

# **Susitna-Watana Hydroelectric Project**

## **Socioeconomic, Recreation, Air Quality, and Transportation Data Gap Analysis *Draft***

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**Disclaimer: This document is provided by AEA as part its effort to gather and share all existing information regarding its proposed Susitna-Watana Project. Doing so should not be interpreted as an endorsement or acceptance by AEA of the content of this document at this time.**

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## EXECUTIVE SUMMARY

This document examines existing information regarding the socioeconomic, recreation, air quality, and transportation conditions in the Susitna-Watana Hydroelectric Project (Project) area. The Project area is located approximately halfway between Anchorage and Fairbanks in the upper Susitna River basin (see Figure 2-1), as proposed by the Alaska Energy Authority (AEA). It would create a single dam on the Susitna River at River Mile 184 in the vicinity of Watana canyon.

A Susitna River two-dam hydroelectric project was first proposed in 1976 by the U.S. Army Corps of Engineers (Corps). The concept was adopted and managed in the 1980s by the Alaska Power Authority (APA), and comprehensive environmental studies were conducted to support Federal Energy Regulatory Authority (FERC) licensing efforts. The project was cancelled in 1986 due to declining oil revenues.

The 2010 Alaska Railbelt Regional Integrated Resource Plan (RIRP), a 50-year, long-range power generation and transmission plan of capital improvement projects, documented the need for a large amount of new power generation to support the railbelt region over the next 10–15 years. The same year, the Alaska Legislature passed House Bill 306, directing the State to receive 50% of its electrical generation from renewable and alternative energy by 2025. Constructing a hydroelectric project in the railbelt region is the only feasible way to achieve this goal. The RIRP identified Watana as the preferred site for such a project.

This analysis evaluates available information for its relevance and applicability using data reviewed from documents developed as part of the original Susitna Project licensing effort, along with more recent reports, contact with agency project leaders, and database searches. If information was not sufficient to satisfy FERC licensing requirements for the Project, a data gap was identified. This document describes the potential data gaps identified for socioeconomic, recreation, air quality, and transportation conditions in the Project area. Actual information needs will be determined when a more refined description of Project facilities, operations, and construction activities is developed.

Based on analysis of the available information, the most important data gaps and areas of concern are described in Table ES.4.1-1.

**Table ES.4.1-1. Summary of Data Gaps**

Data Gap	Specific Information Needed
<b>SOCIOECONOMIC</b>	
<b>Local Government Structure</b>	
SE-1: Update local government baseline to include the Denali Borough	<ul style="list-style-type: none"> <li>• Anderson</li> <li>• Clear</li> <li>• Cantwell</li> <li>• Healy</li> <li>• Smaller settlements (Ferry, McKinley Village, Carlo Creek, etc.)</li> </ul>

Data Gap	Specific Information Needed
SE-2: Update baseline to incorporate MSB Community Councils	Identify baseline conditions and impacts for at the community council level where appropriate
<b>Population</b>	
SE-3: Update baseline population and demographic information	<ul style="list-style-type: none"> <li>• Population</li> <li>• Number of households</li> <li>• Household characteristics</li> <li>• Age characteristics</li> <li>• Race/ethnicity</li> <li>• Gender</li> <li>• Education</li> </ul>
SE-4: Project future population and demographic information	<ul style="list-style-type: none"> <li>• Anticipated population change with and without the project</li> <li>• Community-level forecasts</li> </ul>
SE-5: Develop a construction-related population change estimate	Demographic information during construction period
SE-6: Identify minority and low-income population for environmental justice analysis	Identification of minority and low-income communities
<b>Income</b>	
SE-7: Update baseline income information	<ul style="list-style-type: none"> <li>• Median household income</li> <li>• Per capita income</li> <li>• Population below poverty level</li> </ul>
<b>Housing</b>	
SE-8: Update baseline housing conditions	<ul style="list-style-type: none"> <li>• Existing housing stock</li> <li>• Forecasted housing stock</li> <li>• Availability</li> <li>• Vacancy rates</li> <li>• Housing tenure</li> <li>• Affordability</li> <li>• Tenure</li> <li>• Residential properties near dam site, impoundment area, access corridors, and transmission corridors</li> </ul>
SE-9: Update vacancy rates	Expected vacancy rates
<b>Employment</b>	
SE-10: Update employment information	<ul style="list-style-type: none"> <li>• Existing employment figures</li> <li>• Forecasted employment figures</li> </ul>
<b>Public Services and Facilities</b>	
To be determined as project is refined	
<b>Water and Wastewater</b>	

Data Gap	Specific Information Needed
SE-11: Update baseline water and wastewater demand	<ul style="list-style-type: none"> <li>• Existing water/wastewater demand</li> <li>• Forecasted water/wastewater demand</li> </ul>
SE-12: Update baseline water and wastewater system capacity	<ul style="list-style-type: none"> <li>• Planned capacity of systems</li> <li>• Number of people who can be accommodated by systems</li> </ul>
SE-13: Locate well locations	Utility conflict report to determine location of wells in areas directly impacted by project
SE-14: Locate private systems	Identify private systems impacted by project
SE-15: Update baseline and projected wastewater demand and capacity	<ul style="list-style-type: none"> <li>• Area served by system</li> <li>• Future capacity of system</li> </ul>
<b>Solid Waste</b>	
SE-16: Update landfill capacity information	<ul style="list-style-type: none"> <li>• Verify projected capacities of landfills in each borough</li> <li>• Information about replacement landfill in Denali Borough</li> </ul>
<b>Police</b>	
SE-17: Update baseline police coverage	<ul style="list-style-type: none"> <li>• Existing staffing levels</li> <li>• Projected staffing levels</li> <li>• Detachment location and coverage areas</li> <li>• Level of service standards</li> </ul>
SE-18: Update baseline information to include Wildlife Troopers	<ul style="list-style-type: none"> <li>• Location of detachments</li> <li>• Existing/baseline staffing of detachments</li> <li>• Projected staffing needs</li> </ul>
<b>Fire</b>	
SE-19: Update baseline fire protection in the MSB	<ul style="list-style-type: none"> <li>• Service area boundaries</li> <li>• Station location and resources</li> <li>• Planned improvements (focus on stations/FSAs near project area)</li> </ul>
SE-20: Update baseline information to include Denali Borough Volunteer Fire Departments	<ul style="list-style-type: none"> <li>• Coverage area of each VPD</li> <li>• Station locations</li> <li>• Target response times</li> <li>• Existing resources</li> <li>• Anticipated date of exceeding capacity</li> </ul>
<b>Health Care</b>	
SE-21: Update baseline health care information	<ul style="list-style-type: none"> <li>• Existing health care facilities</li> <li>• Facility capacities</li> </ul>
<b>Education</b>	
SE-22: Update school capacity and baseline and future enrollment	<ul style="list-style-type: none"> <li>• Projected school enrollment for baseline year</li> <li>• Projected school enrollment for project design year</li> <li>• School capacity</li> </ul>
<b>Fiscal Status of Local Government</b>	

Data Gap	Specific Information Needed
SE-23: Update local government fiscal status information	<ul style="list-style-type: none"> <li>• Overall revenues</li> <li>• Overall expenditures</li> <li>• Property tax rates</li> <li>• Property tax revenue</li> <li>• Sales tax rates</li> </ul>
SE-24: Update school district fiscal status information	<ul style="list-style-type: none"> <li>• Existing school districts</li> <li>• Current fiscal status of each district</li> </ul>
<b>Electricity</b>	
SE-25: Update electric power information	<ul style="list-style-type: none"> <li>• Current electrical power information</li> </ul>
<b>RECREATION</b>	
<b>Existing Recreation Facilities</b>	
REC-1: Reasonably foreseeable future recreation facilities	<ul style="list-style-type: none"> <li>• Demand for and carrying capacity of proposed projects in South Denali Region EIS and Denali State Park Management Plan</li> <li>• Potential future use of private land in project area (including development of private recreation facilities)</li> </ul>
REC-2: Update private facilities information	Update of 1985 Lodge Owner Survey to assess status and use of privately owned lodges in project area
<b>Current Recreational Use of the Project Area</b>	
REC-3: Update recreation survey study	Information on current users
REC-4: Identify Alaska Railroad passengers and whistlestop use in project area	Number of passengers using whistlestops to access project area for recreation purposes
REC-5: Update lodge owner survey	Number of annual guests at lodges within project area
REC-6: Update air taxi survey	<ul style="list-style-type: none"> <li>• Number of air taxi operators using project area</li> <li>• Number of annual recreational users transported via air taxi</li> <li>• Key facilities and areas for recreation activities via air taxi</li> </ul>
REC-7: Update guide survey	<ul style="list-style-type: none"> <li>• Number of hunting clients using GMU 13A and 13E</li> <li>• Key areas used for hunting</li> </ul>
REC-8: Update survey of boaters exiting at Susitna Landing, Talkeetna Boat Launch and Airstrip, and Willow Creek	<ul style="list-style-type: none"> <li>• Number of boaters exiting at each site</li> <li>• Types of boats used</li> <li>• Types of recreation activities</li> </ul>
REC-9: Evaluation of current and future commercial use of project area	<ul style="list-style-type: none"> <li>• Number of clients using project area businesses</li> <li>• Key areas used for recreation activities</li> <li>• Planned commercial operations and use</li> </ul>

Data Gap	Specific Information Needed
<b>Recreation Trends and Future Demand</b>	
REC-10: Update projected demand for recreation opportunities in project area	<ul style="list-style-type: none"> <li>• Current annual per capita recreation days in various recreation activities</li> <li>• Projected annual per capita recreation days in various recreation activities</li> </ul>
<b>TRANSPORTATION</b>	
<b>Roads</b>	
TRANS-1: Identify future road network	<ul style="list-style-type: none"> <li>• Location of road</li> <li>• Roadway characteristics</li> </ul>
TRANS-2: Identify existing and future local roads	<ul style="list-style-type: none"> <li>• Location of road</li> <li>• Traffic volume</li> </ul>
TRANS-3: Identify RS 2477 trails	<ul style="list-style-type: none"> <li>• Location of existing RS 2477 corridors</li> <li>• Location of potential RS 2477 corridors</li> <li>• Status of corridor</li> </ul>
TRANS-4: Identify existing bridges/structures	<ul style="list-style-type: none"> <li>• Location of bridges/structures</li> <li>• Vehicle restrictions (height, weight, width, etc.)</li> </ul>
TRANS-5: Update baseline and future traffic volumes and capacity	<ul style="list-style-type: none"> <li>• Current traffic volumes</li> <li>• Roadway configuration (number of lanes, traffic signals, etc.)</li> <li>• Turning movements</li> <li>• Anticipated growth in project area</li> </ul>
<b>Rail</b>	
TRANS-6: Identify baseline and future capacity of ARRC system	<ul style="list-style-type: none"> <li>• Track usage and capacity</li> <li>• Number of rail cars/trains that would move each day</li> <li>• Time of year construction would occur</li> <li>• Origin of construction materials</li> </ul>
<b>Aviation</b>	
TRANS-7: Identify and locate private aviation facilities	<ul style="list-style-type: none"> <li>• Facility locations</li> <li>• Runway size</li> <li>• Runway usage</li> </ul>
TRANS-8: Identify and assess airport capacity	<ul style="list-style-type: none"> <li>• Baseline and projected takeoffs and landings</li> <li>• Availability of unleased land for construction staging</li> </ul>
<b>AIR QUALITY</b>	
<b>Emissions Data</b>	
AQ-1: Update project emissions for construction permitting	<ul style="list-style-type: none"> <li>• Construction equipment needs</li> <li>• Construction activity levels</li> </ul>
AQ-2: Summarize baseline fossil-fuel generation emissions	<ul style="list-style-type: none"> <li>• Estimates of criteria air pollutants for each plant</li> <li>• Breakdowns of electric generation by type</li> </ul>
AQ-3: Add regional air quality data	<ul style="list-style-type: none"> <li>• Summarize data for nearest regional monitors</li> <li>• Compare measured data against current NAAQS</li> </ul>



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### **Acronyms and Abbreviations**

AASP	Alaska Aviation System Plan
ACS	American Community Survey
ADF&G	Alaska Department of Fish and Game
AEA	Alaska Energy Authority
AFB	Air Force Base
AHS	Alaska Highway System
APA	Alaska Power Authority
ARRC	Alaska Railroad Corporation
AST	Alaska State Troopers
ATV	All-Terrain Vehicle
BLM	Bureau of Land Management
CO	Carbon Monoxide
Corps	U.S. Army Corps of Engineers
DBSD	Denali Borough School District
DCCED	Alaska Department of Commerce, Community and Economic Development
DCED	Alaska Department of Commerce and Economic Development
DEC	Alaska Department of Environmental Conservation
DEIS	Draft Environmental Impact Statement
DEED	Alaska Department of Education and Early Development
DNR	Alaska Department of Natural Resources
DOE	U.S. Department of Energy
DOT&PF	Alaska Department of Transportation and Public Facilities
DOWLD	Alaska Department of Labor and Workforce Development
DPOR	Alaska Division of Parks and Outdoor Recreation
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
FSA	Fire Service Area
FSS	Flight Service Station
GA	General Aviation
GWh	Gigawatt Hour
ILS	Instrument Landing System
ISER	Institute of Social and Economic Research
K-12	Kindergarten through Grade 12
LPV	Localizer Performance with Vertical Guidance
LRTP	Long Range Transportation Plan
$\mu\text{g}/\text{m}^3$	Micrograms per Cubic Meter
MP	Milepost
MSB	Matanuska-Susitna Borough
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHS	National Highway System

NO <sub>2</sub>	Nitrogen Dioxide
NOLS	National Outdoor Leadership School
NPS	National Park Service
ORV	Off-Road Vehicle
Pb	Lead
Ppb	Parts per Billion
PM	Particulate Matter
PSD	Prevention of Significant Deterioration
RASP	Regional Aviation System Plan
REGA	Railbelt Electrical Grid Authority
RIRP	Railbelt Integrated Resources Plan
RM	River Mile
RNP	Required Navigation Performance
RS	Revised Statute
RST	Revised Statute Trail
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SO <sub>2</sub>	Sulfur Dioxide
TSP	Total Suspended Particulate Matter
VFD	Volunteer Fire Department
VMT	Vehicle Miles of Travel
VOC	Volatile Organic Compounds

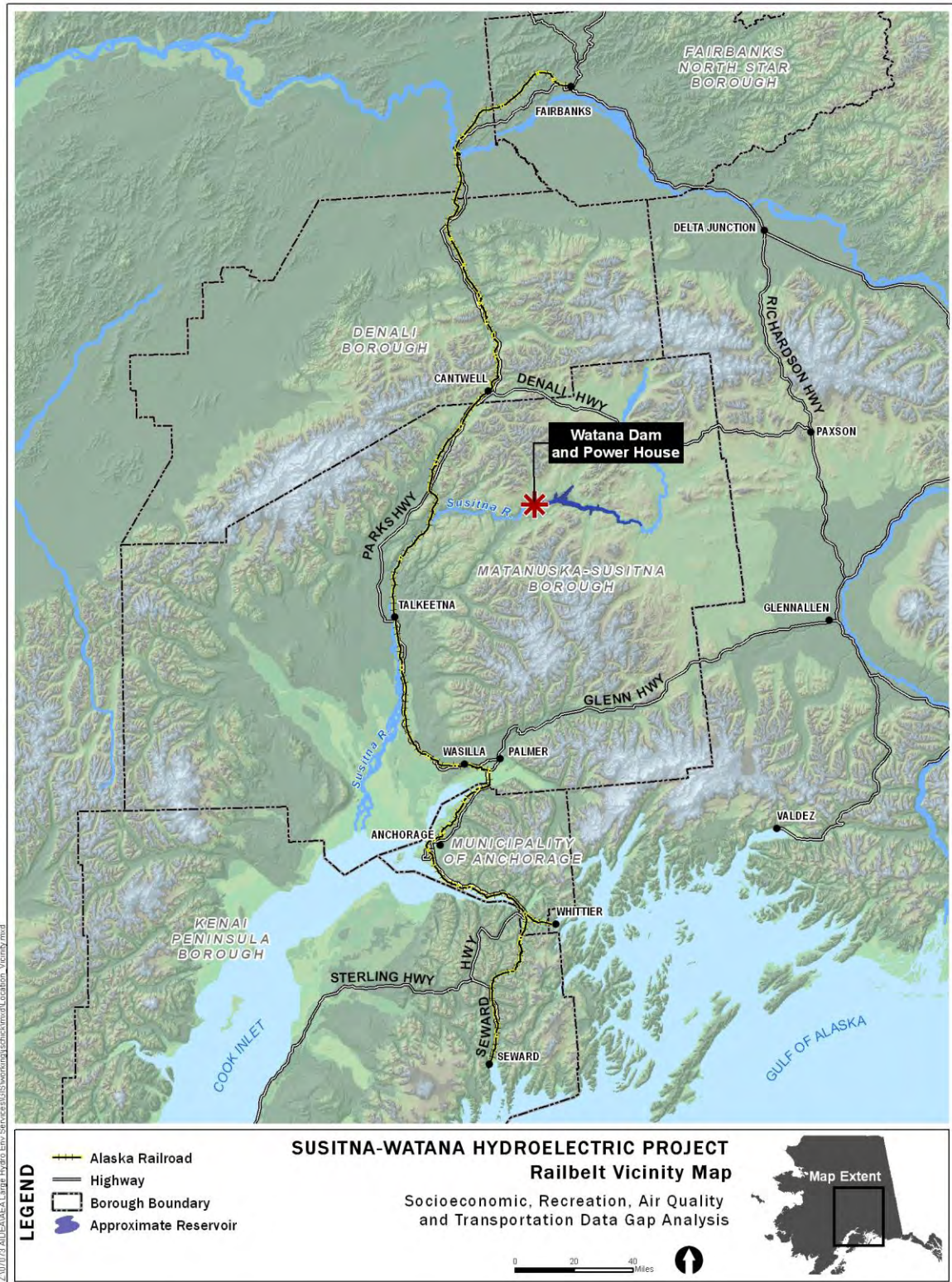
## **1 INTRODUCTION**

This report examines existing information describing the socioeconomic, recreation, air quality, and transportation conditions in the Susitna-Watana Hydroelectric Project (Project) area (Figure 2-1), located in the upper Susitna River basin, as proposed by the Alaska Energy Authority (AEA). Potential “gaps” in the existing data are identified that help inform the National Environmental Policy Act (NEPA) scoping and study planning activities conducted as part of the Federal Energy Regulatory Commission (FERC) licensing process for the proposed Project. The purpose of this data gap analysis is to evaluate available information for its relevance and applicability to the proposed Project. Actual information needs will be determined when a more refined description of Project facilities, operations, and construction activities is developed. The data reviewed for this analysis are contained in selected documents developed as part of the original Susitna Project licensing effort in the early 1980s, along with more recent, readily available reports.

## **2 PROJECT HISTORY**

The Susitna River was identified as a potential large hydropower site in the 1940s by the Bureau of Reclamation. In a 1976 report to Congress, the U.S. Army Corps of Engineers (Corps) proposed a two-dam scheme capable of producing 7,300 Gigawatt hours (GWh) of hydropower (Harza-Ebasco 1987). This concept was adopted by the Alaska Power Authority (APA), which began managing the Project in 1980, and contracted with Acres America to review economic and environmental feasibility and file a FERC license application. Later, Harza-Ebasco was contracted to update the license application and perform final design. The 1980s APA Project consisted of two dams: the first located in Watana Canyon at approximately river mile (RM) 184, and a second located at Devils Canyon (referred to as the Devil Canyon site in most earlier studies; RM 152). The 1980s APA Project effort culminated in the development of a license application filed with FERC in 1983, and an amended license application was prepared in 1985. The Project was cancelled in early 1986 in the face of declining oil revenues. In support of the 1983 and 1985 FERC license applications, the APA conducted comprehensive baseline environmental studies throughout the basin, with the most extensive aquatic efforts focused on the middle Susitna River upstream of Talkeetna. A library of more than 3,500 reference documents was cataloged at the conclusion of the Project (Harza-Ebasco 1987).

Figure 2-1. Location and Vicinity Map



The current Susitna-Watana Hydroelectric Project being evaluated by the AEA is located approximately halfway between Anchorage and Fairbanks in the upper Susitna basin. It would create a single dam on the Susitna River at RM 184 in the vicinity of Watana Canyon. The approximately 700-foot-high dam would have an approximate 557-foot difference between tail water and maximum pond elevation, with a maximum pond approximately at the 2,014-foot elevation (AEA 2010). Watana Reservoir would be 39 miles long and a maximum of two miles wide. The dam's installed capacity would be around 600 megawatts (MW), with the average annual generation estimated to be 2,600 Gigawatt Hour (GWh; AEA 2010). The AEA is currently studying design considerations in order to formulate a decision regarding the type of dam or powerhouse (underground or surface) that would be used or the actual final maximum reservoir level. At this time the actual operation characteristics of the Project are not known, but the current concept is that the Project would provide peaking operations using the reservoir storage to meet daily instream flow and power needs.

### **3 DATA GAP ANALYSIS**

The licensing effort of the 1980s APA Project generated a body of literature, some of which might be used to support future licensing. To evaluate potential impacts, the 1980s study effort sought to describe baseline conditions at a level of reliability necessary to detect and explain possible future changes caused by the proposed hydroelectric development as it was configured at that time. Since then, conditions in the Project area have changed and new information is available, making it necessary to review the 1980s information to identify data gaps (areas where updated information is needed or can be supplemented).

### **4 SOCIOECONOMICS**

Over the past 30 years, Alaska has changed dramatically. According to the Alaska Department of Labor and Workforce Development (DOWLD), the population of Alaska increased by 75% in the past 30 years (from 401,851 in 1980 to 710,231 in 2010). Much of this population increase has occurred along the Railbelt<sup>1</sup>. In 1980, the Trans-Alaska Pipeline had just been completed and the economy was booming. However, this period of prosperity was followed a few years later by an oil bust. That was accompanied by high unemployment, housing foreclosures, etc. The economy recovered from that event and has diversified; thus the state is no longer as dependent on the oil industry as it once was. These events and many others that occurred in the past 30 years have had an impact on the socioeconomic environment. As a result, the information contained in the 1985 amended draft license application for the 1980s APA Project is good simply for historical context; most of the information needs to be updated before it can be included in the current licensing application.

#### **4.1 Methodology**

Key licensing effort summary documents were reviewed from the first half of the 1980s, such as the 1985 amended draft license application (Harza-Ebasco 1985a, 1985b, 1985c, and 1985d), and

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<sup>1</sup> The Railbelt refers to the communities located along the Alaska Railroad mainline.



the Draft Environmental Impact Statement (DEIS; FERC 1984a and 1984b). Information was considered in terms of relevance to current FERC licensing requirements for environmental analysis of the proposed Project, completeness, and the applicability of methods used. The review looked at other available information including:

- 2010 Census
- 2005–2009 American Community Survey (ACS)
- Matanuska-Susitna Borough (MSB) Comprehensive Plan
- Denali Borough Comprehensive Plan
- Chase Community Council Comprehensive Plan
- Talkeetna Community Council Comprehensive Plan
- Draft MSB Public Facilities Plan Revision

Other sources of information included contact with agency Project leaders and database searches. If information was not sufficient to satisfy licensing requirements, a data gap was identified. This document identifies those information needs or gaps to help develop future Project study efforts. For most if not all of the data gaps, additional information about the construction and operation of the proposed Project is necessary before more detailed recommendations can be provided.

Based on information provided about the proposed Project, most of the socioeconomic impacts are likely to occur in the Denali Borough or the MSB. As a result, this socioeconomic data gap analysis will focus on these areas. Where the collection and updating of data are recommended, the information should also be collected at a Railbelt level to provide context. While statewide information may be beneficial in some instances, conditions in rural Alaska tend to be very different from those along the Railbelt. Consequently, comparing local information to statewide information may result in impacts being assessed differently.

## **4.2 Local Government Structure**

In Alaska, there are two forms on municipal government; organized borough and city. Both are political subdivisions of the state.

The powers of each borough and city vary depending on their class. In addition, Alaska also has many unincorporated communities. These communities have no formally organized municipal government and may exist within a borough or the unorganized borough<sup>2</sup>.

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<sup>2</sup> The area not included in one of the 18 organized boroughs is often referred to as the unorganized borough.

## **4.2.1 Data Gaps**

### *4.2.1.1 SE-1: Update local government baseline to include the Denali Borough*

Since the 1985 amended draft license application for the 1980s APA Susitna Hydroelectric Project was developed (Harza-Ebasco 1985a, 1985b, 1985c, and 1985d), the local government structure in the Railbelt has changed. The Denali Borough was formed as a home rule municipal corporation on December 7, 1990. It has a mayor-assembly form of government. There are four communities within the Denali Borough; Anderson (a second-class city), Clear (incorporation type unknown), Cantwell (unincorporated) and Healy (unincorporated). There are also a number of smaller settlements such as Ferry, McKinley Village, and Carlo Creek.

### *4.2.1.2 SE-2: Update baseline to incorporate MSB community councils*

The 1985 amended draft license application did not discuss the role of the community councils within the MSB. The MSB includes 24 community councils that serve as local representative bodies. According to 2.73.020 of the borough code, community councils are intended to give:

- the people a method to work together for expression and discussion of their opinions, needs and desires in a manner that will have an impact on their community's development and services;
- governmental agencies a method for receiving opinions, needs, desires, and recommendations of residents and groups;
- local governing bodies an improved basis for decision-making and assignment of priorities for all capital improvements and governmental programs affecting community development and individual well-being.

Given the size of the MSB, much of the planning is done on a community council level. Describing baseline<sup>3</sup> conditions and impacts on a community council level would be beneficial and would help define the geographic area being discussed.

## **4.3 Population**

Since the 1980s, Alaska's population has continued to increase. In 1980, the State of Alaska had a population of 401,851 which has increased to 710,231 by 2010. In general, the urbanized parts of the State are growing faster than rural areas, with some rural areas losing population. In the Denali Borough, the 2010 population (1,826) is slightly lower than the 2000 population (1,893). In 2010, the borough had 806 households, including 220 households with individuals under 18 years of age. The average household size was 2.2. The borough's median age was 41.5, but it has only 137 individuals age 65 or over. The borough has more males (1,002) than females (824). The majority of the population (88.4%) is white non-Hispanic.

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<sup>3</sup> Baseline is considered to be existing and future conditions with no action.

The population of the Denali Borough can vary greatly depending on the season. In the summer, a large influx of tourists brings numerous temporary workers who move into the borough to support the tourism industry.

The MSB has been one of the fastest growing areas in the country in recent years. The 2010 population (88,995) is approximately 50% higher than the 2000 population (59,322). The borough had 31,824 households, including 12,294 households with individuals under 18 years of age. The average household size was 2.8. The borough's median age was 34.8. The MSB had 7,069 individuals age 65 or over. The borough has more males (46,040) than females (42,995). The majority of the population (82.8%) is white non-Hispanic.

### **4.3.1 Data Gaps**

#### *4.3.1.1 SE-3: Update baseline population and demographic information*

The 1985 amended draft license application (Harza-Ebasco 1985a, 1985b, 1985c, and 1985d) provided an overview of the baseline population for the boroughs and selected communities along the Railbelt. Since that time, the existing demographics of these communities have changed and need to be updated. In addition, additional detail about the demographics of the communities near the Susitna-Watana Hydroelectric Project site should be provided. Updating the projection of future population numbers with and without the Project is essential to understanding the Project's impacts on the socioeconomic environment. Many social impacts are related to change in population and the location of that population change. The Project could impact population by bringing new residents to the area (during either construction or operation of the hydroelectric Project). The changes in population can lead to other impacts on the housing, employment, public facilities, etc., which are discussed later in this report. Specific information that should be identified includes:

- Population
- Number of households
- Household characteristics
- Age characteristics
- Race/ethnicity
- Gender
- Education

Sources of existing population and demographic data include the U.S. Census, the ACS, and the DOLWD.

#### *4.3.1.2 SE-4: Project future population and demographic information*

The 1985 amended draft license application (Harza-Ebasco 1985a, 1985b, 1985c, and 1985d) included population forecasts with and without the Project for selected jurisdictions for 1997, 2003, and 2009. This forecast is now out of date. In recent years, there have been many forecasts

of future MSB population but little work has been done for the Denali Borough. Population projections that detail the anticipated population change resulting from a project have been completed at a borough level in other areas in Alaska (Institute of Social and Economic Research [ISER] 2005). A similar study for the Susitna-Watana Hydroelectric Project would be beneficial. Community-level forecasts could then be completed in coordination with the Denali Borough and the MSB.

If possible, the forecast should be expanded to provide additional information about the future population such as the number of households, school-age children, individuals over 65, etc. Different segments of the population can place different needs on community services. For example, an aging community is likely to need more health care facilities, senior centers, etc. A younger community is likely to have a higher demand for child care facilities, schools, etc.

#### *4.3.1.3 SE-5: Update construction-related population and demographic change estimate*

The construction of the Susitna-Watana Hydroelectric Project is likely to cause more impacts to the social environment than the operation of the facility. While the construction is temporary, the impacts could have lasting effects on communities in the area if the construction effort is not planned out with community impacts in mind. Information about demographics during the construction period should be updated to help identify construction-related impacts.

#### *4.3.1.4 SE-6: Identify Minority and Low Income Population for Environmental Justice Analysis*

The 1985 amended draft license application did not include an analysis of the Project's impact on environmental justice populations. Executive Order 12898 requires Federal agencies to "analyze the environmental effects, including human health, economic and social effects, of Federal actions, include effects on minority and low-income communities, when such analysis is required by NEPA, 42 U.S.C. Section 4321 et seq." (Office of the President 1994). In order to identify impacts to minority and low-income communities, these communities need to be identified. American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, and Native Hawaiian or Other Pacific Islander are considered racial and ethnic minority groups. Sources of information include the 2010 Census, ACS, and DOLWD.

## **4.4 Income**

The 1985 amended draft license application included per capita income for 1970, 1975, 1980, and 1982 for the State, Regional Impact Area, Anchorage, Fairbanks, and the MSB. Per capita incomes have risen since that time. In 1982, the State's per capita income was reported as \$16,598 (Harza-Ebasco 1985a, 1985b, 1985c, and 1985d). According to the 2005–2009 ACS, the state's per capita income has almost doubled since that time and is now approximately \$29,382.

### **4.4.1 Denali Borough**

According to the 2010 Census, the median household income in the Denali Borough in 2009 was \$62,615, which is slightly lower than the State of Alaska (\$66,712). According to the 2005–2009

ACS, the Denali Borough's per capita income was \$44,689, which is higher than the State of Alaska (\$29,382). Approximately 4.8% of the population was below the poverty level in 2009.

In the Denali Borough, almost a third (30.5%) of resident workers made over \$50,000 per year compared to only 27% in the State. A quarter (25.1%) of resident workers earned between \$20,000 and \$40,000 per year while 18.2% earned less than \$5,000.

#### **4.4.2 Matanuska-Susitna Borough**

According to the 2010 Census, the median household income in the MSB in 2009 was \$70,442, which is slightly higher than the State of Alaska (\$66,712). According to the 2005–2009 ACS, the MSB's per capita income was \$24,906, which is lower than the State's per capita income of \$29,382. Approximately 8.7% of the population was below the poverty level in 2009.

In the MSB, almost a third of all resident workers make between \$20,000 and \$49,999 per year. An additional 30.4% make over \$50,000 while 15.8% make under \$50,000 per year (State of Alaska 2011).

#### **4.4.3 Data Gap**

##### *4.4.3.1 SE-7: Update Baseline Income Information*

The most recent per capita income data included in the 1985 amended draft license application was for 1982. As this information is more than 25 years old, it is too dated to be used as part of the current licensing effort. Income information for the Denali Borough as well for specific communities should be included as part of the baseline information. Updated baseline information on income is necessary to help understand the impact of the Project on income. Updated information is also needed to identify low-income populations to satisfy environmental justice requirements. Specific information that should be collected includes median household income, per capita income and population below poverty. Information can be obtained through the 2010 Census, the ACS, the DOLWD, the Denali Borough, and the MSB.

#### **4.5 Housing**

The 1985 amended draft license application looked at baseline housing stock. Areas near the proposed Project site, especially the MSB core area, have experienced a housing boom since 1985, making the previous information dated. Areas that were underdeveloped 25 years ago are now close to fully built out, increasing the existing housing stock dramatically. Residential development patterns have also changed. Historically, much of the residential development in the MSB and the Denali Borough has been on large lots with on-site water and septic systems. While large lots are still popular, some areas have seen more development on smaller lots with community water systems. In addition, housing units that have traditionally been recreational properties are now being used as primary residences.

### 4.5.1 Denali Borough

In the Denali Borough, a majority of the housing is single-family housing. The borough has very low residential densities. According to the 2010 Census, the Denali Borough has 1,771 housing units, of which 55.5 % (965 units) were vacant. Of these vacant units, 77 % (744 units) were for seasonal, recreational, or occasional use. Approximately 4 % (73 units) were for rent or for sale. According to the 2005–2009 ACS, which shows 1,249 housing units in the borough, most of the housing units were built between 1970 and 1999. The median value of an owner-occupied housing unit was \$167,000 and the median rent was \$510. Table 4.5-1 provides an overview of selected occupied housing characteristics.

**Table 4.5-1. Selected Housing Characteristics for Occupied Housing Units in the Denali Borough**

	# of Occupied Housing Units	% of Occupied Housing Units
Occupied housing units		N/A
Owner occupied	334	64%
Used fuel oil or kerosene as the heating source	310	60%
Lacked complete plumbing facilities	114	
Lacked complete kitchen facilities	113	
Had no phone service	64	

*Source: 2005-2009 ACS*

### 4.5.2 Matanuska-Susitna Borough

In the MSB, most housing is single-family residential housing, but there is a fair amount of multi-family housing. In general, residential densities are highest in the core area and are lower in the more rural parts of the borough. According to the 2010 Census ACS, the MSB has 41,329 housing units, which includes 9,505 vacant units. According to the 2005–2009 ACS, which reports 28,532 housing units in the MSB, approximately 9,295 (33%) of the housing units were built between 1980 and 1989. The median value of an owner-occupied housing unit was \$205,000 and the median rent was \$896.

Table 4.5-2 provides an overview of selected occupied housing characteristics.

**Table 4.5-2. Housing Characteristics for Occupied Housing Units in the MSB**

	# of occupied Housing Units	% of Occupied Housing Units
Occupied housing units	21,956	N/A
Owner occupied	17,535	79.9%
Used utility gas as the heating source	15,453	70.4%
Lacked complete plumbing facilities	895	4.1%
Lacked complete kitchen facilities	865	3.9%
Had no phone service	493	2.2%

*Source: 2005-2009 ACS*

### **4.5.3 Data Gaps**

#### *4.5.3.1 SE-8: Update Baseline Housing Conditions*

Updated baseline housing conditions are crucial to understanding the impact the Project will have on the socioeconomic environment. Information collected as part of the 1985 amended draft license application is too dated to be used as part of the current licensing effort. Specific information that should be collected include existing housing stock, forecasted housing stock, availability, vacancy rates, housing tenure, affordability and tenure. In particular, residential properties near the dam site, impoundment area, access corridors and transmission corridors should be identified because these properties have the potential for greater impacts.

Information on existing and future housing stock is typically available in a community’s comprehensive plan. However, the comprehensive plan for the Denali Borough does not include this information. AEA should work with borough representatives to develop a housing forecast for the area. In the MSB, the Talkeetna and Chase Comprehensive Plans contain information about future residential development within the community council. Each plan is more than 10 years old, making the information too dated to be useful. A draft Trapper Creek Comprehensive Plan was developed a few years ago but was never adopted by the MSB.

The MSB is currently conducting a “Build-out and Alternative Futures Analysis” to identify areas suitable for development and to help identify the appropriate areas for different land uses (MSB 2010). This Project is scheduled to be completed in 2011. The initial analysis covered Big Lake, Core Area, Knik-Fairview, Point MacKenzie, Talkeetna, and Willow. The Talkeetna analysis indicates that in 2019 Talkeetna is projected to have 308 dwelling units. If Talkeetna were to be fully built out, it could accommodate approximately 8,620 dwelling units. The MSB plans to conduct this analysis for the entire populated area of the MSB eventually.



#### **4.5.3.2 SE-9: Update Vacancy Rates**

Information about expected vacancy rates should be obtained to help identify potential impacts of the Project on housing, especially meeting construction-related housing demand. Areas with low vacancy rates may not be able to house the influx of people with the existing housing stock. If the demand for housing exceeds the supply, rent increases may result, forcing existing tenants to move, or newly constructed housing that may be empty after Project construction is finished. Information about vacancy rates will help clarify the impact the construction and operation of the Project will have on the housing market. Sources of information include the MSB, Denali Borough, and local realtors.

### **4.6 Employment**

The 1985 amended draft license application included employment information and unemployment rates for the State, Anchorage, Fairbanks, and the MSB in 1970, 1976, 1980, and 1984. In 1984, employment was 225,000 and the unemployment rate was 9.8%. Since then, employment in the State has increased substantially. According to the 2010 Census, Alaska had 326,950 people employed in the civilian labor force and an additional 16,640 in the armed forces. Alaska's unemployment rate in June 2011 was 7.5%.

#### **4.6.1 Denali Borough**

Due to the seasonality of the Denali National Park and other tourism-related ventures, employment in the Denali Borough is very seasonal. The workforce can be fewer than 1,000 in the winter and exceed 4,000 during the summer (Fried 2009). Most of the workforce does not reside within the borough. Many of the non-resident workers are employed in leisure and hospitality, and other service employment. Examples of these types of jobs include hotel employees, restaurant employees, and tour guides. Local residents tend to have higher-paying, year-round jobs with employers such as Usibelli Coal Mine, the school district, and the Golden Valley Electric Association.

Unemployment is also seasonal. In January 2009, the Denali Borough had one of the highest unemployment rates in the state at 20.1%. In June 2009, it was the lowest in the state at 3.2% (Fried 2009).

#### **4.6.2 Matanuska-Susitna Borough**

According to the DOLWD, in the MSB, approximately 35,738<sup>4</sup> members of the resident population age 16 and over are employed. The majority work in the private section (29,639), while 17% are employed by the government (State of Alaska 2011).

Approximately 45% of the MSB workforce does not work within the borough (Fried 2010). Approximately a third commutes to the Municipality of Anchorage<sup>5</sup>. An additional 8% commute

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<sup>4</sup> ACS has 40,787 in the labor force with 40,300 in the civilian labor force.

to the North Slope and 5% worked elsewhere (Fried 2010). Of workers who live in the MSB, the top occupation is retail salesperson (1,259), followed by secondary school teachers, except special and vocational education (1,134). The top industries for MSB residents are trade, transportation, and utilities (7,727), followed by education and health services (4,783) and construction (4,174). Top employers in the MSB include the school district, the State of Alaska, and the Mat-Su Regional Medical Center.

### **4.6.3 Data Gap**

#### *4.6.3.1 SE-10: Update Employment Information*

The 1985 amended draft license application included a brief overview of existing and forecasted employment for selected communities/boroughs along the Railbelt. This information is now more than 25 years old and needs to be updated to reflect current conditions. Information about existing employment in the MSB and the Denali Borough can be obtained from the 2010 Census, the ACS, and the DOLWD. The MSB and the Denali Borough are also good sources of information. It is assumed that a separate study identifying the economic benefits to the Project will be conducted and should identify future employment information and potential Project impacts. As the construction and operation of the proposed Project may have impacts on employment beyond the Denali Borough and the MSB, the geographic areas being studied should be revisited once additional information about the Project is available.

## **4.7 Public Services and Facilities**

Based on the existing information about the Susitna-Watana Hydroelectric Project, impacts to public facilities are likely to be within the MSB and Denali Borough. This discussion is limited to those jurisdictions. As the Project is refined, it may result in the need to examine public services and facilities in other areas. The provision of public services and facilities is typically based on the population being served. The Susitna-Watana Hydroelectric Project has not developed an updated estimate on how the proposed Project will change the population. Once an estimate is available, these data gaps should be revisited to ensure they are still accurate.

### **4.7.1 Water and Wastewater**

The 1985 amended draft license application provides an overview of water and wastewater systems in the MSB (including Palmer and Wasilla), Nenana, Anchorage, and Fairbanks. In the past 25 years, while most residents relied on on-site water and sewer systems, there have been numerous changes to the pipes water and wastewater systems, including expansion of service areas, capacity improvements, and the provision of piped water and wastewater in the Talkeetna area.

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<sup>5</sup> This data excludes federal, uniformed military and self-employed workers, so the actual percentage of workers from the MSB who work in Anchorage is likely to be higher (Fried 2010).

#### **4.7.1.1 Denali Borough**

In the Denali Borough, most residents and businesses use individual wells and septic systems to meet their water and wastewater needs. Both the Usibelli Mine and Healy Clean Coal Project have individual water well systems. The Clear Air Force Station provides piped water and sewer for base facilities.

#### **4.7.1.2 Matanuska-Susitna Borough**

According to the Draft MSB Public Facilities Plan Revision, approximately 83% of households in the MSB are on private well and septic systems (MSB 2009a). There are more than 20,000 active septic tanks in the MSB (MSB 2009a). As much of the future residential growth is expected to occur on larger lots, the MSB anticipates approximately 56,000<sup>6</sup> active septic tanks by 2030 (MSB 2009a). Septic tanks need to be pumped out every one to two years but there are no regional septage handling facilities in the MSB, so the contents are transported to an Anchorage Water and Wastewater Utility facility (MSB 2009a)<sup>7</sup>. In addition, some residents rely on hauling water and outhouses while the more densely developed areas near Wasilla, Palmer, and Talkeetna have piped systems described below.

The City of Wasilla operates a piped water and sewer system. The water system includes three primary groundwater wells and four one-million gallon above-ground reservoirs (City of Wasilla 2011). The utility provides approximately 1,100 service connections and can meet peak flows up to one million gallons per day (City of Wasilla 2011a).

The City of Palmer water system service area includes the City of Palmer and extends north to Cedar Hill Subdivision, south to the Mat-Su Regional Medical Center, east to the airport, and west to the Palmer West Subdivision (Hattenburg Dilley & Linnell [HDL] 2009). The Palmer Service Area is approximately 31.1 square miles (HDL 2009). The City of Palmer's water utility system is a buried pipe distribution system with above- and below-ground water storage reservoirs and water wells. It is a Class A system that distributes approximately one million gallons per day of chlorinated and fluoridated water to approximately 7,000 customers (HDL 2009). Water supply is not expected to be a constraint to growth in coming years (City of Palmer 2006).

The City of Palmer's sanitary sewer system is a piped system which includes three lift stations and an aerated lagoon treatment system (City of Palmer 2006). The sewage treatment facility is outside the city limits (approximately three miles south of downtown) (City of Palmer 2006). Effluent is discharged into the Matanuska River (City of Palmer 2006). According to the 1999 Water and Wastewater System Utility Plan, the capacity of the system is 1,100,000 gallons per day (City of Palmer 2006). The system is at approximately 66% capacity and expected to accommodate the anticipated growth over the next five to 10 years (City of Palmer 2006).

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<sup>6</sup> This forecast is based on an estimated 2030 MSB population of 137,682.

<sup>7</sup> With an increasing number of septic tanks and increasing fuel costs, the development of a septage handling facility in the MSB may be needed.

The City of Palmer operates 24 miles of storm sewer and 265 catch basins (City of Palmer 2006). The State of Alaska maintains the storm drain system for the Glenn Highway (City of Palmer 2006).

The MSB owns and operates the water and wastewater systems in Talkeetna. The water is treated for arsenic to meet water quality standards (MSB 2009a).

#### **4.7.1.3 Data Gaps**

##### **4.7.1.3.1 SE-11: Update Baseline Water and Wastewater Demand**

The 1985 amended draft license application included a description of the existing and forecasted future demand for water and wastewater services. Since that time, the amount of development in the area has increase, resulting in increased demand for water and wastewater services. Future development will also increase the demand on the water supply. The information should be available from the respective utilities, the Denali Borough, and the MSB.

##### **4.7.1.3.2 SE-12: Update Baseline Water and Wastewater System Capacity**

The 1985 amended draft license application included a description of the existing and forecasted future demand for water and wastewater services. Since that time, many facilities have been improved to accommodate the area's growing population, making the previous information out of date. In addition, utility operators continue to make upgrades to the facilities to accommodate the growing water demand. Understanding the planned capacity of the water systems is important to identify potential impacts. Information that should be collected includes the future planned capacity of the system and how many people that system can accommodate. At this time, most of the growth associated with the proposed Susitna-Watana Hydroelectric Project is anticipated to be outside the piped water and wastewater coverage areas. As a result, an in-depth study of this issue is not recommended at this time.

##### **4.7.1.3.3 SE-13: Identify Well Locations**

Many properties in the Denali Borough and the MSB rely on wells for water. Understanding where wells are located is important to determine if the Project will have an effect on them. Identifying the location of wells is most important in the areas directly impacted by the Project. One possible method of identifying these wells is by developing a utility conflict report for the Project. Information may also be available from the Denali Borough, MSB, and the Alaska Department of Environmental Conservation (DEC).

##### **4.7.1.3.4 SE-14: Locate Private Systems**

In addition to the public water and wastewater systems, some properties are on small private systems. These systems are often used to develop lots that are smaller than one acre. Information about these systems is not well documented. Additional research should be done to determine if there are any private systems in the area that will be directly impacted by the proposed Project. Potential sources of information include the Denali Borough, the MSB, and the DEC. Development of a utility conflict report for the Project may help identify these facilities.

#### *4.7.1.3.5 SE-15: Update Baseline and Projected Waste Water Demand and Capacity*

The 1985 amended draft license application included a description of the existing and forecasted future demand for wastewater services. Since that time, the amount of development in the area has increased, which has increased the use of the wastewater system. Knowing the area served by the systems and its future capacity will help identify Project impacts to the wastewater system. Information should be available from the respective utility companies.

### **4.7.2 Solid Waste**

An overview of solid waste handling and capacity of the landfills/solid waste disposal sites was studied as part of the 1980s APA Project but the data is now more than 25 years old. The available disposals sites have changed, more recycling opportunities than during the previous work, and new waste disposal methods have been developed.

#### *4.7.2.1 Denali Borough*

The 1985 amended draft license application noted that residents of the Cantwell area did not have a publically operated and maintained landfill. Currently, the Denali Borough operates a landfill which is located at Milepost (MP) 282.5 George Parks Highway (about two miles southeast of the Clear Air Force Station). According to Denali Borough Solid Waste Operations Plan, the landfill has received approximately 5,500 tons of waste per year between July 2007 and June 2008. Starting in July 2008, it was anticipated that the landfill would receive approximately 7,200 tons per year (the maximum allowable quantity for a Class II landfill) until the landfill was full. Based on these rates, it was estimated that the landfill would reach capacity around 2023 (Denali Borough 2007).

The Denali Borough also operates the Cantwell Transfer Station located at mile 213.2 Parks Highway.

#### *4.7.2.2 Matanuska-Susitna Borough*

The 1985 amended draft license application stated the MSB operated nine landfills but was intending to close most of these sites and set up transfer stations. Since 1985, the MSB has completed these plans. Currently, the MSB Solid Waste Management Division operates several solid waste disposal facilities including (MSB 2009a):

- One permitted Class I landfill near Palmer
- One unattended trench fill near Skwentna
- Twelve waste drop-off sites (waste transfer stations and dumpsters)
- One recycling facility

As of 2002, the lifespan of the landfill was estimated to exceed 70 years (MSB 2009a). In addition, many residents who live off the road system will dispose of their solid waste on their property; either by burying it or burning it (MSB 2009a).

### **4.7.2.3 Data Gap**

#### **4.7.2.3.1 SE-16: Update Landfill Capacity Information**

The projected capacities of the landfills in each borough should be verified with the respective landfill operators. In addition, information about a replacement landfill in the Denali Borough should be obtained once information about disposing of the waste associated with construction of the Susitna-Watana Hydroelectric Project is available.

Additional information about solid waste in the MSB is included in the 2002 MSB Solid Waste Management Plan Update.

### **4.7.3 Police**

A summary of police protection in Anchorage, MSB, Cantwell, Healy, Nenana, and Fairbanks was included in the 1985 amended draft license application. Currently, police protection is still provided by the same entities, with the addition of the Houston Police Department.

#### **4.7.3.1 Denali Borough**

The Alaska State Troopers (AST) provide police services within the Denali Borough. There are AST posts in Cantwell and Healy. In addition, the northern portion of the Denali Borough may receive police service from the AST post in Nenana.

#### **4.7.3.2 Matanuska-Susitna Borough**

Within the MSB, police services are provided by the Alaska State Troopers, the Wasilla Police Department, and the Palmer Police Department. The Houston Police Department is currently not staffed, and emergency calls are being handled by the Alaska State Troopers (City of Houston, N.d.).

The City of Wasilla Police Department provides police services for the City of Wasilla. The department was established in 1993 and has grown from 8 commissioned officers to 24 in 2008 (City of Wasilla 2011b).

The City of Palmer Police Department provides police coverage for the City of Palmer. It has 29 employees, including 13 sworn officers (which includes nine patrol officers), a drug investigator, two sergeants, one lieutenant, one Police Chief, an administrative assistant, a property and evidence records technician, and a janitor (Palmer 2006).

The Palmer Police Emergency Dispatch Center is the central dispatch facility for the MSB. It is staffed by 12 police/emergency dispatchers and one communications supervisor. It dispatches for the Palmer Police department, 11 fire departments, and 12 ambulance service departments.

A new correctional facility, the Goose Creek Correctional Center, is currently under construction. The center is being developed as a medium-security facility with 1,536 beds for

male prisoners (MSB 2009b). The opening date of the prison will depend on when the Department of Corrections obtains sufficient financing.

### **4.7.3.3 Data Gaps**

#### **4.7.3.3.1 SE-17: Update Baseline Police Coverage**

The 1985 amended draft license application included a description of the existing number of police officers and when various areas may need additional personnel. This information is now more than 25 years old and is out of date. Since that time, the Houston Police Department was established and additional personnel were added, among other changes. Information about the baseline police protection is important to understand how the Project will impact police protection. Specific information that should be collected includes existing staffing levels, projected staffing levels, detachment location and coverage areas, and level of service standards (if applicable). This information should be obtained by consulting the respective law enforcement agencies.

#### **4.7.3.3.2 SE-18: Update Baseline Information to Include Wildlife Troopers**

The Division of Wildlife Troopers protects the state's natural resources through wildlife enforcement. The proposed Susitna-Watana Hydroelectric Project may increase access to hunting and fishing areas as well as providing additional boating/recreational opportunities. This may have an impact on the wildlife troopers. Specific information that should be obtained include the location of detachments, the existing/baseline staffing of the detachments in the Project area and projected staffing needs. The information should be obtained by consulting with the Division of Wildlife Troopers.

### **4.7.4 Fire**

The 1985 amended draft license application includes an overview of fire protection in selected communities between Anchorage and Fairbanks. Since that time there have been several changes, including changes to the MSB fire service area boundaries, existing staffing, and projected staffing needs.

#### **4.7.4.1 Denali Borough**

Fire protection in the Denali Borough is provided by volunteer fire departments (VFD) including:

- Cantwell Volunteer Fire Department
- McKinley Volunteer Fire Department
- Tri-Valley Volunteer Fire Department
- Anderson City Fire Department

#### **4.7.4.2 Matanuska-Susitna Borough**

The MSB Department of Emergency Services, the City of Palmer, and the City of Houston provide fire department services within the MSB (MSB 2009a). The MSB Department of Emergency Services provides fire coverage for areas within a Fire Service Area, but not all property in the MSB is covered by a Fire Service Area<sup>8</sup>. The MSB Fire Service is primarily a volunteer department.

Fire protection with the City of Palmer is provided by Palmer Fire and Rescue. Palmer Fire and Rescue is staffed by paid, on-call volunteers who live in the City of Palmer or the Greater Palmer Fire Service Area. It operates out of six stations:

- Station 3-1: 717 S. Cobb St. (downtown Palmer)
- Station 3-2: 5955 N. Glenn Hwy (Mile 51, 3 miles north of Palmer)
- Station 3-3: 15855 E. Clark Rd. (Lazy Mountain)
- Station 3-4: 901 S. Airport Rd. (Palmer Airport)
- Station 3-5: 8200 E. Turner Rd. (Palmer Fishhook Rd.)
- Station 3-6: 645 E. Cope Industrial Way (in Palmer)

Station 3-6 also functions as the Palmer Fire and Rescue Training Center.

The Houston Fire Department is housed in the Houston Emergency Services building at Mile 57.3 on the Parks Highway.

#### **4.7.4.3 Data Gaps**

##### **4.7.4.3.1 SE-19: Update Baseline Fire Protection in the MSB**

The 1985 amended draft license application included an overview of the fire protection services in the MSB. Since that time, there have been changes to fire service areas, available resources, personnel, etc. Information that should be obtained includes the Fire Service Area (FSA) boundaries, station location and resources, and planned improvements (with a focus on stations/FSAs near the Project area). Sources of information include the draft MSB Public Facilities Plan Revision and the MSB Department of Emergency Services.

##### **4.7.4.3.2 SE-20: Update Baseline Information to Include Denali Borough Volunteer Fire Departments**

Information about the VFDs with the Denali Borough is not well documented. Future growth in the borough associated with the proposed Project may impact the VFDs. Specific information that should be obtained includes the coverage area of each VPD, station location, target response

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<sup>8</sup> Areas outside a Fire Service Area rely on their own resources for fire protection.



times, existing resources, and when they anticipate outgrowing their existing resources. Information can be obtained by consulting the Denali Borough and the respective VFDs.

#### **4.7.5 Health Care**

The health care information contained in the 1985 amended draft license application included an overview of health care facilities in selected communities between Anchorage and Fairbanks. Since that time, a number of new health care facilities have opened, including the Mat-Su Regional Medical Center. A wider variety of medical services is available in the MSB, reducing the need for MSB and Denali Borough residents to go to Anchorage or Fairbanks for medical care. Some aspects of the health care system, however, are the same as they were in 1985. For example, the MSB also provides ambulance service for the entire MSB, and medical care in more rural areas is still provided by medical professional other than doctors (such as health aides and physicians' assistants).

##### *4.7.5.1 Denali Borough*

In the Denali Borough, health care is available through the Cantwell Clinic, Anderson Health Clinic, and the Tri-Valley Community Center. Cantwell Clinic is operated by the Copper River Native Association and is a primary health care facility. The Anderson Health Clinic is a part of the Interior EMS Region. Tri-Valley Community Center in Healy is a Community Health Center operated by the Interior Community Health Center. It is funded by a federal grant under Section 330 of the Public Health Service Act (HHS 2009). Community Health Centers are required to treat all patients, regardless of their ability to pay.

In addition, there is a seasonally operated Canyon Health Clinic at Denali Park. These facilities are usually staffed by health aides. The government also operates the Clear AFS Medical Clinic. For more advanced health care, residents must go to facilities in the MSB, Anchorage, and Fairbanks.

##### *4.7.5.2 Matanuska-Susitna Borough*

In the MSB, the largest health care facility is the Mat-Su Regional Medical Center. Opened in 2006, it has 74 beds and offers a wide variety of specialties and services. However, some patients still need to travel to Anchorage or to facilities outside Alaska for their medical care.

The Sunshine Community Clinic in Talkeetna is an emergency care clinic. It is a Community Health Center. There are numerous other clinics and private medical facilities in the MSB. The MSB Emergency Services Department provides emergency medical care to the entire MSB.

##### *4.7.5.3 Data Gap*

###### *4.7.5.3.1 SE-21: Update Baseline Health Care Information*

The information used to develop the 1985 amended draft license application is now out of date. One of the biggest changes is the opening of the new Mat-Su Regional Medical Center to replace the Valley Hospital. Updated information about the existing health care facilities and their capacity will help identify how changes in population will impact the health care system.

Sources of information include the Denali Borough, MSB, facility operators, Alaska Department of Health and Social Services, and the Mat-Su Rural Healthcare Planning Network.

#### **4.7.6 Education**

The 1985 amended draft license application provides an overview of education resources in the MSB (focusing on the schools in Trapper Creek and Talkeetna), Cantwell, Healy, Nenana, Anchorage, and the Fairbanks-North Star Borough in 2009. This information is now out of date for several reasons, including changes in school districts, improvement in school facilities (such as the construction of the new Su Valley Jr./Sr. High School), increase in homeschooling, and shift in population toward more urbanized areas.

##### *4.7.6.1 Denali Borough*

The Denali Borough School District (DBSD) operates three schools (Anderson School, Cantwell School, and Tri-Valley School) and a statewide correspondence school (Denali-PEAK). According to Alaska Department of Commerce, Community and Economic Development (DCCED), as of October 1, 2010, Anderson School had 39 students between Kindergarten and Grade 12 (K-12), Cantwell School had 32, Tri-Valley School had 179, and Denali-PEAK had 491. An additional 27 students were enrolled in pre-elementary programs (Alaska Department of Education and Early Development [DEED] 2010).

##### *4.7.6.2 Matanuska-Susitna Borough*

The MSB School District has approximately 16,000 students at 44 sites, including 20 elementary schools, five middle schools, six high schools, four K–12 schools, a home school, six charter schools, and three alternative education schools (MSB 2011). In the northwest part of the school district (closest to the Project location), there are three schools: Talkeetna Elementary, Trapper Creek Elementary, and Su-Valley Jr./Sr. High School (See Table 4.7-1).

**Table 4.7-1. Schools in the MSB School District near the Susitna-Watana Hydroelectric Project Site**

<b>School Name</b>	<b>Grades</b>	<b>Enrollment as of October 1, 2010</b>
Talkeetna Elementary	Pre-Kindergarten to Grade 6	113 (Pre-Kindergarten students not reported)
Trapper Creek Elementary	Kindergarten to Grade 6	23
Su Valley Jr./Sr. High	Grades 7 through 12	190

*Source: Alaska Department of Education and Early Development.*

##### *4.7.6.3 Data Gap*

###### *4.7.6.3.1 SE-22: Update School Capacity and Baseline and Future Enrollment*

Schools are designed to accommodate a certain number of students. When a school has more students than it was designed for, it can decrease the education quality at the school. For example, students may not receive as much individual attention or can be distracted by other students. An

increased number of students can also raise the costs of operating the school, as more teachers and resources are needed. Understanding the number of students that can be accommodated in existing school facilities is important to understand how the proposed Project will impact the school system. In addition, school-age children who leave the area due to the Project will also have an impact on the school. In Alaska, a minimum of 10 students is necessary for a school to qualify for full state funding.

Specific information that should be collected is the projected school enrollment for the baseline year, projected school enrollment for the Project's design year, and school capacity. Information about the school capacity in the MSB is available in the October 2009 Public Review Draft of the MSB Public Facilities Plan Revision<sup>9</sup>. The school district indicated that by 2015, several new schools will be needed in the MSB to accommodate the anticipated enrollment. These schools will be needed in areas experiencing population growth, primarily in the Wasilla, Palmer, and Big Lake/Houston school attendance areas. These data are several years old and should be verified with the school district. Information about schools in the Denali Borough should be available from the Denali School District.

Information about the number of school-age children who are expected to relocate due to construction and operation of the Project, as well as where they are likely to relocate, has not been identified at this time. As a result, information on additional schools may be necessary. The level of analysis should be commensurate with the number of school-age children.

#### **4.7.7 Fiscal Status of Local Government**

The 1985 amended draft license application includes an overview of the finances for the MSB, Palmer, Wasilla, Houston, Cantwell, Nenana, Anchorage, and Fairbanks in 1985. Since then, the sources and amounts of government revenue and expenditures have changed. For example, the City of Wasilla currently has a 2% sales tax.

##### **4.7.7.1 Data Gaps**

###### **4.7.7.1.1 SE-23: Update local government fiscal Status Information**

The information about the fiscal status of local government contained in the 1985 amended draft license application is now out of date. This section needs to be updated to include current revenue and expenditure information. Information about the Denali Borough also needs to be incorporated into this section. Updating this information will help identify potential impacts to the fiscal status of local governments in the Project area. Specific information that should be collected includes overall revenues, overall expenditures, property tax rates, property tax revenue and sales tax rates. One potential source of this information is the finance department of each local government.

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<sup>9</sup> The plan is based on information from the Matanuska-Susitna School District's 20-year plan.

#### **4.7.7.1.2 SE-24: Update School District Fiscal Status Information**

The 1985 amended draft license application provides an overview of the fiscal status of the MSB school district, Railbelt School District, and the Nenana City Public School. Since that time, the school districts in the Project area have changed. The Railbelt School District no longer exists, and the Denali Borough School District was formed. The baseline information should be updated to reflect the existing school districts and their current fiscal status. This information should be obtained from the respective school districts.

### **4.7.8 Electricity**

The 1985 amended draft license application provides an overview of electric power in the Railbelt. While the utility providers have not changed, the number of customers, generation capacity, hours sold, and similar information have. For example, the Matanuska Electric Association now serves almost twice as many customers (from 27,269 in May 1985 to approximately 54,600 in 2011) and Municipal Light & Power, Chugach Electric Association, and Matanuska Electric Association took over the Eklutna Hydroelectric Power Plant in 1996.

#### **4.7.8.1 Data Gap**

##### **4.7.8.1.1.1 SE-25: Update Electric Power Information**

Information about electric power utilities in the Railbelt should be updated to reflect current conditions. It is assumed that AEA is already collecting updated information as part of Project development process and can use this information to update this section.

## **5 RECREATION**

### **5.1 Methodology**

The recreation data gap analysis began by reviewing key licensing effort summary documents from the first half of the 1980s, such as the 1985 amended draft license application (Harza-Ebasco 1985a, 1985b, 1985c, and 1985d) and 1985 Plan of Study (Harza-Ebasco 1984a). In addition to these documents, reports and studies supporting the 1985 amended draft license application were also reviewed. These include the Recreation Survey Report, Guide Survey Report, Air Taxi Survey Report, and Resource User Survey (Harza-Ebasco 1985f, 1985g, 1985h, 1985i, 1985j; ISER 1984). The review also included existing comprehensive plans, recreation plans, trails plans, and park management plans. Plans reviewed included:

- South Denali Environmental Impact Statement and Record of Decision (National Park Service [NPS] 2006)
- Susitna Matanuska Area Plan (Alaska Department of Natural Resources [DNR] in draft 2010)
- Alaska's Outdoor Legacy Statewide Comprehensive Outdoor Recreation Plan 2009–2014 (DNR 2009b)

- Division of Parks and Outdoor Recreation Ten Year Strategic Plan 2007–2017 (Alaska Division of Parks and Outdoor Recreation [DPOR] 2007)
- Denali State Park Management Plan (DPOR 2006)
- Cultural Resource Management Plan for the Denali Highway Lands (VanderHoek 2005)
- Alaska Recreational Trails Plan (DNR 2000)
- Susitna Basin Recreation Rivers Management Plan (DNR 1991)
- Susitna Area Plan (DNR 1985)
- MSB Comprehensive Development Plan (MSB 2005)
- MSB Trails Plan (MSB 2008)
- Mat-Su Comprehensive Economic Development Strategy (TIP Strategies Inc. 2010)
- MSB Parks and Recreation Open Space Plan (MSB 2000)
- Talkeetna Comprehensive Plan (MSB 1999)
- Chase Comprehensive Plan (MSB 1993)
- Black bear management report of survey and inventory activities 1 July 2004–30 June 2007 (Tobey 2008)
- Brown bear management report of survey and inventory activities 1 July 2006–30 June 2008 (Tobey and Schwanke 2009a)
- Caribou management report of survey-inventory activities: 1 July 2006 – 30 June 2008 (Tobey and Schwanke 2009b)
- Dall Sheep Management Report of Survey and Inventory Activities 1 July 2004–30 June 2007 (Bentzen 2008)
- Furbearer Management Report of Survey-Inventory Activities 1 July 2003–30 June 2006 (Schwanke and Tobey 2007)
- Moose Management Report of Survey and Inventory Activities 1 July 2005–30 June 2007 (Tobey and Schwanke 2008)
- Wolf Management Report of Survey and Inventory Activities 1 July 2005–30 June 2008 (Schwanke 2009)

This information was supplemented with agency internet and database information. If information was not sufficient to satisfy licensing requirements, a data gap was identified. This document identifies those information needs or gaps to help develop future Project study efforts.

## **5.2 Project Area**

The Susitna-Watana Hydroelectric Project is located within the Southcentral region of Alaska in northern part of the MSB. The Middle and Upper Susitna River basin encompasses over 39,000 square miles of land in the northern portion of the MSB (Harza-Ebasco 1985e). The immediate Project area is defined as the proposed Watana Dam site, located on the Susitna River at RM 184

(as measured from the mouth of the river), and the resulting Watana reservoir, which would extend 39 miles upstream to RM 223. The proposed reservoir is likely to be two miles wide at its widest. While other Project components have not yet been proposed, concepts from Phase One of the 1980s APA Project suggest that an access road and transmission lines are also likely to be part of the final design (Harza-Ebasco 1985f). These linear elements have the potential to impact an area larger than the dam and reservoir itself. Similarly, potential alterations to the flow of the Susitna River downstream of the dam site could have potential impacts as far downstream as the community of Talkeetna. Below Talkeetna, the addition of water from the Talkeetna and Chulitna rivers to the Susitna would make impacts further downstream unlikely.

Based on these potential effects, the Project vicinity studied for the purpose of recreation is defined by the Alaska Railroad and Parks Highway on the west, the Susitna River to the east, the Denali Highway to the north, and the hydrologic divide between the Susitna and Talkeetna Rivers to the south. This area covers approximately 3,600 square miles.

The Project area supports low levels of widely dispersed recreation. Due to its remote nature, minimal human development, and minimal existing recreational facilities, recreation within the Project area is primarily a backcountry and wilderness experience, although none of the land within the Project area is federally designated wilderness. While located near the most densely populated region of Alaska, the abundant wildlife, magnificent scenery, remote and challenging environment, and lack of human activity are qualities that attract many visitors to the area. Land not directly adjacent to the Parks and Denali highways is remote and can be difficult to access. The level of use of the area is generally low and limited by the difficulty of accessing land not adjacent to the road system. As a result, most recreation is concentrated near the road system. Some recreation access is provided by boat on navigable rivers, by foot, and by small airplane.

### **5.3 Existing Recreation Facilities**

There are no existing developed recreation facilities on the Susitna River at the Watana Dam site. In the broader Project area, both public and private recreation facilities exist. These are primarily located along the road system. Access to these facilities is provided by highway vehicle, all-terrain vehicle (ATV) and off-road vehicle (ORV), foot, airplane (float, ski, and wheeled), snowmachine, skis, and snowshoe (DNR 2011).

#### **5.3.1 Public Facilities**

Public facilities in the Project area include facilities along the Parks Highway in Denali State Park, along the Denali Highway, and along the Alaska Railroad right-of-way. In addition, the Parks Highway has been recognized as both a National and Alaska State Scenic Byway; driving along the Parks Highway for pleasure and sightseeing purposes is a major recreational use of the area. Both the Parks and the Denali highways are used for recreational activities, including wildlife viewing, mountaineering, hiking, dog mushing, guided tours, snowmobiling, and bicycling (DNR 2008).

In Denali State Park, recreation facilities attract a variety of visitors, both tourists and Alaska residents, each year. Facilities include 118 campsites at the Byers Lake, Lower Troublesome

Creek, Denali Viewpoint South, and Denali Viewpoint North campgrounds; picnic areas; the Alaska Veteran's Memorial Visitors Center; public use cabins; scenic pullouts; a boat launch at Byers Lake; four trailheads; and 48 miles of interconnected trails (DPOR 2010). Use of motorized vehicles is restricted to maintained roads and parking areas within the state park; snowmachines may be used in the park when snow depth is sufficient. Park land use designations and trail management also restrict the use of bicycles and pack animals on most trails within the state park (DPOR 2006).

The Denali Highway also has several roadside recreation facilities located within the Project area. The Denali Highway area, managed by the Bureau of Land Management (BLM) and the State, is managed for multiple uses. State land is open to Generally Allowed Uses as defined by the state (DNR 2009a), which include many recreational activities such as hiking, camping, and ATV use. BLM lands generally are open to similar general uses, including recreational uses. Along the highway, the BLM manages several recreational facilities, including a roadside campground at Brushkana Creek (22 sites with water, toilets, and trails), picnic facilities, a boat launch at the Denali Highway Bridge over the Susitna River, and numerous turnouts and viewpoints to available for scenic viewing and rustic camping (BLM 2008).

Multiple trails and routes exist in the Project area. The state of Alaska has formally identified six Revised Statute (RS) 2477 trails in the Project area. Many of these were and still are used to access mining claims, fishing and hunting areas, or remote cabins from communities such as Chase, Curry, and Hurricane that exist along the rail corridor. Use of these trails is governed by the generally allowed uses defined by the state (DNR 2009a). Recognized RS 2477 public right-of-way trails in the Project area include:

- Susitna River Trail (also referred to as the Gulkana/Denali Winter Trail, Revised Statute Trail [RST] 294): Access to this trail is from the Denali Highway where the highway crosses the Susitna River. The trail travels southeast, following the Susitna River to its junction with the McLaren River. This trail continues up the McLaren River and ultimately connects with trails originating from the Lake Louise area (DNR 2011). The trail is approximately 125 miles long.
- McWilliams/Gold Creek Trail (RST 469): This trail is accessed from the railroad station and community of Gold Creek at Mile 263 of the Alaska Railroad. The trail heads east, following the base of the hills, climbs the plateau south of the Susitna River, and then continues south-southeast toward mining claims on John Creek. The trail is approximately 36 miles long (DNR 2011).
- Indian River-Portage Creek Trail (RST 100): This trail is accessed from the Chulitna station at Mile 274 of the Alaska Railroad. It heads eastward, crossing the Indian River, and continuing east to cabins on Portage Creek. The trail is approximately eight miles long (DNR 2011).
- Murder Lake North to Ridgeline Trail (RST 80): This trail is accessed from Murder Lake and heads northwest to a ridge. The trail is approximately two miles long. This trail has historically been used for berry picking and hunting access purposes (DNR 2011).

- Stephan Lake to Murder Lake Trail (RST 61): This trail connects the south shore of Stephan Lake to Murder Lake. The trail is approximately one-half mile long and has been used for access between landowners on Stephan Lake and Murder Lake, and as a recreational trail to access fishing on Murder Lake (DNR 2011).
- Stephan, Murder, and Daneka Lakes Connector Trail (RST 377): This trail is accessed from the west end of Stephan Lake, and heads southwest to Murder Lake. It then continues southward, crossing Prairie Creek and terminating at Daneka Lake. It is used to access cabins and for recreational fishing, hiking, and hunting (DNR 2011).
- Curry Landing Strip to Lookout Tower Trail (RST 1509): This trail is accessed from the Curry Station along the Alaska Railroad right-of-way and travels west to the lookout tower. The trail is used to access a viewpoint with views of the Alaska Range and Mt. McKinley (DNR 2011).

In addition to RS 2477 trails, additional trails exist in Denali State Park and along the Denali Highway. These include:

- Kesugi Ridge Trail: Access to this trail, found in Denali State Park, is from the Parks Highway at the Little Coal Creek, Byers Lake, and Ermine Hill Trailheads. This trail traverses the ridgeline between the Parks Highway and the Susitna River, overlooking the Middle Susitna River basin. This trail is formally designated as an Alaska State Trail (DPOR 2010).
- Troublesome Creek Trail: Access to this trail, found in Denali State Park, is from the Parks Highway at the Troublesome Creek and the Byers Lake Trailheads. This trail traverses Curry Ridge but has been closed in recent years due to severe flood damage resulting in a trail washout (DPOR 2010).
- Byers Lake Loop Trail: Access to this trail, found in Denali State Park, is from the Byers Lake Campground. The trail forms an easy, 4.8 mile loop around Byers Lake (DPOR 2010).
- Little Coal Creek Trail, Ermine Hill Trail, Cascade Trail, all found in Denali State Park, area accessed from the Little Coal Creek, Ermine Hill and Byers Lake Trailheads, respectively. These trails provide access from the Parks Highway to the Kesugi Ridge Trail (DPOR 2010)
- Butte Creek Trail: Access to this trail is from the Denali Highway where the highway crosses the Susitna River. The trail travels west past Snodgrass lake and along Butte Creek to its headwaters at Butte Lake (MSB 2008).

The MSB trail plan also identifies numerous trails in the Talkeetna area, including the Talkeetna River Trail (RST 1620), which follows the Talkeetna River upstream. The trails are not included in the Project area.

The identification and formal designation of trails has been a high priority for the state and the MSB. Many trails in the MSB are not formally designated and, according the MSB's trail plan, many also cross private land, making future access to trails uncertain. Identifying, designating,



and obtaining easements for trails in the MSB is a need identified by both the Alaska State Trails Plan (DNR 2000) and the MSB Trails Plan (MSB 2008)

### **5.3.2 Private Facilities**

Private recreation facilities in the Project area include private lodges and cabins. Most facilities are near the road or railroad corridors, although access to some of these facilities is provided by boat, floatplane, or wheeled plane.

Fly in lodges in the Project area include:

- Stephan Lake Lodge located on Stephan's Lake. The lodge advertises hiking and fishing and is accessible by float plane.
- High Lake Lodge located on High Lake offers wheeled plane access and advertises fly-in fishing, unguided hunting, and hiking.
- Tsusena Lake Lodge on Tsusena Lake is accessible via float plane. Operation status is unknown.
- Clear Creek Lodge. Exact location and operation status is unknown.

Lodges along the Denali Highway include:

- Alpine Creek Lodge at MP 86 operates year-round, and offers ATV tours, snowmachining, photography, wildlife viewing, fishing, and hiking.
- Gracious House at MP 82 offers flight-seeing, snowmachining, and unguided hunts.
- Additional lodges on the eastern end of Denali highway lie outside the Project area.

Lodges along the Parks Highway in the Project area include:

- Byers Creek Lodge at MP 144 offers fishing, hiking, and wildlife/bird watching.
- Mt. McKinley Princess Wilderness Lodge at MP 132 offers lodging, dining, and tour packages in conjunction with Princess Rail Tours.
- Mary's McKinley View Lodge at MP 134 offers dining and lodging.

Private cabins also exist on Clarence Lake, Portage Creek, Stephan Lake, High Lake, Big Lake, and Daneka Lake. While many of these lodges and cabins are known to be in good condition and operable, the status of some is currently unknown. In addition to these lodges and camps, a substantial Boy Scouts Explorer Camp with nationwide draw is planned for the south end of Curry Ridge.

In addition to private lodges, multiple commercial recreation and tourism operations use the Project area. Use by these companies is discussed in greater detail below.

### **5.3.3 Data Gaps**

The 1985 amended draft license application included an in-depth analysis of regional recreational facilities (Figure E.7.2.2, Existing Recreation; Table E.7.2.5, Existing Trails in the Study Area; and Table E1.7.1, Data on Regional Recreation Facilities). The 1985 amended draft license application also used the DNR study entitled *Susitna River Basin Land Use and Recreation Atlas* (1980), which provided detailed descriptions of trails and facilities in the region. While most of the public and private facilities listed in the 1985 document are still in existence, the size and use of these facilities may have changed in the past 25 years. Information sources updating the status of public facilities are available and include the Denali State Park Management Plan, the Cultural Resource Management Plan for the Denali Highway Lands, and the South Denali Region Environmental Impact Statement (EIS; DPOR 2006, VanderHoek 2005, NPS 2006). Data gaps to be addressed include an evaluation of reasonably foreseeable future actions for further development of facilities, particularly in Denali State Park, and providing an update on the status and operations of private facilities in the Project area.

#### **5.3.3.1 REC-1: Reasonably Foreseeable Future Recreation Facilities**

As part of the South Denali Region EIS and the update of the Denali State Park Management Plan, the DPOR has identified several potential facilities' development priorities. These include the South Denali Visitor Complex, which would include substantial additional campgrounds, parking, a visitor center, trailheads, and trails. In addition, the DPOR has also proposed several measures to increase access to and from the Susitna River and Alaska Railroad facilities at the Indian River Canyon and near Curry Ridge. These developments would include trail access from the existing trail systems on Kesugi Ridge and planned trails on Curry Ridge, river boat docks, trail shelters, public use cabins, raft put-in sites, and a hand tram across the Susitna River at Curry Ridge (DPOR 2006). These facilities, if built, could have a large effect on increasing access to the east side of the Susitna River and increasing visitation to the Project area. The specific plans, including an analysis of the demand for and carrying capacity of these proposed projects, should be examined to evaluate how these developments may impact recreation and access in the Project area. This information may be obtained through discussion with the DPOR and DNR.

In addition to public facilities, much of the land in the immediate area of the Watana Dam site is privately owned by Cook Inlet Region, Inc. Understanding potential future use of privately owned land in the Project area, including the potential for development of private recreation facilities, is a key component of understanding potential impacts to recreation as a result of the proposed Project.

#### **5.3.3.2 REC-2: Update Private Facilities Information**

An update to the 1985 Lodge Owner Survey (Harza-Ebasco 1985j) is needed to assess the status and use of privately owned lodges in the Project area.

## **5.4 Current Recreational Use of the Project Area**

Since the license application was developed in the 1980s, the population of Southcentral Alaska and of the MSB in particular has grown considerably, placing increasing demands on recreation areas throughout Southcentral Alaska. In addition, increases in technology and new methods of access, such as the improvements to snowmachine technology, are providing increased access to the Project area. The Project area is also being used for a greater diversity of recreation activities than it was in 1985; these include helicopter skiing, snowboarding, and adventure film production. As a result, past assessments of use of the Project area are unlikely to reflect current use amounts and trends, and need to be reevaluated and updated.

Despite developments in technology and increased forms of access, recreational use of the Project area is relatively low and generally concentrated around developed recreation facilities near the road system. Access to the Project area is by airplane (float, wheel, or ski), helicopter, bicycle, ORV, road vehicle, snowmachine, foot, motorized boat, non-motorized boat, and horse or beast of burden. Access to the Project area may also increase, as the DPOR and the Alaska Railroad are discussing developing facilities in whistlestop locations to provide greater access to areas along the rail corridor. New recreation projects that are being considered and promoted by recreation land managers in the area, including the new South Denali Visitor Complex and the associated trails, campgrounds, and proposed interties with the Alaska Railroad's whistlestops along the Susitna River, all have the potential to increase access and visitation to the Project area.

Current users of land in the Project area, including both recreation and commercial users, participate in a wide variety of activities. Most public land in the Project area is managed to allow the State's Generally Allowable Uses, which include mountain biking, ORV/ATV use, camping, hunting, fishing, hiking, berry picking, nature/bird watching, and photography. Along the Denali and Parks highways, campers use campgrounds and highway pullouts, stop at scenic overlooks, and use public facilities in Denali State Park.

Away from the road system and developed recreation facilities, backcountry use of the land within the Project area also occurs. The remote, roadless nature of the northern Talkeetna Mountains provides a wilderness-style experience that has been described as comparable to that of the Brooks Range, but more easily accessible from the road system than other areas in Alaska. A cursory internet search reveals several personal accounts of multi-day expedition style traverses of the Talkeetna Range by independent parties. In addition, the Alaska Wilderness Classic, a wilderness adventure race which requires participants to locate their own route from set starting and ending points, traversed the southern portion of the Project area, from Eureka to Talkeetna, in 2003, 2004, and 2005. Despite these accounts, no quantification of use of the Project area for backcountry trips exists at this time.

Winter visitation and recreational use in the Project area is reduced, particularly along the Denali Highway, which is closed to ordinary highway vehicles for the season. However, the Project area is still used by snowmachiners, dog mushers, skiers, and hunters. In recent years, the Alaska Railroad and the Nordic Skiing Association of Anchorage have coordinated to run a single-day "ski train" to Curry on the Alaska Railroad corridor on the west side of the Project area.

In the late summer and fall, hunters are a dominant user group in the area. The northern Talkeetna Mountains fall within the Alaska Department of Fish and Game's (ADF&G) Game Management Unit 13. The Project area is split between Subunits 13A and 13E with the Watana Dam site being located right on the border between the two subunits. Unit 13 has a history as an area of high importance for hunting in Southcentral Alaska. It is home to the Nelchina Caribou herd as well as to some of the highest densities of black and brown bears in the region (Tobey 2008; Tobey and Schwanke 2009a, 2009b). It is also of high importance due to its proximity to population centers in Southcentral Alaska and its relative ease of access from the road system. Hunting continues to be a popular recreational activity in the Project area. Information on the number of individuals issued permits to hunt in the Project area is available for Dall sheep, caribou, and moose (Tobey and Schwanke 2009b, 2008; Bentzen 2008). For other species, game management plans only report the total number of successful hunters.

The number of licensed big game hunting guides in the area provides some measure of commercial hunting activity in the Project area. A guide is required for all non-residents who hunt brown bear or Dall sheep in the area unless accompanied by an Alaska-related resident and all nonresident aliens who hunt any big game animal in the state. Currently, there are 11 guides registered to provide big game services in the Guide Use Area 13, which includes the Project area (DEC N.d.).

The Parks and Denali highways themselves are also visitor destinations, as both packaged tour and independent travelers often drive these roads for pleasure and to view scenery and wildlife. The Parks Highway was designated as a State Scenic Byway in 1998 from MP 132 to 248. An increasing number of both package tour and recreational travelers also travel on the Alaska Railroad through the Project area for similar purposes.

Boating on the lower Susitna River is a common recreational and commercial activity. Several companies from Talkeetna, such as the Denali River Guides, Mahay's Riverboat Service, and the Talkeetna River Guides, advertise boating and fishing tours up river as far as the entrance to Devil's Canyon. However, few if any, go past the entrance to Devil's Canyon, as the river is considered un-navigable in the middle and upper reaches through Devil's and Watana canyons (BLM 2011).

The Upper and Middle Susitna rivers have received attention for whitewater boating recreation. The rapids of Watana Canyon are rated as Class IV and are considered dangerous even for experienced boaters. The rapids of Devil's Canyon have been called "the biggest whitewater on the continent and the some of the biggest ever run in the world" and the "Mount Everest of kayaking" (Embick 1994). The rapids are 11 miles long and rated at Class VI at water flows that have been successfully run; the first successful kayak run of Devil's Canyon was recorded in 1976 (Harza-Ebasco 1985i). The Watana and Devil's Canyon rapids have claimed the lives of both experienced and inexperienced boaters. Access to the Susitna River is either from the Denali Highway Bridge over the Susitna or by floatplane into Stephan Lake or other area lakes (Embick 1994).

### **5.4.1 Commercial Recreation and Tourism Use**

In addition to independent recreational users, commercial users are also common in the Project Area. The DNR collects commercial recreation day use registration from commercial operators on state land. To provide spatial information about where commercial recreation is occurring, commercial recreation data are collected and reported by the by Game Management Unit in which the activity takes place. However, there are no similar data collection efforts evaluating non-commercial recreation use. The Project area includes Subunits 13A and 13E. The commercial use of these two units from 2005 through 2010 has varied between 16,000 in 2005 to 1,600 in 2009. Use appears to be highly variable and no trends in usage patterns are evident.

Commercial operators in the Project area include, but are not limited to:

- Hiking, Backpacking and Guiding Services
  - Alaska Mountaineering School
  - National Outdoor Leadership School (NOLS)
  - Talkeetna Travel
  - Denali Trekking Company
  - Alaska Wilderness Trails
  - Alaska Nature Guides
  - Adventures Cross-Country
  - Equinox Wilderness Expeditions
  - Wilderness Ventures
  - The Road Less Traveled
  - Moondance Adventures
  - Alaska Wilderness Trails
- Riverboat and Rafting Services
  - Denali River Guides
  - Mahay's Riverboat Service
  - Talkeetna River Guides
- Fly Fishing Guiding Services
  - Just Fly Fish
  - Denali Southside River Guides

### **5.4.2 Data Gaps**

The 1985 amended draft license application included an in-depth analysis of regional recreational use (Figure E.7.3.1, Estimated Recreational Demand) in the Project area, including

analysis of demand by activity. The 1985 document also included projections of future demand in the year 2000. As discussed, the growth in Southcentral Alaska population, increase in access to the Project area, and use of the area for new activities suggests that past assessments of use of the Project area are unlikely to reflect current use amounts and trends and need to be reevaluated and updated. This represents a major data gap in current knowledge of recreation in the region.

The primary method of addressing this data gap is to provide an update to the Recreation Survey Report conducted for the 1985 amended draft license application (Harza-Ebasco 1985d). This update should provide data on the estimated recreation use of the Project area, including use for hunting, fishing, camping, canoeing, kayaking, hiking, cross-country skiing and snowshoeing, and any other common activities. Some of these data are readily available from DNR's records of commercial use of Game Management Units 13A and 13E and is reported in the pre-application document discussion. The following is a list of additional studies and surveys that are needed to provide the information necessary to fully evaluate current recreation use in the Project area.

#### *5.4.2.1 REC-3: Update to Recreation Survey*

This Recreation Survey study (Harza-Ebasco 1985f) evaluated recreation activities in the Project area including use of recreation facilities, satisfaction with recreation facilities, attitudes about the need for additional recreation facilities, rates of participation in consumptive and non-consumptive activities, demographic characteristics, and trip patterns. The survey focused on users of recreation sites along the Denali and Richardson highways. Survey methods included counting vehicles at recreation sites along both highways and distributing questionnaires to individuals at recreation sites.

In addition, the Resource User Survey, conducted by ISER (1985), provided an in-depth analysis of resource use and activities engaged in by study area households. ISER interviewed 4,545 study area residents regarding their hunting, fishing, and other recreational activities in the Project area.

Recreational use of the Project area is likely to have changed since 1985. An update to the Recreation Survey study should be developed to provide information on current users of recreation facilities in the Project area. In addition to surveying users at facilities on the Denali Highway and Richardson Highways, recreation users of facilities on the Parks Highway within the Project area should also be included.

#### *5.4.2.2 REC-4: Identify Alaska Railroad Passengers and Whistlestop Use in the Project Area*

The Alaska Railroad provides an important transportation method used by individuals to access to access the Project area. Many passengers on the Alaska Railroad use the railroad as part of an organized tour and pass through the Project area without stopping. Viewing scenery and wildlife are both important activities for these passengers.

A more limited number of Railroad passengers use the Alaska Railroad's whistlestops to access the Project area, getting off at Chase, Curry, Gold Creek, Canyon, and other stops along the rail

line. It is not known at this time how many passengers use the whistlestop to access the area for recreation purposes. This information may be available from the Alaska Railroad Corporation (ARRC).

#### *5.4.2.3 REC-5: Update Lodge Owner Survey*

The Lodge Owner Survey (Harza-Ebasco 1985j) provided specific information on the location, method of access, facilities, clientele, and recreation activities offered at lodges within the Project area. While several of the lodges surveyed in the 1985 effort still appear to be in operation, details on facilities, number of guests, and recreation activities may have changed in the past 25 years.

An update to the Lodge Owner Survey should be conducted to provide information on the number of annual guest at lodges within the Project area. Many lodge owners, particularly those located off the road system, may also be able to provide information on lodge guest activities while in the Project area.

#### *5.4.2.4 REC-6: Update Air Taxi Survey*

The Air Taxi Survey Report (Harza-Ebasco 1985h) provided information on the number of passengers air taxis transported to the Project area. Air taxis are one of the primary methods of accessing remote sections of the Project area for recreation purposes. According to the 1985 survey, 37 air taxis dropped clients off in the Project area. The majority of these air taxis were based in Anchorage, but many were based in other communities in Southcentral Alaska. The survey also included estimates of the recreation activities participated in by air taxi clients. Air taxis often fly clients into remote lakes for fishing or hunting, provide resupply drop-offs for campers, or transport kayakers and boaters. For most air taxi operators, the majority of clients were hunters and fishermen, with sightseers and other representing less than 10% for most operators (Harza-Ebasco 1985h).

It is likely that the number of air taxi operators using the Project area has changed in the 25 years since the air taxi survey was conducted. Updating the survey would provide an estimate of air taxi operators currently using the Project area. Air taxi business owners may be able to provide estimates of the number of independent recreational users transported annually as well as key facilities and areas used for recreation activities.

#### *5.4.2.5 REC-7: Update Guide Survey*

Update of the Guide Survey Report (Harza-Ebasco 1985g). Hunting guides are required for non-resident, big game hunts in the Project area. The 1985 survey reported that 20 guides were licensed to operate in the Project area. In 2011, 11 guides were listed as authorized to provide big game services in Guide Use Area 13 by the Alaska Department of Commerce and Economic Development (DCED 2011). Updating the 1985 guide survey is a key step in understanding current hunting use of the Project area. Guides and guide business owners may be able to provide estimates of the number of clients using Game Management Units 13A and 13E as well as key areas used for hunting purposes.

#### **5.4.2.6 REC-8: Update Survey of Boaters Exiting at the Susitna Landing; Talkeetna Boat Launch and Airstrip; and Willow Creek**

Boating on the Susitna River is a recreation activity that could be directly impacted by the proposed Project. The 1985 Survey of Boaters Exiting at the Susitna Landing; Talkeetna Boat Launch and Airstrip; and Willow Creek during 1984 (Howe 1985) provided information on recreational use of the Susitna River including type of boat and recreation activities, such as sport fishing or trapping, in which boaters participated.

Boating recreation on the Susitna River is likely to have changed in the past 25 years since the 1985 study was conducted. Developments in boat technology and interest in boating opportunities may have increased both the area of use and the number of recreational boating users. For example, since the 1985 survey was conducted, it has been reported that the rapids of Devil's Canyon have been successfully run with a jet boat by a resident of Talkeetna. An update to the 1985 boater survey is needed to assess current recreational use of the Susitna River.

#### **5.4.2.7 REC-9: Evaluation of Current and Future Commercial Use of the Project Area**

To fully evaluate recreational use of the Project area, it is recommended that other commercial use of the Project area be evaluated through business owner surveys. Several businesses offer recreation activities and experiences in the Project area. A brief survey identified many businesses that offer recreation opportunities in the Project area. These include Denali River Guides, Mahay's Riverboat Service, Talkeetna River Guides, Talkeetna Travel, Denali Trekking Company, Alaska Wilderness Trails, Alaska Nature Guides, Just Fly Fish, Denali Southside River Guides, Alaska Mountaineering School, and the National Outdoor Leadership School, in addition to the lodges already discussed. These and other business owners may be able to provide estimates of the number of clients using the Project area as well as key areas used for recreation activities.

In addition to current use, planned recreation operations and use of the Project area also requires evaluation. For example, a substantial Boy Scouts Explorers Camp on the south end of Curry Ridge may dramatically change recreational use of the Project area and should be evaluated as well.

### **5.5 Recreation Trends and Future Demand**

Outdoor recreation is a key part of the way of life in Alaska. Alaskans participate in wildland recreation at twice the rate of the rest of the country; 96% of resident survey respondents said that parks and recreation were important or very important to their lifestyle (DNR 2009b). Alaska offers a considerable amount of space and facilities for outdoor recreation. The state is home to 60% of the acreage of the National Park System, the nation's two largest national forests, and the nation's largest state park system (DNR 2009b).

Outdoor recreation in Alaska includes a diversity of activities. In 2009, the Statewide Comprehensive Outdoor Recreation Plan (SCORP) reported that the 10 ten favorite activities Alaskans participate in include hiking, fishing, hunting, snowmachining, cross country skiing, camping, biking, ORV/ATV riding, skiing and snowboarding, and running. Other popular



activities include bird and wildlife watching, walking the dog, backpacking, berry picking, using playgrounds, driving for pleasure and sightseeing, recreational mining, mountaineering, whitewater rafting, spelunking, dog mushing, kayaking, power boating and participating in beach activities (DNR 2009b).

Ownership of outdoor equipment, an indication of the value that Alaskans place on various types of outdoor recreation, is also increased between 2004 and 2009, according to SCORP. Notably, ownership of ORV/ATV (28.5% increase), snowmachine (21.3%), hunting (17.3%), and canoe and raft (14.2%) equipment showed the largest increases in ownership (DNR 2009b). Within the Southcentral region, access to recreation areas is primarily along the road system; facilities such as campgrounds, trails, trailheads, cabins, and boat launches are key links that provide access from the road system to more inaccessible lands and recreation areas. Access to land for recreation is also provided by plane (float, wheeled, or ski) and boat.

In addition to recreation by Alaska residents, outdoor recreation also plays a major role in attracting tourists to the state. The number of tourists visiting Alaska is expected to increase at a rate of 10% per year in the coming years (DPOR 2006). In the past, the majority of visitors to the Southcentral region and to the MSB, in particular, were independent travelers with interests in camping, fishing, and hiking. In recent years, however, the number of tourists who arrive in to Southcentral Alaska on package commercial tours, such as cruise passengers, has been increasing (DPOR 2006). In the MSB, this has been due in large part to the opening of two large lodges, the Mt. McKinley Princess Wilderness Lodge and the Talkeetna Alaskan Lodge, which opened in 1997 and 1999, respectively. These lodges cater primarily to cruise passengers and have resulted in a more than doubling of the borough's bed tax revenues between 1999 and 2004 (DPOR 2006). Through these lodges, many guests also participate in day "excursions" that include recreation activities such as sightseeing, tours, river rafting, hiking, and sportfishing (Princess Tours 2010).

Demand for recreational opportunities and facilities in Alaska is increasing. The resident population of Alaska has grown over 50% since the 1980s. Furthermore, the resident population of the MSB has grown even faster. Growth in the MSB averaged 4% per year and the population increased by 50% between 1990 and 2000 (NPS 2006). The population of the MSB is now more than 85,000 people and contains approximately 11% of the state's population (DPOR 2006). ISER predicts that the population of the borough may be as high as 103,937 by 2015 (U.S. Census Bureau 2010, MSB 2000). The majority of the population and expected growth in the MSB are located in within the valley area between and around Wasilla and Palmer. The increase in population of the Southcentral region and the MSB in particular has resulted in an increased demand for year-round recreation opportunities and facilities throughout the region (NPS 2006).

Population growth has also spurred increasing development in the Southcentral region and in the MSB in particular. Land along the Parks highway has experienced changes in land ownership and use as federal and state land is conveyed to the MSB government, the Cook Inlet Regional Corporation, the Mental Health Trust, the University of Alaska, and private landowners. The MSB believes that this growth may have significant impacts on the availability of recreational trails in the area, as few recreational trails have been formally designated and many currently

cross private property. As the level of development on private parcels increases, access to many of these trails could be blocked (MSB 2000).

SCORP also evaluated potential recreation needs in the state of Alaska. About 74% of respondents were either very or somewhat satisfied with recreation facilities within an hour of their community. In addition, 84% of respondents felt that when allocating limited funds, that funds should be spent to maintain present facilities before developing new facilities. The desire to allocate funding toward existing facilities was also highlighted by the fact that the public rated maintaining existing trails, building roadside toilets, and improving the maintenance of existing facilities as the most important recreation needs in the state with 67, 63, and 58%, respectively, of respondents ranking these needs as very important. In contrast, just 39% of respondents felt that building new parks from existing state land was very important (DNR 2009b).

### **5.5.1 Data Gap**

The 1985 amended draft license application provides estimates and analysis of potential projected recreation demand in the Project area that could result from the development of the proposed Project. The study of recreation demand is based on per capita participation based on a method developed by the U.S. Soil Conservation Service. This method includes estimates of average annual per capita participation days in a variety of recreation activities in the Project area based on the 1985 assessment of recreation use. The Project Recreation Demand Assessment estimates recreation demand in the Project area through the year 2000.

#### **5.5.1.1 REC-10: Update Projected Demand for Recreation Opportunities in the Project Area**

The 1985 Project Recreation Demand Assessment is out of date and needs to be updated to reflect current population and recreation trends to accurately predict recreation demand into 2035. As discussed, the population of Alaska, and of the Southcentral Region and the MSB in particular, has grown considerably in the past 25 years. For example, the 1985 Project Recreation Demand Assessment projected the population of the MSB to be about 58,000 people in the year 2000; the Census-reported population in 2000 was in fact more than 59,000 people. Today, the population of the MSB is more than 88,000 people and it is the fastest-growing area in Alaska. In addition to population growth, the amount of current recreation use of the Project area is not well known. Many of the recommended studies identified above will be important in providing an accurate estimate of annual per capita participation days in a variety of recreation activities, but much of this information is not available at this time.

## **6 TRANSPORTATION**

In the Railbelt region, the public transportation system is dominated by road, rail, and aviation. In coastal communities, water-based transportation systems are important, especially the Ports of Anchorage and Seward. In other communities, marine is used mostly for fishing and recreational purposes as opposed to a primary means of transportation. As a result, water-based transportation is not included in this analysis.

The 1985 amended draft license application did not include a separate section to address transportation resources. Access considerations were included in Exhibit A, Sections 1.12, and in Exhibit E, Section 10.

Section 1.12.3 of the 1985 document included the following transportation improvements:

- Connection to the Alaska Railroad at Cantwell
- New road from the Denali Highway to Watana camp site
- A future road from the Watana camp site to Native lands on the south side of the Susitna River
- In Cantwell, the road from the marshalling yard to four miles east of the Parks/Denali Highway junction will be paved

This data gap analysis will provide additional information to characterize the current baseline conditions of the public transportation system in the Railbelt area especially around the middle and upper Susitna River system.

It is assumed that the majority of the impacts to the transportation network would be associated with the construction of the Susitna-Watana Hydroelectric Project.

## **6.1 Methodology**

This analysis began by reviewing existing transportation plans. Plans that were reviewed include:

- MSB Long Range Transportation Plan (LRTP)
- MSB Regional Aviation System Plan
- George Parks Highway Scenic Byway Corridor Partnership Plan
- Parks Highway Visioning Document
- Denali Borough Comprehensive Plan
- Alaska Aviation System Plan (AASP) Forecast Report
- Statewide LRTP
- Interior Alaska Transportation Plan
- Wasilla Airport Master Plan
- Palmer Airport Master Plan
- MSB Regional Aviation System Plan

This information was supplemented with internet resources and agency coordination and web sites. Other sources of information included contact with agency project leaders and database searches. If information was not sufficient to satisfy licensing requirements, a data gap was

identified. This document identifies those information needs or gaps to help develop future Project study efforts.

## **6.2 Roads**

Overall, in the past 30 years, Alaska's roads have been more heavily used. The State's Annual Vehicle Miles of Travel (VMT) has an increasing trend (from 4,010 million in 1985 to 4,932 million in 2009) (Alaska Department of Transportation & Public Facilities [DOT&PF] 2010). Traffic volumes have also been increasing.

In the Denali Borough and the MSB, roads can be built and maintained by DOT&PF or a local government such as the MSB or Denali Borough. In general, DOT&PF is responsible for higher functioning roads (roads that carry longer distance traffic) such as freeways and major arterials, while lower functioning roads (roads that carry more local traffic or provide property access) are typically the responsibility of local government.

### **6.2.1 Existing Road Network**

The State Highway System consists of roads on the National Highway System (NHS) or the Alaska Highway System (AHS). The NHS is "an interconnected system of routes that serve important national functions (security, commerce, and travel). The NHS is comprised of Interstate and defense routes, other principal arterial routes, and routes connecting to intermodal facilities such as airports, ports, and ferry terminals. With a few exceptions, all NHS routes in Alaska are owned by ADOT&PF." The AHS is "is comprised of highways that have statewide significance but are not on the NHS. The AHS includes routes that connect communities and routes that link to recreational sites or areas of resource development. Most AHS routes are owned by ADOT&PF."

Near the Susitna-Watana Hydroelectric Project site, the primary road is the George Parks Highway. The highway was completed in 1971 and is approximately 323 miles long. The George Parks Highway connects the Glenn Highway to Fairbanks, providing the primary access to the MSB, Denali Borough, Denali National Park and Preserve and Denali State Park along the way. The Parks Highway is mostly a two lane highway but some segments are built to a higher standard (four lanes, divided controlled access, etc) (DOT&PF 2008). The section between MP 132 and 248<sup>10</sup> is designated as an Alaska State Scenic Byway.

According to the Parks Highway Visioning Document, the section of the Parks Highway between Trapper Creek (MP 118) and Broad Pass (MP 204) is mostly a rural area with little visible development. There is some off-road development in the area including residences, cabins, and a Princess Lodge (DOT&PF 2006). This segment of the Parks Highway has three at-grade railroad crossings that will be grade-separated in the future (DOT&PF 2006). Due to the building not being structurally sound, the East Fork maintenance station near MP 185 is closed, so maintenance of this section is performed from Cantwell (DOT&PF 2006). In the summer, one

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<sup>10</sup> Along the Glenn Highway, mileposts (MP) do not begin with 0. Instead, they begin at MP 35 because they continue the milepost numbering of the Glenn Highway, which starts at MP 0 in Anchorage.

of the concerns about this section of highway is that some travelers are there to get between locations, while others are there to enjoy the scenery. In the winter, some of the grades and alignment have been a concern, with the more severe problems occurring on the Honolulu Creek and East Fork hills (DOT&PF 2006). The George Parks Highway Scenic Byway Corridor Partnership Plan indicates that between Trapper Creek and Broad Pass, it is likely that “an updated, two-lane section outfitted with passing and climbing lanes with select, short, four-lane sections will be adequate to address 2030 traffic needs” (DOT&PF 2008).

The section of the Parks Highway between MP 204 and Carlo Creek (MP 224) is mostly rural except for near Cantwell. This section of highway includes the Summit railroad crossing (MP 204). Currently, this crossing is at-grade, but a future grade separation is planned (DOT&PF 2006). There are also multiple crossings of the Nenana River as well as other creeks (DOT&PF 2006).

Traffic volumes along the Parks Highway tend to decrease from Wasilla to the entrance to Denali National Park and Preserve. From there, volumes tend to increase as the road gets closer to Fairbanks (DOT&PF 2008). Traffic on the Parks Highway can vary significantly depending on the time of year, with volumes being much higher during summer than winter (DOT&PF 2008). Additional traffic volume information is available in the DOT&PF Central Region Annual Traffic Report and the DOT&PF Northern Region Annual Traffic Report.

Also near the Susitna-Watana Hydroelectric Project is the Denali Highway (also known as Route 8). The Denali Highway connects the Parks Highway (near Cantwell) to the Richardson Highway (near Paxton). It was opened in 1957 and is approximately 135 miles in length. It is a gravel highway, but small portions of the highway (eastern 21.3 miles and western 2.6 miles) are paved. The Denali Highway is not maintained in the winter (October 1 to mid-May), and is used primarily to access adjacent lands for hunting, harvesting, or recreational purposes.

### **6.2.2 Other Denali Borough Roads**

The Denali Highway is classified as a rural major collector<sup>11</sup>. Other rural major collectors in the Denali Borough are:

- Cantwell Road
- Healy Spur Road
- Denali National Park Road
- Anderson Road (from Parks Highway to B Street)
- Clear Road

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<sup>11</sup> A collector links arterial and local roads. They tend to link communities to arterials and collect traffic from local roads. In comparison, an arterial road is used more for longer trips and generally has higher speed limits and fewer access roads. Local roads provide direct access to property.

The Denali Borough also has a small number of rural minor collectors. They are:

- Healy School Road
- Carbon Way
- Stampede Road
- Anderson Road (G Street to B Street)

All other roads are considered local roads by DOT&PF and are not discussed further in this report.

### **6.2.3 Other MSB Roads**

The MSB has more extensive transportation network with numerous arterials, collectors, and local roads. As the MSB has grown dramatically in recent years, traffic volumes in the MSB have been increasing. Some of the highest traffic volume roads include:

- Parks Highway
- Palmer-Wasilla Highway
- Glenn Highway
- Knik-Goose Bay Road

To accommodate these increasing volumes, many road improvements are planned. One of the biggest projects is the Parks Highway Alternative Corridor Project. This project is trying to identify and construct an alternative Parks Highway Corridor around Wasilla to address congestion and traffic safety concerns. Other planned improvements include Knik-Goose Bay Road, Port MacKenzie Road, and the Palmer Wasilla Highway. For a complete list of planned road improvements in the MSB, please see the MSB LRTP.

### **6.2.4 Data Gaps**

#### *6.2.4.1 TRANS-1: Identify Future Road Network*

A community's LRTP identifies its planned improvements to the transportation network. The MSB's LRTP was last adopted in 2007 and an updated plan is scheduled to be adopted in 2012. As population and employment in the area are likely to continue growing, traffic volumes are also likely to continue growing, resulting in improvements to the road network. Information about the future road network is important to understand how the construction and operation of the Susitna-Watana Hydroelectric Project will impact the road network. Information to be collected includes location of road and roadway characteristics. Sources of information include the MSB including the MSB LRTP, DOT&PF, and the Denali Borough.

#### **6.2.4.2 TRANS-2: Identify Existing and Future Local Roads**

The information about local roads in the MSB and Denali Borough needs to be improved, especially in the area that will be flooded by the impound area and along potential access and transmission corridors. Disruptions to the local road network could limit mobility in the area and restrict property access. The Project may be able to connect local roads to the Watana access road, providing better transportation connectivity to local residents and visitors. Sources of local road information include the Denali Borough and MSB.

Information to be collected includes:

- Location of road
- Traffic volume

Sources of information include:

- MSB
- Denali Borough
- Community Councils
- Aerial photography
- Local residents

#### **6.2.4.3 TRANS-3: Identify RS 2477 Trails**

In 1866, RS 2477 was passed by the federal government, granting broad rights-of-way over unreserved federal lands. Under RS 2477, a right-of-way would exist automatically if a public highway was established across public land. RS 2477 has been controversial in Alaska because millions of acres that were once owned by the federal government are now owned by private owners or Native corporations. The RS 2477 right-of-way must be honored by the new land owner. Identifying the RS 2477 rights-of-way near the Susitna-Watana Hydroelectric Project will ensure the right-of-way is preserved.

The DNR is currently researching and adjudicating RS 2477 as funding and priorities allow.

Specific information needed includes:

- Location of existing RS 2477<sup>12</sup>
- Location of potential RS 2477 corridors
- Status of corridor

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<sup>12</sup>The Denali Borough Comprehensive Plan has identified several RS 2477 Trails.

Sources of information include:

- MSB
- Denali Borough
- DNR

#### **6.2.4.4 TRANS-4: Identify Existing Bridges/Structures**

Bridges and other structures may accommodate different vehicles than the roadway. In some cases, the bridge or structure may be a limiting factor. For example, an overpass may not be tall enough to allow certain vehicles underneath. Vehicles may be too heavy or too wide for an existing structure. Additional information about bridges and structures that may restrict traffic is needed to determine if the bridges and other structures are adequate for Project needs.

This information is needed only for bridges and structures that are likely to be used during the construction and operation of the Susitna-Watana Hydroelectric Project. Information to be collected includes:

- Location of bridges/structures
- Vehicle restrictions – height, weight, width, etc.

This information should be available in the DOT&PF Bridge Inventory and by consulting DOT&PF bridge section staff.

#### **6.2.4.5 TRANS-5: Update Baseline and Future Traffic Volumes and Capacity**

Roadways are designed to handle a certain amount of traffic volume. When traffic volumes exceed the designed capacity of the roadway, it can lead to congestion, increased accidents, increased (or inconsistent) travel times, and other problems. Information about the available capacity of the baseline roadway is needed to understand the how the traffic generated by the construction and operation of the Susitna-Watana Hydroelectric Project will impact the road network. Traffic volumes collected as part of the 1980s APA Project licensing effort are from 1985 and were for the Parks Highway only. This information is now out of date. As access and transmission corridors have not yet been identified, nor has the method of transporting construction resources, information about additional roadways may be needed.

Information that needs to be collected includes current traffic volumes, roadway configuration (number of lanes, traffic signals, etc.), turning movements, and anticipated growth in the area. Additional information about the Project is needed before the most appropriate method of determining future traffic volumes and capacity can be identified. Potential methods include increasing traffic volumes based on historic traffic growth and developing a traffic model for the Project area.

The MSB LRTP includes a future traffic forecast for the year 2030. The LRTP is scheduled to be updated in late 2011/early 2012. As part of this update, a new traffic forecast should be



generated, but the forecast year is unknown at this point. It may be possible to expand the existing MSB traffic model to include the Denali Borough if a regional traffic model is needed for the Project.

### **6.3 Rail**

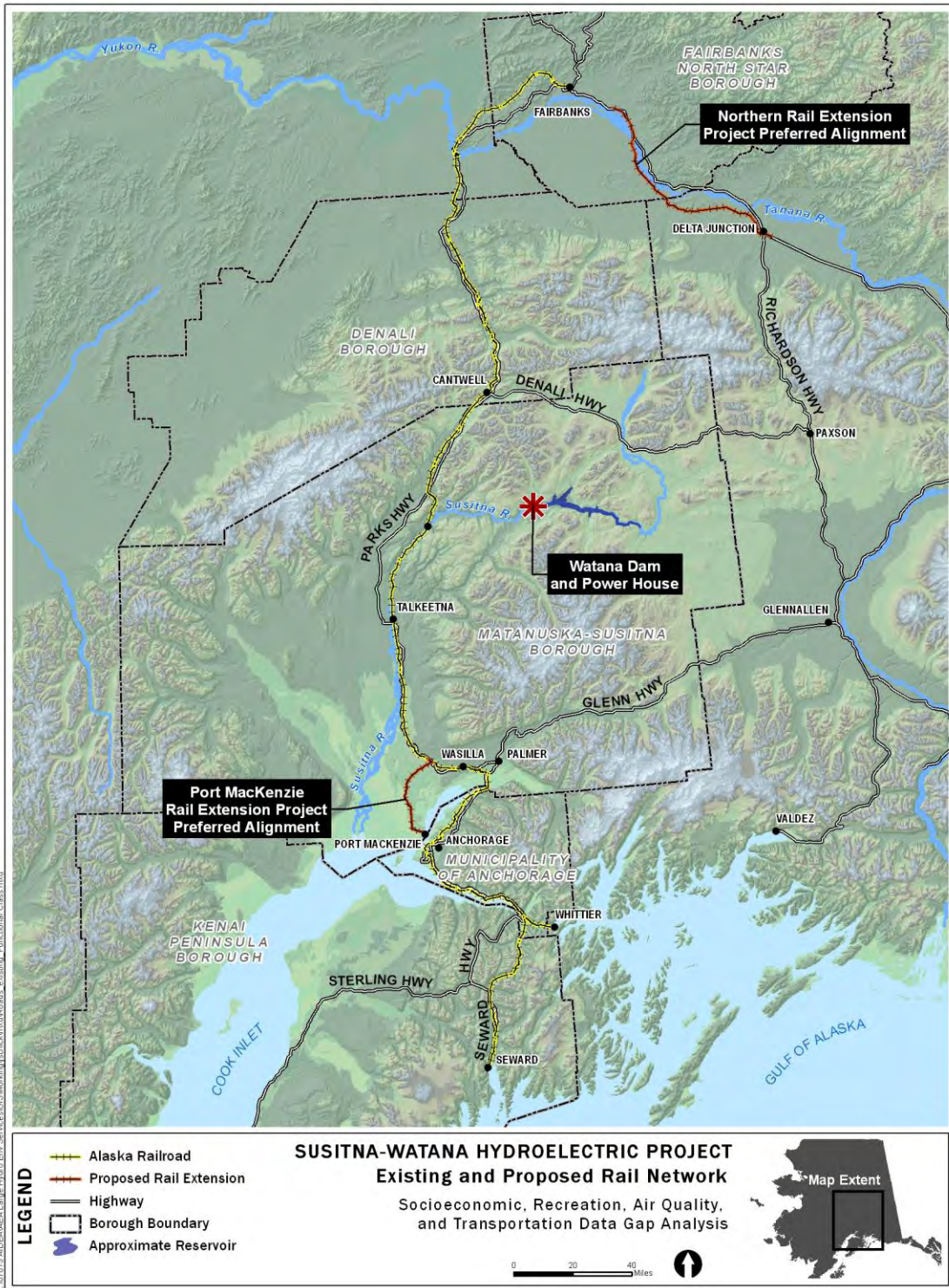
The ARRC is the only railroad in the Railbelt region (Figure 6-1). Since 1985, the ARRC has been owned and operated by the State of Alaska. The southern terminus of the ARRC mainline is in Seward and the northern terminus is Eielson Air Force Base (AFB). In addition, there are several spur lines, including one in the Denali Borough that connects the ARRC mainline to the Usibelli Coal Mine.

The ARRC makes improvements to its system every year. Two major extension projects are currently being pursued (Port MacKenzie Rail Extension and Northern Rail Extension).

The Port MacKenzie Rail Extension involves the construction of 30 to 45 miles, depending on the route, of new rail line connecting the existing rail system to the MSB's Port MacKenzie. This project is estimated to be completed in 2014.

The Northern Rail Extension project includes the construction of approximately 80 miles of new rail line connecting the existing Eielson Branch rail line to a location near Delta Junction. The construction of phase one (the Tanana River Crossing) is anticipated to be completed by 2015.

Figure 6-1. Existing and Proposed Rail Network



Other major capital projects currently being implemented by the ARRC include (ARRC 2011):

- Seward East & West Dock Investments
- Seward Coal Loading Facility
- Seward Depot Improvements
- Chugach Forest Whistle Stop Service
- Whittier Infrastructure and Master Planning
- Whittier Branch CTC (Signalization) Installation
- Historic Freight Shed LEED Renovation
- Ship Creek Intermodal Transportation Center
- Commuter Partnerships and Opportunities
- Commuter Rail Study Update
- Diesel Multiple Unit Railcar
- South Wasilla Rail Line Relocation
- Rail/ROW Rehabilitation to Moose Creek
- Talkeetna Depot Restroom Facility
- Curry Quarry Ballast & Riprap Production
- Healy Canyon Safety & Reliability
- Nenana Rail Line Relocation
- Fairbanks Freight Intermodal Improvements
- Fairbanks Depot Second Track
- Fairbanks Area Rail Line Relocation
- North Pole Road/Rail Crossing Reduction

In 2010, the ARRC had a passenger ridership of 405,135 passengers and moved 6.33 million tons of freight (ARRC 2010). Information on future ridership and freight volumes is unknown at this time. Based on previous trends, passenger and freight volumes are likely to increase in the future. Most of the ARRC's passenger trips are recreation/tourism-oriented. The Hurricane Turn Train (which operates between Talkeetna and Chase) provides flag stop service between these communities, providing access to remote cabins along this stretch of track.

### **6.3.1 Data Gap**

#### *6.3.1.1 TRANS-6: Identify Baseline and Future Capacity of ARRC System*

Moving construction materials and equipment by rail is a possibility for the Project. If this mode is selected, a spur line from the ARRC mainline to the Project site would be constructed. As part

of the mode selection, the AEA should coordinate with the ARRC to determine if the ARRC has the capacity (rolling stock, tracks, and personnel) to accommodate the construction needs of the Project. It is important to understand how the construction needs of the Project would fit in with ARRC's existing and future operations. Additional information regarding the likely construction needs should be identified before these discussions should take place. Specific information needed includes:

- Track usage and capacity – how many more trains can ARRC accommodate with existing resources
- Number of rail cars/trains of material that would be moving each day
- Time of year that construction would occur
- Origin of construction materials

## **6.4 Aviation**

Aviation is a basic mode of transportation in Alaska, as approximately 82% of Alaska's communities are not served by roads (DOT&PF 2011b). Despite having road access, aviation is still an important mode of transportation in Railbelt region communities. Overall, demand for aviation is likely to increase in the future. The AASP notes that higher growth is anticipated in more urban areas, with less growth in more rural airports (Federal Aviation Administration [FAA] 2011a).

The following section provides an overview of the public use aviation facilities in the Denali Borough and MSB. Once more information is known about the construction and operation of the Susitna-Watana Hydroelectric Project, information on additional airports may be needed.

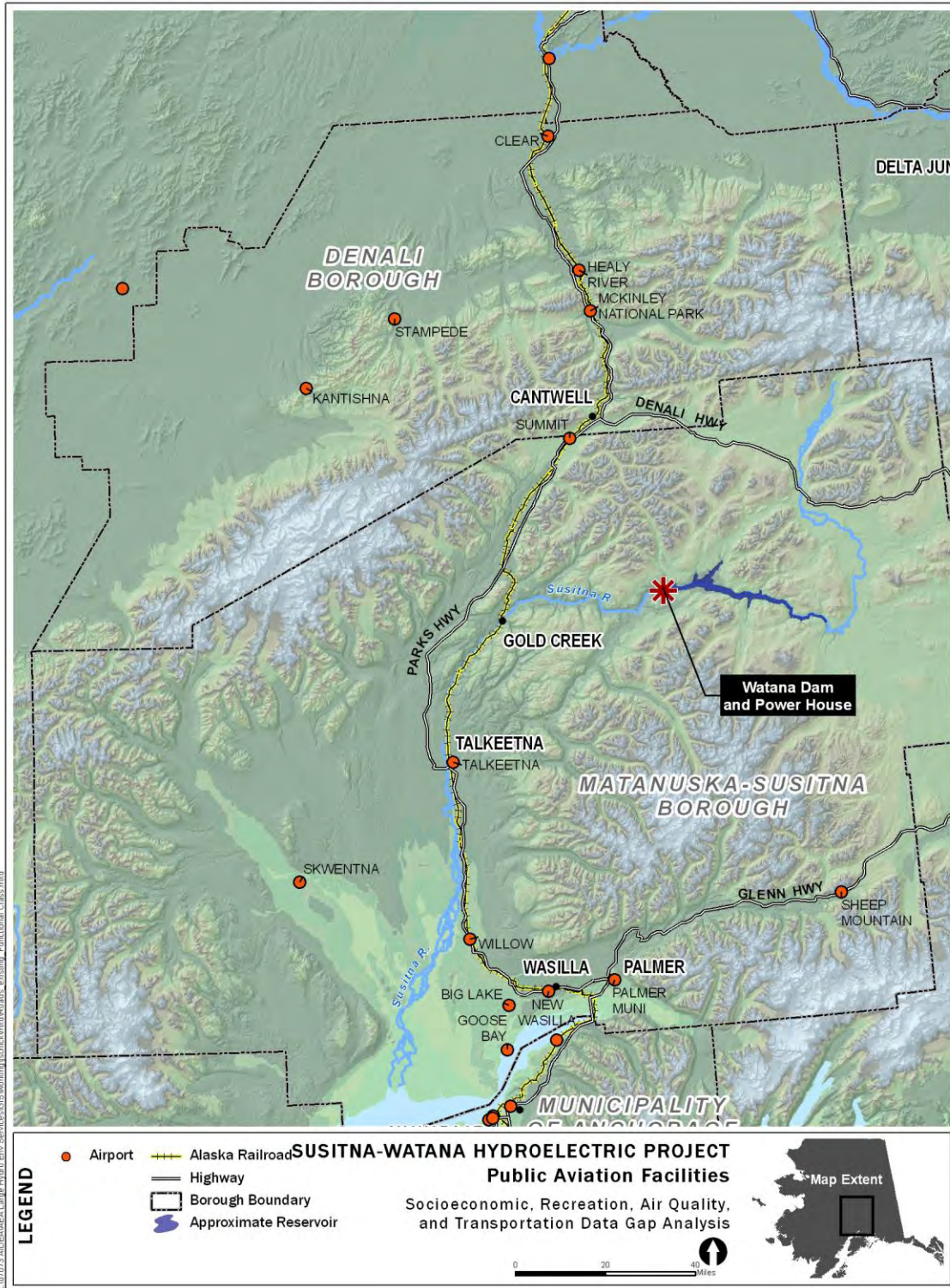
### **6.4.1 Existing Conditions**

The largest airport in Alaska is the Ted Stevens Anchorage International Airport, followed by the Fairbanks International Airport. Both airports have large volumes of passenger and cargo service. These two airports also provide the main links between Alaska and other states/countries.

In addition to two international airports, there are numerous other public airports (Figure 6-2), private airports, private landing strips, and floatplane lakes throughout the Railbelt region. In general, private use, privately owned airports, seaplane bases, and heliports are not included in this report because they are not available for public use. In addition, many lakes, rivers, gravel bars, and backcountry strip exist in the study area. As these are used mainly for access to property or for recreational purposes such as hunting or fishing, they will not be discussed in this report.



Figure 6-2. Public Airports



### 6.4.1.1 Denali Borough

In the Denali Borough, there are five public airports<sup>13</sup> (see Figure 6-2 and Table 6.4-1).

**Table 6.4-1. Publically Owned Public Use Airports in the Denali Borough**

Name	ID	Owner	Runway Size (ft)	Surface
Healy River	HRR	DOT&PF	2,920 X 60	Asphalt
Kantishna	5Z5	DOT&PF <sup>14</sup>	1,850 X 35	Gravel
Clear	Z84	DOT&PF	4,000 X 100	Asphalt
Stampede	Z90	National Park Service (NPS)	1,960 X 40	Turf
McKinley National Park <sup>15</sup>	INR	NPS	3,000X68	Gravel

*Source: DOT&PF Interior Transportation Plan*

The Cantwell Airport is privately owned, but public use is allowed.

The AASP developed a commercial passenger and cargo forecast by borough and Census area. The forecast for the Denali Borough is shown in Table 6.4-2.

**Table 6.4-2. AASP Forecast for Denali Borough**

	2008	2015	2020	2030
Passenger Forecast	48	35	35	35
Cargo tonnage	-	-	-	-
Commercial Aircraft Operations	1,501	957	931	869

*Source: Alaska Aviation System Plan*

<sup>13</sup> For the purposes of this report, a public airport is an airport owned and operated by a governmental entity and is open to the public.

<sup>14</sup> The Kantishna airport is partially owned by the NPS.

<sup>15</sup> Commercial and business use of the McKinley National Park airport is not allowed unless authorized by the NPS.

### 6.4.1.2 Matanuska-Susitna Borough

The MSB has 10 public use airports (see Figure 6-2 and Table 6.4-3). The City of Wasilla owns and operates a public airport, as does the City of Palmer. The DOT&PF operates an additional eight public airports (Big Lake, Goose Bay, Skwentna, Talkeetna, Willow, Lake Louise, Sheep Mountain, and Summit). In addition, the BLM owns the Talkeetna Village Strip, but its use is limited to private individuals. A more detailed description of the existing aviation system in the MSB can be found in the MSB Regional Aviation System Plan (RASP).

**Table 6.4-3. Publicly Owned Public Use Airports in the Matanuska-Susitna Borough**

Name	ID	Owner	Runway Size (ft)	Surface
Wasilla	IYS	City of Wasilla	3,700 X 75	Asphalt
			1690 X 60	Turf - Gravel
Palmer Municipal	PAQ	City of Palmer	6009 X 100	Asphalt
			3617 X 75	Asphalt
			1,560 X 60	Gravel
Big Lake	BGQ	DOT&PF	2,435 X 70	Gravel
Goose Bay	Z40	DOT&PF	3,000 X 75	Gravel
Skwentna	SKW	DOT&PF	3,400 X 75	Gravel
Talkeetna	TKA	DOT&PF	3,500 X 75	Asphalt
Willow	UUO	DOT&PF	4,400 X 75	Gravel
Lake Louise*	Z55	DOT&PF	700 X 18	Gravel-Turf
Sheep Mountain	SMU	DOT&PF	2,270 X 10	Gravel-Dirt
Summit	UMM	DOT&PF	3,840 X 80	Turf - Gravel

*Source: FAA database (FAA 2011b) accessed July 11, 2011*

*\*The Lake Louise airport is currently closed due to safety issues.*

According to the RASP, within the MSB, there are approximately 106 private airports<sup>16</sup> registered with the FAA and an additional 53 unregistered private airports. In addition, there are

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<sup>16</sup> For this report, a private airport is considered to be a landing area for aircraft located on private property and is not available for public use.

14 private airparks<sup>17</sup>. Of the private airports, five allow public access (Road Commission Nr 1, Clearwater, Rainy Pass Lodge, Jonesville Mine, and Butte Municipal). The AASP commercial passenger and cargo forecast for the MSB is shown in Table 6.4-4.

**Table 6.4-4. AASP Commercial Passenger and Cargo Forecast for the MSB**

	2008	2015	2020	2030
Passenger Forecast	5,026	6,121	7,178	9,515
Cargo	57	63	74	104
Commercial Aircraft Operations	18,147	19,977	22,551	27,764

*Source: Alaska Aviation System Plan.*

## 6.4.2 Planned Improvements

### 6.4.2.1 Denali Borough

No major improvements have been identified for airports in the Denali Borough (DOT&PF 2011).

### 6.4.2.2 Matanuska-Susitna Borough

There are planned improvements at most of the public use airports in the MSB. Proposed improvements to Wasilla Airport include:

- Acquire snow removal equipment
- Localizer Performance with Vertical Guidance (LPV) Approach
- Acquire Property
- Pilot/Passenger Facility
- Pave General Aviation (GA) Apron and Expansion and Airport Access Road
- Seaplane Base
- Runway and Parallel Taxiway Extension and Instrument Landing System (ILS) Equipment Installation
- Airport Water and Sewer
- North Airpark Development

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<sup>17</sup> A private airpark is considered to be a shared private runway with adjacent homes, hangars, and similar facilities.



- Taxiway K and Heliport
- East Apron Expansion

More information about these improvements can be found in the Wasilla Airport Master Plan (City of Wasilla 2010).

According to the 2009 Palmer Airport Master Plan (City of Palmer 2009), there are approximately \$82 million of improvements planned for the Palmer Airport over a 20-year period. The improvements are divided into short-term (zero to five years), medium-term (six to 10 years), and long-term (11 to 20 years) projects. Planned short-term improvements to the Palmer Airport include:

- Wildlife hazard assessment
- Repave runway 16-34
- Re-grade the area between the end of runway 16 and the parallel taxiway
- Acquire property within the runway protection zone at the end of Runway 9
- Obstruction survey and tree removal
- Update compass rose
- Acquire property for general aviation expansion
- Acquire property south of Inner Springer Loop Road
- Construct helipad
- Construct shelter hangers on Apron A
- Prepare land to develop large commercial lease lots
- Expand the large aircraft apron
- Gravel taxiway near the midpoint of gravel runway
- Develop an aviation campground
- Develop a seasonal ski strip
- Conduct an instrument approach feasibility study

Planned medium-term projects include:

- Development of required navigation performance (RNP) and LPV approaches
- General aviation lease lots in northwest corner of airport
- Expand apron to the south of flight service station (FSS)
- Construct parallel taxiway along south side of Runway 9-27
- Acquisition of buffer property to the south and northeast of the airport

- Resurface aprons

Long-Term improvements include:

- Extension of Gulkana Street
- Acquire buffer property to the south and northeast of the airport
- Airfield paving project

For more information about these improvements, please see the 2009 Palmer Airport Master Plan.

The MSB Regional Aviation System Plan outlined improvements to other public use airports that were identified in an airport master plan or a FAA or DOT&PF spending plan (see Table 6.4-5).

**Table 6.4-5. Capital Improvement Needs from Published Reports and Documents**

Airport	Improvements
Big Lake	New lighting system
	Apron expansion
	Two-bay equipment building and loader
Lake Louise	Reconstruct runway
Skwentna	Repair runway erosion
Summit	Grade runway
Talkeetna	Lease lots, apron expansion, helipad
	Floodplain mitigation
	Remediate abandoned landfill
	Additional apron expansion
	Additional lease lots
	Floatplane facility at airport

*Source: Regional Aviation System Plan*

### **6.4.3 Data Gaps**

#### *6.4.3.1 TRANS-7: Identify and Locate Private Aviation Facilities*

In the MSB and Denali Borough, there are multiple private airports, landing strips, and other private aviation facilities. Information about these private facilities varies greatly. Information is available about the aviation facilities included in the MSB Regional Aviation System Plan. This plan focused on aviation facilities that were accessible from the road system, so additional information on facilities located elsewhere in the MSB may be needed. Information about the location and usage of these facilities is important to understand how the Susitna-Watana Hydroelectric Project would impact these facilities. The transmission and access corridors have yet to be defined. These corridors could impact operations at these facilities.

Specific information that should be collected includes facility location, runway size, and usage. Additional information about the Project is needed to identify where additional research is needed.

Sources of information include aerial photography, MSB, MSB RASP, Denali Borough, FAA, facility owners, and DOT&PF.

#### *6.4.3.2 TRANS-8: Identify and Assess Airport Capacity*

Decisions regarding how much construction material will be flown to the Watana site have not been made yet. However, based on the 1980s application, it is assumed that material and people will be flown into the site. Knowing the capacity of the airports where these flights will originate is important to understand the impact of the construction and operation of the Susitna-Watana Hydroelectric Project. Airports can accommodate a certain volume of take-offs and landings. Airports that are at or near capacity may be negatively impacted by the additional flights caused by the Project. Typically, the increased number of take-offs and landings should not be a problem at most airports. The availability of land for staging construction supplies may be a limiting factor. The originating airports need to have a large enough staging area.

Information about the existing airport capacity that should be collected includes baseline and projected landings and takeoffs and availability of unleased land for construction staging. Sources of information include Airport Master Plans, airport managers/owners, and DOT&PF.

## **7 AIR QUALITY**

### **7.1 Methodology**

There are two primary air quality-related data needs for this Project:

1. Representative air quality data to characterize existing concentrations of pollutants in the Project area, and
2. Recent emissions data for existing fossil-fueled utility plants that may have their emissions reduced if the Project is implemented.

For the data gap analysis, with respect to air quality data, HDR has searched online databases to identify available air quality data for Alaska monitoring locations that best represent the generally pristine nature of the Project area. Similarly, HDR has searched for U.S. Environmental Protection Agency (EPA), U.S. Department of Energy (DOE), and DEC online databases for emissions data, and has determined that the EPA and DOE online data should provide adequate detail on existing emissions sources in Alaska for purposes of the FERC application documentation.

This report provides more details on the type of data available and the data that have been obtained and downloaded by HDR to date below.

Section 7.2 summarizes the data and information in the 1985 amended draft license application for the Susitna-Watana Hydroelectric Project, and provides recommendations for expanding the assessment from what was documented in that report.

## **7.2 Assessment of 1985 Amended Draft License Application Documentation**

The 1980 license application, as amended in 1985, provides some useful estimates of emissions from point sources and fugitive sources that would exist for portions of the projected six-year construction period. However, that documentation appears to contain an important error in terms of the regulatory applicability discussion, with regard to the Prevention of Significant Deterioration (PSD) permitting program, as detailed below.

The PSD rules published by the EPA in 40 CFR 52.21 require that “major” new air pollution sources and “major modifications” of major sources of air pollution obtain a permit-to-construct prior to beginning construction of any permanent portion of an affected project. A major source as defined in the PSD rules is a facility that emits:

- At least 100 tons/year of one or more criteria air pollutants (carbon monoxide [CO], nitrogen dioxide [NO<sub>2</sub>], sulfur dioxide [SO<sub>2</sub>], particulate matter [PM], volatile organic compounds [VOCs], or lead [Pb]) if the facility is one of 28 specific types of sources, or
- At least 250 tons/year of one or more criteria air pollutants if the facility type is not among the 28 specifically listed source categories.

Another qualifier is that any fugitive emissions (i.e., not from point sources) are not to be included in total calculated emissions for comparison with the above PSD major emission thresholds, unless the source category is one of the 28 listed categories, or is a source category that was being regulated under Section 111 or 112 of the Clean Air Act as of August 7, 1980.

Based on the types and sizes of stationary sources (small refuse incinerator, emergency diesel generators, and concrete batch plant) listed in the prior license application, it does not appear that fugitive emissions should be counted toward the PSD applicability determination. If fugitive emissions were included in the PSD applicability determination, the emissions calculated in the original license application could have approached or exceeded levels sufficient to trigger PSD

applicability if they operated for 8760 hours/year. However, it is common practice for sources operating part-time to accept minor permit limitations to remain below PSD major thresholds.

Given the point source emissions estimated in the prior license application (Table E.3.5.3 in the 1985 amended draft license application), the Project would clearly not trigger PSD permitting, as maximum emissions of any pollutant are approximately an order of magnitude the applicable PSD major threshold of 250 tons/year.

Assuming PSD would not apply to the construction activity, the Project would not be subject to pre-construction ambient air quality monitoring as stated in the original Watana license application. If PSD permitting does not apply, the Project would also not be required to conduct an ambient air quality impact analysis (usually through dispersion modeling). However, as part of the minor source permitting process, the DEC can require an ambient air impact analysis at its discretion.

Information in the prior license application indicates that ambient monitoring was conducted near a field camp in the Project vicinity for total suspended particulate matter (TSP), which was previously the regulated form of PM. Maximum 24-hour average TSP concentrations are cited in that application as being less than 10 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), based on the monitoring. The currently regulated forms of PM are particles under 10 microns ( $\text{PM}_{10}$ ) and particles under 2.5 microns ( $\text{PM}_{2.5}$ ). Since  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$  represent the finer fractions of TSP, the concentrations of these regulated forms of PM are expected to be even lower than the TSP values measured earlier. Given the remoteness of the Watana site from human development, and the lack of any new emission sources in the Project area since the earlier measurements, it is expected that all size fractions of PM in the Project area would currently have concentrations less than  $10 \mu\text{g}/\text{m}^3$ .

## **7.3 Air Quality and Emissions Data**

### **7.3.1 Data Gaps**

Given that the prior (1980s) monitoring of TSP in the Project area showed very low concentrations, it is not recommended that additional PM monitoring be conducted in the Project area, considering that there has been no significant development or human emitted activities in proximity to the Project location.

The only more recent regional monitoring data identified during HDR's search has been collected in the northeast corner of Denali National Park, approximately one mile west of the McKinley National Park Airport. This site is just over 60 miles north of the Project location. In the years 2000–2003,  $\text{PM}_{2.5}$  was monitored at this location and showed values generally far below the 24-hour average and annual average National Ambient Air Quality Standards (NAAQS). Two 24-hour concentrations over the  $35 \mu\text{g}/\text{m}^3$  NAAQS level occurred in August 2002, but these may have been of local origin, as most other 24-hour samples from the four-year period show values in the single digits, and typically a fraction of a  $\mu\text{g}/\text{m}^3$  in the winter period. Note that these high levels did not constitute a measured violation of the NAAQS, because the

standard is based on the average of the 98<sup>th</sup> percentile value of measured concentrations over a three-year period.

Ozone data have also been collected for more than 10 years, including up to the present, at the same Denali location where PM<sub>2.5</sub> data were collected. These data have generally shown concentrations well below the current eight-hour ozone NAAQS of 75 parts per billion (ppb). However, for a one-week stretch in April 2008, ozone concentrations at the Denali monitor remained significantly elevated with the maximum eight-hour value on one day equaling 76 ppb. This did not constitute a measured violation because the standard is based on a three-year average of the annual 99<sup>th</sup> percentile of daily maximum eight-hour concentrations. Also, HDR's review of the meteorological data for the week of elevated ozone values in 2008 indicates that the ozone may have come from the stratosphere. A strong storm system followed by high pressure can mix some of the high ozone concentrations from the stratosphere down to ground level. Thus, this event was most likely due to such a natural occurrence, as opposed to man-made pollution.

While only TSP concentrations data have been collected in the immediate Project vicinity, expectations are that other pollutant levels in the Project vicinity are near background/natural levels, considering the lack of nearby human activity. Thus, no further ambient monitoring data collection is recommended for any air pollutants. Rather, data from the prior Project-area TSP monitoring and more recent data from the Denali monitor site can be summarized in a new license application.

There are three types of air pollutant emission data that should be gathered and/or updated for this Project.

#### *7.3.1.1 AQ-1: Update Projected Emissions for Construction Permitting*

The Project construction schedule should be updated from the prior license application, along with manpower and support equipment estimates. Based on construction equipment needs and activity levels, the Project-related emissions should be updated to confirm whether or what kind of air permitting and analysis would be needed. Likely, this would be a minor (non-PSD) permitting exercise by DEC.

#### *7.3.1.2 AQ-2: Summarize Baseline Fossil-Fuel Generation Emissions*

To help assess the indirect effects of the new electric power generation by the Project, data on existing fossil-fuel based generation should to be summarized, and along with appropriate assumptions, can be used to help assess the emission benefits of the Project. HDR has downloaded from DOE on-line databases their most recent (2009) data for Alaska. These data give estimates of criteria air pollutants for each plant, and also provide breakdowns of electric generation by type (hydropower, coal, oil, natural gas, and other renewable). Additional information for this effort can be gleaned from the AEA's and other studies such as the Railbelt Electrical Grid Authority (REGA) Study (Black & Veatch 2008), and the Alaska RIRP Study (Black & Veatch 2010).

### *7.3.1.3 AQ-3: Add Regional Air Quality Data*

Data from the nearest regional monitors should be summarized and compared against current NAAQS.

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