No. 7, Lot 6. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 28 ins. in the ground, with alum. cap mkd. L5 AP3 AP7 L6 S3835 1984 from which A hemlock, 13 ins. diam., bears S. 32 3/4° E., 10 lks. dist., mkd. AP7 L6 S3835 BT. A hemlock, 14 ins. diam., bears N. 62° W., 5 lks. dist., mkd. AP3 L5 S3835 BT. This Angle Point is located on the crest of a ridge.
	N. 32°13' E., along the general crest of a ridge. Sharp ascent through dense old growth of spruce, hemlock and cedar, with sparse underbrush of huckleberry and thimbleberry.
10.34	Point for Angle Point No. 4, Lot 5, identical with Angle Point No. 6, Lot 6. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with alum. cap mkd. L5 AP6 AP4 L6 S3835 1984

Lot 5, U.S. Survey No. 3835, Alaska

CHAINS	
	from which A spruce, 30 ins. diam., bears North, 30 lks. dist., mkd. AP4 L5 S3835 BT. A hemlock, 15 ins. diam., bears S. 49° E., 30 lks. dist., mkd. AP6 L6 S3835 BT. This Angle Point is located on the crest of a ridge.
	N. 5°17' E., along the general crest of a ridge. Sharp ascent through dense old growth of spruce, hemlock and cedar, with sparse underbrush of huckleberry and thimbleberry.
14.54	Point for Angle Point No. 5, Lot 5, identical with Angle Point No. 5, Lot 6. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with alum. cap mkd. AP5 L5 / AP5 L6 S3835 1984 from which A hemlock, 12 ins. diam., bears N. 54° E., 73 lks. dist., mkd. AP5 L6 S3835 BT. A hemlock, 15 ins. diam., bears N. 12 3/4° W., 46 lks. dist., mkd. AP5 L5 S3835 BT. This Angle Point is located on the crest of a ridge.
	N. 53°38' E., along the general crest of a ridge. Gradual ascent through old growth of hemlock and scattered clearings, with sparse underbrush.
11.69	Point for Angle Point No. 6, Lot 5, identical with Angle Point No. 4, Lot 6. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 25 ins. in the ground, with alum. cap mkd. L5 AP6 / AP4 L6 S3835 1984 from which A hemlock, 10 ins. diam., bears S. 42 3/4° E., 12 lks. dist., mkd. AP4 L6 S3835 BT. A hemlock, 11 ins. diam., bears S. 88° W., 71 lks. dist., mkd. AP6 L5 S3835 BT.

Lot 5, U.S. Survey No. 3835, Alaska

CHAINS	
	This Angle Point is located on the crest of a ridge.
	N. 26°41' E., along the general crest of a ridge.
	Gradual ascent through smaller old growth of hemlock and scattered clearings, with sparse underbrush.
11.64	Point for Angle Point No. 7, Lot 5, identical with Angle Point No. 3, Lot 6.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd.
	L5 / AP3 AP7 / L6 S3835 1984
	from which
	A hemlock, 6 ins. diam., bears S. 69 3/4° E., 26 lks. dist., mkd. AP3 L6 S3835 BT.
	A hemlock, 12 ins. diam., bears N. 39 1/2° W., 24 lks. dist., mkd. AP7 L5 S3835 BT.
	This Angle Point is located on the crest of a ridge.
	N. 3°02' E., along the general crest of a ridge.
	Gradual ascent over mostly open ground, with scattered scrub hemlock.
15.99	Point for Angle Point No. 8, Lot 5, identical with Angle Point No. 2, Lot 6.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 18 ins. in the ground, in a collar of stone, 2 ft. diam., with alum. cap mkd.
	L5 \ AP2 AP8 | L6 S3835 1984
	from which
	A hemlock, 7 ins. diam., bears N. 8° W., 9 lks. dist., mkd. AP2 L6 S3835 BT.
	A hemlock, 8 ins. diam., bears N. 84 1/4° W., 17 lks. dist., mkd. AP8 L5 S3835 BT.
	This Angle Point is located on the crest of a ridge.
	N. 27°58' W., along the general crest of a ridge.
	Gradual ascent over mostly open ground, with scattered scrub hemlock.
9.10	Point for Angle Point No. 9, Lot 5, identical with Angle Point No. 1, Lot 6.

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Lot 5, U.S. Survey No. 3835, Alaska

	CHAINS	
		Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 18 ins. in the ground, in a collar of stone, 2 ft. diam., with alum. cap mkd. L5 | AP1 AP9 \ L6 S3835 1984 from which A hemlock, 8 ins. diam., bears N. 80 3/4° E., 16 lks. dist., mkd. AP1 L6 S3835 BT. A hemlock, 7 ins. diam., bears S. 21 1/2° E., 12 lks. dist., mkd. AP9 L5 S3835 BT. This Angle Point is located on the crest of a ridge near the low point of a saddle.
		N. 3°27' W., along the general crest of a ridge. Gradual ascent over mostly open ground, with scattered scrub hemlock.
	13.00	Top of Minerva Mountain; begin gradual descent along the crest of a ridge which runs from the top of Minerva Mountain to the top of Juno Mountain.
	28.29	Point for cor. No. 2, Lot 5, identical with cor. No. 4, Lot 6, on line 4-5, U.S. Survey No. 1761. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd. C2 L5 | C4 L6 S3835 1984 from which A hemlock, 13 ins. diam., bears N. 81° E., 53 lks. dist., mkd. X BT. A hemlock, 8 ins. diam., bears S. 36 1/2° E., 66 lks. dist., mkd. C4 L6 S3835 BT. This cor. is located on the crest of a ridge which runs from the top of Minerva Mountain to the top of Juno Mountain.
		N. 44°17' W., on line 2-3, Lot 5, identical with a portion of line 4-5, U.S. Survey No. 1761.
	85.44	Point for cor. No. 3, Lot 5, identical with cor. No. 5, U.S. Survey No. 1761, position determined from the original monument's hole and its original accessories A hemlock, 8 ins. diam., bears S. 14° E., 60 lks. dist., with fragmetary scribing on a partially healed blaze.

Lot 5, U.S. Survey No. 3835, Alaska

CHAINS	
	A hemlock, 5 ins. diam., bears S. 30 1/2° E., 70 lks. dist., with a healed blaze.
	From this point, the original monument, an iron post, 3 ft. long, 2 ins. diam., with brass cap mkd. FE S1761 AP5 1927, was found laying alongside in a disturbed position.
	At the cor. point
	Set original monument, 30 ins. in the ground.
	Add the marks 1984 on the brass cap.
	And a new accessory
	A granite boulder, 7 x 8 x 2 ft. above the ground, bears S. 67° W., 61 lks. dist., mkd. X BO.
	This cor. is located on the top of Juno Mountain.
	N. 68°01' W., on line 3-4, Lot 5, identical with line 5-6, U.S. Survey No. 1761.
	Gradual descent over fairly open, rolling ground, with scattered scrub hemlock.
19.65	Point for cor. No. 4, Lot 5, identical with cor. No. 6, U.S. Survey No. 1761, monumented with an iron post, 2 ins. diam., firmly set, projecting 9 ins. above the ground, with brass cap mkd. FE S1761 AP6 1927.
	No remains of the original bearing trees were found.
	Add the marks 1984 to the brass cap.
	And new bearing trees
	A hemlock, 6 ins. diam., bears S. 35 1/2° E., 92 lks. dist., mkd. C4 L5 S3835 BT.
	A hemlock, 8 ins. diam., bears N. 42° W., 77 lks. dist., mkd. X BT.
	This cor. is located in a fairly level clearing near the top of Ward Mountain.
	N. 42°51' W., on line 4-5, Lot 5, identical with a portion of line 6-7, U.S. Survey No. 1761.
	Across the top of Ward Mountain, over fairly open ground with scattered scrub hemlock.
2.47	Corner No. 5, Lot 5, identical with cor. No. 6, Lot 1, on line 6-7, U.S. Survey No. 1761, hereinbefore described.
	Line 5-6, Lot 5, through Angle Point Nos. 1 through 5, Lot 5, and a portion of the line between Angle Point No. 5, Lot 5, and Angle Point No. 6, Lot 5, are previously described in these notes for Lot 1.
	Line 5-6, Lot 5, through a portion of the line between Angle Point No. 5, Lot 5, and Angle Point No. 6, Lot 5 and from Angle Point Nos. 6 through 8, Lot 5, are previously described in these notes for Lot 3.

Lot 5, U.S. Survey No. 3835, Alaska

CHAINS	
	From cor. No. 6, Lot 5, identical with cor. No. 6, Lot 3, on line 4-1, U.S. Survey No. 1281, hereinbefore described.
	N. 0°01' E., on line 6-7, Lot 5, identical with a portion of line 4-1, U.S. Survey No. 1281.
1.70	Point for cor. No. 7, Lot 5, identical with cor. No. 1, U.S. Survey No. 1281, monumented with a granite stone, 12 x 10 x 10 ins., firmly set, 7 ins. in the ground, mkd. 1 1281, with an X on top, from which the original bearing trees A spruce, 62 ins. diam., bears S. 70 ° E., 37 lks. dist., with fragmentary scribing on a partially healed blaze. A hemlock, 12 ins. diam., bears N. 9°50' W., 18 lks. dist., with a healed over blaze. (Record, 28 lks.) At the cor. point Set an iron post, 28 ins. long, 2 1/2 ins. diam., 25 ins. in the ground, with brass cap mkd. S3835 L5 C7 C1 S1281 1984 No new acessories taken. Bury the mkd. stone alongside the iron post.
	N. 89°55' E., on line 7-8, Lot 5, identical with line 1-2, U.S. Survey No. 1281.
3.70	Westerly shore of Carlanna Lake, bears S. 7° E. and N. 7° W.
7.00	True point for cor. No. 8, Lot 5, identical with the true point for cor. No. 2, U.S. Survey No. 1281, position established at record bearing and distance from the remains of an original bearing tree; A hemlock stump, 42 ins. diam., bears S. 42°15' E., 56 lks. dist., with a healed blaze. Corner point not monumented, falls in Carlanna Lake.
	S. 0°03' E., on line 8-9, Lot 5, identical with line 2-3, U.S. Survey No. 1281.
0.20	Shore of Carlanna Lake, bears N. 54° E. and S. 54° W.
0.75	Point selected for the witness cor. to cor. No. 8, Lot 5, identical with the witness cor. to cor No. 2, U.S. Survey No. 1281. Set an iron post, 28 ins. long, 2 1/2 ins. diam., 25 ins. in the ground, with brass cap mkd.

Lot 5, U.S. Survey No. 3835, Alaska

CHAINS	
	WC S3835 L5 C8 C2 S1281 1984
	from which
	A hemlock, 13 ins. diam., bears S. 6 3/4° E., 80 lks. dist., mkd. X BT.
	A spruce, 20 ins. diam., bears N. 69 1/2° W., 87 lks. dist., mkd. X BT.
	Over fairly level ground, through old growth of spruce, hemlock and cedar, with medium dense underbrush of devil's club, thimbleberry and huckleberry.
7.10	Point for cor. No. 9, Lot 5, identical with cor. No. 3, U.S. Survey No. 1281, monumented with a granite stone 20x12 ins., firmly set, projecting 6 ins. above the ground, mkd. 3 1281, with an X on top, from which the original accessories
	A hemlock snag, 30 ins. diam., bears N. 89°30' E., 88 lks. dist., mkd. 3 1281 BT on partially healed blaze.
	A granite boulder, 2 x 2 ft., projecting 2 ft. above the the ground, bears S. 18° W., 9 lks. dist., mkd. X BO 3 1281.
	At the cor. point
	Set an alum. rod, 12 ins. long, 3/4 in. diam., cemented 7 ins. in a drill hole in the original stone monument, with alum. cap mkd.
	S1281 | C9 C3 | L5 S3835 1984
	And a new bearing tree
	A spruce, 8 ins. diam., bears N. 11 1/4° E., 27 lks. dist., mkd. C9 L5 S3835 BT.
	S. 89°55' W., on line 9-10, Lot 5, identical with a portion of line 3-4, U.S. Survey No. 1281.
	Over fairly level ground, through old growth of spruce, hemlock and cedar, with medium dense underbrush of devil's club, thimbleberry and huckleberry.
2.00	Leave timber, edge bears N. and S.
3.41	Corner No. 10, Lot 5, identical with cor. No. 4, Lot 3, on line 3-4, U.S. Survey No. 1281, hereinbefore described.

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Lot 5, U.S. Survey No. 3835, Alaska

CHAINS	
	S. 42°52' E., on line 10-11, Lot 5, identical with line 4-3, Lot 3, hereinbefore described.
1.58	Corner No. 11, Lot 5, identical with cor. No. 3, Lot 3, hereinbefore described.
	S. 46°13' E., on line 11-12, Lot 5, identical in part with line 3-2, Lot 3, and line 2-1, Lot 4, hereinbefore described.
11.53	Corner No. 2, Lot 3, identical with cor. No. 2, Lot 4, on line 11-12, Lot 5, hereinbefore described.
32.68	Corner No. 12, Lot 5, identical with cor. No. 1, Lot 4, identical with cor. No. 3, U.S. Survey No. 1229 and identical with cor. No. 2, U.S. Survey No. 1781, hereinbefore described.
	S. 89°54' E., on line 12-13, Lot 5, identical with line 3-2, U.S. Survey No. 1229. Over rolling ground, through a logged area with dense brush of devil's club, thimbleberry and huckleberry, with small spruce and hemlock.
26.00	Enter stand of old growth spruce, hemlock and cedar, with medium dense underbrush of devil's club and huckleberry.
35.20	Corner No. 13, Lot 5, identical with cor. No. 2, U.S. Survey No. 1229, monumented with a concrete filled iron post, 3 ins. diam., firmly set, in a 6 x 6 ins. concrete base, projecting 18 ins. above the ground, mkd. H-2-EAH on SW side, from which the remains of the original bearing trees A spruce snag, 18 ins. diam., bears N. 25°40' E., 20 lks. dist., with rotted out blaze. A hemlock stump, 12 ins. diam., bears S. 41°45' E., 9 lks. dist., badley decayed, no blaze visible. And new bearing trees A hemlock, 6 ins. diam., bears N. 60 3/4° E., 43 lks. dist., mkd. C13 L5 S3835 BT. A cedar, 6 ins. diam., bears N. 39° W., 35 lks. dist., mkd. C13 L5 S3835 BT.
	S. 0°04' W., on line 13-1, Lot 5, identical with a portion of line 2-1, U.S. Survey No. 1229. Gradual descent across a W. facing slope, through old growth of spruce, hemlock and cedar, with medium dense underbrush of devil's club, huckleberry and thimbleberry.
1.10	Hoadly Creek, 20 lks. wide, course S. 55° W.
11.75	Creek, 5 lks. wide, course S. 55° W.
11.90	Leave timber, enter logged area, with dense brush of devil's club, huckleberry, thimbleberry and young poplar; edge bears N. 55° E. and S. 55° W.
15.95	Creek, 2 lks. wide, course S. 82° W.
18.10	Creek, 3 lks. wide, course S. 64° W.

Lot 5, U.S. Survey No. 3[illegible] Alaska

Chains	
23.60	Creek, 1 lk. wide, course W.
29.00	Enter stand of old growth spruce, hemlock and cedar, edge bears E. and W.; begin graudual ascent across W. facing slope.
37.48	Corner No. 1, Lot 5, identical with cor. No. 5, Lot 6 and point of beginning.

Lot 6

Beginning at the point for cor. No. 1, Lot 6, identical with cor. No. 9, Lot 7, on line 2-3, Star Lode, M.S. No. 769.

Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 22 ins. in the ground, with alum. cap mkd.

S3835
L6
C1 / L7
SL / C9
MS 769

1984

from which

A hemlock, 8 ins. diam., bears N. 33 1/4° E., 30 lks. dist., mkd. C9 L7 S3835 BT.

A cedar, 42 ins. diam., bears S [illegible]° E., 18 lks. dist., mkd. MS 769 BT.

N. 25°19' E., on line 1-2, Lot 6, identical with line 9-10, Lot 7.

Ascend through hemlock, cedar and spruce, with medium dense underbrush.

1.20	Stream, 2 lks. wide, course S. 11° L.
1.70	Stream, 2 lks. wide, course S. 33° W.; begin steep ascent.
8.70	Top of ascent; begin moderate descent.
15.00	Bottom of descent; over generally level land.
19.01	Point for cor. No. 2, Lot 6, identical with cor. No. 10, Lot 7.

Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 20 ins. in the ground, encircled by a mound of stone, 3 ft. base, to 4 ins. below top, with alum. cap mkd.

S3835

L6 / L7
C2 / C10

1984

from which

A hemlock, 12 ins. diam., bears S. 3 1/2° W., 48 lks. dist., mkd. C10 L7 S3835 BT.

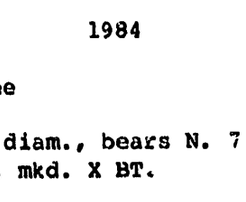
Lot 6, U.S. Survey No. 3835, Alaska

CHAINS	
	A cedar, 10 ins. diam., bears N. 37° W., 32 lks. dist., mkd. C2 L6 S3835 BT.
	N. 38°34' E., on line 2-3, Lot 6, identical with line 10-11, Lot 7.
	Over generally level land, through hemlock and cedar, with sparse underbrush.
0.40	Begin moderate ascent.
4.40	Top of ascent; begin gradual descent.
4.85	Begin steep descent.
14.70	End of steep descent; descend gradually.
16.10	Stream, 1 lk. wide, course S. 20° E.; begin steep ascent.
22.50	Ascent becomes more gradual, across a SE slope.
26.68	Point for cor. No. 3, Lot 6, identical with cor No. 11, Lot 7, on line 4-5, U.S. Survey No. 1761.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd.
	C3 L6 C11 L7 S3835 1984
	from which
	A hemlock, 15 ins. diam., bears S. 9 1/2° W., 36 lks. dist., mkd. C11 L7 S3835 BT.
	A hemlock, 6 ins. diam., bears S. 72 1/2° W., 27 lks. dist., mkd. C3 L6 S3835 BT.
	N. 44°17' W., on line 3-4, Lot 6, identical with a portion of the line 4-5, U.S. Survey No. 1761.
	Ascend over broken slope, through hemlock, spruce and cedar.
125.53	Corner No. 4, Lot 6, identical with cor. No. 2, Lot 5, hereinbefore described.
	Line 4-5, Lot 6, through Angle Point Nos. 1 through 9, Lot 6, is previously described in these notes for Lot 5.
	From cor. No. 5, Lot 6, identical with cor. No. 1, Lot 5, hereinbefore described.
	S. 0°04' W., on line 5-6, Lot 6, identical with a portion of line 2-1, U.S. Survey No. 1229.
	Gradual descent through old growth of spruce, hemlock and cedar, with medium dense underbrush.

Lot 6, U.S. Survey No. 3835, Alaska

CHAINS	
10.06	Point for cor. No. 6, Lot 6, identical with cor. No. 5, U.S. Survey No. 1280, on line 1-2, U.S. Survey No. 1229, monumented with a schist stone, 6 x 12 ins., firmly set, projecting 12 ins. above the ground, mkd. 1280 5 on SE face, from which the remains of the original bearing trees A fallen hemlock, 10 ins. diam., bears S. 37° E., 50 lks. dist., with a healed blaze, mkd. 5 1280 BT, when opened. A fallen hemlock, 10 ins. diam., bears S. 72°30' E., 50 lks. dist., with a healed blaze. At the cor. point. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 6 ins. in the ground, encircled by a mound of stone, 3 ft. base, to top, with alum. cap mkd. S3835 L6 C6 S1229 C5 S1280 1984 And new bearing trees A hemlock, 7 ins. diam., bears S. 70 1/2° E., 38 lks. dist., mkd. C6 L6 S3835 BT. A hemlock, 17 ins. diam., bears N. 26 1/4° W., 30 lks. dist., mkd. S1229 BT. Bury the marked stone alongside the alum. post. This cor. falls at the edge of an area with dense brush and blown down timber.
	Thence with the record bearing and distances bet. cor. No. 6, Lot 6, and cor. No. 7, Lot 6, which was not retraced and is ommitted from this field note record.
	Point for cor. No. 7, Lot 6, identical with cor. No. 4, Wyoming Lode, M.S. No. 769, on line 4-5, U.S. Survey No. 1280, position determined from the intersection of record distances measured from the face of the original bearing trees. A cedar, 18 ins. diam., bears S. 65° E., 6 lks. dist., with fragmentary scribing visible on a partially healed blaze. (Record, S. 71° E., 3.6 ft. dist., to face of tree.) A cedar, 17 ins. diam., bears S. 15° W., 32 lks. dist., with fragmentary scribing visible on a partially healed blaze. (Record, 20.4 ft. dist., to face of tree.) From this point, several large stones were found laying downhill, in a disturbed position, none of which could be identified as the original monument. At the cor. point Set an alum. post, 30 ins. long, 2 1/2 ins. diam.,

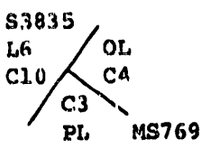
Lot 6, U.S. Survey No. 3835, Alaska

CHAINS	
	20 ins. in the ground, encircled by a mound of stone, 3 ft. base, to top, with alum. cap mkd.
	
	1984
	And a new bearing tree
	A cedar, 4 ins. diam., bears N. 7 3/4° E., 12 lks. dist., mkd. X BT.
	N. 30°24' E., on line 7-8, Lot 6, identical with line 4-3, Wyoming Lode, M.S. No. 769.
	Gradual descent through old growth of cedar, pine and hemlock, with medium dense underbrush of cedar, hemlock and huckleberry.
3.70	Creek, 2 lks. wide, course S. 36° E.
5.20	Creek, 3 lks. wide, course S. 60° E.; begin steep ascent.
6.80	Top of steep ascent; continue gradual ascent.
9.07	Point for cor. No. 9, Lot 6, identical with cor. No. 3, Wyoming Lode, M.S. No. 769 and identical with cor. No. 4, Columbia Lode, M.S. No. 769, monumented with a schist stone, 24 X 10 X 6 ins., firmly set, 16 ins. in the ground, mkd. 3 4 769, with an X on top and a mound of stone alongside, from which the original bearing trees
	A hemlock, 17 ins. diam., bears S. 76°30' E., 29 lks. dist., with fragmentary scribing on a partially healed blaze. (Record, 18.9 ft. dist., to face of tree.)
	A hemlock, 20 ins. diam., bears N. 36°30' W., 22 lks. diam., mkd. 3 769 X on a partially healed blaze. (Record, 14.4 ft. dist., to face of tree.)
	At the cor. point
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 20 ins. in the ground, encircled by a mound of stone, 3 ft. base, to 4 ins. below top, with alum. cap mkd.
	1984
	And a new bearing tree
	A hemlock, 14 ins. diam., bears N. 63 1/2° E., 16 lks. dist., mkd. X BT.
	Bury the marked stone alongside the alum. post.
	N. 30°31' E., on line 8-9, Lot 6, identical with line 4-3, Columbia Lode, M.S. No. 769.

Lot 6, U.S. Survey No. 3835, Alaska

CHAINS	
	Gradual ascent through old growth of hemlock and cedar, with medium dense underbrush.
2.30	Creek, 3 lks. wide, course S. 80° E.
5.90	Creek, 4 lks. wide, course S. 40° E.
8.20	Creek, 4 lks. wide, course S. 45° E.
8.60	Creek, 4 lks. wide, course S. 15° W.
9.12	Point for cor. No. 9, Lot 6, identical with cor. No. 3, Columbia Lode, M.S. No. 769 and identical with cor. No. 4, Potosi Lode, M.S. No. 769, monumented with a schist stone, 30 x 12 x 6 ins., firmly set, 20 ins. in the ground, mkd. 3 4 769, with an X on top and a mound of stone alongside, from which the original bearing trees A hemlock stump, 7 ins. diam., bears S. 13° E., 14 lks. dist., badly decayed with no blaze visible. (Record, S. 18°30' E., 9.5 ft. dist, to face of tree.) A hemlock, 13 ins. diam., bears N. 15° W., 17 lks. dist., with a healed blaze. (Record, N. 10°30' W., 10.8 ft. dist., to face of tree.) At the cor. point Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 18 ins. in the ground, encircled by a mound of stone, 3 ft. base, to top, with alum. cap mkd. S3835 L6 PL C9 C4 C3 CL MS769 1984 And new bearing trees A cedar, 11 ins. diam., bears N. 66 1/2° E., 22 lks. dist., mkd. C4 MS769 BT. A cedar, 7 ins. diam., bears S. 18 1/4° E., 16 lks. dist., mkd. C3 MS769 BT. Bury the marked stone alongside the alum. post.
	N. 30°18' E., on line 9-10, Lot 6, identical with line 4-3, Potosi Lode, M.S. No. 769. Gradual ascent through old growth of hemlock and cedar, with medium dense underbrush.
9.11	Point for cor. No. 10, Lot 6, identical with cor. No. 3, Potosi Lode, M.S. No. 769 and identical with cor. No. 4, Ohir Lode, M.S. No. 769, monumented with a schist stone, 24 x 12 x 5 ins., firmly set, 16 ins. in the ground, with no visible markings and a mound of stone alongside, from which the original bearing trees A hemlock snag, 14 ins. diam., bears S. 79° E., 24 lks. dist., with a rotted blaze. (Record, S. 76° E., 15 ft. dist., to face of tree.)

Lot 6, U.S. Survey No. 3835, Alaska

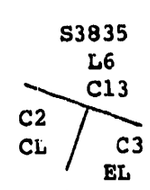
CHAINS	
	A spruce, 8 ins. diam., bears N. 73 3/4° W., 11 lks. dist., with a healed blaze. (Record, N. 79° W., 7 ft. dist., to face of tree.)
	At the cor. point
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 14 ins. in the ground, encircled by a mound of stone, 3 ft. base, to 6 ins. below the top, with alum. cap mkd.
	
	1984
	And new bearing trees
	A cedar, 10 ins. diam., bears N. 24 1/4° E., 27 lks. dist., mkd. C10 L6 S3835 BT.
	A spruce, 18 ins. diam., bears S. 66 1/2° E., 41 lks. dist., mkd. C4 MS769 BT.
	Bury the stone monument alongside the alum. post.
	N. 30°26' E., on line 10-11, Lot 6, identical with line 4-3, Ophir Lode, M.S. No. 769.
	Gradual asent through hemlock and cedar, with medium dense underbrush.
0.40	Creek, 3 lks. wide, course S. 46° E.
5.00	Creek, 3 lks. wide, course S. 40° E.
7.50	Southern most edge of ravine, 100 ft. wide, 50 ft. deep, with a creek, course S. 60° E.
9.14	Point for cor. No. 11, Lot 6, identical with cor. No. 3, Ophir Lode, M.S. No. 769 and identical with cor. No. 4, Cosmos Lode, M.S. No. 769, monumented with a granite stone, 20 x 8 x 6 ins., firmly set, 16 ins. in the ground, mkd. 3 4 769, with a mound of stone alongside, from which the original bearing trees
	A hemlock, 36 ins. diam., bears N. 75° E., 41 lks. dist., with a healed blaze. (Record, 26.6 ft. dist. to face of tree.)
	A hemlock snag, 24 ins. diam., bears S. 13° E., 6 lks. dist., with fragmentary scribing visible on partially healed blaze. (Record, 2.9 ft. dist., to face of tree.)
	At the cor. point
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 20 ins. in the ground, encircled by a mound of stone, 3 ft. base, to top, with alum. cap mkd.

Lot 6, U.S. Survey No. 3835, Alaska

CHAINS	
	S3835 L6 CL C11 C4 C3 OL MS769 1984 And new bearing trees A hemlock, 9 ins. diam., bears N. 4 1/2° E., 38 lks. dist., mkd. C11 L6 S3835 BT. A hemlock, 6 ins. diam., bears N. 39° E., 17 lks. dist., mkd. X BT. Bury the marked stone alongside the alum. post.
	N. 30°17' E., on line 11-12, Lot 6, identical with line 4-3 Cosmos Lode, M.S. No. 769. Over nearly level ground, through hemlock and spruce, with medium dense underbrush.
6.60	Creek, 4 lks. wide, course S. 82° E.
8.40	Creek, 4 lks. wide, course S.
9.13	Point for cor. No. 12, Lot 6, identical with cor. No. 3, Cosmos Lode, M.S. No. 769, monumented with a granite stone, 24 x 12 x 6 ins., firmly set, 12 ins. in a mound of stone, mkd. 3 769, from which the original bearing trees A hemlock, 36 ins. diam., bears S. 29° E., 24 lks. dist., with fragmentary scribing on a partially healed blaze. (Record, 14.4 ft. dist., to face of tree.) A hemlock, 42 ins. diam., bears S. 88 3/4° W., 12 lks. dist., mkd. 3 769 BT on a partially healed blaze. (Record, 6 ft. dist., to face of tree.) At the cor. point Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 20 ins. in the ground, encircled by a mound of stone, 3 ft. base, to top, with alum. cap mkd. S3835 L6 C12 C3 CL MS769 1984 And a new bearing tree A hemlock, 8 ins. diam., bears N. 23° E., 42 lks. dist., mkd. C12 L6 S3835 BT. Bury the marked stone alongside the alum. post.

Lot 6, U.S. Survey No. 3835, Alaska

CHAINS	
	S. 59°52' E., on line 12-13, Lot 6, identical with line 3-2, Cosmos Lode, M.S. No. 769.
	Gradual descent, through old growth of hemlock and spruce, with medium dense underbrush.
8.94	Creek, 3 lks. wide, course S.
15.30	Begin sharp descent.
20.65	Creek, 5 lks. wide, course S. 38° E.; begin more gradual descent.
21.96	Point for cor. No. 13, Lot 6, identical with cor. No. 2, Cosmos Lode, M.S. No. 769 and identical with cor. No. 3, Eclipse Lode, M.S. No. 769, monumented with a granite stone, 24 x 7 x 5 ins. firmly set, 15 ins. in the ground, mkd. 76, with an X on top and a mound of stone alongside, from which the original bearing trees
	A spruce, 25 ins. diam., bears N. 18° W., 26 lks. dist., with healed blaze. (Record, 16 ft. dist., to face of tree.)
	A spruce snag, 42 ins. diam., bears N. 82 3/4° W., 10 lks. dist., with a rotted blaze. (Record, N. 67°00' E., 5.5 ft. dist., to face of tree.)
	At the cor. point
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, and in a collar of stone, 2 ft. diam., with alum. cap mkd.



1984

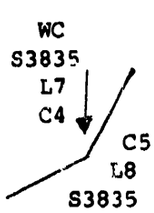
	And new bearing trees
	A hemlock, 10 ins. diam., bears N. 7 3/4° E., 28 lks. dist., mkd. C13 L6 S3835 BT.
	A hemlock, 8 ins. diam., bears S. 10 1/4° W., 52 lks. dist., mkd. C3 MS769 BT.
	Bury the marked stone alongside the alum. post.
	S. 58°58' E., on line 13-14, Lot 6, identical with line 3-2, Eclipse Lode, M.S. No. 769.
	Gradual descent through large old growth of spruce, hemlock and cedar, with medium dense underbrush.
4.60	Creek, 4 lks. wide, course S. 28° W.
6.60	Creek, 6 lks. wide, course S. 57° W.
18.80	Creek, 20 lks. wide, course S. 51° W.

Lot 6, U.S. Survey No. 3835, Alaska

CHAINS	
22.62	Point for cor. No. 14, Lot 6, identical with cor. No. 2, Eclipse Lode, M.S. No. 769 and identical with cor. No. 3, Star Lode, M.S. No. 769, monumented with a schist stone, 24 x 12 x 8 ins., loosely set, mkd. 2 3 769, with a mound of stone alongside, from which the original bearing trees A cedar, 14 ins. diam., bears N. 66° E., 40 lks. dist., with fragmentary scribing on a partially healed blaze. (Record, a spruce, 14 ins. diam., N. 33°30' E., 14.8 ft. dist, to face of tree.) A hemlock, 13 ins. diam., bears S. 44 1/4° W., 33 lks. dist., with marks 69 visible on partially healed blaze. (Record, S. 72°30' E., 16.9 ft. dist, to face of tree.) At the cor. point Set an alum rod, 16 ins. long, 3/4 in. diam., cemented 12 ins. in bedrock, with alum. cap mkd. S3835 L6 C14 C2 EL C3 SL MS769 1984 And a new bearing tree A cedar, 8 ins. diam., bears N. 10 3/4° W., 25 lks. dist., mkd. C14 L6 S3835 BT. Bury the marked stone alongside the alum. rod.
	S. 59°04' E., on line, 14-1, Lot 6, identical with a portion of line 3-2, Star Lode, M.S. No. 769. Gradual ascent through old growth of spruce, hemlock and cedar, with medium dense underbrush.
3.10	Creek, 1 lk. wide, course N. 26° E.
4.20	Creek, 3 lks. wide, course N. 3° W.
10.45	Creek, 2 lks. wide, course N. 23° E.
13.60	Creek, 4 lks. wide, course N. 29° E.
13.80	Creek, 3 lks. wide, course N. 40° W.
17.20	Creek, 3 lks. wide, course N. 21° W.
20.23	Cor. No. 1, Lot 6, identical with cor. No. 9, Lot 7, on line 3-2, Star Lode, M.S. No. 769 and point of beginning.

Lot 7, U.S. Survey No. 3835, Alaska

CHAINS	Lot 7
	Beginning at the true point for cor. No. 1, Lot 7, identical with the true point for cor. No. 8, Lot 8, on line 4-5, U.S. Survey No. 1761, at the thread of Ketchikan Creek, 60 lks. wide; impractical to monument. From this point, the witness cor. to cor. No. 1, Lot 7, identical with the witness cor. to cor. No. 8, Lot 8, bears S. 44°05' E., 1.55 chs. dist., hereinafter described. S. 3°30' W., on line 1-2, Lot 7, identical with line 8-7, Lot 8, downstream generally following the thread of Ketchikan Creek.
7.90	True point for cor. No. 2, Lot 7, identical with the true point for cor. No. 7, Lot 8, at the thread of Ketchikan Creek; impractical to monument. From this point, the point selected for the witness cor. to cor. No. 2, Lot 7, identical with the witness cor. to cor. No. 7, Lot 8, bears N. 41°51' W., 0.82 chs. dist. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 25 ins. in the ground and in a collar of stone, 3 ft. diam., with alum. cap mkd. WC C2 C7 L7 L8 1984 from which A hemlock, 11 ins. diam., bears S. 56 1/2° W., 14 lks. dist., mkd. X BT. A hemlock, 20 ins. diam., bears N. 64 3/4° W., 14 lks. dist., mkd. X BT.
	S. 62°26' W., on line 2-3, Lot 7, identical with line 7-6, Lot 8, downstream generally following the thread of Ketchikan Creek.
4.87	True point for cor. No. 3, Lot 7, identical with the true point for cor. No. 6, Lot 8, at the thread of Ketchikan Creek; impractical to monument. From this point, the point selected for the witness cor. to cor. No. 3, Lot 7, identical with the witness cor. to cor. No. 6, Lot 8, bears N. 29°00' W., 0.43 chs. dist. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground and in a collar of stone, 2 ft. diam., with alum. cap mkd. WC S3835 L7 C3 C6 L8 S3835 1984

CHAINS	
	from which A hemlock, 5 ins. diam., bears S. 71 3/4° W., 39 lks. dist., mkd. X BT. A hemlock, 4 ins. diam., bears N. 59 1/2° W., 23 lks. dist., mkd. X BT.
	S. 28°18' W., on line 3-4, Lot 7, identical with line 6-5, Lot 8, downstream generally following the thread of Ketchikan Creek.
2.89	True point for cor. No. 4, Lot 7, identical with the true point for cor. No. 5, Lot 8, at the thread of Ketchikan Creek; impractical to monument. From this point, the point selected for the witness cor. to cor. No. 4, Lot 7, identical with the witness cor. to cor. No. 5, Lot 8, bears N. 8°40' E., 1.01 chs. dist. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 22 ins. in the ground and in a collar of stone, 3 ft. diam., with alum. cap mkd.  1984 from which A hemlock, 21 ins. diam., bears N. 10 3/4° E., 34 lks. dist., mkd. X BT. A hemlock, 14 ins. diam., bears N. 69 1/2° W., 25 lks. dist., mkd. X BT.
	S. 77°48' W., on line 4-5, Lot 7, identical with line 5-4, Lot 8, downstream generally following the thread of Ketchikan Creek.
3.56	True point for cor. No. 5, Lot 7, identical with the true point for cor. No. 4, Lot 8, identical with the true point for cor. No. 4, Lot 9 and identical with the true point for cor. No. 29, Lot 11, at the thread of Ketchikan Creek; impractical to monument.
	S. 89°54' W., on line 5-6, Lot 7, identical with line 4-3, Lot 9. Across Ketchikan Creek.
1.50	Right bank of Ketchikan Creek, and the confluence of a creek, 6 lks. wide, banks bear northerly and southerly; ascend through hemlock, spruce and immature cedar.
2.00	Point selected for the witness cor. to cor. No. 5, Lot 7, identical with the witness cor. to cor. No. 4, Lot 8, identical with the witness cor. to cor. No. 4, Lot 9 and identical with the witness cor. to cor. No. 29, Lot 11.

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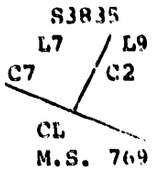
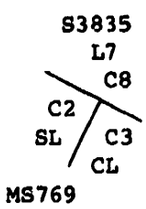
Lot 7, U.S. Survey No. 3835, Alaska

CHAINS	
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground and in a collar of stone, 2 ft. diam., with alum. cap mkd.
	WC S3835 L7 C5 C4L8 L9C4 C29 L11 S3835 1984
	from which
	A cedar, 5 ins. diam., bears S. 28 1/2° W., 21 lks. dist., mkd. X BT.
	A cedar, 7 ins. diam., bears N. 36 1/2° W., 17 lks. dist., mkd. X BT.
3.99	Point for cor. No. 6, Lot 7, identical with cor. No. 3, Lot 9.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 12 ins. in the ground, encircled by a mound of stone, 4 ft. base, to 5 ins. below top, with alum. cap mkd.
	S3835 L7 C6 C3 L9 S3835 1984
	from which
	A cedar, 8 ins. diam., bears S. 19 1/2° W., 28 lks. dist., mkd. C3 L9 S3835 BT.
	A cedar, 7 ins. diam., bears S. 42 1/2° W., 16 lks. dist., mkd. X BT.
	A cedar, 7 ins. diam., bears N. 25 3/4° W., 16 lks. dist., mkd. C6 L7 S3835 BT.
	S. 25°19' W., on line 6-7, Lot 7, identical with line 3-2, Lot 9.
	Descend gradually across a SE slope, through hemlock and cedar, with medium dense underbrush of alder and devils club.
12.20	Creek, 10 lks. wide, course S. 52° E.
15.30	Creek, 3 lks. wide, course S. 39° E.
21.69	Point for cor. No. 7, Lot 7, identical with cor. No. 2, Lot 9, on line 2-3, Comet Lode, M.S. No. 769.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd.

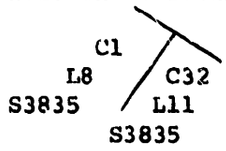
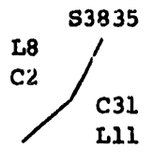
Lot 7, U.S. Survey No. 3835, Alaska

CHAINS	
	 1984 from which A cedar, 12 ins. diam., bears N. 67 1/2° E., 27 lks. dist., mkd. C2 L9 S3835 BT. A hemlock, 10 ins. diam., bears N. 35 3/4° W., 55 lks. dist., mkd. C7 L7 S3835 BT.
	N. 60°02' W., on line 7-8, Lot 7, identical with a portion of line 2-3, Comet Lode, M.S. No. 769. Ascend, through dense hemlock.
2.75	Dilapidated water flume, 4 ft. diam., bears N. 6° E. and S. 18° W.
12.00	Top of ascent, bears NE and SW; descend steep NW slope.
15.36	Point for cor. No. 8, Lot 7, identical with cor. No. 3, Comet Lode, M.S. No. 769 and identical with cor. No. 2, Star Lode, M.S. No. 769, monumented with a schist stone, 30 x 20 x 10 ins., firmly set, 20 ins. in the ground, mkd. 3 2 769, with an X on top and in a mound of stone, 3 ft. base, from which the original bearing trees A spruce, 28 ins. diam., bears N. 33 1/2° E., 24 lks. dist., with healed blaze. (Record, 14.8 ft. dist, to face of tree.) A hemlock stump, 15 ins. diam., bears N. 80° E., 29 lks. dist., badly decayed with no blaze. (Record, S. 73°30' E., 16.9 ft. dist., to face of tree.) At the cor. point Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground and in a collar of stone, 3 ft. diam., with alum. cap mkd.  1984 And new bearing trees A hemlock, 11 ins. diam., bears S. 50 3/4° E., 25 lks. dist., mkd. C3 MS769 BT. A cedar, 36 ins. diam., bears S. 17 1/4° W., 58 lks. dist., mkd. C3 MS769 BT.

Lot 7, U.S. Survey No. 3835, Alaska

CHAINS	
	N. 59°04' W., on line 8-9, Lot 7, identical with a portion of line 2-3, Star Lode, M.S. No. 769.
	Gradual descent, through hemlock and cedar, with medium dense underbrush.
2.27	Corner No. 9, Lot 7, identical with cor. No. 1, Lot 6, herinbefore described.
	N. 25°19' E., on line 9-10, Lot 7, identical with line 1-2, Lot 6, hereinbefore described.
19.01	Corner No. 10, Lot 7, identical with cor. No. 2, Lot 6, hereinbefore described.
	N. 38°34' E., on line 10-11, Lot 7, identical with line 2-3, Lot 6, hereinbefore described.
26.68	Corner No. 11, Lot 7, identical with cor. No. 3, Lot 6, on line 4-5, U.S. Survey No. 1761, herinbefore described.
	S. 44°17' E., on line 11-12, Lot 7, identical with a portion of line 5-4, U.S. Survey No. 1761.
5.50	Point for cor. No. 12, Lot 7, identical with the 1 1/2 Mi. point, line 4-5, U.S. Survey No. 1761, monumented with an iron post, 2 ins. diam., loosely set, projecting 20 ins. above ground, with brass cap mkd. FE S1761 M 1 1/2 1927, from which the original bearing trees A dead hemlock, 11 ins. diam., bears S. 32 1/4° E., 3 lks. dist., with no marks visible on partially healed blaze. (Record, N. 17 3/4° E.) A rootwad hole, bears N. 82° W, 27 lks. dist., with a fallen hemlock alongside, 28 ins. diam., with no marks visible on partially healed blaze. (Record, N. 72° W., 22 lks.) At the cor. point, reset the original iron post, 36 ins. long, 2 ins. diam., 26 ins. in the ground. Add the marks 1984 to the brass cap. And new bearing trees A hemlock, 14 ins. diam., bears N. 84 3/4° E., 19 lks. dist., mkd. X BT. A spruce, 42 ins. diam., bears N. 33 1/2° W., 60 lks. dist., mkd. X BT.
	S. 44°05' E., on line 12-1, Lot 7, identical with a portion of line 5-4, U.S. Survey No. 1761. Descend through dense hemlock, spruce and cedar.
13.76	True point for cor. No. 1, Lot 7, identical with the true point for cor. No. 8, Lot 8, at the thread of Ketchikan Creek and point of beginning.

Lot 8, U.S. Survey No. 3835, Alaska

CHAINS	Lot 8
	Beginning at the point for cor. No. 1, Lot 8, identical with cor. No. 32, Lot 11, on line 4-5, U.S. Survey No. 1761. Set an alum. rod, 26 ins. long, 3/4 in. diam., cemented 14 ins. in a drill hole in bedrock, with alum. cap mkd.  1984 from which A hemlock, 9 ins. diam., bears N. 36 1/4° E., 22 lks. dist., mkd. X BT. A hemlock, 6 ins. diam., bears S. 41 1/4° E., 32 lks. dist., mkd. C32 L11 S3835 BT. A cedar, 16 ins. diam., bears S. 62 3/4° W., 16 lks. dist., mkd. C1 L8 S3835 BT. S. 33°17' W., on line 1-2, Lot 8, identical with line 32-31, Lot 11. Descend through hemlock, cedar and spruce.
6.10	Creek, 4 lks. wide, course N. 40° W.
6.58	Point for cor. No. 2, Lot 8, identical with cor. No. 31, Lot 11. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 22 ins. in the ground and in a collar of stone, 2 ft. diam., with alum. cap mkd.  1984 from which A cedar, 4 ins. diam., bears S. 37° W., 27 lks. dist., mkd. X BT. A cedar, 7 ins. diam., bears N. 84° W., 14 lks. dist., mkd. C2 L8 S3835 BT.
	S. 56°57' W., on line 2-3, Lot 8, identical with line 31-30, Lot 11. Over fairly level ground, through hemlock and cedar, with medium dense underbrush of willow and devil's club.
4.60	Creek, 4 lks. wide, course N. 40° W.
6.39	Point for cor. No. 3, Lot 8, identical with cor. No. 30, Lot 11.

Lot 8, U.S. Survey No. 3835, Alaska

CHAINS	
	Set an alum post, 30 ins. long, 2 1/2 ins. diam., 22 ins. in the ground, with alum. cap mkd. S3835 L8 C3 C30 L11 S3835 1984 from which A hemlock, 7 ins. diam., bears N. 31° E., 35 lks. dist., mkd. C3 L8 S3835 BT. A cedar, 10 ins. diam., bears S. 22 1/2° E., 3 lks. dist., mkd. C30 L11 S3835 BT.
	S. 89°54' W., on line 3-4, Lot 8, identical with line 30-29, Lot 11. Over fairly level ground, through hemlock and cedar, with medium dense underbrush.
1.00	Left bank of Ketchikan Creek, 100 lks. wide, bears N. 60° E. and S. 60° W.
5.00	True point for cor. No. 4, Lot 8, identical with the true point for cor. No. 5, Lot 7, identical with the true point for cor. No. 4, Lot 9 and identical with the true point for cor. No. 29, Lot 11, at the thread of Ketchikan creek, hereinbefore described.
	Line 4-5, Lot 8, identical with line 5-4, Lot 7, through line 7-8, Lot 8, identical with line 2-1, Lot 7, are previously described in Lot 7.
	From the true point for cor. No. 8, Lot 8, identical with the true point for cor. No. 1, Lot 7, on line 4-5, U.S. Survey No. 1761, at the thread of Ketchikan Creek, hereinbefore described. S. 44°05' E., on line 8-1, Lot 8, identical with a portion of line 5-4, U.S. Survey No. 1761.
0.30	Left bank of Ketchikan Creek, bears N. 3°29' E. and S. 3°29' W.; ascend steep bank 50 ft. high.
1.00	Top of bank; thence over fairly level ground, through dense hemlock, spruce and cedar.
1.55	Point selected for the witness cor. to cor. No. 8, Lot 8, identical with the witness cor. to cor. No. 1, Lot 7. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with alum. cap mkd. WC C1 L7 C8 L8 S3835 1984

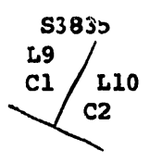
Lot 8, U.S. Survey No. 3835, Alaska

CHAINS	
	from which
	A hemlock, 10 ins. diam., bears S. 27 1/2° E., 27 lks. dist., mkd. X BT.
	A hemlock, 7 ins. diam., bears S. 71 3/4° E., 12 lks. dist., mkd. X BT.
5.00	Gorge, 30 lks. wide, 20 lks. deep, with creek, 6 lks. wide, course S. 70° W.
6.20	Cor. No. 1, Lot 8, identical with cor. No. 32, Lot 11, on line 4-5, U.S. Survey No. 1761 and point of beginning.

Lot 9

Beginning at the point for cor. No. 1, Lot 9, identical with cor. No. 2, Lot 10, on line 2-3, Comet Lode, M.S. No. 769.

Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 22 ins. in the ground and in a collar of stone, 3 ft. diam., with alum. cap mkd.



from which

A hemlock, 14 ins. diam., bears N. 9 3/4° E., 37 lks. dist., mkd. C1 L9 S3835 BT.

A cedar, 13 ins. diam., bears S. 73 1/2° E., 28 lks. dist., mkd. C2 L10 S3835 BT.

A hemlock, 12 ins. diam., bears S. 45° W., 47 lks. dist., mkd. X BT.

N. 60°02' W., on line 1-2, Lot 9, identical with a portion of line 2-3, Comet Lode, M.S. No. 769.

Ascend gradually, through hemlock, spruce and cedar, with medium dense underbrush of willow and devil's club.

1.52	Center of tramway, bears N. 25° E. and S. 25° W.
3.04	Cor. No. 2, Lot 9, identical with cor. No. 7, Lot 7, on line 2-3, Comet Lode, M.S. No. 769, hereinbefore described.

N. 25°19' E., on line 2-3, Lot 9, identical with line 7-6, Lot 7, hereinbefore described.

21.69	Cor. No. 3, Lot 9, identical with cor. No. 6, Lot 7, hereinbefore described.

N. 89°54' E., on line 3-4, Lot 9, identical with line 6-5, Lot 7, hereinbefore described.

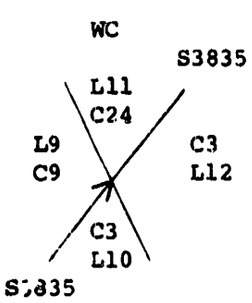
Lot 9, U.S. Survey No. 3835, Alaska

CHAINS	
1.99	Witness cor. to cor. No. 4, Lot 9, identical with the witness cor. to cor. No. 5, Lot 7, identical with the witness cor. to cor. No. 4, Lot 8 and identical with the witness cor. to cor. No. 29, Lot 11, hereinbefore described.
3.99	True point for cor. No. 4, Lot 9, identical with the true point for cor No. 5, Lot 7, identical with the true point for cor. No. 4, Lot 8 and identical with the true point for cor. No. 29, Lot 11, at the thread of Ketchikan Creek, hereinbefore described.
	S. 77°48' W., on line 4-5, Lot 9, identical with line 29-28, Lot 11, downstream generally following the thread of Ketchikan Creek.
1.17	True point for cor. No. 5, Lot 9, identical with the true point for cor. No. 28, Lot 11, at the thread of Ketchikan Creek; impractical to monument. From this point, the point selected for the witness cor. to cor. No. 5, Lot 9, identical with the witness cor. to cor. No. 28, Lot 11, bears N. 50°26' E., 1.20 chs. dist. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 29 ins. in the ground, with alum. cap mkd. WC S3835 C5 L9 L11 S3835 C28 1984 from which A cedar, 10 ins. diam., bears S. 8 3/4° W., 21 lks. dist., mkd. X BT. A hemlock, 8 ins. diam., bears N. 46 3/4° W., 17 lks. dist., mkd. X BT.
	S. 32°13' W., on line 5-6, Lot 9, identical with line 28-27, Lot 11, downstream generally following the thread of Ketchikan Creek.
11.03	True point for cor. No. 6, Lot 9, identical with the true point for cor. No. 27, Lot 11, at the thread of Ketchikan Creek; impractical to monument. From this point, the point selected for the witness cor. to cor. No. 6, Lot 9, identical with the witness cor. to cor. No. 27, Lot 11, bears S. 84°17' E., 0.92 chs. dist. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 24 ins. in the ground and in a collar of stone, 2 ft. diam., with alum. cap mkd. WC S3835 L11 L9 C27 C6 1984 from which

Lot 9, U.S. Survey No. 3835, Alaska

CHAINS	
	A hemlock, 8 ins. diam., bears N. 44 1/2° E., 73 lks. dist., mkd. X BT.
	A hemlock, 6 ins. diam., bears S. 56 1/2° E., 27 lks. dist., mkd. X BT.
	Raise a mound of stone, 2 ft. base, 1 ft. high, E. of witness cor.
	S. 7°28' W., on line 6-7, Lot 9, identical with line 27-26, Lot 11, downstream generally following the thread of Ketchikan Creek.
3.66	True point for cor. No. 7, Lot 9, identical with the true point for cor. No. 26, Lot 11, at the thread of Ketchikan Creek; impractical to monument.
	From this point, the point selected for the witness cor. to cor. No. 7, Lot 9, identical with the witness cor. to cor. No. 26. Lot 11, bears N. 68°33' E., 0.74 chs. dist.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 20 ins. in the ground and in a collar of stone, 4 ft. diam., with alum. cap mkd.
	WC C7 L9 C26 L11 S3835 1984
	from which
	A hemlock, 14 ins. diam., bears S. 59 3/4° E., 19 lks. dist., mkd. X BT.
	A cedar, 12 ins. diam., bears N. 14 3/4° W., 15 lks. dist., mkd. X BT.
	S. 25°47' W., on line 7-8, Lot 9, identical with line 26-25, Lot 11, downstream generally following the thread of Ketchikan Creek.
0.40	Top of waterfall, 40 ft. high.
4.42	True point for cor. No. 8, Lot 9, identical with the true point for cor. No. 25, Lot 11, at the thread of Ketchikan Creek; impractical to monument.
	From this point, the witness cor. to cor. No. 8, Lot 9, identical with the witness cor. to cor. No 25, Lot 11, bears S. 65°00' E., 0.60 chs. dist.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 20 ins. in the ground, encircled by a mound of stone, 4 ft. base, to top, with alum. cap mkd.
	WC L11 L9 C25 C8 S3835 1984

Lot 9, U.S. Survey No. 3835, Alaska

CHAINS	
	from which A hemlock, 18 ins. diam., bears S. 1° E., 16 lks. dist., mkd. X BT. A hemlock, 7 ins. diam., bears S. 53° E., 33 lks. dist., mkd. X BT.
	S. 20°57' E., on line 8-9, Lot 9, identical with line 25-24, Lot 11, downstream generally following the thread of Ketchikan Creek.
0.82	True point for cor. No. 9, Lot 9, identical with the true point for cor. No. 3, Lot 10, identical with the true point for cor. No. 24, Lot 11 and identical with the true point for cor. No. 3, Lot 12, at the thread of Ketchikan Creek; impractical to monument.
	S. 25°19' W., on line 9-1, Lot 9, identical with line 3-2, Lot 10. Across Ketchikan Creek.
0.90	Right bank of Ketchikan Creek, 20 ft. high, bears S. 20° E. and N. 20° W.
1.50	Point selected for the witness cor. to cor. No. 9, Lot 9, identical with the witness cor. to cor. No. 3, Lot 10, identical with the witness cor. to cor. No. 24, Lot 11 and identical with the witness cor. to cor. No. 3, Lot 12. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with alum. cap mkd.  1984 from which A cedar, 10 ins. diam., bears S. 24 3/4° E., 40 lks. dist., mkd. X BT. A cedar, 7 ins. diam., bears N. 80 1/2° W., 35 lks. dist., mkd. X BT.
3.50	Cor. No. 1, Lot 9, identical with cor. No. 2, Lot 10, on line 2-3, Comet Lode, M.S. No. 769 and point of beginning.

Lot 10

Beginning at the point for designated cor. No. 1, Lot 10, identical with the witness cor. to cor. No. 2, Comet Lode, M.S. No. 769, which now becomes a witness point for Comet Lode, M.S. No. 769, monumented with a slate stone,

Lot 10, U.S. Survey No. 3835, Alaska

CHAINS	
	3 x 10 x 24 ins., firmly set, 14 ins. in the ground, mkd. WC 2-2 769, with an X on top, from which the original bearing trees
	A hemlock stump, 17 ins. diam., bears N. 12 3/4° W., 10 lks. dist., with a healed blaze. (Record, N. 1°00' E., 15 ft. dist., to face of tree.)
	A hemlock, 13 ins. diam., bears N. 75 1/2° W., 8 lks. dist., with a healed blaze. (Record, a spruce, S. 48°15' E., 12.8 ft. dist., to face of tree.)
	At the cor. point
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 25 ins. in the ground and in a collar of stone, 2 ft. diam., with alum. cap mkd.
	WP CL MS769 1984
	And new bearing trees
	A hemlock, 12 ins. diam., bears S. 5 1/4° E., 28 lks. dist., mkd. X BT.
	A hemlock, 16 ins. diam., bears S. 77 3/4° W., 38 lks. dist., mkd. X BT.
	Bury the marked stone alongside the alum. post.
	N. 60°02' W., on line 1-2, Lot 10, identical with a portion of line 2-3, Comet Lode, M.S. No. 769.
	Gradual ascent through old growth of spruce, hemlock and cedar, with medium dense underbrush.
3.49	Cor. No. 2, Lot 10, identical with cor. No. 1, Lot 9, on line 2-3, Comet Lode, M.S. No. 769; hereinbefore described.
	N. 25°19' E., on line 2-3, Lot 10, identical with line 1-9, Lot 9, hereinbefore described.
2.00	Witness cor. to cor. No. 3, Lot 10, identical with the witness cor. to cor. No. 9, Lot 9, identical with the witness cor. to cor. No. 24, Lot 11 and identical with the witness cor. to cor. No. 3, Lot 12; hereinbefore described.
2.60	Right bank of Ketchikan Creek, bears S. 20° E. and N. 20° W.
3.50	True point for cor. No. 3, Lot 10, identical with the true point for cor. No. 9, Lot 9, identical with the true point for cor. No. 24, Lot 11 and identical with the true point for cor. No. 3, Lot 12, at the thread of Ketchikan Creek; hereinbefore described.
	S. 20°57' E., on line 3-4, Lot 10, identical with line 3-2, Lot 12, downstream generally following the thread of Ketchikan Creek.

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Lot 10, U.S. Survey No. 3835, Alaska

CHAINS	
5.54	True point for cor. No. 4, Lot 10, identical with the true point for cor. No. 2, Lot 12, on line 2-3, Comet Lode, M.S. No. 769, at the thread of Ketchikan Creek, impractical to monument. No acessories taken.
	N. 59°32' W., on line 4-1, Lot 10, identical with a portion of line 2-3, Comet Lode, M.S. No. 769. Across rocky creek bottom.
0.25	Right bank of Ketchikan Creek, bears S. 10° E. and N. 10° W.
0.52	Corner No. 1, Lot 10, identical with the witness point for Comet Lode, M.S. No. 769 and point of beginning.

Lot 11

Beginning at the point for cor. No. 1, Lot 11, identical with cor. No. 4, Lot 13, on line 4-5, U.S. Survey No. 1761.

Set an iron post, 28 ins. long, 2 1/2 ins. diam., 22 ins. in the ground and in a collar of stone, 2 ft. diam., with brass cap mkd.

S3835

1984

from which

A hemlock, 8 ins. diam., bears S. 3 1/2° E., 17 lks. dist., mkd. C4 L13 S3835 BT.

A spruce, 7 ins. diam., bears S. 71 1/4° E., 10 lks. dist., mkd. X BT.

A cedar, 8 ins. diam., bears N. 26 1/2° W., 22 lks. dist., mkd. X BT.

S. 1°38' E., on line 1-2, Lot 11, identical with line 4-3, Lot 13.

Ascend, through hemlock, spruce and cedar.

6.50	Top of ascent.
12.40	Top of cliff, 50 ft. high, edge bears N. 60° E. and S. 60° W.
12.93	Point for cor. No. 2, Lot 11, identical with cor. No. 3, Lot 13. Set an iron post, 28 ins. long, 2 1/2 ins. diam., 10 ins. in the ground, encircled by a mound of stone, 3 ft. base, to , with brass cap mkd.

Lot 11, U.S. Survey No. 3835, Alaska

CHAINS	
	S3835 L13 L11 C3 C2 1984 from which A boulder, 7 x 6 ft., protruding 3 ft. above ground, bears N. 7° W., 16 lks. dist., mkd. X BO on southern face.
	N. 57°00' E., on line 2-3, Lot 11, identical with line 3-2, Lot 13. Ascend across southern slope, over excavated boulders; thence through dense alder, spruce, cedar and hemlock.
3.65	Point for cor. No. 3, Lot 11, identical with cor. No. 2, Lot 13. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 22 ins. in the ground and in a collar of stone, 2 ft. diam., with alum. cap mkd. S3835 L13 C2 C3 L11 S3835 1984 from which A cedar, 5 ins. diam., bears N. 31° E., 21 lks. dist., mkd. X BT. A cedar, 6 ins. diam., bears S. 58 1/2° E., 14 lks. dist., mkd. C3 L11 S3835 BT.
	N. 76°00' E., on line 3-4, Lot 11, identical with line 2-1, Lot 13. Gradual ascent through hemlock and cedar.
1.10	Top of ascent; continue over fairly level ground.
3.10	Begin gradual descent.
5.75	Creek, 1 lk. wide, course N. 7° W.
5.96	Point for cor. No. 4, Lot 11, identical with cor. No. 1, Lot 13, on line 4-5, U.S. Survey No. 1761. Set an iron post, 28 ins. long, 2 1/2 ins. diam., 10 ins. in the ground, encircled by a mound of stone, 5 ft. base, to 6 ins. below the top, with brass cap mkd.

Lot 11, U.S. Survey No. 3835, Alaska

CHAINS	
	C1 L13 / / C4 / L11 S3835 1984 from which A cedar, 14 ins. diam., bears N. 8° E., 16 lks. dist., mkd. X BT. A hemlock, 10 ins. diam., bears S. 39 1/2° W., 37 lks. dist., mkd. C4 L11 S3835 BT. A cedar, 15 ins. diam., bears N. 89 1/4° W., 35 lks. dist., mkd. C1 L13 S3835 BT.
	S. 44°15' E., on line 4-5, Lot 11, identical with a portion of line 5-4, U.S. Survey No. 1761. Gradual ascent over fairly open ground, with scattered hemlock and cedar.
3.51	Point for cor. No. 5, Lot 11, identical with cor. No. 3, Lot 14, on line 4-5, U.S. Survey No. 1761. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 15 ins. in the ground, encircled by a mound of stone, 2 1/2 ft. base, to top, with alum. cap mkd. C5 L11 / C3 L14 S3835 1984 from which A cedar, 20 ins. diam., bears N. 22 1/2° E., 38 lks. dist., mkd. X BT. A pine, 9 ins. diam., bears S. 27 1/2° W., 78 lks. dist., mkd. C3 L14 S3835 BT. A cedar, 9 ins. diam., bears S. 87 1/2° W., 100 lks. dist., mkd. C5 L11 S3835 BT.
	S. 76°00' W., on line 5-6, Lot 11, identical with line 3-4, Lot 14. Gradual ascent over fairly open ground, with scattered hemlock, cedar and pine.
1.40	Creek, 2 lks. wide, course N. 17° W.
4.30	Top of ascent; begin gradual descent.
5.10	Begin steep descent; timber becomes denser.
7.22	Point for cor. No. 6, Lot 11, identical with cor. No. 4, Lot 14. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with alum. cap mkd.

Lot 11, U.S. Survey No. 3835, Alaska

CHAINS	
	S3835 L11 C6 C4 L14 S3835 1984 from which A spruce, 12 ins. diam., bears N. 16 1/4° E., 24 lks. dist., mkd. C6 L11 S3835 BT. A spruce, 8 ins. diam., bears S. 1 1/2° W., 5 lks. dist., mkd. C4 L14 S3835 BT.
	S. 57°00' W., on line 6-7, Lot 11, identical with line 4-5, Lot 14. Sharp descent through old growth of spruce, hemlock and cedar, with medium dense underbrush.
3.70	Approximate center line of the road to Ketchikan Lake, bears S. 20° E. and N. 20° W.
3.87	Point for cor. No. 7, Lot 11, identical with cor. No. 5, Lot 14. Set an iron post, 28 ins. long, 2 1/2 ins. diam., 6 ins. below the surface of the ground, with brass cap mkd. L11 C7 C5 L14 S3835 1984 from which A hemlock, 8 ins. diam., bears S. 79 1/2° E., 68 lks. dist., mkd. C5 L14 S3835 BT. A cedar, 35 ins. diam., bears S. 12 1/2° W., 47 lks. dist., mkd. C7 L11 S3835 BT. The cor. is located on the west shoulder of the road to Ketchikan Lake.
	S. 20°00' E., on line 7-8, Lot 11, identical with line 5-6, Lot 14. Over fairly level ground, alongside of the road to Ketchikan Lake.
10.25	Creek, 2 lks. wide, course S. 65° W.
13.30	Enter stand of old growth spruce, hemlock and cedar, edge bears generally N. and S.
14.42	Point for cor. No. 8, Lot 11, identical with cor. No. 6, Lot 14. Set an iron post, 28 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with brass cap mkd.

Lot 11, U.S. Survey No. 3835, Alaska

CHAINS	
	S3835 L11 C8 \ L14 C6 1984 from which A hemlock, 8 ins. diam., bears S. 69° E., 8 lks. dist., mkd. X BT. A cedar, 15 ins. diam., bears N. 10 3/4° W., 8 lks. dist., mkd. C6 L14 S3835 BT.
	S. 50°00' E., on line 8-9, Lot 11, identical with line 6-7, Lot 14. Over rolling ground, through old growth of spruce, hemlock and cedar, with medium dense underbrush.
1.25	Creek, 2 lks. wide, course S. 8° W.
1.70	Begin ascent over SW facing slope.
6.50	Creek, 5 lks. wide, course S. 65° W.
7.55	Creek, 5 lks. wide, course S. 58° W.
7.75	Creek, 4 lks. wide, course S. 87° W.
16.10	Center of waterfall, 20 lks. wide, course S. 62° W.
16.44	Point for cor. No. 9, Lot 11, identical with cor. No. 7, Lot 14. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 29 ins. in the ground, with alum. cap mkd. C9 L11 \ C7 L14 S3835 1984 from which A hemlock, 8 ins. diam., bears S. 18 3/4° E., 38 lks. dist., mkd. C7 L14 S3835 BT. A cedar, 17 ins. diam., bears S. 46 1/2° W., 38 lks. dist., mkd. C9 L11 S3835 BT.
	S. 40°00' W., on line 9-10, Lot 11, identical with line 7-8, Lot 14. Descend through old growth of spruce, hemlock and cedar, with medium dense underbrush.
2.00	Begin steep descent over rocky SW slope.
3.03	True point for cor. No. 10, Lot 11, identical with the true point for cor. No. 8, Lot 14, not monumented; falls on steep rock face.

Lot 11, U.S. Survey No. 3835, Alaska

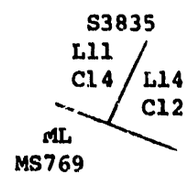
CHAINS	
	N. 50°00' W., on line 10-11, Lot 11, identical with line 8-9, Lot 14.
0.20	Point selected for the witness cor. to cor. No. 10, Lot 11, identical with the witness cor. to cor. No. 8, Lot 14. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 22 ins. in the ground and in a collar of stone, 3 ft. diam., with alum. cap mkd. WC S3835 L11 C10 C8 L14 S3835 1984 from which A cedar, 10 ins. diam., bears S. 72 3/4° E., 20 lks. dist., mkd. X BT. A hemlock, 7 ins. diam., bears N. 24° W., 52 lks. dist., mkd. X BT. Gradual descent over SW slope, through old growth of spruce, hemlock and cedar, with elderberry underbrush.
3.75	Creek, 4 lks. wide, course S. 81° W.
5.05	Creek, 20 lks. wide, course S. 60° W.
9.30	Creek, 5 lks. wide, course S. 68° W.
12.90	Approximate centerline of the gravel road to Ketchikan Lake, bears S. 26° E. and N. 26° W.; continue over fairly level ground.
18.47	Point for cor. No. 11, Lot 11, identical with cor. No. 9, Lot 14. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 23 ins. in tne ground, with alum. cap mkd. S3835 L11 C11 C9 L14 S3835 1984 from which A pine, 8 ins. diam., bears S. 58 1/2° E., 16 lks. dist., mkd. C11 L11 S3835 BT. A pine, 12 ins. diam., bears S. 80 1/4° W., 60 lks. dist., mkd. C9 L14 S3835 BT.
	West, on line 11-12, Lot 11, identical with line 9-10, Lot 14.

Lot 11, U.S. Survey No. 3835, Alaska

CHAINS	
	Over fairly level ground, through old growth of spruce, hemlock, pine and cedar, with medium dense underbrush.
0.67	Point for cor. No. 12, Lot 11, identical with cor. No. 10, Lot 14.
	Set an alum. rod, 18 ins. long, 3/4 in. diam., cemented 12 ins. in a drillhole in bedrock, with alum. cap mkd.
	S3835 L11 C12 C10 L14 S3835 1984
	from which
	A cedar, 8 ins. diam., bears N. 29 1/2° E., 5 lks. dist., mkd. C12 L11 S3835 BT.
	A pine, 8 ins. diam., bears S. 45 1/2° W., 14 lks. dist., mkd. C10 L14 S3835 BT.
	N. 40°30' W., on line 12-13, Lot 11, identical with line 10-11, Lot 14.
	Over fairly level ground, through hemlock, spruce, pine and cedar, with medium dense underbrush.
1.00	Creek, 4 lks. wide, course S. 56° W.
5.94	Point for cor. No. 13, Lot 11, identical with cor. No. 11, Lot 14.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 18 ins. in the ground, encircled by a mound of stone, 3 1/2 ft. base, to top, with alum. cap mkd.
	S3835 L11 C13 C11 L14 S3835 1984
	from which
	A cedar, 25 ins. diam., bears N. 89 1/4° E., 31 lks. dist., mkd. C13 L11 S3835 BT.
	A hemlock, 10 ins. diam., bears N. 59 1/2° W., 15 lks. dist., mkd. C13 L11 S3835 BT.
	S. 28°37' W., on line 13-14, Lot 11, identical with line 11-12, Lot 14.
	Over rolling ground, through hemlock, spruce, pine and cedar, with meduim dense underbrush.
13.07	Point for cor. No. 14, Lot 11, identical with cor. No. 12, Lot 14, on line 3-4, Meteor Lode, M.S. No. 769.

Lot 11, U.S. Survey No. 3835, Alaska

CHAINS	
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 29 ins. in the ground, with alum. cap mkd.



1984

from which

A pine, 6 ins. diam., bears S. 36 1/2° W., 25 lks. diam., mkd. MS769 BT.

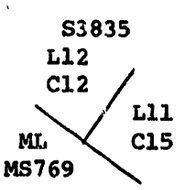
A cedar, 4 ins. diam., bears N. 14° W., 27 lks. dist., mkd. X BT.

N. 59°08' W., on line 14-15, Lot 11, identical with a portion of line 3-4, Meteor Lode, M.S. No. 769.

Over rolling ground, through hemlock, spruce, pine and cedar, with medium dense underbrush.

6.07 Point for cor. No. 15, Lot 11, identical with cor. No. 12, Lot 12, on line 3-4, Meteor Lode, M.S. No. 769.

Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 10 ins. in the ground, encircled by a mound of stone, 4 1/2 ft. base, to top, with alum. cap mkd.



1984

from which

A pine, 7 ins. diam., bears N. 14° E., 21 lks. dist., mkd. C12 L12 S3835 BT.

A cedar, 5 ins. diam., bears S. 55 1/4° W., 29 lks. dist., mkd. MS769 BT.

N. 28°37' E., on line 15-16, Lot 11, identical with line 12-11, Lot 12.

Over fairly level ground, through hemlock, spruce, pine and cedar, with medium dense underbrush.

2.00 Begin gradual ascent.

9.50 Top of ascent; continue over fairly level ground.

15.15 Point for cor. No. 16, Lot 11, identical with cor. No. 11, Lot 12.

Set an alum. rod, 18 ins. long, 3/4 in. diam., cemented 12 ins. in a drillhole in bedrock, with alum. cap mkd.

Lot 11, U.S. Survey No. 3835, Alaska

CHAINS	
	S3835 L12 \ L11 C11 / C16 1984 A cedar, 5 ins. diam., bears N. 12 1/2° E., 37 lks. dist., mkd. X BT. A hemlock, 10 ins. diam., bears S. 61 1/2° E., 33 lks. dist., mkd. C16 L11 S3835 BT.
	N. 40°30' W., on line 16-17, Lot 11, identical with line 11-10, Lot 12. Gradual ascent through hemlock, spruce and cedar, with medium dense underbrush.
0.53	Point for cor. No. 17, Lot 11, identical with cor. No. 10, Lot 12. Set an alum. rod, 18 ins. long, 3/4 in. diam., cemented 10 ins. in a drillhole in bedrock, with alum. cap mkd. S3835 L12 | L11 C10 \ C17 1984 from which A hemlock, 8 ins. diam., bears N. 52° E., 16 lks. dist., mkd. C17 L11 S3835 BT. A cedar, 4 ins. diam., bears N. 32 1/2° W., 43 lks. dist., mkd. X BT.
	North, on line 17-18, Lot 11, identical with line 10-9, Lot 12. Over rolling ground, through scattered hemlock, spruce and cedar.
9.09	Point for cor. No. 18, Lot 11, identical with cor. No. 9, Lot 12. Set an iron post, 28 ins. long, 2 1/2 ins. diam., 24 ins. in the ground and in a collar of stone, 2 ft. diam., with brass cap mkd. C9 L12 | C18 L11 S3835 1984 from which A cedar, 8 ins. diam., bears N. 10° E., 50 lks. dist., mkd. C9 L12 S3835 BT.

Lot 11, U.S. Survey No. 3835, Alaska

CHAINS	
	A spruce, 5 ins. diam., bears S. 55° E., 23 lks. dist., mkd. X BT.
	East, on line 18-19, Lot 11, identical with line 9-8, Lot 12.
	Over fairly open level ground, with scattered hemlock, spruce and cedar.
0.51	Point for cor. No. 19, Lot 11, identical with cor. No. 8, Lot 12.
	Set an iron post, 28 ins. long, 2 1/2 ins. diam., 8 ins. in the ground, encircled by a mound of stone, 3 ft. base, to 5 ins. below the top, with brass cap mkd.
	S3835 L12 | L11 C8 | C19 1984
	from which
	A pine, 10 ins. diam., bears N. 7 1/2° E., 29 lks. dist., mkd. C19 L11 S3835 BT.
	A cedar, 5 ins. diam., bears S. 25 1/4° W., 3 lks. dist., mkd. X BT.
	N. 1°38' W., on line 19-20, Lot 11, identical with line 8-7, Lot 12.
	Over fairly open level ground, with scattered hemlock, spruce, pine and cedar.
3.90	Timber becomes more dense.
9.10	Creek, 1 lk. wide, course N. 40° W.
11.82	Point for cor. No. 20, Lot 11, identical with cor. No. 7, Lot 12.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 28 ins. in the ground, with alum. cap mkd.
	C20 C7 | L11 L12 S3835 1984
	from which
	A pine, 12 ins. diam., bears S. 5° W., 43 lks. dist., mkd. C7 L12 S3835 BT.
	A cedar, 6 ins. diam., bears S. 74 3/4° W., 28 lks. dist., mkd. C20 L11 S3835 BT.
	S. 33°17' W., on line 20-21, identical with line 7-6, Lot 12.

Lot 11, U.S. Survey No. 3835, Alaska

CHAINS	
	Gradual ascent through hemlock, spruce, pine and cedar.
2.29	Point for cor. No. 21, Lot 11, identical with cor. No. 6, Lot 12. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 15 ins. in the ground, encircled by a mound of stone, 3 ft. base, to 5 ins. below top, with alum. cap mkd. S3835 L11 C21 C6 L12 S3835 1984 from which A pine, 12 ins. diam., bears S. 57 1/4° E., 31 lks. dist., mkd. C6 L12 S3835 BT. A cedar, 7 ins. diam., bears S. 24 3/4° W., 78 lks. dist., mkd. C6 L12 S3835 BT.
	S. 57°00' W., on line 21-22, Lot 11, identical with line 6-5, Lot 12. Over fairly level ground, through scattered cedar and pine.
1.15	Creek, 1 lk. wide, course N. 8° E.
4.70	Creek, 2 lks. wide, course N. 15° W.
6.15	Creek, 5 lks. wide, course N. 4° E.
7.91	Point for cor. No. 22, Lot 11, identical with cor. No. 5, Lot 12. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 25 ins. in the ground, with alum. cap mkd. S3835 L11 C22 C5 L12 S3835 1984 from which A cedar, 5 ins. diam., bears S. 13° W., 20 lks. dist., mkd. X BT. A pine, 6 ins. diam., bears N. 14 1/4° W., 25 lks. dist., mkd. C22 L11 S3835 BT.
	S. 89°54' W., on line 22-23, Lot 11, identical with line 5-4, Lot 12.

Lot 11, U.S. Survey No. 3835, Alaska

CHAINS	
	Over rolling ground, through hemlock, spruce, pine and cedar.
5.70	Begin descent over W. facing slope.
7.97	Point for cor. No. 23, Lot 11, identical with cor. No. 4, Lot 12. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 22 ins. in the ground and in a collar of stone, 2 ft. diam., with alum. cap mkd. S3835 L11 C23 / C4 L12 S3835 1984 from which A cedar, 8 ins. diam., bears S. 33 1/2° E., 30 lks. dist., mkd. C4 L12 S3835 BT. A spruce, 18 ins. diam., bears S. 87 1/4° W., 97 lks. dist., mkd. X BT, is located on the right bank of Ketchikan Creek. The cor. is located on the left bank of Ketchikan Creek.
	S. 25°19' W., on line 23-24, Lot 11, identical with line 4-3, Lot 12. Over rolling ground, through old growth of hemlock, spruce and cedar, with medium dense underbrush of devil's club.
15.50	Left bank of Ketchikan Creek, bears N. and S.
16.52	True point for cor. No. 24, Lot 11, identical with the true point for cor. No. 9, Lot 9, identical with the true point for cor. No. 3, Lot 10 and identical with the true point for cor. No. 3, Lot 12, at the thread of Ketchikan Creek; hereinbefore described.
	Lines 24-25, Lot 11, identical with line 9-8, Lot 9, through line 28-29, Lot 11, identical with line 5-4, Lot 9, are previously described in Lot 9.
	Lines 29-30, Lot 11, identical with line 4-3, Lot 8, through line 31-32, Lot 11, identical with line 2-1, Lot 8, are previously described in Lot 8.
	From cor. No. 32, Lot 11, identical with cor. No. 1, Lot 8, on line 4-5, U.S. Survey No. 1761, hereinbefore described. S. 44°05' E., on line 32-1, Lot 11, identical with a portion of line 5-4, U.S. Survey No. 1761. Over rolling ground, through old growth of spruce, hemlock and cedar, with medium dense underbrush.
1.50	Old tramway, bears N. 33° E. and S. 33° W.

Lot 11, U.S. Survey No. 3835, Alaska

CHAINS	
4.00	Center of 2 wood stave pipes, 48 ins. diam., bears N. 7° E. and S. 7° W.
5.50	Approximate centerline of the gravel road to Ketchikan Lake., bears N. 15° E. and S. 15° W.
8.49	Corner No. 1, Lot 11, identical with cor. No. 4, Lot 13, on line 4-5, U.S. Survey No. 1761 and point of beginning.

Lot 12

Beginning at the true point for cor. No. 1, Lot 12, identical with the true point for cor. No. 4, Meteor Lode, M.S. No. 769 and identical with the true point for cor. No. 2, Comet Lode, M.S. No. 769, position determined at the record bearing and distance from the witness cor. to cor. No. 4, Meteor Lode, M.S. No. 769, identical with the witness cor. to cor. No. 2, Comet Lode, M.S. No. 769, on line 3-4, Meteor Lode, M.S. No. 769, this being the best evidence of the original cor. position, impractical to monument; falls in Ketchikan Creek.

From this point, the witness cor. to cor. No. 2, line 1-2, Comet Lode, M.S. No. 769, identical with the witness cor. to cor. No. 4, line 4-1, Meteor Lode, M.S. No. 769, bears S. 27°54' W., 1.03 chs. dist., monumented with a quartz stone, 24 x 8 x 6 ins., firmly set, 18 ins. in the ground, mkd. 2-2 769, with an X on top. This point now becomes a witness point on line 1-2, Comet Lode, M.S. No. 769, identical with a witness point on line 1-4, Meteor Lode, M.S. No. 769, from which the original bearing trees

A spruce, 25 ins. diam., bears N. 16°30' E., 8 lks. dist., with a healed blaze. (Record, 4.8 ft. dist., to face of tree.)

A hemlock, 15 ins. diam., bears N. 79°46' W., 17 lks. dist., with a healed blaze.

At the witness point

Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 20 ins. in the ground, with alum. cap mkd.

WP

CL / ML

MS769

1984

And a new bearing tree

A hemlock, 10 ins. diam., bears S. 75 3/4° W., 43 lks. dist., mkd. X BT.

Bury the marked stone alongside the alum. post.

N. 59°32' W., on line 1-2, Lot 12, identical with a portion of line 2-3, Comet Lode, M.S. No. 769.

Across Ketchikan Creek.

Lot 12, U.S. Survey No. 3835, Alaska

CHAINS	
0.59	True point for cor. No. 2, Lot 12, identical with the true point for cor. No. 4, Lot 10, at the thread of Ketchikan Creek, on line 2-3, Comet Lode, M.S. No. 769, hereinbefore described.
	Line 2-3, Lot 12, identical with line 4-3, Lot 10, is previously described in these notes for Lot 10.
	Lines 3-4, Lot 12, identical with line 24-23, Lot 11, through line 11-12, Lot 12, identical with line 16-15, Lot 11, are previously described in Lot 11.
	From cor. No. 12, Lot 12, identical with cor. No. 15, Lot 11, on line 3-4, Meteor Lode, M.S. No. 769, hereinbefore described. N. 59°08' W., on line 12-13, Lot 12, identical with a portion of line 3-4, Meteor Lode, M.S. No. 769. Descend through old growth of spruce, hemlock and cedar, with medium dense underbrush.
0.94	Begin sharp descent over SW slope.
9.64	Creek, 2 lks. wide, course S.
14.54	Creek, 4 lks. wide, course S. 10° E.
15.28	Point selected for the witness cor. to cor. No. 13, Lot 12, identical with the witness cor. to cor. No. 4, Meteor Lode, M.S. No. 769 and identical with the witness cor. for cor. No. 2, Comet Lode, M.S. No. 769, on line 3-4, Meteor Lode, M.S. No. 769, monumented with a slate stone, 24 x 10 x 8 ins., firmly set, 12 ins. in the ground, mkd. WC 4 769, with an X on top and a mound of stone alongside, from which the original bearing trees A hemlock, 14 ins. diam., bears N. 10° E., 23 lks. dist., with fragmentary scribing on a partially healed blaze. (Record, N. 1°00' E., 15 ft. dist., to face of tree.) A spruce, 48 ins. diam., bears S. 50°15' E., 25 lks. dist., with a healed blaze. (Record, 10.8 ft. dist., to face of tree.) At the cor. point Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 18 ins. in the ground, encircled by a mound of stone, 4 ft. base, to top, with alum. cap mkd. WC C2 CL C4 ML MS769 1964 Bury the marked stone alongside the alum. post.
	N. 59°35' W., on line 13-1, Lot 12, identical with a portion of line 3-4, Meteor Lode, M.S. No. 769. Across Ketchikan Creek.

Lot 12, U.S. Survey No. 3835, Alaska

CHAINS	
0.27	True point for cor. No. 1, Lot 12, identical with the true point for cor. No 4, Meteor Lode, M.S. No. 769, identical with the true point for cor. No. 2, Comet Lode, M.S. No. 769 and point of beginning.

Lot 13

Beginning at the point for cor. No. 1, Lot 13, identical with cor. No. 4, Lot 11, hereinbefore described.

Line 1-2, Lot 13, identical with line 4-3, Lot 11, through line 3-4, Lot 13, identical with line 2-1, Lot 11, are previously described in Lot 11.

From cor. No. 4, Lot 13, identical with cor. No. 1. Lot 11, on line 4-5, U.S. Survey No. 1761, hereinbefore described.

S. 44°05' E., on line 4-5, Lot 13, identical with a portion of line 5-4, U.S. No. Survey 1761.

Gradual ascent through hemlock, spruce and cedar, with scattered clearings.

CHAINS	
11.80	Point for cor. No. 5, Lot 13, identical with the 1 Mi. point, line 4-5, U.S. Survey No. 1761, monumented with an iron post, 2 ins. diam., firmly set, projecting 10 ins. above a rock collar, with brass cap mkd. FE S1761 M-1 1927, from which the original bearing trees

A hemlock, 8 ins. diam., bears S. 34 1/2° W., 22 lks. dist., with a healed blaze. (Record, S. 32° W., 20 lks.)

A cedar, 20 ins. diam., bears N. 77 1/2° W., 14 lks. dist., mkd. FES 1761 M1 BT on partially healed blaze. (Record, 12 lks.)

Add the marks 1984 on the brass cap.

No new accessories taken.

S. 44°15' E., on line 5-1, Lot 13, identical with a portion of line 5-4, U.S. Survey No. 1761.

Gradual ascent through hemlock and cedar, with scattered clearings.

CHAINS	
1.43	Corner No. 1, Lot 13, identical with cor. No. 4, Lot 11 and point of beginning.

Lot 14

Beginning at the point for cor. No. 1, Lot 14, identical with cor. No. 3, Lot 15 and identical with cor. No. 6, U.S. Survey No. 2635, monumented with an iron post, 1 in. diam., firmly set, projecting 12 ins. above the ground, with brass cap mkd. S2635 C6 1944, from which the original bearing trees

Lot 14, U.S. Survey No. 3835, Alaska

CHAINS	
	A hemlock, 28 ins. diam., bears N. 50 3/4° E., 22 lks. dist., with a healed blaze. (Record, N. 45° E., 24 lks.)
	A hemlock, 48 i diam., bears N. 80 3/4° W., 35 lks. dist. with a healed blaze. (Record, N. 70° W., 39 lks.)
	Add marks to read
	S3835 S2635 L14 C6 C1 C3 L15 S3835 1984 1944
	And a new bearing tree
	A hemlock, 40 ins. diam., bears N. 1 3/4° W., 75 lks. dist., mkd. C6 S2635 BT.
	Thence on line 1-2, Lot 14, identical with line 3-4, Lot 15, along the crest of a ridge, which runs westerly from the top of Deer Mountain, through Angle Point Nos. 1 through 4, Lot 14, identical with Angle Point Nos. 1 through 4, Lot 15.
	S. 58°35' E., along the general crest of a ridge.
	Ascend through old growth of hemlock, spruce and cedar, with medium dense underbrush.
11.38	Point for Angle Point No. 1, Lot 14, identical with Angle Point No. 1, Lot 15.
	Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 8 ins. in the ground, encircled by a mound of stone, 3 ft. base, to top, with alum. cap mkd.
	S3835 L14 AP1 AP1 L15 S3835 1984
	from which
	A spruce, 22 ins. diam., bears N. 6 1/2° E., 15 lks. dist., mkd. AP1 L14 S3835 BT.
	A hemlock, 15 ins. diam., bears S. 33 1/2° W., 33 lks. dist., mkd. AP1 L15 S3835 BT.
	This Angle Point is located on the crest of a ridge.
	S. 87°38' E., along the general crest of a ridge.
	Sharp ascent through old growth of hemlock, spruce and cedar, with medium dense underbrush.

Lot 14, U.S. Survey No. 3835, Alaska

CHAINS	
25.22	Point for Angle Point No. 2, Lot 14, identical with Angle Point No. 2, Lot 15. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with alum. cap mkd. S3835 L14 AP2 AP2 L15 S3835 1984 from which A hemlock, 10 ins. diam., bears N. 85° E., 9 lks. dist., mkd. AP2 L15 S3835 BT. A hemlock, 36 ins. diam., bears N. 23 1/2° W., 60 lks. dist., mkd. AP2 L14 S3835 BT. This Angle Point is located on the crest of a ridge.
	N. 76°31' E., along the general crest of a ridge. Sharp ascent through old growth of hemlock, spruce and cedar, with medium dense underbrush.
7.76	Point for Angle Point No. 3, Lot 14, identical with Angle Point No. 3, Lot 15. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 27 ins. in the ground, with alum. cap mkd. S3835 L14 AP3 AP3 L15 S3835 1984 from which A cedar, 21 ins. diam., bears S. 52 1/2° W., 49 lks. dist., mkd. AP3 L15 S3835 BT. A hemlock, 10 ins. diam., bears N. 66° W., 18 lks. dist., mkd. AP3 L14 S3835 BT. This Angle Point is located on the crest of a ridge.
	N. 45°12' E., along the general crest of a ridge. Ascend through hemlock, cedar and scattered clearings, with medium dense underbrush.
22.83	Point for Angle Point No. 4, Lot 14, identical with Angle Point No. 4, Lot 15. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 25 ins. in the ground, with alum. cap mkd.

Lot 14, U.S. Survey No. 3835, Alaska

CHAINS	
	S3835 L14 AP4 AP4 L15 S3835 1984 from which A hemlock, 10 ins. diam., bears S. 27° E., 22 lks. dist., mkd. AP4 L15 S3835 BT. A hemlock, 13 ins. diam., bears S. 84 3/4° W., 22 lks. dist., mkd. AP4 L14 S3835 BT. This Angle Point is located on the crest of a ridge.
	N. 72°23' E., along the general crest of a ridge. Sharp ascent through scrub hemlock and scattered clearings, with sparse underbrush.
9.11	Point for cor. No. 2, Lot 14, identical with cor. No. 4, Lot 15 and identical with cor. No. 4, U.S. Survey No. 1761, determined from the remains of the original bearing trees A fallen hemlock, 15 ins. diam., bears S. 4° W., 20 lks. dist., mkd. S1761 on partially healed blaze. A double hemlock, 8 ins. diam., bears S. 50° W., 14 lks. dist., the side of the tree which would have been scribed is broken off. At the cor. point Set an alum. rod, 13 ins. long, 3/4 in. diam., cemented 12 ins. in a drillhole in bedrock, with alum. cap mkd. L14 C2 C4 L15 S3835 1984 And new accessories Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 28 ins. in the ground, for a reference monument, bears N. 89°15' E., 52 lks. dist., with alum. cap mkd. RM C2 L14 C4 L15 S3835 52 LKS 1984 and an arrow pointing to the cor. Set an alum. post, 30 ins. long, 2 1/2 ins. diam., 27 ins. in the ground, for a reference monument, bears S. 19°30' W., 26 lks. dist, with alum. cap mkd. RM C4 L15 S3835 26 LKS 1984 and an arrow pointing to the cor. This cor. is located on the extreme top of Deer Mountain.

Lot 14, U.S. Survey No. 3835, Alaska

CHAINS	
	N. 44°15' W., on line 2-3, Lot 14, identical with a portion of line 4-5, U.S. Survey No. 1761.
	Descend over broken W. facing slope, through hemlock, spruce and cedar, with scattered clearings.
74.97	Corner No. 3, Lot 14, identical with cor. No. 5, Lot 11, on line 4-5, U.S. Survey No. 1761, hereinbefore described.
	Line 3-4, Lot 14, identical with line 5-6, Lot 11, through line 11-12, Lot 14, identical with line 13-14, Lot 11, are previously described in Lot 11.
	From cor. No. 12, Lot 14, identical with cor. No. 14, Lot 11, on line 3-4, Meteor Lode, M.S. No. 769, hereinbefore described.
	S. 59°08' E., on line 12-13, Lot 14, identical with a portion of line 4-3, Meteor Lode, M.S. No. 769.
	Ascend through spruce, hemlock, cedar and pine, with scattered openings.
1.29	Point for cor. No. 13, Lot 14, identical with cor. No. 3, Meteor Lode, M.S. No. 769 and identical with cor. No. 4, Sterling Lode, M.S. No. 769, monumented with a schist stone, 20 x 10 x 4 ins., firmly set, 12 ins. in a mound of stone, mkd. 3 2 769, with an X on top, from which the original bearing trees A cedar, 14 ins. diam., bears S. 53° W., 3 lks. dist., mkd. 4 3 769 X on a partially healed blaze. (Record, S. 5°30' W., 1.2 ft. dist., to face of tree.) A cedar, 10 ins. diam., bears N. 5°30' W., 7 lks. dist., no marks visible on a partially healed blaze. (Record, 4.4 ft. dist., to face of tree.) At the cor. point Set an iron post, 28 ins. long, 2 1/2 ins. diam., 20 ins. in the ground and in a collar of stone, 2 ft. diam., with brass cap mkd. S3835 L14 C13 C3 ML C4 SL MS769 1984 No new accessories taken. Bury the marked stone alongside the iron post.
	S. 60°20' E., on line 13-14, Lot 14, identical with line 4-3, Sterling Lode, M.S. No. 769. Over rolling ground, through hemlock, spruce and cedar.
11.80	Creek, 5 lks. wide, course S. 5° E.

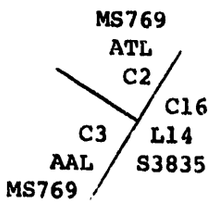
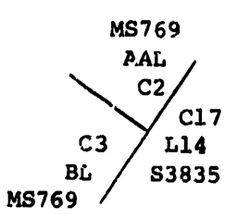
Lot 14, U.S. Survey No. 3835, Alaska

CHAINS	
13.05	Creek, 5 lks. wide, course S. 15° W.
16.30	Approximate centerline of the gravel road to Ketchikan Lake, bears N. 1° E. and S. 1° W.
19.00	Creek, 5 lks. wide, course W.; begin ascent over W. facing slope.
22.69	Point for cor. No. 14, Lot 14, identical with cor. No. 3, Sterling Lode, M.S. No. 769, monumented with a schist stone 18 x 5 x 9 ins., firmly set, 12 ins. in the ground, mkd. 3 769, with an X on top and a broken down mound of stone alongside, from which the original bearing trees A hemlock, 27 ins. diam., bears S. 56° E., 24 lks. dist., with fragmentary scribing visible on a partially healed blaze. (Record, S. 73°30' E., 13.9 ft. dist., to face of tree.) A hemlock snag, 24 ins. diam., bears S. 36°45' W., 22 lks. dist., with a rotted blaze. (Record, 14 ft. dist., to face of tree.) At the cor. point Set an iron post, 28 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with brass cap mkd. S3835 C3 L14 SL C14 MS769 1984 And a new bearing tree A spruce, 40 ins. diam., bears S. 12° W., 72 lks. dist., mkd. C14 L14 S3835 BT. Bury the marked stone alongside the iron post. From the cor. point, cor. No. 3, U.S. Survey No. 1704, bears N. 61°12' W., 9.18 chs. dist., monumented with an iron post, 2 ins. diam., firmly set, projecting 8 ins. above the ground, with brass cap mkd. S1704 C3 1926, from which the original bearing trees A hemlock, 30 ins. diam., bears S. 40°30' E., 40 lks. dist., with fragmentary scribing on a partially healed blaze. A hemlock 30 ins. diam., bears S. 56°15' W., 16 lks. dist., mkd. S1704 on a partially healed blaze.
	S. 29°59' W., on line 14-15, Lot 14, identical with line 3-2, Sterling Lode, M.S. No. 769. Across a W. facing slope, through hemlock, spruce and cedar, with medium dense underbrush.
1.55	Creek, 4 lks. wide, course S. 80° W.
9.30	Dry creek bed, 25 lks. wide, drains W.

Lot 14, U.S. Survey No. 3835, Alaska

CHAINS	
9.43	Point for cor. No. 15, Lot 14, identical with cor. No. 2, Sterling Lode, M.S. No. 769 and identical with cor. No. 3, Altamont Lode, M.S. No. 769, monumented with a schist stone, 30 x 20 x 4 ins., laying loose in original hole, mkd. 2 3 769, with an X on top and a broken down mound of stone alongside, from which the original bearing trees A hemlock, 40 ins. diam., bears N. 33 3/4° E., 46 lks. dist., with a healed blaze. (Record, N. 30°15' E., 28.6 ft. dist., to face of tree.) A hemlock, 38 ins. diam., bears S. 56° W., 52 lks. dist., with a healed blaze. (Record, S. 58° W., 34.6 ft. dist., to face of tree.) At the cor. point Set an iron post, 28 ins. long, 2 1/2 ins. diam., 27 ins. in the ground, with brass cap mkd. MS769 SL C2 C15 L14 C3 S3835 ATL MS769 1984 And a new bearing tree A hemlock, 20 ins. diam., bears N. 71° E., 49 lks. dist., mkd. C15 L14 S3835 BT. Bury the marked stone alongside the iron post.
	S. 29°44' W., on line 15-16, Lot 14, identical with line 3-2, Altamont Lode, M.S. No. 769. Across a W. facing slope, through hemlock, spruce and cedar, with medium dense underbrush.
3.20	Creek, 4 lks. wide, course N. 77° W.
5.40	Creek, 2 lks. wide, course N. 31° W.
6.35	Creek, 2 lks. wide, course N. 40° W.
7.00	Creek, 9 lks. wide, course N. 20° W.
9.08	Point for cor. No. 16, Lot 14, identical with cor. No. 2, Altamont Lode, M.S. No. 769 and identical with cor. No. 3, Altoona Lode, M.S. No. 769, monumented with a shcist stone, 30 x 12 x 6 ins., firmly set, 15 ins. in the ground, mkd. 2 3 769, with an X on top and a mound of stone alongside, from which the original bearing trees A hemlock stump, 27 ins. diam., bears N. 39° E., 25 lks. dist., badly decayed with no blaze visible. (Record, N. 28°45' E., 16 ft. dist., to face of tree.) A hemlock, 17 ins. diam., bears S. 79 1/4° W., 12 lks. dist., with a healed blaze. (Record, S. 74°30' W., 7.7 ft. dist., to face of tree.)

Lot 14, U.S. Survey No. 3835, Alaska

CHAINS	
	At the cor. point Set an iron post, 28 ins. long, 2 1/2 ins. diam., 26 ins. in the ground, with brass cap mkd.  1984 And a new bearing tree A hemlock, 24 ins. diam., bears N. 13 1/4° W., 8 lks. dist., mkd. C2 MS769 BT.
	S. 29°47' W., on line 16-17, Lot 14, identical with line 3-2, Altoona Lode, M.S. No. 769. Ascend through hemlock, spruce and cedar, with medium dense underbrush.
3.35	Deer Mountain Trail, bears N. 75° E. and S. 75° W.
7.40	Creek, 7 lks. wide, course N. 34° W.
9.08	Point for cor. No. 17, Lot 14, identical with cor. No. 2, Altoona Lode, M.S. No. 769 and identical with cor. No. 3, Burlington Lode, M.S. No. 769, monumented with a slate stone, 30 x 6 x 6 ins., firml[illegible] 18 ins. in a mound of stone, mkd. 2 3 769, with an [illegible] from which the original bearing trees A hemlock, 13 ins., diam., bears S. 9 1/4° E., 9 lks. dist., with a healed blaze. (Record, S. 40°00' E., 4.9 ft. dist., to face of tree.) A hemlock, 12 ins. diam., bears N. 27° W., 32 lks. dist., with a healed blaze. (Record, N. 23°30' E., 22 ft. dist., to face of tree.) At the cor. point Set an iron post, 28 ins. long, 2 1/2 ins. diam., 6 ins. in the ground, encircled by a mound of stone, 3 ft. base, to top, with brass cap mkd.  1984 And a new bearing tree A cedar, 10 ins. diam., bears S. 57 3/4° E., 9 lks. dist., mkd. C17 L14 S3835 BT. Bury the marked stone alongside the iron post.

Lot 14, U.S. Survey No. 3835, Alaska

CHAINS	
	S. 30°10' W., on line 17-18, Lot 14, identical with a portion of line 3-2, Burlington Lode, M.S. No. 769.
	Gradual ascent through hemlock, spruce and cedar, with medium dense underbrush.
4.96	Point for cor. No. 18, Lot 14, at the intersection of line 5-6, U.S. Survey No. 2635.
	Set an iron post, 28 ins. long, 2 1/2 ins. diam., 22 ins. in the ground, with brass cap mkd.

MS769
BL
C18
S2635 L14
S3835

1984

from which

A hemlock, 15 ins. diam., bears N. 20 1/2° E., 78 lks. dist., mkd. S2635 BT.

A spruce, 26 ins. diam., bears N. 84 1/4° E., 15 lks. dist., mkd. C18 L14 S3835 BT.

From the cor. point, cor. No. 5, U.S. Survey No. 2635, bears North, 22.66 chs. dist., monumented with an iron post, 1 in. diam., firmly set, projecting 3 ins. above the ground, with brass cap mkd. C5 S2635 S1704 1944, from which the original bearing trees

A hemlock, 10 ins. diam., bears S. 10 1/2° W., 43 lks. dist., with fragmentary scribing on a partially healed blaze.

A cedar, 9 ins. diam., bears S. 79 3/4° W., 32 lks. dist., with fragmentary scribing on a partially healed blaze. (Record, 24 lks.)

South, on line 18-1, Lot 14, identical with a portion of line 5-6, U.S. Survey No. 2635.

Descend through hemlock, spruce and cedar, with medium dense underbrush.

0.05 Top of cliff, 35 ft. high, bears S. 26° E. and N. 26° W.; descend cliff.

1.94 Corner No. 1, Lot 14, identical with cor. No. 3, Lot 15, identical with cor. No. 6, U.S. Survey No. 2635 and point of beginning.

Lot 15

Beginning at the point for cor. No. 1, Lot 15, identical with cor. No. 2, Burlington Lode, M.S. No. 769 and identical with cor. No. 3, California Lode, M.S. No. 769, monumented with a schist stone, 24 x 10 x 6 ins., firmly set, 12 ins. in a mound of stone, mkd. 3 2 769, with an X on top, from which the remains of an original bearing tree

Lot 15, U.S. Survey No. 3835, Alaska

CHAINS	
	A hemlock stump, 20 ins. diam., bears N. 74°30' W., 18 lks. dist., with a rotted blaze. (Record, 12.1 ft. dist., to face of tree.)
	At the cor. point
	Set an iron post, 28 ins. long, 2 1/2 ins. diam., 22 ins. in the ground and in a collar of stone, 2 ft. diam., with brass cap mkd.
	MS769 BL C2 C1 L15 C3 S3835 CL MS769 1984
	And new bearing trees
	A hemlock, 14 ins. diam., bears S. 25° E., 34 lks. dist., mkd. C1 L15 S3835 BT.
	A cedar, 20 ins. diam., bears S. 76 1/4° W., 41 lks. dist., mkd. C3 MS769 BT.
	Bury the marked stone alongside the iron post.
	N. 30°10' E., on line 1-2, Lot 15, identical with a portion of line 2-3, Burlington Lode, M.S. No. 769.
	Gradual ascent through hemlock, spruce and cedar, with medium dense underbrush.
1.67	Point for cor. No. 2, Lot 15, at the intersection with line 7-6, U.S. Survey No. 2635.
	Set an iron post, 28 ins. long, 2 1/2 ins. diam., 20 ins. in the ground and in a collar of stone, 2 ft. diam., with brass cap mkd.
	S2635 BL C2 MS769 L15 S3835 1984
	from which
	A hemlock, 13 ins. diam., bears S. 40 1/4° W., 18 lks. dist., mkd. MS 769 BT.
	A hemlock, 10 ins. diam., bears N. 75 1/2° W., 24 lks. dist., mkd. S2635 BT.
	From the cor. point, cor. No. 7, U.S. Survey No. 2635, bears West, 21.35 chs. dist., monumented with an iron post, 1 in. diam., firmly set, in a drillhole in bedrock, projecting 3 ins. above the ground, with brass cap mkd. S2635 C7, S1297 C10 1944, from which the original bearing trees
	A pine, 10 ins. diam., bears S. 3°06' W., 52 lks. dist., mkd. 1297 10 S2635 C7 BT on a partially healed blaze.

Lot 15, U.S. Survey No. 3835, Alaska

CHAINS	
	A pine, 10 ins. diam., bears S. 47°45' W., 60 lks. dist., mkd. 1297 10 S2635 C7 BT on a partially healed blaze.
	East, on line 2-3, Lot 15, identical with a portion of line 7-6, U.S. Survey No. 2635.
	Sharp ascent through old growth of hemlock, spruce and cedar, with medium dense underbrush.
1.13	Corner No. 3, Lot 15, identical with cor. No. 1, Lot 14 and identical with cor. No. 6, U.S Survey No. 2635, hereinbefore described.
	Line 3-4, through Angle Point Nos. 1 through 4, Lot 15, is previously described in Lot 14.
	From cor. No. 4, Lot 15, identical with cor. No. 2, Lot 14 and identical with cor. No. 4, U.S. Survey No. 1761, hereinbefore described.
	S. 44°25' E., on line 4-5, Lot 15, identical with a portion of line 4-3, U.S. Survey No. 1761.
	Over broken ground through hemlock, spruce and scattered clearings, with medium dense underbrush between Deer and Doe Mountains.
71.89	True point for cor. No. 5, Lot 15, identical with the true point for the 1 1/2 Mi. point, line 3-4, U.S. Survey No. 1761, at record distance from the witness cor., not monumented; falls on steep bluffs.
	S. 44°28' E., on line 5-6, Lot 15, identical with a portion of line 4-3, U.S. Survey No. 1761.
1.35	The witness cor. to cor. No. 5, Lot 15, identical with the witness cor. to the 1 1/2 Mi. point, line 4-3, U.S. Survey No. 1761, monumented with an iron post, 1 1/2 ins. diam., firmly set, projecting 10 ins. above the ground, with brass cap mkd. FE S1761 M 1 1/2 1927, from which the original bearing trees A spruce, 22 ins. diam., bears S. 70° W., 3 lks. dist., mkd. FE S1761 M 1 1/2 BT on a partially healed blaze. (Record, S. 13 1/2° W.) A hemlock, 14 ins. diam., bears N. 70° W., 18 lks. dist., mkd. FE S1761 M 1 1/2 BT on a partially healed blaze. (Record, spruce, N. 82° W.)
	Add the marks 1984 to the brass cap.
	No new accessories taken.
	Sharp ascent through hemlock, spruce and cedar, with medium dense underbrush.
4.20	Top of Doe Mountain; begin sharp descent.
28.20	Creek, 4 lks. wide, course S. 45° W.; begin sharp ascent.

Lot 15, U.S. Survey No. 3835, Alaska

CHAINS	
40.11	Point for cor. No. 6, Lot 15, identical with the 1 Mi. point, line 3-4, U.S. Survey No. 1761, monumented with an iron post, 2 ins. diam., firmly set, projecting 10 ins. above the ground, with brass cap mkd. FE S1761 M-1 1927, from which the original bearing trees A hemlock, 30 ins. diam., bears S. 22° E., 12 lks. dist., mkd. FE S1761 M1 BT on a partially healed blaze. (Record, N. 44 1/4° E.) A hemlock, 28 ins. diam., bears N. 55° W., 60 lks. dist., mkd. FE S1761 M1 BT on a partially healed blaze. (Record, N. 49 3/4° W., 59 lks.) Add the marks 1984 to the brass cap. No new accessories taken.

Thence with record bearings and distances, between cor. Nos. 6 through 1, Lot 15, the point of beginning, which were not retraced and are omitted from this field note record, corner Nos. 7 through 35 are designated as shown on the plat of this survey.

General Description

This survey is situated in the mountains to the northwest, behind the city of Ketchikan, Alaska, on Revillagigedo Island.

The land is mostly covered with dense stands of old growth spruce, hemlock and cedar, with medium to dense underbrush, on steep mountainsides and benchland.

The soil is a thin layer of moss covered loam, overlaying bedrock.

Access to the survey was by foot, motor vehicle, and helicopter.

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FIELD ASSISTANTS

NAMES	CAPACITY
Brock R. Clifford	Cadastral Surveyor
Lawrence W. Collins	Student Trainee (LS)
Craig S. Dukart	Student Trainee (LS)
James E. Gabonay	Surveying Technician
Carl R. Groenveld	Student Trainee (LS)
Gary S. Marciniak	Student Trainee (LS)
Steven D. Tyler	Surveying Technician
Thomas G. Wright	Student Trainee (LS)

CERTIFICATE OF SURVEY

I, David J. Clark, Cadastral Surveyor, HEREBY CERTIFY upon honor that, in pursuance of amended special instructions bearing the date of August 8, 1983, I have surveyed U.S. Survey No. 3835, comprising Lots 1 through 15, dependently resurveyed portions of U.S. Survey Nos. 1281, 1404 and 1587 and retraced portions of M.S. Nos. 769 and 1413, and U.S. Survey Nos. 1207, 1229, 1281, 1417, 1761, 1781, 1833, 2090, 2632, 2635 and 2796, situated on Revillagigedo Island, near Ketchikan, in the State of Alaska, which are represented in the foregoing field notes as having been executed by me and under my direction; and that said survey has been made in strict conformity with said special instructions, the Manual of Instructions for the Survey of the Public Lands of the United States, and in the specific manner described in the foregoing field notes.

July 10, 1986 — David J. Clark
(Date) (Cadastral Surveyor)

_____ _____
(Date) (Cadastral Surveyor)

CERTIFICATE OF APPROVAL

BUREAU OF LAND MANAGEMENT
Anchorage, Alaska

The foregoing field notes of the survey of U.S. Survey No. 3835, comprising Lots 1 through 15, dependent resurvey of portions of U.S. Survey Nos. 1281, 1404 and 1587, and retraced portions of M.S. Nos. 769 and 1413, and U.S. Survey Nos. 1207, 1229, 1281, 1417, 1761, 1781, 1833, 2090, 2632, 2635 and 2796, situated on Revillagigedo Island, near Ketchikan, Alaska,

executed by David J. Clark, Cadastral Surveyor,
having been critically examined and found correct, are hereby approved.

August 12, 1986 — Francis D. Gackstetter
(Date) (Deputy State Director for Cadastral Survey, Alaska)