Recreational and Visual Resources Study

Grant Lake Hydroelectric Project (FERC No. 13212)

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USKH Inc.

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TABLE OF CONTENTS

List of Tables

List of Figures

Acronyms and Abbreviations

ADF&G	Alaska Department of Fish & Game
ADNR	Alaska Department of Natural Resources
ADOT&PF	Alaska Department of Transportation and Public Facilities
ATV	all-terrain vehicle
dB	decibels
DLA	Draft License Application
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
GIS	Geographic Information System
GPS	Global Positioning System
INHT	Iditarod National Historic Trail
KHL	Kenai Hydro, LLC
KRSMA	Kenai River Special Management Area
LA	License Application
MP	milepost
MW	megawatt
NAVD 88	North American Vertical Datum of 1988
NGVD 29	National Geodetic Vertical Datum of 1929
NOI	Notice of Intent
PAD	Pre-Application Document
PM&E	protection, mitigation and enhancement
Project	Grant Lake Hydroelectric Project
TLP	Traditional Licensing Process
USFS	U.S. Department of Agriculture, Forest Service

Recreation and Visual Resources Study
Final Report
Grant Lake Hydroelectric Project (FERC No. 13212)

1 INTRODUCTION

On August 6, 2009, Kenai Hydro, LLC (KHL) filed a Pre-Application Document (PAD; KHL 2009), along with a Notice of Intent (NOI) to file an application for an original license, for a combined Grant Lake/Falls Creek Project (Federal Energy Regulatory Commission [FERC] No. 13211/13212 ["Project" or "Grant Lake Project"]) under Part I of the Federal Power Act (FPA). On September 15, 2009, FERC approved the use of the Traditional Licensing Process (TLP) for development of the License Application (LA) and supporting materials. Per the TLP, KHL underwent consultation with the requisite stakeholders in relation to the development of a series of natural resource studies that were completed in 2013. One of these was the Recreation and Visual Resources Study. Recreation and visual resources are important attributes that are highly valued by the public as important considerations for any project. This report seeks to record, analyze, and document current features and the potential effects of the Grant Lake Project on these resources.

The proposed Grant Lake Hydroelectric Project would be located near the community of Moose Pass, Alaska (population 206), approximately 25 miles north of Seward, Alaska (population 3,016), just east of the Seward Highway (State Route 9); this highway connects Anchorage (population 279,671) to Seward. The Alaska Railroad parallels the route of the Seward Highway, and is also adjacent to the Project area. The community of Cooper Landing (population 369) is located 24 miles to the northwest and is accessible via the Sterling Highway (State Route 1) which connects to the Seward Highway approximately 10 miles northwest of Moose Pass. The proposed Project location is in the mountainous terrain of the Kenai Mountain Range.

2 GOALS AND OBJECTIVES

The goal of this study was to identify recreational and visual resources that may be affected by the construction and operation of the proposed Project, identify both positive and negative effects to those resources created by the Project, and to suggest measures that could be implemented to mitigate potential impacts. The specific objectives of the study were to:

- Determine availability of recreation resources and the quality of those resources.
- Determine quality of the scenic environment.
- Evaluate impacts of:
  - Project construction and operation on distribution of local and tourist recreational use, access and recreational experience on Grant Lake, Grant Creek, and Vagt Lake.
  - Project construction and operation on the distribution and abundance of fish and wildlife for anglers and hunters.
  - Project construction and operation (including roads and facilities) on visual quality in the area.

- Project roads and transmission line corridors (if not buried in road grade) on aesthetic and visual resources (including impacts on Scenic Byway viewpoints and views from existing recreational trails and use areas).
- Project construction and operation on local and regional recreation resources.
- Project facilities and operation (including road access, safety, and use) on local residential land use on Grant Creek and along the road corridor.
- Project construction and operation on quality of life characteristics of the area (i.e., noise, changed access to remote area, light pollution).

3 SCOPE OF WORK

The research and fieldwork associated with the scope of work for this Recreational and Visual Resources Study was conducted in the summer of 2013. The study was conducted according to the approach described in the *Recreational and Visual Resources Study Plan* (KHL 2013). The specific work tasks included;

- Continuation of work that was completed in 2010
- In-office reviews of existing conditions
- (1) Winter site and (1) Summer visits for data collection of existing use and on-site observations
- (1) Sight-seeing flight for recreational and visual impact analysis
- Creation of (4) visual simulations of key observation points showing Project impacts
- Consultation of land management agencies and stakeholders regarding recreation and visual resources
- Evaluation of an alternative route of the Iditarod National Historic Trail (INHT)

4 METHODS

On-foot site visits in conjunction with a small aircraft flight were the primary sources of observations. These were performed in 2013.

An initial winter survey was conducted by Kim Graham on March 3, 2013. This site visit was conducted on snow shoes and with access to Trail Lake narrows provided via the Vagt Lake trail. This winter survey observed winter recreation activities and recorded; any evidence of other trail usage, existing noise levels, and potential winter viewsheds. Waypoints were recorded with a Global Positioning System (GPS) unit, and transferred with notes and decibel readings into a Geographic Information System (GIS) shapefile. On May 31, 2013, Dwayne Adams and Kim Graham, studied the Project site (on foot) and marked an alternative route for the INHT. This re-route was recorded with GPS waypoints, and then transferred to a GIS shapefile with collected notes. A separate summer survey was conducted on July 12, 2013, by Kim Graham, using the same instruments and recording information in a similar fashion. A final aircraft survey was conducted on August 25, 2013, by Kim Graham, recording viewsheds from a typical sight-seeing flight using a digital camera. Table 4.1-1 documents the entirety of the survey schedule.

Table 4.1-1. Survey schedule.

Site Visit Purpose	Date	Instruments	Data Collected	Staff
Winter Survey	March 3, 2013	Camera, GPS unit, Decibel reader	Winter use, winter viewsheds, field observations	Kim Graham
INHT reroute	May 31, 2013	Camera, GPS unit, Decibel reader	Alternative trail reroute, trail viewpoints	Dwayne Adams and Kim Graham
Summer Survey	July 12, 2013	Camera, GPS unit, Decibel reader	Summer use, summer viewsheds, field observations	Kim Graham
Aircraft flight	August 25, 2013	Camera	Sight-seeing route, aerial viewsheds	Kim Graham

Under the guidance of the U.S. Department of Agriculture, Forest Service (USFS) document *Landscape Aesthetics, A handbook for Scenery Management*, viewer groups were identified and were the basis for discussion of potential impacts of the Project (USFS 1995). These viewer groups were then used, in conjunction with the collected information and the outlined scope of work, to identify key observation points from which users would be able to see the Project. These points were developed into full visual simulations through computer programs including Photoshop, Sketchup, and Indesign. Impacts were further discussed and combined with potential mitigation measures.

5 STUDY OVERVIEW

The Project is located near Moose Pass, Alaska, a small community located on the Kenai Peninsula of Alaska. The area is heavily dominated by mountains, low density populations, and diverse ecosystems. The overall landscape character is natural, with diverse topography, large lakes, fast moving rivers, alpine tundra, and taiga forest. It is home to long-standing trail systems to the west and ancient ice-fields to the east. Figure 5.0-1 displays the Project's general geographic location.

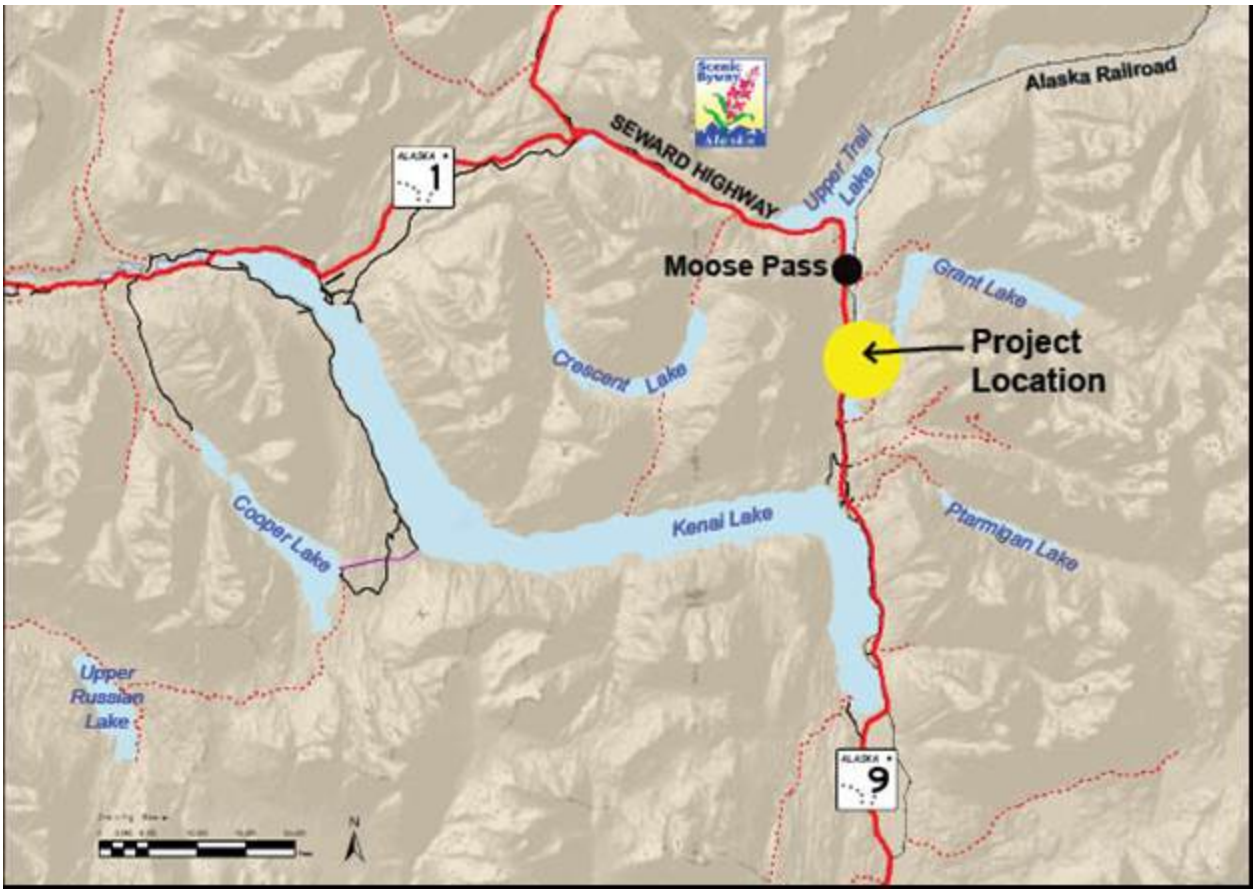

Figure 5.0-1. Project location.

The area has a long standing history of hydroelectric power, dating back to the early 1900s. Other hydroelectric projects in the area include the Cooper Lake Hydroelectric Project, approximately 20 miles away, near the community of Cooper Landing, as well as as Bradley Lake near Homer, Eklutna north of Anchorage, and Marathon Creek in Seward which provided power to Seward General Hospital in the past.

The Project location is also subject to a large volume of people passing through the area, many of whom are tourists and most of whom are traveling for scenic enjoyment. The Seward Highway, connecting Anchorage to Seward, is used by travelers either driving to Anchorage for supplies or to Seward for recreation. This highway is one of the most used highways in the state, and holds the honor of being a Scenic Byway. Its value as being a scenic resource is well established.

5.1 Study Boundaries

General boundaries for the Recreation and Visual Resources Study were approximately five radial miles around the Project area. These boundaries extend from Moose Pass, to the top of the ridgelines around Grant Lake itself, south around Lower Trail Lake, north along the highway

corridor, and back to Moose Pass (Figure 5.1-1). The Project area was defined by mountain ridges which provide a distinct separation of the Project area from other adjacent uses.

For the purposes of this report, the recreation resources will be discussed as Component 1, and the visual resources will be Component 2. Each component shares the same study boundaries but is discussed separately.

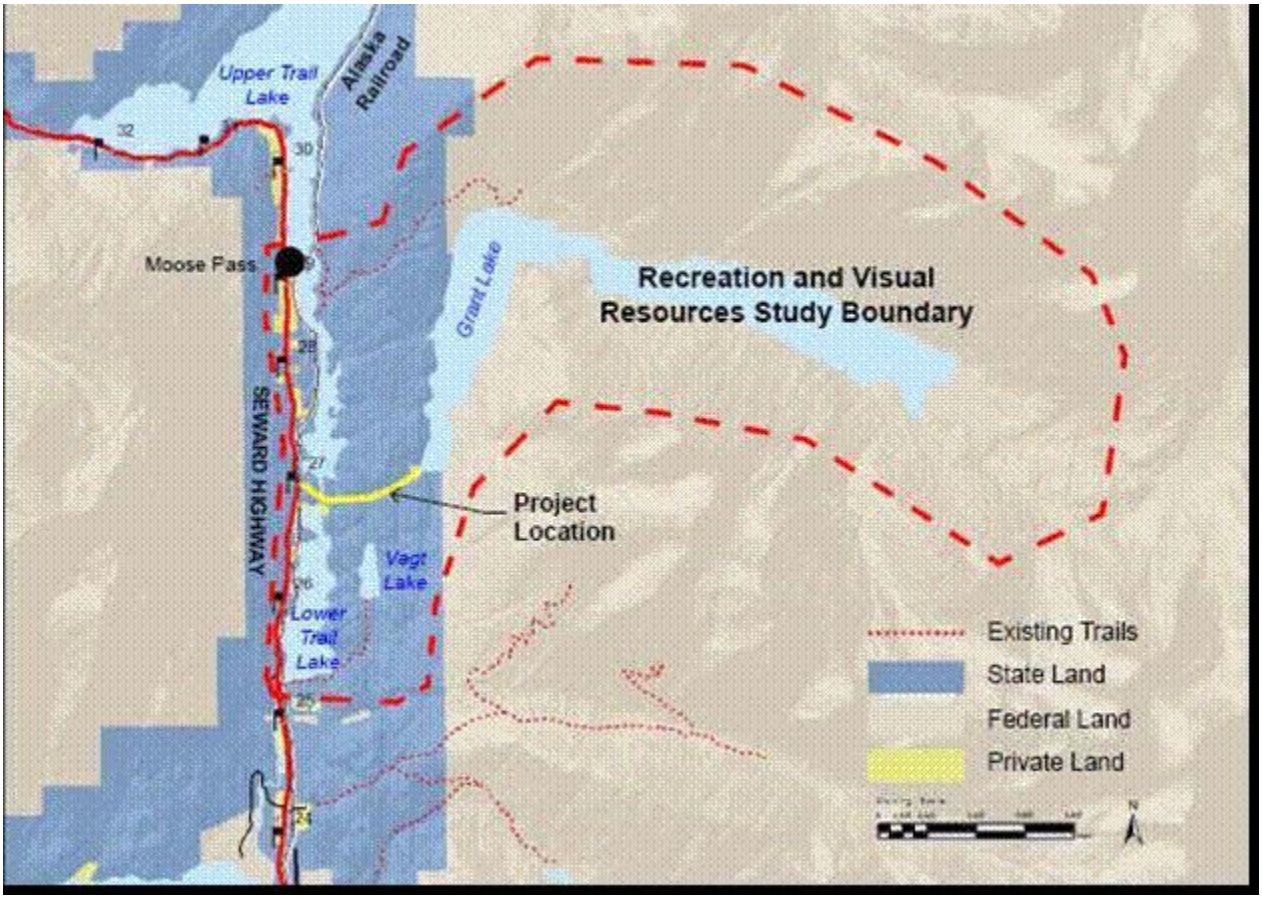

Figure 5.1-1. Study area boundary.

5.2 General Project Components

The Project components are concentrated around the outlet of Grant Lake and the bottom of the canyon reach (Reach 4/5 break) near the mid-point of Grant Creek. Figure 5.2-1 displays the global natural resources study area for the efforts undertaken in 2013 and 2014 along with the likely location of Project infrastructure and detail related to land ownership in and near the Project area.

The proposed Project would be composed of an intake structure at the outlet to Grant Lake, a tunnel, a surge tank, a penstock, and a powerhouse. It would also include a tailrace detention pond, a switchyard with disconnect switch and step-up transformer, and an overhead or

underground transmission line. The preferred alternative would use approximately 15,900 acre-feet of water storage during operations between pool elevations of approximately 692 and up to 703 feet North American Vertical Datum of 1988 (NAVD 88)[1].

An intake structure would be constructed approximately 500 feet east of the natural outlet of Grant Lake. An approximate 3,200-foot-long, 10-foot diameter horseshoe tunnel would convey water from the intake to directly above the powerhouse at about elevation 628 feet NAVD 88. At the outlet to the tunnel a 360-foot-long section of penstock will convey water to the powerhouse located at about elevation 531 feet NAVD 88. An off-stream detention pond will be created to provide a storage reservoir for flows generated during the rare instance when the units being used for emergency spinning reserve are needed to provide full load at maximum ramping rates. The tailrace would be located in order to minimize impacts to fish habitat by returning flows to Grant Creek upstream of the most productive fish habitat.

Two concepts are currently being evaluated for water control at the outlet of Grant Lake. The first option would consist of a natural lake outlet that would provide control of flows out of Grant Lake. A new low level outlet would be constructed on the south side of the natural outlet to release any required environmental flows when the lake is drawdown below the natural outlet level. The outlet works would consist of a 48-inch diameter pipe extending back into Grant Lake, a gate house, regulating gate, controls and associated monitoring equipment. The outlet would discharge into Grant Creek immediately below the natural lake outlet.

In the second option, a concrete gravity diversion structure would be constructed near the outlet of Grant Lake. The gravity diversion structure would raise the pool level by a maximum height of approximately 2 feet (from 703 to 705 feet NAVD 88), and the structure would have an overall width of approximately 120 feet. The center 60 feet of the structure would have an uncontrolled spillway section with a crest elevation at approximately 705 feet NAVD 88. Similar to the first option, a low level outlet would be constructed on the south side of the natural outlet to release any required environmental flows when the lake is drawn down below the natural outlet level. The outlet works would consist of a 48-inch diameter pipe extending back into Grant Lake, a gate house a regulating gate, controls, and associated monitoring equipment. The outlet would discharge into Grant Creek immediately below the diversion structure.

Further discussions related to specifics of the aforementioned Project infrastructure along with the need and/or feasibility of the diversion dam will take place with stakeholders in 2014 concurrent with the engineering feasibility work for the Project. Refined Project design information will be detailed in both the Draft License Application (DLA) and any other ancillary engineering documents related to Project development. The current design includes two Francis turbine generators with a combined rated capacity of approximately 5.0 megawatts (MW) with a total design flow of 385 cubic feet per second. Additional information about the Project can be found on the Project website: http://www.kenaihydro.com/index.php.

[1] The elevations provided in previous licensing and source documents are referenced to feet mean sea level in NGVD 29 [National Geodetic Vertical Datum of 1929] datum, a historical survey datum. The elevations presented in the Grant Lake natural resources study reports are referenced to feet NAVD 88 datum, which results in an approximate +5-foot conversion to the NGVD 29 elevation values.

Upper Trail Lake

Moose Pass

Grant Lake

Diversion

Intake

Access Road

Grant Creek

Intake Access Road

Tunnel

Penstock

Power House

Pond Outlet

Detention Pond

Lower Trail Lake

Vagt Lake

Legend

- Alaska Railroad
- Seward Highway

Land Ownership

- ARRC
- BLM
- BOROUGH
- PRIVATE
- STATE
- USFS
- Study Area

MAP NOTES:

1. THIS MAP WAS DEVELOPED FOR KENAI HYDRO, LLC AS PART OF THE GRANT LAKE HYDROELECTRIC PROJECT (FERC NO. 13212), NATURAL RESOURCES STUDY DOCUMENTATION. THE LOCATION OF PROJECT FEATURES IS SUBJECT TO CHANGE AND IS SHOWN FOR PLANNING PURPOSES ONLY.
2. THIS MAP WAS DEVELOPED FROM THE FOLLOWING RESOURCES:
   A. AERIAL IMAGERY DEVELOPED BY USFS.
   B. PROJECT FEATURE LOCATIONS PROVIDED BY KENAI HYDRO, LLC.
   C. LAND OWNERSHIP BOUNDARIES PROVIDED BY KENAI PENINSULA BOROUGH'S GIS DEPARTMENT.
3. THIS MAP PRESENTS DATA IN THE FOLLOWING GEOGRAHIC SYSTEMS:
   - HORIZONTAL DATUM: NORTH AMERICAN DATUM 1983 (NAD 83)
   - VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUMS 1988 (NAVD 88)
   - PROJECTION: ALASKA 4 FIPS 5004 FEET STATE PLANE

REV	DATE	BY	DESCRIPTION

N

Drawing Scale:

0 0.25 0.5 1 Miles

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A Touchstone Energy® Cooperative

GRANT LAKE HYDROELECTRIC PROJECT - FERC PROJECT #P-13212

GRANT LAKE NATURAL RESOURCES STUDY

Figure 5.2-1
Natural Resources Study Area

DESIGNED: Jake Woodbury
DRAWN: Jake Woodbury
CHECKED: C. Warnock
ISSUED DATE: 1/9/2014

DRAWING

SCALE: 1:27,000

Project features as currently envisioned are summarized in Table 5.2-1.

Table 5.2-1. Grant Lake Project features.

Number of Generating Units	2	
Turbine Type	Francis	
Rated Generator Output		
Unit 1	1.0 MW	
Unit 2	4.0 MW	
Maximum Rated Turbine Discharge		
Unit 1	75 cfs	
Unit 2	310 cfs	
Turbine Centerline Elevation	526 ft NAVD 88	
Normal Tailwater Elevation		
Minimum	517 ft NAVD 88	
Maximum	520 ft NAVD 88	
Average Annual Energy	19,700 MWh	
Normal Maximum Reservoir Elevation	703 ft NAVD 88	
Normal Minimum Reservoir Elevation	692 ft NAVD 88	
Gross Head	183 ft	
Net Head at Maximum Rated Discharge	171.6 ft	
Grant Lake		
Drainage Area	44 mi^2	
Surface Area	1,790 ac	
Active Storage Volume	15,900 ac-ft (Elevation 703 to 692 feet NAVD 88)	
Average Annual Natural Outflow	139,650 ac-ft	
Average Annual Natural Outflow	193 cfs	
Grant Creek Diversion		
Type (2 options under consideration)	None (natural lake outlet)	Concrete Gravity Dam
Maximum Height	NA	2 ft
Overall Width	NA	120 ft
Spillway Crest Length	NA	60 ft
Crest Elevation	703 ft NAVD 88	705 ft NAVD 88
Water Conveyance		
Intake	Tower	
Invert Elevation	660 ft NAVD 88	
Lower Pressure Pipeline		
Type	Welded steel	
Length	200 ft	
Diameter	48 in	
Pressure Tunnel		
Type	10-ft horseshoe	
Length	3,200 ft	

Velocity at Maximum Turbine Discharge	3.9 fps
Surge Tank	
Diameter	96 in
Base Elevation (preliminary)	655 ft NAVD 88
Top Elevation (preliminary)	765 ft NAVD 88
Penstock	
Type	Welded steel
Length	360 ft
Diameter	72 in
Powerhouse	
Approximate Dimensions	45 ft x 60 ft x 30 ft high
Finished Floor Elevation	531 ft NAVD 88
Tailrace Detention Pond	
Approximate Acreage	5 ac
Approximate Capacity	15 ac-ft
Outlet Conveyance Length	300 ft
Tailrace	
Type	Open channel
Length	200 ft
Option 1	
Transmission Line	
Type	Overhead or underground
Length	Approximately 3.5 miles
Voltage	24.9 kV
Access Roads	
Type	Single lane gravel surfacing with turnouts
Length	Approximately 4.0 miles; including 3.0 miles to the powerhouse and 1.0 mile to the intake (portions will be new road)
Option 2	
Transmission Line	
Type	Overhead or underground
Length	Approximately 1.0 mile
Voltage	115 kV
Access Roads	
Type	Single lane gravel surfacing with turnouts
Length	Approximately 1.95 miles; including 1.0 mile to the powerhouse and 0.95 mile to the intake (this will be a new road)

The Project access would leave the Seward Highway at approximately milepost (MP) 26.9. This route would travel eastward to cross Trail Lakes at the downstream end of the narrows between Upper and Lower Trail lakes and then continue eastward to the powerhouse. This route would

be approximately 1 mile long. It would cross Alaska Railroad tracks near an existing railroad crossing for a private driveway. The road would cross the narrow channel connecting Upper and Lower Trail lakes with an approximately 100-foot-long single lane bridge. This bridge is proposed as a clear span with the west abutment located on bedrock and the east abutment on fill. The proposed route would avoid cuts and travel along the base of some small hills on the south side of Grant Creek to the Powerhouse. This proposed access road would have one 90-degree crossing of the INHT.

The intake access road would be approximately one mile long, beginning at the powerhouse. The road would ascend a 230-foot bluff to get to the top of the southern lip of the Grant Creek canyon. The road would then generally follow the southern edge of the canyon until it descends to Grant Lake.

The entire road complex would be gravel with a 14-foot top width. Maximum grade would be 16 percent. Periodic turnouts would be provided to allow construction traffic to pass. Fifty-foot radius curves would be used to more closely contour around the small steep hills of bedrock to limit the extent of the excavation and the height of the embankments.

The intake would direct water into a tunnel ending with the penstock and powerhouse at the base of the slope. Once the water passes through the powerhouse, it would pass through a control weir and then flow through an open channel approximately 200 feet long. This channel would have an auxiliary detention pond that would provide supplementary water storage for emergency spinning reserve. The rip-rap lined channel would end at the existing creek bed and the water would be returned to Grant Creek.

The powerhouse would be located on the southern side of Grant Creek near the end of the canyon section (Reach 4/5 break). The powerhouse would be approximately 45 feet by 60 feet by 30 feet high and would have a finished floor elevation of 531 feet NAVD 88. The powerhouse would be a pre-engineered metal building on a concrete foundation.

From the powerhouse, a transmission line would link with the existing overhead electrical transmission lines located to the west of the Seward Highway. Both underground and overhead transmission lines to deliver energy from the Project to the grid are being evaluated. In addition to any overhead transmission structures, the facilities would include a switchyard at the powerhouse consisting of a pad-mounted disconnect switch and a pad-mounted step-up transformer. The transmission line would run from the powerhouse parallel to the access road where it would intersect the City of Seward distribution line or Chugach Electric's transmission line depending on current engineering feasibility work and utility interconnect agreements made with these electric utilities. The interconnection would have a pole mounted disconnect switch. If used, the poles would be designed as tangent line structures on about 250-foot centers.

6 COMPONENT 1 – RECREATION RESOURCES

6.1 Management Plans -- Goals and Intents

For the Grant Lake area, there are a number of management plans that propose processes and measures to protect and facilitate habitat, recreation, and visual resources. The following is a list of affected management plans and a summary of relevant content.

6.1.1 Kenai River Comprehensive Management Plan

The Kenai River Comprehensive Management Plan (ADNR 1997) proposes that a number of state parcels adjoining Trail Lakes and Trail River be incorporated into the Kenai River Special Management Area (KRSMA) and proposes that these actions be accommodated within the Kenai Area Plan. It also proposes a 200-foot vegetated buffer be provided along the shore of the lakes and river. These proposals are provided to protect fish populations and resources of the Kenai River.

6.1.2 Kenai Area Plan

From the Kenai Area Plan (ADNR 2001), public recreation and tourism presents goals of keeping public areas open and available for use. This management plan supports recreation and tourism activities such as backcountry skiing, hiking, snowmaching, and sightseeing. Specifically from this plan, the INHT trail and trail corridor is to have a conveyance of a 1,000-foot-wide easement to include a visual and sound buffer between the recreation corridor and adjacent uses. No permanent structures or equipment are to be placed within the trail corridor. In keeping with this management plan, the Project has provided an alternate route for the INHT easement, keeping the 1,000-foot-wide corridor away from any permanent structures and adjacent uses.

The Kenai Area plan has designated Grant Lake within region 2B, with the Grant Lake Project area affected by Units 380G, 380F, and 381. Figure 6.1-1 illustrates where these units are located with respect to Grant Lake. These particular areas have been identified for their Public Recreation and Tourism uses and protection of existing habitat. They are recognized as being strongly oriented toward recreation, particularly with respect to the trails and surrounding lakes.

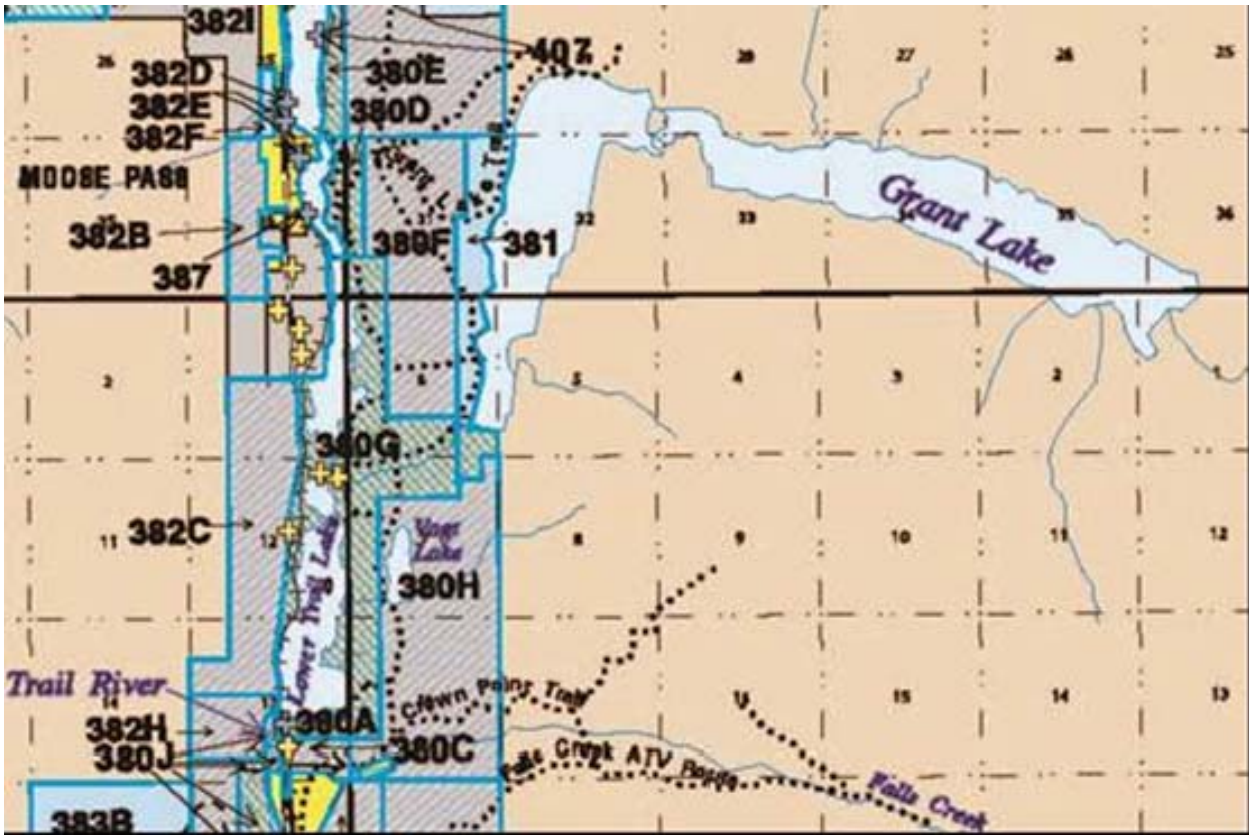

Figure 6.1-1. Kenai Area Plan map, enlargement of Grant Lake designation..

6.1.3 Revised Land and Resource Management Plan

Most of the Project area is located on Kenai Peninsula Borough, State of Alaska and a minimal amount of private land. Lands east of the western shore of Grant Lake lies within Chugach National Forest. Those lands are managed in accordance with the Revised Land and Resource Management Plan for Chugach National Forest (USFS 2002). The plan is currently being updated. Until revisions are final the 2002 plan remains "current". This management plan provides guidance for all resource management activities on national forest land within the Chugach National Forest.

The area in and around Grant Lake is managed as part of the Kenai Mountains Roadless Area, encompassing 319,600 acres. It is managed to meet goals for improved and developed recreation opportunities while maintaining landscape character and providing for timber management.

Grant Lake is designated within the 2002 Revised Land and Resource Management Plan with a prescription for "Fish, Wildlife, and Recreation Management". Areas north and east of the lake are managed as "Backcountry". "Fish, Wildlife, and Recreation Management" provides a "desired future condition" of "ecological processes, moderately affected by human activity, dominate…Evidence of resource management may be present." "Backcountry" areas present a desired future condition of "ecological processes, largely unaffected by human activity…provide

excellent opportunities for solitude, tranquility, isolation, quiet, challenge, and a degree of risk when traveling backcountry" (USFS 2002).

6.2 Recreation Users

The area surrounding Grant Lake provides numerous recreation resources. They vary in access and usability throughout the seasons and by daily weather conditions. Recreational uses also vary between motorized versus non-motorized use. Existing forms of recreation include (Figure 6.2-1):

- Hiking/Walking
- Camping
- Fishing
- Boating
- Hunting
- Snowmachining
- Snowshoeing
- Cross Country Skiing
- Ice fishing
- Aerial Sight-Seeing
- Driving for Pleasure

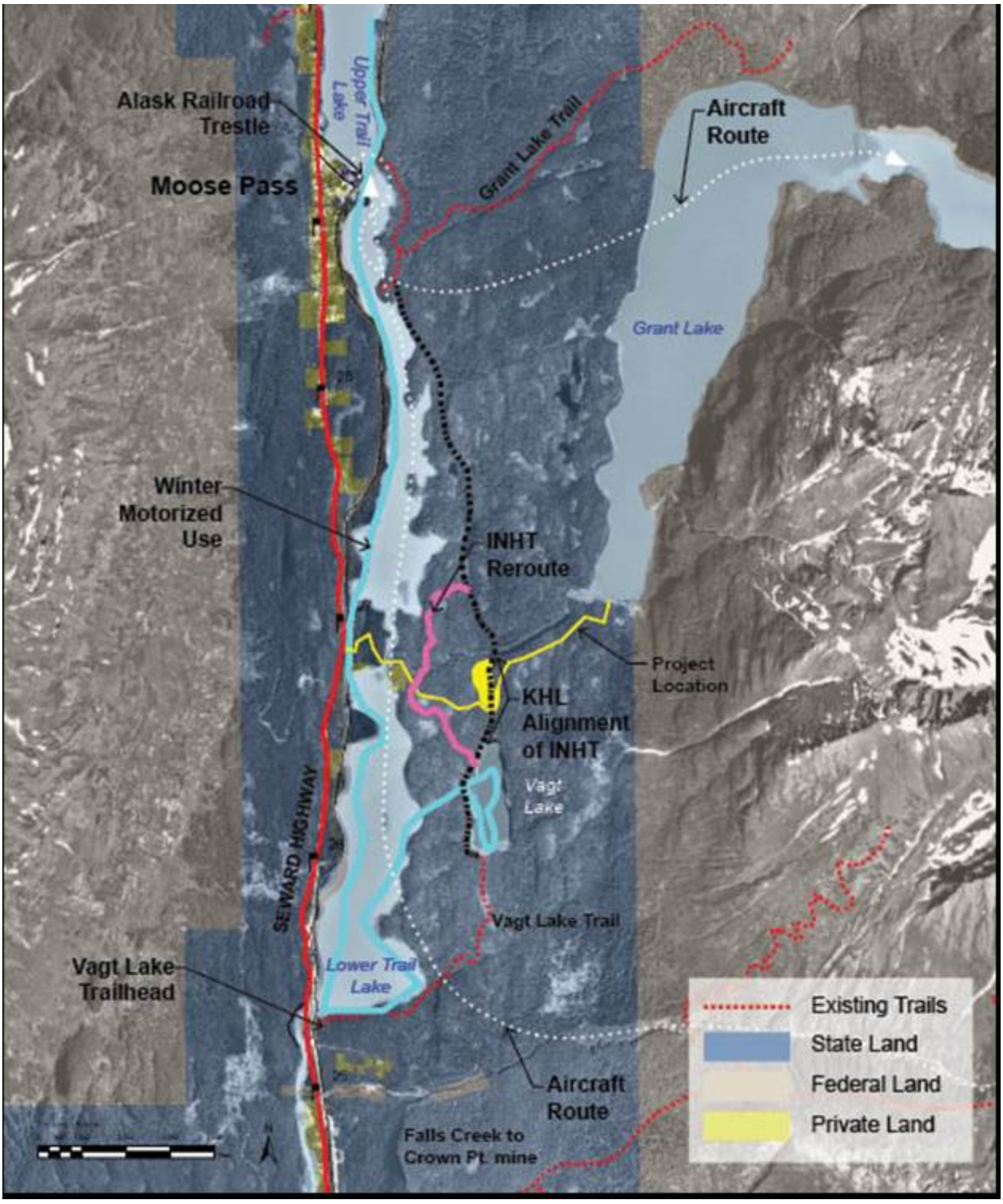

Figure 6.2-1. Recreation resources map.

6.2.1 Existing Observed Winter Use

During the winter survey, snowmachine users were observed unloading and parking at the Vagt Lake Trailhead and traveling northeast across Lower Trail Lake (Figure 6.2-2) to a partially flagged route through the trees up to Vagt Lake. An alternative start point was in Moose Pass, near an existing boat ramp. Other snowmachine users were observed traveling north-south along the western shores of both Trail Lakes and beyond across Upper Trail Lake toward Johnson Pass. Users did not ride through the Narrows as the water was open and flowing quite strongly through the area. This appears to be a normal phenomenon, keeping a portion of Lower Trail Lake open during the winter months. Open water was also observed at the Alaska Railroad trestle, located between Moose Pass and the rail line. Users traveled on the railroad tracks for passage around these open water areas. The Alaska Railroad Corporation signs the tracks and considers this use as trespassing.

Though there may be some use of Grant Lake for snowmachining, there was no evidence of trails leading to Grant Lake from trails along the Trail Lakes shoreline. Terrain challenges and the lack of a well-defined trail may limit the interest in snowmachining at the lake. However, it is expected that the mine access road that is north of Grant Creek may provide access to Grant Lake for snowmachining.

Baseline noise in the area measured consistently at 40 decibels (dB). Conditions during measurement included a gentle wind and background road noise from the highway. At the time snowmachine users passed by along the lake creating decibel readings that spiked to 75-80 dB.

Along the Vagt Lake Trail, local residents were observed hiking and snowshoeing as recreation. Cross country ski tracks were also found leading from the Vagt Lake Trailhead to Vagt Lake (Figures 6.2-3 and 6.2-4). Though it is difficult to identify the number of users, it appeared that snow had fallen within 48 hours and numerous tracks were observed. No further winter use was observed at the time of the survey.

Figure 6.2-2. Trail Lake.

Figure 6.2-3. Vagt Lake trailhead.

Figure 6.2-4. Trail near north end of Vagt Lake.

6.2.2 Existing Observed Summer Use

Summer uses included hiking on Vagt Lake Trail, camping at Vagt Lake, fishing in Upper Trail Lake, Lower Trail Lake, and Vagt Lake, some motorized all-terrain vehicle (ATV) activity on Grant Lake Trail, and small aircraft takeoffs and landings at Trail Lake. Additionally, the team providing fishery research for the Project noted approximately 12 anglers on Grant Creek, over the entire summer and fall data gathering period.

Boaters from Vagt Lake trailhead were observed floating down Trail River to Kenai Lake as well. Trail River does not provide the river experience nor the length of river to be a viable commercial float experience though some floating of the river does take place as a recreation activity.

Evidence of ATV use from Trail Lake to Grant Lake is shown in Figures 6.2-5 and 6.2-6. This activity is presumed to be in connection with mining activities in the area. Again, it is difficult to quantify the use but it is sufficient to maintain a clear and distinct trail.

Figure 6.2-5. Grant Lake trail.

Figure 6.2-6. Grant Lake Trail through meadow.

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At the time of the survey, noise levels ranged from 40 dB to 50 dB. No nearby motorized use was occurring during the inspection. Noise was generated from highway traffic, and though the Seward Highway had increased usage in comparison to the winter survey, noise levels did not exceed 50 dB.

Driving for pleasure, as with tourism-related bus traffic, is a key recreation activity along the Seward Highway corridor. Alaska Department of Transportation & Public Facilities (ADOT&PF) reports a range of average annualized daily traffic count ranging between 1,568 vehicles per day in 2012 to 1,614 vehicles per day in 2010 (ADOT&PF 2011). In 2012, this traffic had a highest "maximum average daily traffic count" of 3802 vehicles in July and a low maximum average daily traffic count of 611 in January. Most of these drivers and passengers are expected to be traveling partly to enjoy scenery, regardless of the primary reason for the trip.

6.3 INHT

The INHT is proposed within a dedicated easement inside of the Project area. In the effort to reconnect the Seward-Girdwood portion, an easement of 1,000 foot width was issued by the Alaska Department of Natural Resources (ADNR) in August of 2004. This is more specifically described in November of 2004 in the Final Finding and Decision, ADL 228890, Grant of Public Easement, Iditarod National Historic Trail, Seward to Girdwood (ADNR 2004). According to this document, the INHT will connect at MP 25, or the outlet for Lower Trail Lake and this trailhead will be upgraded with a parking lot to hold up to 50 vehicles. The trail continues north using the Vagt Lake Trail to the northeast tip of Upper Trail Lake where the trail crosses back onto federal land. There is some light use of the trail to Vagt Lake and there have been trail improvements from the south, to Vagt Lake, to accommodate this use. However, north of Vagt Lake the trail is merely flagged and use appears to vary from occasional to non-existent.

6.4 Sight-Seeing Flights (Aircraft)

Small aircraft provide sight-seeing flights several times a day in the summer months. The typical routes are from Moose Pass, over Grant Lake to Prince William Sound for viewing of the glaciers and Harding Icefield, then back to Moose Pass by flying over Falls Creek. Aircraft are typically float planes thast leave from Trail Lake (see Figure 6.4-1). These same aircraft are utilized for hunting and fishing purposes in the area. It has been noted that Grant Lake is not used as a fishing destination but is a drop-off location for hunting of mountain goats, caribou, bear, and moose.

Figure 6.4-1. Floatplane tie up, Trail Lake.

6.5 Hunting and Fishing

6.5.1 Hunting

Under the Alaska Department of Fish & Game (ADF&G), Grant Lake is within Game Management Unit 7 (Figure 6.5-1) which covers the eastern portion of the Kenai Peninsula. The area is open for black bear, brown bear, caribou, Dall sheep, moose, mountain goat, wolf, and wolverine. These hunts are permitted through the ADF&G, with regulations pertaining to residents and non-residents alike, and vary according to season.

Figure 6.5-1. Game Management Unit 7 map.

Table 6.5-1 reflects the harvested quantities of the game species as recorded by ADF&G in 2012.

Table 6.5-1. Harvest within Game Management Unit 7 (ADF&G 2013).

Species	Hunt Number	Hunters	Harvest
Black Bear	General Season	6,129	1,469
Brown/Grizzly Bear	RB300	389	25
Caribou	DC001	89	24
Dall Sheep	General Season	2,001	599
Moose	General Season	19,202	3,758
Mountain Goat	DG339	2	0

Although Table 6.5-1 encompasses a broader area than the study area. The amount of backcountry area and the terrain that is represented by the Grant Lake study area relative to full game management unit would suggest that the area is hunted for all or most of the game species indicated.

6.5.2 Fishing

Vagt Lake is an ADF&G stocked lake, making it an enticing destination for recreationists. The lake is a 2 mile walk from the Vagt Lake trailhead, allowing it to be a convenient and enjoyable walk through the woods around Lower Trail Lake. Preliminary discussions have noted that Grant Lake is not actively used for fishing as the only species known and/or documented to be in the lake are sculpin and stickleback. Grant Creek is fished for rainbow trout and Dolly Varden but is closed to the taking of salmon. During the seven month period of fish sampling conducted by fisheries biologists for the Project, approximately 12 fishermen were observed on Grant Creek.

6.6 Recreation Impacts and Potential Mitigation Opportunities

The Project is expected to have specific effects as described below.

6.6.1 Winter Use

With provision of road access to Grant Creek, it is expected that winter use will increase as a result of the safe passage around/over Trail Lakes and the development of a roadway to Grant Lake. Assuming KHL allows public access, it will be much easier for snowmachine users, skiers, and hikers to navigate over or around Upper and Lower Trail Lakes without the risk posed by open water. Dependent upon access provisions that are provided by the Project for public use, including parking, it is possible that Grant Lake would provide snowmobiling and ready access for those wanting to snowmobile on the lake and off into the headlands above the lake. While this presents opportunities for motorized and non-motorized winter recreation, it also expands the presence of humans and compromises the setting for those seeking quiet and solitude.

While recreational opportunities will increase, the provision of access to the public is an issue that will have to be negotiated between KHL and the USFS.

6.6.2 Summer Use

As with winter use, the summer use levels are expected to increase. If the establishment of a fifty car parking lot at the Vagt Lake Trailhead as proposed by the Grant of Public Easement for the INHT does occur, that alone will trigger an expanded use by user groups. Additionally, the bridge across the narrows, if provided, will provide quick and easy access for summer recreation around the Grant Lake area; something that is limited at present. Also, it may assist in lessening trespass that occurs on the Alaska Railroad crossing of Lower Trail Lake. The issue of access is an issue that will require coordination with management agencies as this ability to expand recreation use has the same effect as with winter use; greater recreation opportunity but greater presence of humans in an area that currently receives little use.

6.6.3 INHT

Currently, there is a conflict between the Project and the INHT with the powerhouse and ancillary facilities being located within the easement. While the current access road alignment limits crossings of the trail to one 90-degree crossing, under the current Project proposal, the INHT would essentially run directly through the middle of the powerhouse. For the safety of the public, it is expected that the Project may require security measures to prevent vandalism or damage and the structures and fencing may not be in keeping with the setting appropriate for the INHT.

The Project is in the process of proposing that the INHT be re-routed to the west, but still retain a 500-foot setback from the privately owned parcels located near the Trail Lake shoreline. This re-routed section would provide the desired buffer for the trail while giving users a more enjoyable views of the lakes. It also bypasses some marshy areas and exposes users to more distinctive landforms, water characteristics, and areas of outstanding scenic quality KHL is currently consulting with the requisite stakeholders related to this issue and a series of site visits and meetings will be held during the remainder of 2013 and 2014 to collaboratively reach an agreement on an acceptable re-route of the proposed trail around the single Project feature currently acting as an impediment. All consultation and agreements reached will be comprehensively documented in the FERC LA.

6.6.4 Sight-Seeing Flights (Aircraft)

It is not expected that sight-seeing flights will be affected by the Project. Although there will be temporary construction activity and changes to the landscape as a result of the Project infrastructure, sight-seeing users will still enjoy the lakes, rivers, mountains, and ice-fields that surround Moose Pass.

6.6.5 Hunting and Fishing

Impacts to hunting as a result of the Project include a possible increase in hunting pressure as a result of the proposed access road that would more easily facilitate access to Grant Lake.

Currently, most individuals are expected to gain access to hunted areas via float plane. A roadway that would allow hunters to either unload a boat at Grant Lake, or to easily hike up the road with a pack raft, would greatly increase the numbers of hunters that would hunt around Grant Lake and the surrounding backcountry.

There would also likely be an increase in fishing activity on Grant Creek. Currently, Grant Creek receives limited fishing activity due both to limited access and the lack of an open salmon fishery. The availability of a roadway that facilitates creek access would open the opportunity for trout and dolly varden fishing along the creek. While the fishery is assumed to be limited in the future to non-anadromous species, the availability of a creek on the road system would enable those fishermen who simply fish for the recreational experience and thus fishing pressure on the creek would likely increase.

6.6.6 Noise

Noise sources would include vehicles that are traveling the access roadway to the powerhouse and to the intake structure. However, the facility is proposed to operate remotely with access on a monthly basis during normal operational periods. For those limited visits, sound levels at 50 feet from the source of pickup trucks and automobiles would range in the neighborhood of 70-80dB (Reed 2010). Thus recreation users of the roadway or the INHT would be subjected to short periods of noise above that of the ambient noise of 40dB in the winter and 40-50dB in the summer.

The provision of a roadway may induce snowmachine traffic to the roadway and may also induce an increase in use of Grant Lake and the surrounding areas. Snowmachines generate sound levels as high as 83dBA at 50 feet from the source (Reed 2010) and the sound can be detrimental to the experience of non-motorized users in an area. While this is a moderate to major impact to that use, the use of Grant Lake by non-motorized users tends to be small to absent in the winter in particular, thus the overall impact to existing conditions would be relatively small.

6.6.7 Construction

Construction impacts would be temporary and would affect trail use and fishing along Grant Creek. The presence of construction equipment and construction noise would provide a short-term but major impact to the environment desired by those recreating along the creek. Construction is planned to take place only in the summer months, thus noise and lighting impacts during the winter months, would be limited. Noise impacts would be expected to some degree in the summer though the construction site is generally removed from residences and visitor destinations, depending on the individual part of the infrastructure that is being constructed.

6.6.8 Compliance with Current Management Plans

The proposed facilities will have a relatively minor effect to existing recreation use in the area. Project facilities are located beyond the 200-foot buffer proposed by KRSMA. Because the lands are retained in State ownership for purposes of habitat protection, there is no prescribed 200 foot buffer in the Kenai Area Plan. Still, the roadway and Project facilities would be

located on State of Alaska land that is proposed for habitat protection and recreation uses. Proposed facilities could enhance the ability to meet recreation goals with the provision of increased access to trail and backcountry resources, though there would be some limited compromise of habitat protection goals in order to provide for the road and transmission line.

This may not fully meet management intent of Chugach National Forest for lands that are designated and managed as "backcountry". These areas are available for non-motorized recreation, however the provision of road access to Grant Lake may induce increased use of the backcountry for snowmachining. While the numbers of non-motorized users is small, this may not be in conformance with the management intention of the USFS.

6.6.9 Recreational Opportunities

The proposed Project provides an opportunity for increased recreation access to the area. The access road could provide Grant Lake access that is currently difficult and unavailable to many recreationists. Having the access could increase boating opportunities and access to backcountry that provides spectacular views and wildlife viewing. The Project could also allow increased access to hunters, allowing quicker access to background peak areas. The Project could provide parking to facilitate use of both hiking to Grant Lake on the Project access roadway, and to the INHT.

While the opportunity for increased recreation activity is provided, this has a negative aspect of possibly increasing the evidence of humans within this area of forest and on Grant Lake. Wilderness areas are managed for their pristine conditions and their lack of the evidence of human disturbance. If an increase in recreational opportunities is undesirable, a gate could be installed on the access road at any point to limit access to authorized personnel only. Close coordination with agencies will be needed to determine how access will be managed to meet agency goals.

7 COMPONENT 2 – VISUAL RESOURCES

The USFS document *Landscape Aesthetics, A handbook for Scenery Management* provides an established guide for the analysis of landscapes, and furthermore, provides a useful framework for review of scenic quality (USFS 1995). The process employs steps for the definition of landscape units as "ecological units" and provides guidance for defining "viewer groups", "landscape character", "scenic integrity", and "scenic classes". From this collected process, the resulting information is used to determine the impacts to visual resources by the proposed Project.

Landscape components are the physical elements that make up the visual environment, including landform, water, vegetation, and man-made development. The general landscape setting of the Project area is characterized by numerous mountains, rivers, lakes, alpine tundra, and taiga forest. The area is strongly characterized as being a classic "U" shaped glacial valley, and the junction of east-west and north-south drainages. The drainage flows north to south from Upper Trail Lake into Kenai Lake and the Grant Lake drainage from its mountainous backdrop, east to west to its connection to Trail Lake. The Project area landscape character ranges from the

developed small road community of Moose Pass to primitive backcountry with pristine lakes and serrated alpine peaks.

7.1 Ecological Units

To provide a framework for analyzing the visual environment, three landscape units have been identified based on the interaction of existing land use patterns, topography, and distance from the Project. Each unit is defined with respect to its scenic attractiveness and scenic integrity and identification of these units is an important key to analyzing the visual effects of the Project. The respective units and associated matrix are documented in Figure 7.1-1 and Table 7.1-1, respectively.

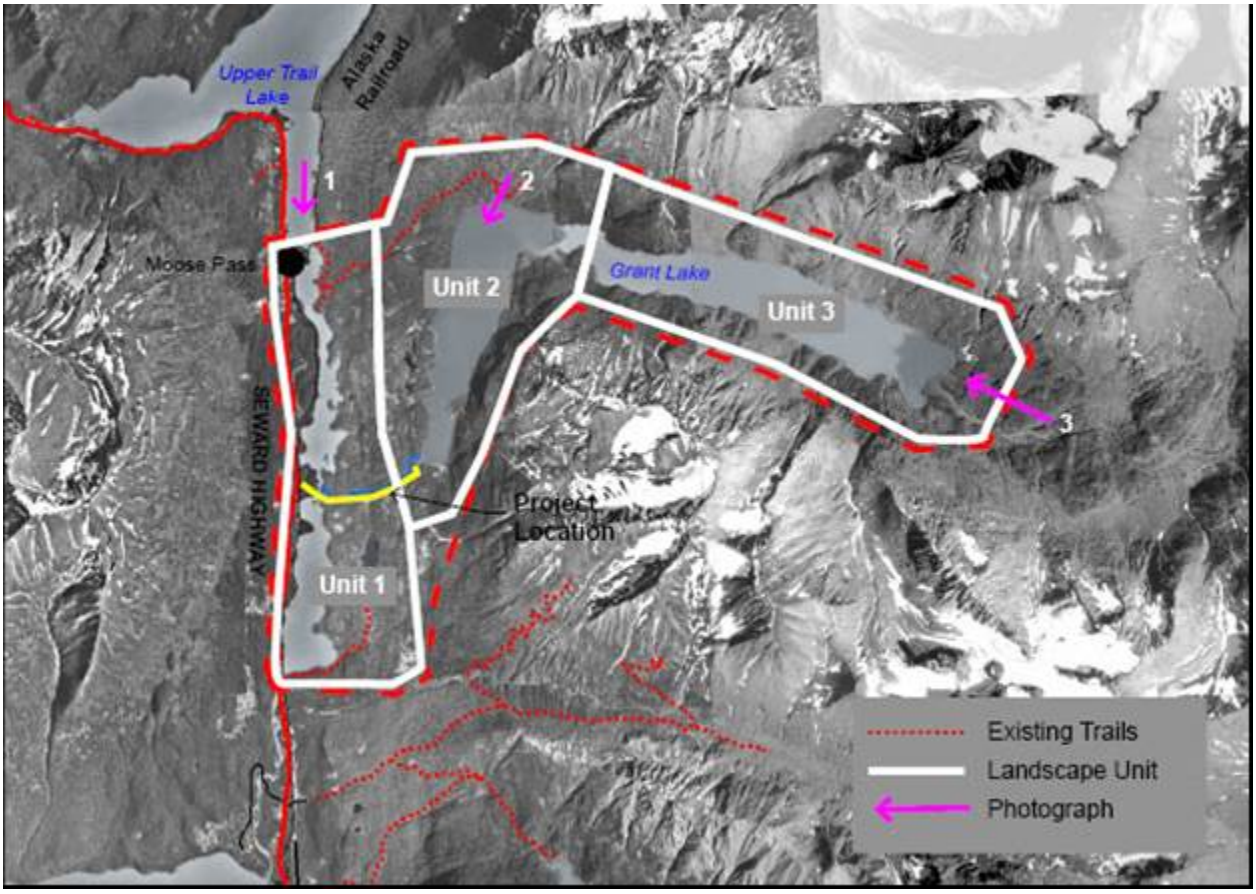

Figure 7.1-1. Unit key map**.**

Table 7.1-1. Unit key matrix.

Unit	Title	Description	Elevation
1	Trail Lakes Valley	Corridor of Trail Lakes valley from Moose Pass to Lower Trail Lake bridge	Lake level to ~300 feet above
2	Grant Lake West	Western half of Grant Lake	Lake level to ~300 feet above
3	Grant Lake East	Eastern half of Grant Lake	Lake level to ~300 feet above

7.2 Viewers

There are three major types of viewer groups or constituents in the Project area. The groups were identified based on the existing land uses and travel routes. Table 7.2-1 identifies the viewer groups and their expectations and values for the viewshed of the Project. These viewers are described in terms of their "concern levels". "Concern levels are a measure of public importance placed on landscapes viewed from travelways and use areas." (USFS 1995) There are three concern levels, with high (1) denoting those viewers who would have high interest in the surrounding landscape.

Table 7.2-1. Viewer group and expected values for the viewshed.

Viewer Group	Expected Values
Residents	Generally have a desire for protection of visual quality, including views from roadways, waterways, and individual residences. Generally cautious concerning changes to visual environment.
Recreationists/ Tourists	Includes both road and rail traffic. Generally have high appreciation for visual quality of an area and desire for undisturbed areas. Also share a desire for views from roadways and waterways.
Aircraft	High variability in visual values and the acceptance of changes to existing visual conditions. Many are sight-seers with high degree of sensitivity to visual quality.

There are variations in the number of residents, recreationists, tourists, and viewers from aircraft throughout the year. Summer months are typically characterized by a significant increase in viewers, particularly as a result of tour travel, as well as fishing and hunting activities. This visitor population drops drastically after these seasons have passed into the winter months. Both numbers of on the ground viewers and the air traveler populations are much lower during winter and early spring. Float planes, which are docked on Upper Trail Lake during the summer months, are removed from the lake in the winter. There is little small aircraft traffic in the winter compared to numbers of float plane takeoffs and landings that occur from May through September. These visitors typically have a high level of appreciation for scenic values and scenic integrity. In fact, it is these values that bring them to visit this area.

The population of Moose Pass is generally stable through the entirety of the year. The State of Alaska Department of Labor and Work Force Development (2013) reports 219 residents in Moose Pass in April of 2010, 240 residents in July of 2011, and 231 in July of 2012. This would seem to indicate relative stability given that April is more indicative of winter conditions than summer conditions in Moose Pass. The residents of Moose Pass can be characterized as treasuring their "small town" culture and the environment in which they are located. They have a high value for the setting in which the town is located and have a high level of value for scenic integrity.

Seward, located approximately 25 miles south of Moose Pass, experienced approximately 355,000 visitors in the Summer of 2011 (McDowell 2011). Virtually all of these visitors pass through Moose Pass by either road or rail. Rail passenger service is only available in the summer. A majority of the road traffic passes through the community in the summer months as well. In 2012, this traffic had a highest "maximum average daily traffic count" of 3802 vehicles in July and a low maximum average daily traffic count of 611 in January (ADOT&PF 2013).

There are a number of recreationists who travel on the eastern side of the valley via trails or on Trail Lakes in the winter. Most trail use is limited in the Vagt Lake area, to the south of the Project components. Winter use within the Project area is generally confined to the Vagt Lake area or is located on the Trail Lake frozen surface and includes snowmachiners, snowshoers and skiers. There are a small number of fishermen who travel along the Grant Creek bank but the number is quite limited as salmon fishing is restricted on the creek. There is evidence that some residents/recreationists hike along Grant Creek though the size of the trails indicate that this use is very limited. These recreationists typically have a high level of appreciation for the conduct of their recreation activities and value the undisturbed setting.

Hikers typically gain access to Grant Lake via the Grant Lake trail which is located north of the Project and provides access to a mine site located at the northern corner of the lake. There are also known to be some recreationists who fly small boats or pack in rafts for traveling along the shoreline of Grant Lake. Some of these include hunters trying to gain access to remote areas to the north and west of Grant Lake. Both hikers and hunters value the setting of their recreation pursuit and prefer an undisturbed landscape.

7.3 Visual Character

7.3.1 Landscape Visibility

Landscape visibility addresses the relative importance and sensitivity of what is seen and perceived in the landscape. It consists of three elements:

- Travel ways and use areas
- Concern levels
- Distance zones

Landscape visibility is also a function of several other considerations, including:

- Context of viewers
- Duration of view
- Degree of discernible detail
- Seasonal variations
- Number of viewers.

The first area of analysis involves determining whether the Project area can be seen from travel ways and use areas. Travel ways represent linear concentrations of public viewing. Use areas are specific locations that receive concentrated public viewing. For this Project, primary travel ways and use areas include the road system running north-south along the western shores of Trail Lakes. Secondary travel ways include the small aircraft sight-seeing routes from Upper Trail Lake west to Prince William Sound and back.

As discussed in Section 7.2, viewer concern for their surroundings is an important part of the analysis of the importance of visual quality impacts. As described, almost all viewers have a high sensitivity to either the presence of undisturbed landscapes, or sensitivity to changes of the landscape as viewed from their homes. Thus the concern level of almost all viewers of the landscape is considered to be high, being a concern level of "1".

7.3.2 Distance Zones, Viewer Exposure, and Seasonal Variations

Distance zones define the viewing distances of the viewer. The zones are noted as foreground, middleground, and background. The viewing distances are based on the amount of details that the observer can perceive. Distance zones help determine what portions of the landscape are more critical to the visual character and what areas are more sensitive to change. For example, travelers on the highway are more aware of changes to the foreground of the landscape than the background, given the same level of change of the landscape. Table 7.3-1 better defines distance zones.

Table 7.3-1. Distance zones (USFS 1995).

Distance Zones	Distance	Description	Distance Zones	Distance
Foreground (fg)	0 – 0.5 miles	Distinguish vegetative detail and full use of senses	Foreground (fg)	0 – 0.5 miles
Middleground (mg)	0.5 – 4 miles	Distinguish large boulders, small openings in the forest	Middleground (mg)	0.5 – 4 miles
Background (bg)	4 miles to horizon	Distinguish groves of trees, large openings in the forest.	Background (bg)	4 miles to horizon

This Project is dominated by Foreground and Middleground distance zones. Almost all views are from the valley floor and the natural topography obscures views of most background areas east or west of primary view areas. Views are available to background to the north and south, but only to the tops of peaks to the east, east of Grant Lake.

Viewer exposure is a function of the type of view seen; the distance, perspective, and duration of the view. The term exposure may also refer to the number of people exposed to a particular view. It is expressed by the numbers, distance, duration, and speed of view for each of the Viewer Groups. Table 7.3-2 outlines viewer groups and the associated exposure periods based on observations of their use patterns and use periods.

Table 7.3-2. Viewer groups and exposure period.

Viewer Group	Exposure Period
Residents	Continual
Recreationists/ Tourists	Varies-generally minutes, hours for fishermen on Grant Lake and hunters in Grant Lake basin
Aircraft	Varies-generally seconds or minutes

Seasonal variations are characterized by leaf loss within the Project area between summer and winter conditions. Summer foliage tends to obscure views with restriction of views beyond a distance of as much as several hundred feet for undisturbed areas. Also, the presence of foliage tends to provide screening of some views from the Seward Highway across Trail Lake. These views are extended to greater distances, across the lake, during winter months.

Winter months provide greater contrast of manmade disturbances since disturbed lands provide planes or lines that are visible since a lack of vegetation provides a strong contrasting line or plane within the landscape. This depends on whether vegetation between the viewer and disturbance obscures or modifies the view.

7.3.3 Scenic Attractiveness

There are three values used to describe the scenic attractiveness of an area. These classes are developed to determine the relative scenic value of landscapes. They measure the scenic importance of a landscape based on human perceptions of intrinsic beauty of landform, water characteristics, vegetation pattern, and cultural land use. Table 7.3-3 characterizes scenic attractiveness classifications.

Table 7.3-3. Attractiveness classes and description (USFS 1995).

Class	Title	Description
A	Distinctive	Areas where landform, vegetative patterns, water characteristic and cultural features combine to provide unusual, unique, or outstanding scenic quality. These landscapes have strong positive attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance.
B	Typical	Areas where landform, vegetative patterns, water characteristics, and cultural features combine to provide ordinary or common scenic quality. These landscapes have generally positive, yet common, attributes of variety, unity, vividness, mystery, intactness, order harmony, uniqueness, pattern, and balance. Normally they would form the basic matrix within the ecological unit.
C	Indistinctive	Areas where landform, vegetative patterns, water characteristics, and cultural land use have low scenic quality. Often water and rockform of any consequence are missing in class C landscapes. These landscapes have weak or missing attributes of variety, unity, vividness, mystery, intactness, order, harmony, uniqueness, pattern, and balance.

7.3.4 Scenic Classes

Scenic classes indicate the relative importance, or value, of discrete landscape areas having similar characteristics of scenic attractiveness and landscape visibility. Scenic classes are determined using the matrix in Table 7.3-4.

Table 7.3-4. Scenic class matrix (USFS 1995).

Scenic Attractiveness	Distance Zone and Concern Levels		
	Fg1	Mg1	Bg1
A	1	1	1
B	1	2	2
C	1	2	3

7.4 Landscape Analysis Discussion

7.4.1 Unit 1: Trail Lakes Valley

The Trail Lakes Unit includes almost all travel ways and viewers, except some of those traveling by aircraft. It also includes recreationists using trails or fishing the shoreline of Grant Creek. Further it would include those traveling on the frozen surface of Trail Lake in the winter. Residents, recreationists, and aircraft have varying degrees of visibility for this unit, as their exposure is fluctuating from a few seconds to continual. Their concern level and exposure periods provide a high level of sensitivity to changes in the viewshed.

The area is characterized in Figure 7.4-1, with a long view to the south down Upper to Lower Trail Lakes, with Kenai Lake far in the background. Travel patterns of viewers are shown in Figure 7.4-2. Viewers are primarily residents of Moose Pass and travelers on the Alaska

Railroad or Seward Highway. Viewers are afforded foreground views, and the area has a highly distinctive scenic attractiveness, or Class A as defined in Table 7.3-3. Most views are foreground due to the enclosed nature of the Trail Lake basin. Background views are occasionally available with breaks in vegetation for those traveling on the Seward Highway or the Alaska Railroad, or living in Moose Pass. Shoreline vegetation tends to be deciduous, mixing with conifers with increasing elevation, turning to a primarily coniferous forest up to the u-shaped valley crest. Views are provided to alpine settings in the background. The landscape is typified by forest, dominant water features of high complexity and high level of order, and low density development in Moose Pass that tends to be of small scale and complementary to the landscape. The landforms, vegetative patterns, and water characteristics are intrinsically unique, with the majority of the existing landscape well preserved.

Figure 7.4-1. Looking south across Trail Lakes toward Kenai Lake.

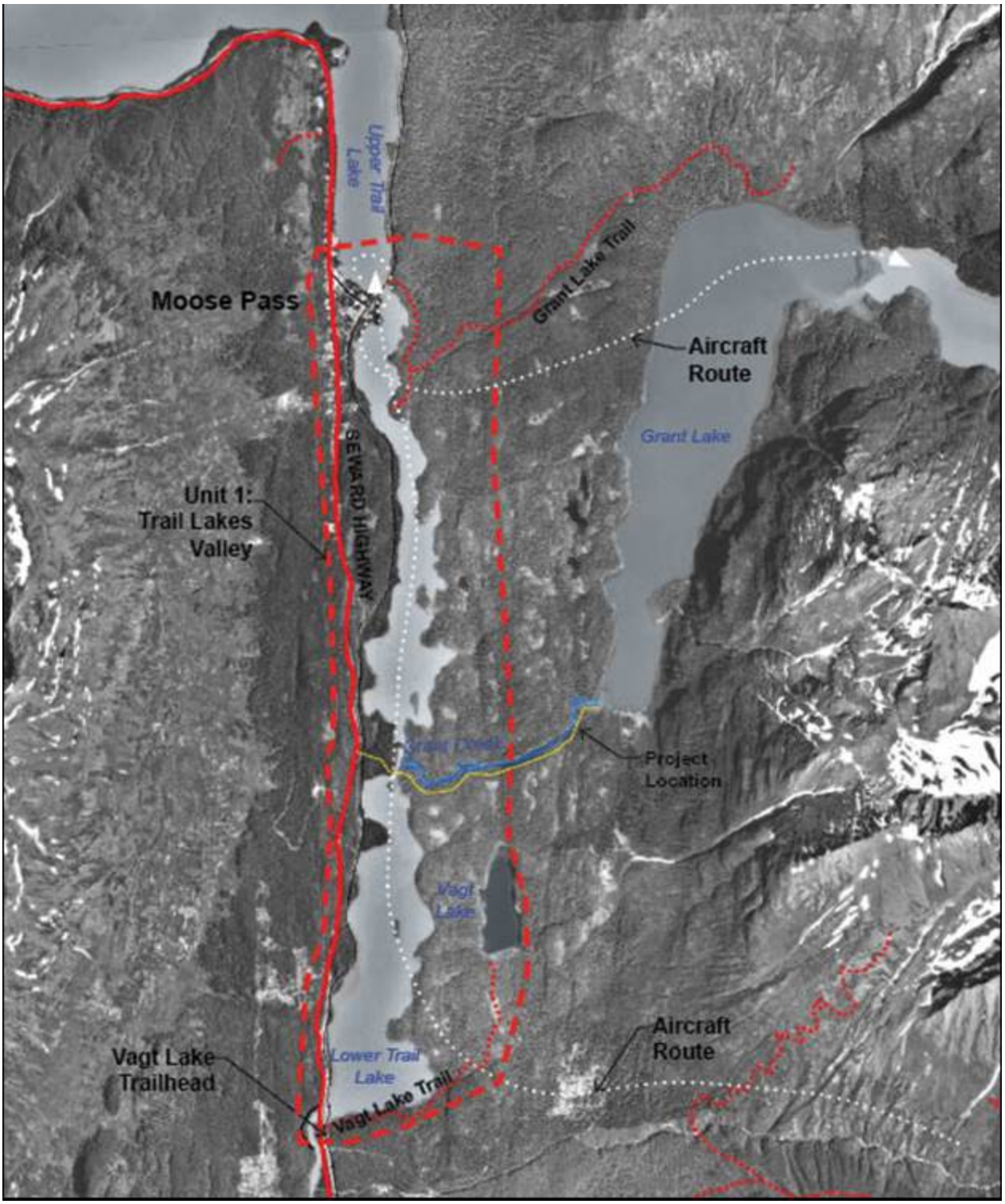

Figure 7.4-2. Unit Map 1: Trail Lakes Valley.

Project components within this area include the access roadway, the powerhouse, possibly transmission lines, ancillary support structures including parking, fencing, rock-lined channel, and the auxiliary detention pond.

The roadway entrance and a short portion of its length would be visible from the Seward Highway and the Alaska Railroad. Other Project components would be visible to those who fish Grant Creek and to the limited number of hikers who may on occasion follow the creek. The natural topography of the unit does offer enough variation to allow some features to blend more, or to be masked by the undulating landforms and density of the vegetation. This provides screening of proposed Project components, which will be seemingly hidden or concealed within the landscape for almost all viewers.

7.4.2 Unit 2: Grant Lake West

The Grant Lake West landscape unit is highly distinctive (Class A as defined in Table 7.3-3), and virtually fully intact with little to no evidence of human presence, as shown in Figure 7.4-3. This view is from the north, looking south towards the project features, specifically the outfall of the lake. Figure 7.4-4 illustrates travel patterns for those who visit this unit. The area has few viewers, no residents within the unit, and recreationists/tourists restricted to either those using the limited amount of trail access or those viewing the area by aircraft. The viewer exposure period ranges from hours for those traveling by trail or seconds/minutes for those traveling by aircraft.

This unit is characterized by Grant Lake and the surrounding mountains. The limited number of viewers located within the area would have foreground views. However, for most viewers, who are located in Moose Pass or on the road/rail corridor, the area is unseen. Vegetation remains an evergreen and deciduous forest around the lake and dissipates into alpine tundra with elevation. Large openings provide a mix of perennial herbaceous plants, with numerous Alaskan wildflowers.

Figure 7.4-3. Looking south across Grant Lake from Grant Creek Trail.

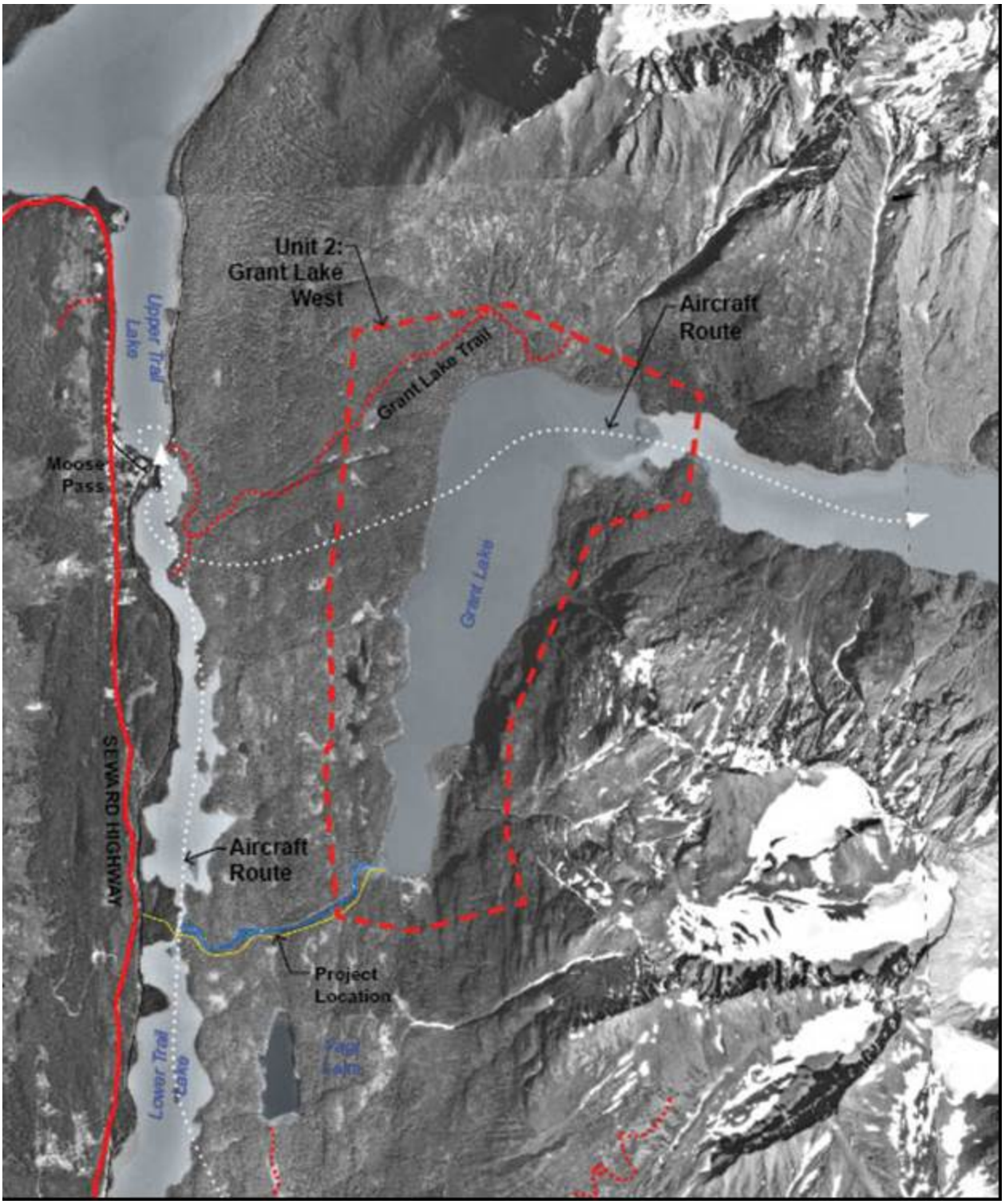

Figure 7.4-4. Unit Map 2: Grant Lake west.

Project components that would be located within the area would include the Project's intake structure and the access roadway, located at the southerly most portion of the lake, near the Grant Lake outfall. These components would generally be unseen by those along the lake shore. The

intake structure would be seen by boaters who currently gain access via packraft or plane. It would be seen in the middleground for those who hike around the lake and can view the opening of the lake to Grant Creek. Aircraft would be able to see the structures as well though the exposure time would be limited.

7.4.3 Unit 3: Grant Lake East

Naturally obscured by the sharp easterly turn of Grant Lake, this eastern portion of Grant Lake is a u-shaped valley that feeds to the previously discussed unit, separated by a thin neck of water. The valley is entirely undisturbed as in evidence in Figure 7.4-5. The distance from this unit to the Project is approximately 3-6 miles with no direct line of sight to Project components.

Viewer exposure is restricted to aircraft and the occasional recreationist and/or hunter who may access the area by trail and possibly travel by packraft (Figure 7.4-6). Aircraft views are typically from relatively high elevations and duration of the view changes dramatically dependent upon altitude and weather. These groups may include hunters as well. Though the area does not contain any Project components, proposed lake level changes may create a visual variation that may be noticeable by those gaining access to the area. Seasonal flows currently provide for some variations in lake levels thus an exposed shoreline does occur during the year. The lower level attributed to the KHL would persist for more periods of time though the character would be similar to that of historic patterns, perhaps slightly pronounced.

Figure 7.4-5. Looking west across Grant Lake.

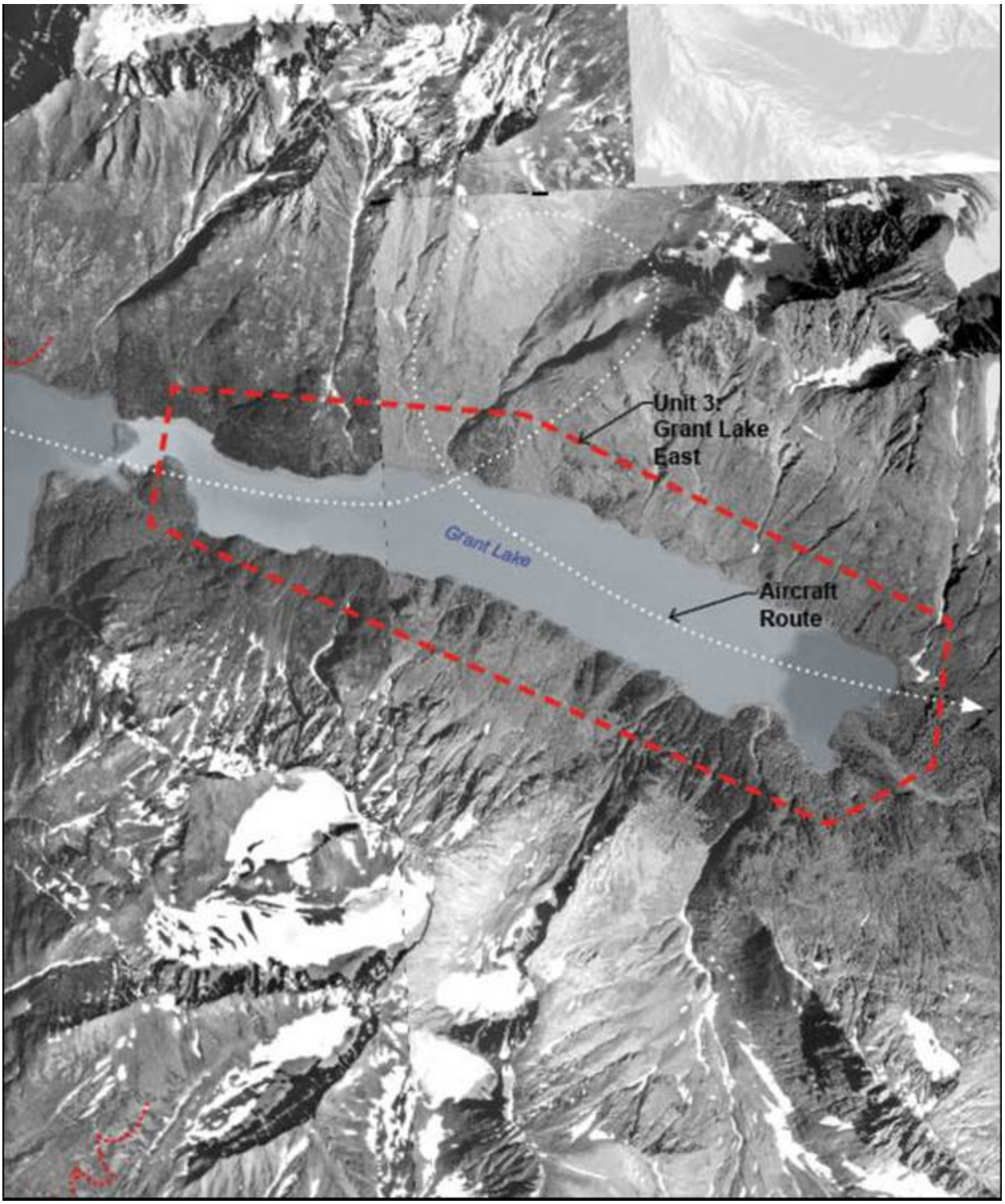

Figure 7.4-6. Unit Map 3: Grant Lake east.

The scenic attractiveness of the viewshed remains distinctive, or Class A per Table 7.3-3. Peaks provide a serrated skyline with a complex mix of snow, valleys, and well-patterned vegetation.

The area is a pristine wilderness with unique landforms and water features. Vegetation is sparse, with forest surrounding the lake and covering the valley floor, with alpine tundra at upper elevations.

7.5 Views

For the purposes of showing potential Project impacts, key views were selected and developed to create visual simulations. The following key views were selected as having the most valuable potential in showing Project components and visual impacts. The location of these key views is indicated in Figure 7.5-1.

- Key View 1: view of the Trail Lakes narrows access road crossing area from the Seward Highway
- Key View 2: view of the intake structure and lake shoreline
- Key View 3: view of proposed facilities from the Seward Highway or Alaska Railroad (winter)
- Key View 4: view of the access road or powerhouse from the right-of-way for the proposed INHT.

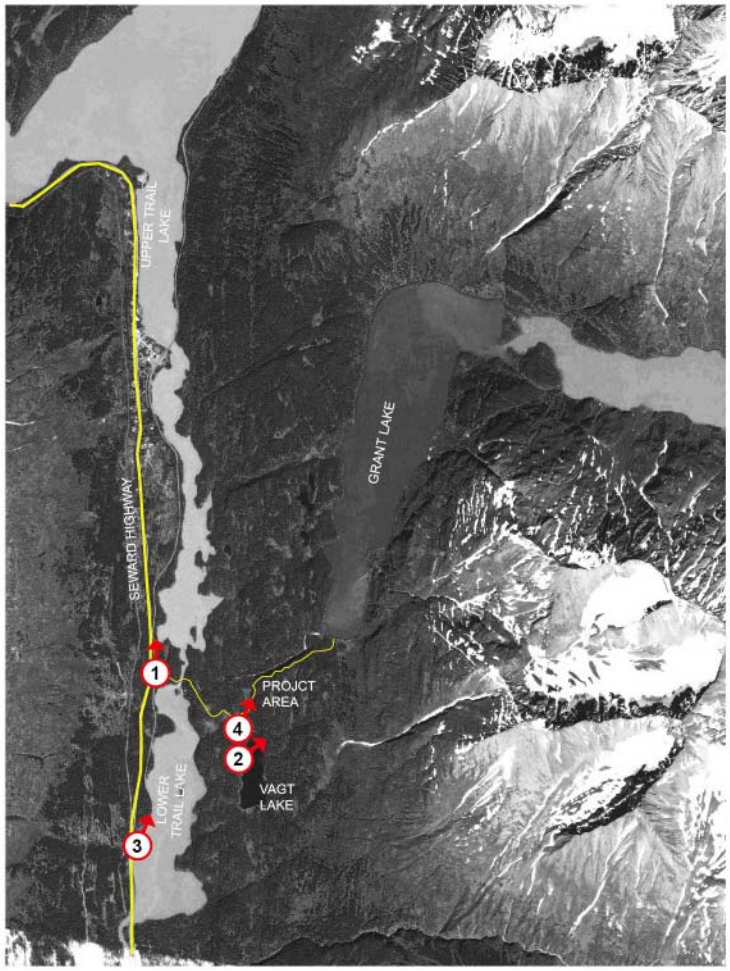

Figure 7.5-1. Location of key views.

7.5.1 Key View 1: Access Road from Seward Highway

Key view #1 is the view of the Project access road from the Seward Highway. The new access road leaves the Seward Highway at approximately MP 26.9, crosses the Alaska Railroad tracks, then continues east to the proposed bridge.

The highway corridor between Lower Trail Lake and Upper Trail Lake tends to be viewed as a "closed forest" as the existing vegetation blocks the majority of viewing points along the road. Moreover, the narrowness of the road leads the viewer's eye forward until the vegetation recedes at both Lower Trail Lake and Moose Pass itself.

This access road may become more visible with the winter months and loss of foliation; however, the scale of the roadway would be similar to that of a driveway which is a common feature along the highway. There is an existing driveway to private land approximately 100 yards south of the proposed new roadway. It is expected the existing roadway would be closed and the old entrance maintained as a turnoff as shown in the before/after visual simulation in Figures 7.5-1 and 7.5-2) One issue that could increase the visual presence of the road would be an agency decision that would open the KHL Project access to wide public use. If public access is desirable by agencies, the roadway could have an increased presence and be marked by road signs and possibly the width of the roadway increased to offer vehicle turn lanes. Figures 7.5-2 and 7.5-3 display the current view and the likely view with the Project component (access road) in place, respectively, with the assumption that the roadway will be non-public.

Figure 7.5-2. Key View 1: before.

Figure 7.5-3. Key View 1: after.

7.5.2 Key View 2: View of Intake Structure and Lake Shoreline

This key view simulation shows the small intake structure located at the southern shores of Grant Lake, the diversion dam to the west, the remaining stream and stream bed once diverted, and the small access road to the intake structure. Also with in this view is the powerhouse itself, the detention pond, and the outlet diversion. Each Project component is linked by a small gravel road, with the upper access road not maintained in the winter. The current Project design has the level of the lake rising up to two feet above natural conditions , but as the edges of the lake are quite steep, the effect will be less noticeable as the change does not widen but simply raises the level of the lake in this area. Over time there may be a recognizable ring of vegetation as flooded vegetation at the shoreline edge dies out and becomes evident. However, there are currently natural seasonal fluctuations of the lake level that provide an exposed shoreline at low water levels thus the new condition will be an small expansion of an existing condition that occurs on the lake. While this will be discernible on the ground and may be noticeable, it will be less so, if evident at all from the air. Figures 7.5-4 and 7.5-5 display the current view and the likely view with the Project components (lake infrastructure) in place, respectively.

Figure 7.5-4. Key View 2: before.

Figure 7.5-5. Key View 2: after.

7.5.3 Key View 3: View of Facilities from Seward Highway

As the highway corridor is quite narrow, and the vegetation impedes most views, the only open areas whereby a viewer from the Seward Highway would have a vantage point of the Project would be near Lower Trail Lake. The bridge crossing, powerhouse, and primary access road will not be visible to most viewers from the Seward Highway. The upper access road connecting the powerhouse to the intake structure may be more visible, as it climbs in elevation, however most vegetation is evergreen thus it is not expected that the roadway will be visible to most Seward Highway viewers in the summer or winter. Figures 7.5-6 and 7.5-7 display the current view and the likely view with the access road being slightly visible climbing the hillside in the right-center of the photo, in the distance. The change would be negligible, particularly considering that viewers at this location are traveling at a speed of approximately 50 miles per hour. Drivers are focused on views down the road while passengers are focused on more visible landscape of the lake and Crown Point Peak, more to the east, 45-90 degrees to the location that the access road would be.

Figure 7.5-6. Key View 3: before.

Figure 7.5-7. Key View 3: after.

7.5.4 Key View 4: Access Road or Powerhouse from the Right-of-Way for the Proposed INHT

The INHT trail will intersect with the powerhouse access road, intersecting south of Grant Creek and east of Lower Trail Lake. This intersection would be a marked intersection that would provide views to an opening in the forest allowing more visibility and exposure to the Project. This intersection could serve as a trailhead in the future dependent on the desire of managing agencies. Figure 7.5-8 displays the current view and the likely view with the Project component (access road) in place respectively. In the simulation, the access road is illustrated at a crossing of the INHT and assumes a gravel surface for both the trail and the road at this crossing location. A sign would provide direction for hikers and other users.

Figure 7.5-8. Key View 4: before and after.

7.6 Visual Impacts and Potential Mitigation Opportunities

The Grant Lake Project area is a highly distinctive, well-seen, and valued area of the Kenai Peninsula. Of particular note is that much of the landscape is undisturbed and much is little used and is unseen by most people. Following is a summary of key observations.

Landscape Character: The landscape of the Project area is characterized by complex mountains with serrated ridgelines and a highly ordered landscape. Water features are striking with turquoise waters and clear streams that provide marked contrast with the colors and patterns of the forest. Vegetation is typical of the area, primarily of a mixed deciduous/coniferous forest that leads to high altitude alpine vegetation that is highly patterned and colorful, contrasting with geological features and scree slopes. The community of Moose Pass is also distinctive, and is small scale, in keeping with the landscape. The area is highly memorable.

Scenic Attractiveness: The landscape remains a Class A, or distinctive landscape (as previously defined in Table 7.3-3) throughout the Project area. The foreground, middleground, and background each are unique and attractive to viewers.

Scenic Integrity: The majority of the Project area is intact and undisturbed, allowing for a high level of scenic integrity. Currently, the only evidence of human presence is associated with the road and rail corridor, including the community of Moose Pass. While these elements provide evidence of human presence, the roadway, the railway, and the community of Moose Pass are within scale and context of the setting.

Viewer Groups: Residents, recreationists/tourists, and aircraft are the primary viewers of the Project area. Most views are constrained to the Seward Highway, the Alaska Railroad, and residents of Moose Pass, and those who travel by snowmachine, skis, snowshoes, or on foot.

Landscape Visibility: The Project area is viewed by the viewer groups from all distance zones; however, the natural topography of the area limits distance zones to the foreground for most viewers.

Concern Levels: Concern levels are high, as the area is used and viewed by a wide range of viewers, all of whom value the area for its high visual quality and intactness.

Scenic Class: The scenic class and the scenic attractiveness of the area remain at the highest level of 1, due to the unique landforms, vegetative patterns, and outstanding topography, and thee concern level of the viewers.

7.7 Project Effects

7.7.1 Project Components

Intake Structure: The intake structure would include a gravity diversion structure and intake tower that would be approximately 15 feet above the lake surface. The structure would be hidden for most viewers excepting the small number of those traveling along the shoreline by boat, or by those traveling above the lake by aircraft. The structures would be minor elements in the landscape. The concrete tower would contrast with the lake surface providing a striking light color against the turquoise waters of the lake. However, the size of the structure relative to the lake, as seen from the air provides a minor change to the landscape.

Shoreline Alteration: The change in lake level could provide evidence of vegetation die back as the vegetation adapts to changing lake levels. This vegetation as it dies, or the remaining shoreline as the lake level changes, would provide an expanded shoreline around the lake. While this could occur, there are currently natural seasonal fluctuations at the shoreline edge and during drought conditions the shoreline currently is visible as an exposed edge, thus the possible shoreline expansion would be an increase to the visibility of the shoreline rock edge, not a new condition. This will be visible to those traveling by foot but less conspicuous to those traveling over the area by plane. This would be a minor change to the shoreline landscape.

Access Roadway: The access roadway would be visible from the Seward Highway, from the Alaska Railroad tracks, and for those traveling by boat, raft, snowmachine, snowshoe, or skis on Trail Lake. It would also be visible from the air. It would generally be unseen by residents of Moose Pass. From the Seward Highway it would read as a side road or driveway intersecting the highway, a common element along the roadway. The road would also be seen by those who

would use the INHT at the time that construction takes place. At this point in time, the INHT is a dedicated easement but not constructed. For those affected, the bridge crossing of the Trail Lake narrows would be similar in scale and scope to that of the Alaska Railroad crossing that currently exists. The roadway would continue into the forest and only several hundred feet would be visible for users along Trail Lake. Thus the roadway would be a moderate change to the landscape though generally unseen by most viewers.

Auxiliary Detention Basin: The detention basin would generally be unseen except from the air. It would be seen from the INHT as mapped, though not constructed at this time. The basin would generally be confined within an existing depression in the landscape. Thus, the form of the feature would approximate that of the existing landscape. However, the fluctuating water levels will change the nature of the vegetation as the vegetation adapts to growing conditions. There would also be minor site structures that would be associated with the detention basin, pipes, and infrastructure. These structures and the changes to the landscape would be moderate changes to the landscape but would be largely unseen, depending on whether the INHT easement is relocated or not.

Powerhouse/Ancillary Features: The powerhouse would be a visible, man-made structure in a natural setting as would other components such as parking and associated channels and site structures. They would not replicate the area's landscape in form though the Project components could be colored or painted to be complementary to the landscape. The components would be unseen by most viewers excepting those hiking, skiing, snowshoeing, or fishing along Grant Creek. It would also be evident to those hiking along the INHT, should it be constructed as currently planned.

Powerlines: The proposed Project has yet to define whether powerlines would be above or below grade. Currently, the only transmission lines within the Project area are those located west of the community of Moose Pass, largely out of view of the casual observer. Underground lines would generally be unseen, excepting where a powerline might tie to the existing powerlines west of the Moose Pass community and the occasional ancillary facilities that are assumed to be minor structures in keeping with the scale of the community. The construction of powerlines above ground could possibly present an impact to visual resources, dependent on their location. While other Project facilities would be screened by existing vegetation or replicate existing visual features in the Project area, the powerlines would contrast with the setting and visual resources.

Construction: Construction activities would have little impact to visual resources excepting during the temporary construction activities associated with the roadway and bridging of Trail Lake. The presence of construction equipment could be a minor to moderate impact to visual resources during the construction period depending on how construction equipment was staged. However, the location of almost all Project components is unseen from key viewpoints and most viewers. The construction would generate noise that would be heard by recreationists as pilings were driven, should pile or sheet driving be required. Further, lights may be needed for construction that would be evident in mornings and evenings during winter construction, should winter construction take place.

Operations and Maintenance: Routine operations and maintenance will typically take place monthly during normal operations. There will be dust generated on the gravel road and noise generated by vehicles traveling on the roadway, but this activity is expected to be limited in period and of little detriment to visual quality. During the winter months there would be lights from the vehicles monthly but again, this would be of little consequence to visual quality. The powerhouse itself would have security lighting that would be on through darkness on winter nights. This lighting is expected to be very localized, only at the powerhouse. The lighting is assumed to have cutoffs to ensure that there is little fugitive light. Given the density of the forest at the powerhouse site, there should be little indication of lighting, if any, that would compromise the dark skies visible from key view points or from any locations near Moose Pass.

7.7.2 Potential Mitigation Opportunities

The primary Project impacts would be localized and unseen by most viewers. For the hikers, skiers, snowshoers, and fishermen who recreate along Grant Creek, or to future users of the INHT (if constructed as planned), the impacts provide moderate though localized visual impacts. Project components could be designed to provide some separation of Project facilities from Grant Creek and could be designed to provide colors and textures that are complementary to the landscape.

Construction could be staged such that equipment was kept on site, outside of views. Also, it could be staged to limit pile or sheetpile driving and hours of construction and lighting limited to prevent intrusion to dark skies and noise interjected to the community.

With respect to the INHT, an alternative route could be provided that would be a net benefit to the trail user experience. The trail is located such that views are limited and the trail provides a generally homogenous vegetation and terrain experience from the northward shore of Vagt Lake. An alternative alignment could reduce the presence of Project components relative to the trail location as planned and could provide enhanced views to Trail Lake and background peaks. KHL is currently consulting with the requisite stakeholders related to this issue and a series of site visits and meetings will be held during 2014 to collaboratively reach an agreement on an acceptable re-route of the proposed trail around the single Project feature currently acting as an impediment. All consultation and agreements reached will be comprehensively documented in the FERC LA.

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