RIPARIAN STUDY 2012 – DRAFT FINAL

INTRODUCTION

The Alaska Energy Authority (AEA) is preparing a License Application that will be submitted to the Federal Energy Regulatory Commission (FERC) for the Susitna-Watana Hydroelectric Project (Project) using the Integrated Licensing Process (ILP). The Project is located on the Susitna River, an approximately 300 mile long river in the Southcentral region of Alaska. The Project's dam site will be located at River Mile (RM) 184. The results of this study and other studies will provide the information basis for the FERC's National Environmental Policy Act (NEPA) analysis for the Project license

Construction and operation of the Susitna-Watana Hydroelectric Project as described in the Pre-application Document (PAD, AEA 2011) will alter the natural flow regime of the Susitna River. This study plan outlines the objectives and methods for mapping and characterizing the current riparian vegetation. A thorough understanding of how project activities will affect riparian communities and hydrologic processes in the study area will be critical for developing best management practices, developing predictive models of potential changes in riparian ecosystems downstream of the proposed dam, assessing potential impacts to wildlife, and preparing environmental impact statements and FERC documentation.

STUDY OBJECTIVES

The goal of the Riparian Study is to characterize the existing riparian ecosystem in the Susitna-Watana Hydroelectric Project study area and the extent to which the proposed Project will impact riparian processes and function. The overall, multi-year objectives of the Riparian Study are to:

- Characterize the riparian communities, physical processes, and ecological processes in the Project area downstream from the Watana Dam site;
- Quantify the potential impacts due to Project construction;
- Evaluate potential changes to the riparian habitats, riparian processes, wetland functions, and successional pathways from Project operations;
- Predict potential changes in riparian ecosystems with linkages to hydrologic flow;
- Develop potential protection, mitigation and enhancement measures to address project-related impacts to riparian habitats, riparian processes, wetland functions, and successional pathways; and

STUDY AREA

The riparian study area will have some overlap with vegetation and wetland mapping efforts near the dam site, but the main focus will be on the riparian habitats along the Susitna River and tributaries below the dam site that could be directly or indirectly altered by project operations. The riparian study will include representative reaches of the Susitna River downstream from the dam site (Figure 1-1 from the Pre-Application Document [PAD]).

EXISTING INFORMATION

A number of riparian and vegetation mapping resources for the project area were identified as part of the preparation of the PAD (AEA 2011), which was prepared to identify data gaps and prioritize the field effort. Of primary importance to the Riparian Study is the previous vegetation mapping and successional dynamics studies by McKendrick et al. (1982), Collins and Helm (1997), and Helm and Collins (1997). These previous works will serve as a baseline for developing a stratified sampling scheme and provide a conceptual framework upon which to build our vegetation classification and models for predicting downstream effects.

METHODS

TASK 1: REVIEW AND COMPILE EXISTING INFORMATION

A number of riparian and vegetation mapping resources for the project area were identified as part of the preparation of the PAD (AEA 2011). Data sources that may be used include data collected in support of McKendrick et al. (1982) and Collins and Helm (1997), soil surveys, digital elevation data, the National Hydrography Dataset (USGS and EPA 1999), and any map products that may have been produced for the area as part of other studies. These data will be compiled and reviewed and where possible, included as a map layer in ArcGIS® (ESRI, Redlands, California) to assist the current mapping effort. Aerial photography that is available for the project area will be acquired and evaluated for quality and geodetic control. If high-resolution aerial photography is not available for some portions of the study area, lower-quality imagery may be used to support the initial field effort, with the understanding that detailed riparian vegetation mapping will be performed as needed when higher-quality imagery becomes available.

TASK 2: COMPLETE PRELIMINARY MAPPING

Prior to the 2012 field season, riparian ecosystems will be classified and mapped using the current aerial photography available for the study area. We propose to map the existing riparian ecosystems using an Integrated Terrain Unit (ITU) approach, a multi-parameter mapping technique that has been successfully employed across the state of Alaska. The ITU approach is based on methodology developed for various Ecological Land Surveys (ELS) conducted throughout the state of Alaska over the past 15 years (e.g. Jorgenson et. al. 2003). We propose a minimum mapping size of 1 acre for terrestrial polygons and 0.25 acres for waterbodies. ITU map polygons will be attributed with geomorphology (e.g. Braided Active Overbank Deposit), surface form (e.g. Mid-channel Bar), and vegetation class (Viereck et al. 1992) parameters. These parameters will be displayed on maps individually to produce distinct geomorphology, surface form, and vegetation maps. The ITU codes will be aggregated into ecotype (local-scale ecosystems) and wildlife habitat map classes based on classification systems designed by wildlife scientists specifically for Alaska. The multi-parameter, aggregative approach, combined with the flexibility of working across disciplines makes the ITU approach a powerful mapping tool for completing the study objectives.

TASK 3: COMPLETE GROUND VERIFICATION

We will use the preliminary mapping to design a stratified sampling scheme and select potential study sites, including at least one representative site for each riparian habitat type. We will complete the 2012 ground verification in two phases. In Phase 1, we will work with the Instream Flow Study Lead to conduct helicopter assisted reconnaissance of the section of the Susitna River from Talkeetna to Willow in mid-June to determine the feasibility of re-locating field sites originally established by McKendrick et al. (1982) and Collins and Helm (1997) for potential re-sampling and to identify potential new study sites. We will adjust our sampling scheme based on

the results of the reconnaissance survey and prepare for the second phase of field sampling. Phase 2 of the field sampling will occur in late June-early July and will include intensive sampling of preselected study sites in conjunction with the wetland, instream flow, and wildlife habitat data collection. Data will be recorded digitally in the field using a standardized data entry form designed to link directly to a relational database. Study sites will be at a minimum 500 m^2 (forested) and 50 m^2 (non-forest) circular plots, although shape may vary depending on the shape of the vegetation stand being sampled. We will follow methods provided by McKendrick et al. (1982), Collins and Helm (1997), and Helm and Collins (1997). Data attributes collected in the field will include:

- Geo-referenced plot locations (< 3-m accuracy)
- Vegetation cover by species in each of 7 height categories (0.0-0.1 m, 0.4-1 m, 1-2 m, 2-4 m, 4-8 m, 8-16 m, and >16 m) based on transect point counts;
- Ages (cross section cuttings or cores) and height of dominant woody plants;
- Density by size class (< 0.4 m, 0.4-2 m, 2-4 m and <4cm Diameter at Breast Height (DBH); <4 m and >4 cm DBH; and >4 m and <4 cm DBH) or other size or structure classes for browse evaluations;
- Crown dominance for each species;
- General environmental variables, including physiography, geomorphic unit, surface form, soil drainage, soil moisture, elevation, aspect, and slope
- Shallow soil pits for hydrologic variables, including depth of water above or below ground surface, depth to saturated soil, pH, and electrical conductivity (EC); and soil depositional profiles;
- Phenological attributes for selected plant species;
- Vegetation structure and composition to identify each polygon's cover types and vegetation community; and
- Wildlife sign such as browse marks, nests, dens, droppings, singing birds, carcasses, tracks, burrows.

ANALYSIS

The ITU mapping will be refined using the field verification data. The refined ITU map will be used to generate several spatial analyses, including summary statistics by ITU component, ecotype and habitat classes, and derived map classes. The results of the preliminary analysis will be used in part to inform the 2013–2014 Riparian Study Plan. Results from preliminary analyses will include:

- Summary of the extent and adequacy of the existing aerial imagery;
- Summary statistics by riparian habitat classes for completed portions of the mapping;
- Summary statistics for vegetation transect data developed from relational databases;
- Preliminary uncorrected vegetation classification error rates; and
- Preliminary comparative statistics for previous delineations and the current map.

LOGISTICAL SUPPORT AND HEALTH AND SAFETY

The field survey will be performed using the following schedule, transportation, and personnel:

- Phase 1: one field crew of 2-3 scientists will comprise the field work, and will include 6 days of field reconnaissance surveys from 20–25 June, 2012.
- Phase 2: two field crews comprised of 2 scientists each will perform the field survey over a 9-day period from 26 June– 4 July 2012.
- Both phases of field work will require a 4-passenger helicopter with approximately 6 hours of flight time required each day.

A Health, Safety, and Environmental Plan will be prepared prior to the field effort that will

include:

- Project Safety Risk Assessment and Plan: This consists of a matrix that describes specific potential hazard/risk categories; the methods to be used to minimize risks; and responses to hazards.
- Field Communication Plan: This plan identifies the field personnel, the physical location of the field party, and contact information (telephone, fax, email, satellite phone, cell phone, or radio).
- Emergency Contact form and Emergency Medical form: All field personnel complete (or update) these forms prior to beginning field work.

All field personnel will have, at a minimum, CPR and Basic First Aid training prior to commencing fieldwork. Discussions regarding safety concerns raised by field personnel will be documented on a Safety Concerns or Minor Safety Incident Report. Should a minor safety incident occur, a Safety Concerns or Minor Safety Incident Report will be filled out by the staff member(s) involved in the incident and reviewed by the Field Project Leader (FPL) and Project Manager (PM). After returning from the field, all forms will be submitted to the Safety Group for review and a copy will be stored in the project's safety folder. A post-field safety review will be conducted to review all safety concerns or minor incidents, identify any problems areas where safety training or planning can be improved, and those resolutions will be communicated to the PM/FPL and the staff involved in the incident.

A major safety incident (defined as an accident that required removal of the staff member from the field, hospitalization, or other responses that would initiate an OSHA or Workman's Compensation report) will be reported immediately to their PM/FPL, Contracts Manager, and AEA. A detailed report on the safety incident, the response, and any actions required will be prepared by the PM and submitted to the Safety Group for review. As with the minor incident reports, this report will be reviewed during the post-field audit and any appropriate changes in planning, training, or response will be undertaken and documented with a follow-up addendum to the original report.

NEXUS BETWEEN PROJECT AND RESOURCE TO BE STUDIED AND HOW THE RESULTS WILL BE USED

Project operations will affect riparian habitats downstream from the proposed Watana Dam site. Project effects will include direct, indirect, and cumulative effects to riparian habitat. This study will characterize and quantify riparian habitats and successional stages downstream from the dam site and will evaluate potential direct and indirect effects of Project operations on riparian habitats. This is a multi-year study that will begin in 2012 at locations where aerial imagery is

currently available. Upon a complete assessment of the Project area, mitigation alternatives will be developed from the data to address adverse Project-induced impacts.

This study addresses the following issues identified in the PAD (AEA 2011):

- Losses of vegetation and wetland communities and productivity from reservoir inundation and the development of other Project facilities (direct effects).
- Changes to vegetation and wetland communities along access roads, transmission corridors, and reservoir edges due to alteration of solar radiation, temperature moderation, erosion and dust deposition, reservoir fluctuation, pathogen dispersal and abundance.
- Potential changes in wetlands, wetland functions, riparian vegetation, and riparian succession patterns related to altered hydrologic regimes below the dam.

This study will provide an analysis of the number of acres and distribution of riparian habitat types to provide a basis for riparian habitat and wetland function analyses, and development of mitigation measures. Wildlife use and riparian habitat functions are related to the types and successional stages of riparian vegetation communities; therefore results of this study will be necessary to evaluate baseline and future wildlife use and wetland function for the Project area.

Results of this study will also be used to supplement the Instream Flow Study, Geomorphology Study, Vegetation Study, Wetland Study, Rare Plant Study and Invasive Plant Study. During field visits, site locations of all incidental observations of rare or sensitive plants or wildlife or significant wildlife habitat features (e.g. raptor nests) will be coordinated with the relevant resources through AEA.

PRODUCTS

Summary of extent and adequacy of existing aerial imagery. The current aerial imagery may not represent the appropriate time of year or resolution for riparian habitat mapping that can be associated with known river stage. Data gaps will be identified such that additional aerial imagery can be obtained in 2012. The 2012 study area will be refined based on available existing data.

Draft Technical Memoranda. Draft technical memoranda will be prepared for each work group meeting. The topics for the draft memoranda will be developed in coordination with AEA, the Botanical Resources Program Lead, the Riparian Instream Flow Modeler, and the licensing participants to meet the needs for developing the 2013-2014 Riparian Study Plan. Each memo will summarize progress, identify data gaps, and indicate coordination efforts with other studies.

Geospatially-referenced relational database. A geospatially-referenced relational database of riparian vegetation site data collected during 2012 field season, including representative photographs of riparian habitats will be prepared. This database will form the basis for additional data collection in 2013-2014. All field data will be associated with location information collected using a Global Positioning System (GPS) receiver in unprojected geographic coordinates (latitude/longitude) and the World Geodetic System (WGS 84) datum. Naming conventions of files, data fields and metadata descriptions must meet the ADNR standards established for the Susitna-Watana Hydroelectric Project.

Riparian maps in ArcGIS® software. Riparian maps will be developed and delivered periodically according to the schedule indicated below. The riparian maps will continue to be developed during 2013–2014. Naming conventions of files and data fields, spatial resolution,

and metadata must meet the Alaska Department of Natural Resources (ADNR) standards established for the Susitna-Watana Hydroelectric Project.

Summary of 2012 interim results. A brief interim report, including the database and riparian habitat mapping (to date) will be prepared and presented to AEA and the licensing participants to provide the status of the study, identify any issues that have occurred and allow for further refinement of the 2013-2014 component of the study.

Final 2012 Technical Memorandum. A technical memoranda summarizing the 2012 results, the relational database and all spatial products will be submitted to AEA. Results and recommendations for future studies will be presented to resource agency personnel and other licensing participants, along with spatial data products.

SCHEDULE

The following schedule is for the 2012 scope of work. Summary results and evaluation of existing data may lead to development of additional data collection or evaluation techniques in subsequent years. The Technical Memo will inform the formal 2013-2014 study planning process.

- Evaluation of existing aerial imagery and identification of areas without adequate coverage– April 13, 2012
- Draft Technical Memorandum – June 29, 2012
- Summary of Interim 2012 Results – September 10, 2012
    1. Preliminary riparian map (to date) in ArcGIS® software
    2. Geospatially-referenced relational database,
    3. Brief summary of mapping and field efforts.
- Draft riparian habitat map in ArcGIS® software – November 9, 2012
- Quality-controlled geospatially-referenced relational database – November 9, 2012
- Final Technical Memorandum and GIS and data deliverables – November 9, 2012

REFERENCES

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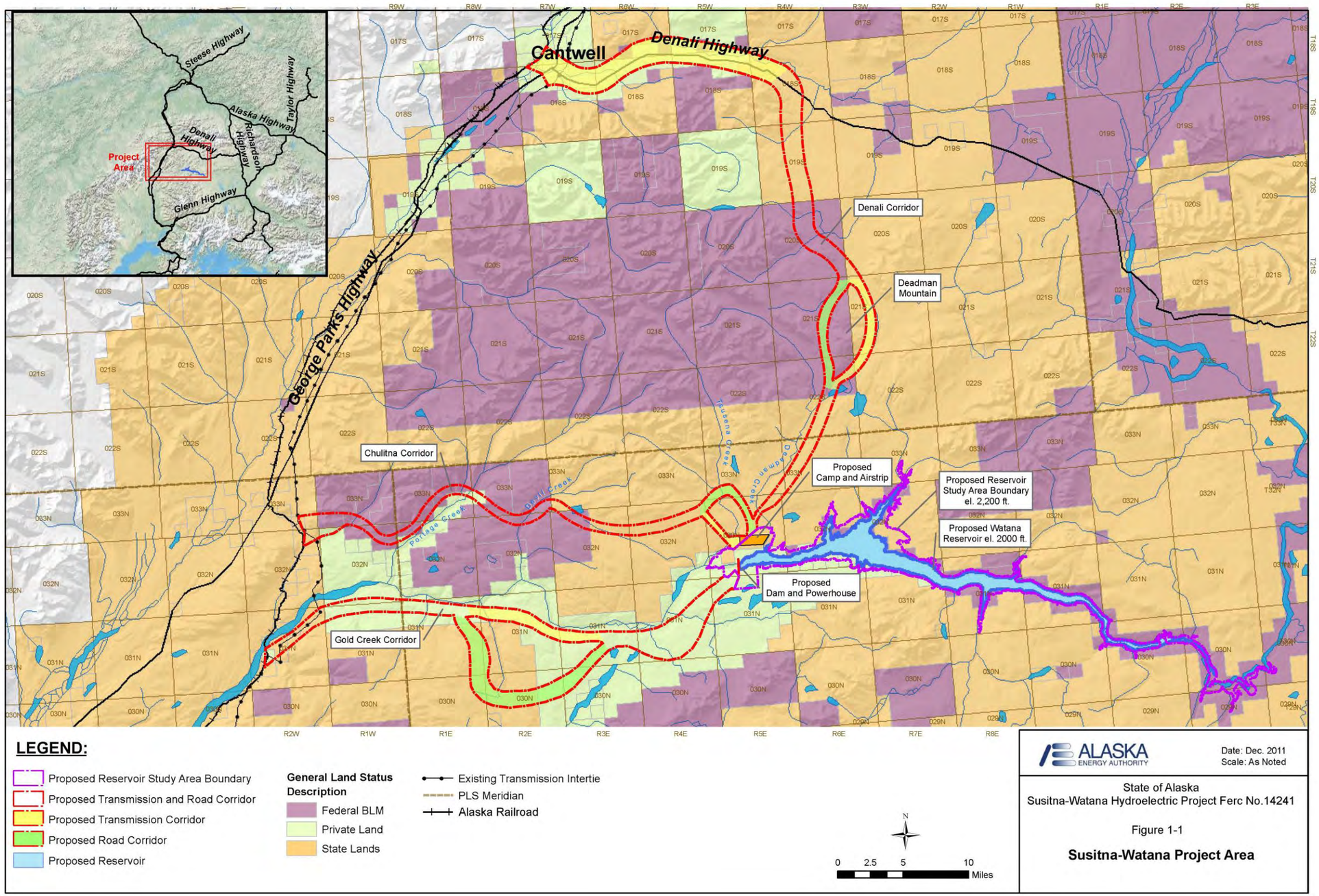
Steese Highway
Alaska Highway
Taylor Highway
Denali Highway
Richardson Highway
Project Area
Glenn Highway
Cantwell
Denali Highway
George Parks Highway
Denali Corridor
Deadman Mountain
Chulitna Corridor
Proposed Camp and Airstrip
Proposed Reservoir Study Area Boundary el. 2,200 ft.
Proposed Watana Reservoir el. 2000 ft.
Proposed Dam and Powerhouse
Gold Creek Corridor
LEGEND:
Proposed Reservoir Study Area Boundary
Proposed Transmission and Road Corridor
Proposed Transmission Corridor
Proposed Road Corridor
Proposed Reservoir
General Land Status Description
Federal BLM
Private Land
State Lands
Existing Transmission Intertie
PLS Meridian
Alaska Railroad
0 2.5 5 10 Miles
ALASKA ENERGY AUTHORITY
Date: Dec. 2011
Scale: As Noted
State of Alaska
Susitna-Watana Hydroelectric Project Ferc No.14241
Figure 1-1
Susitna-Watana Project Area

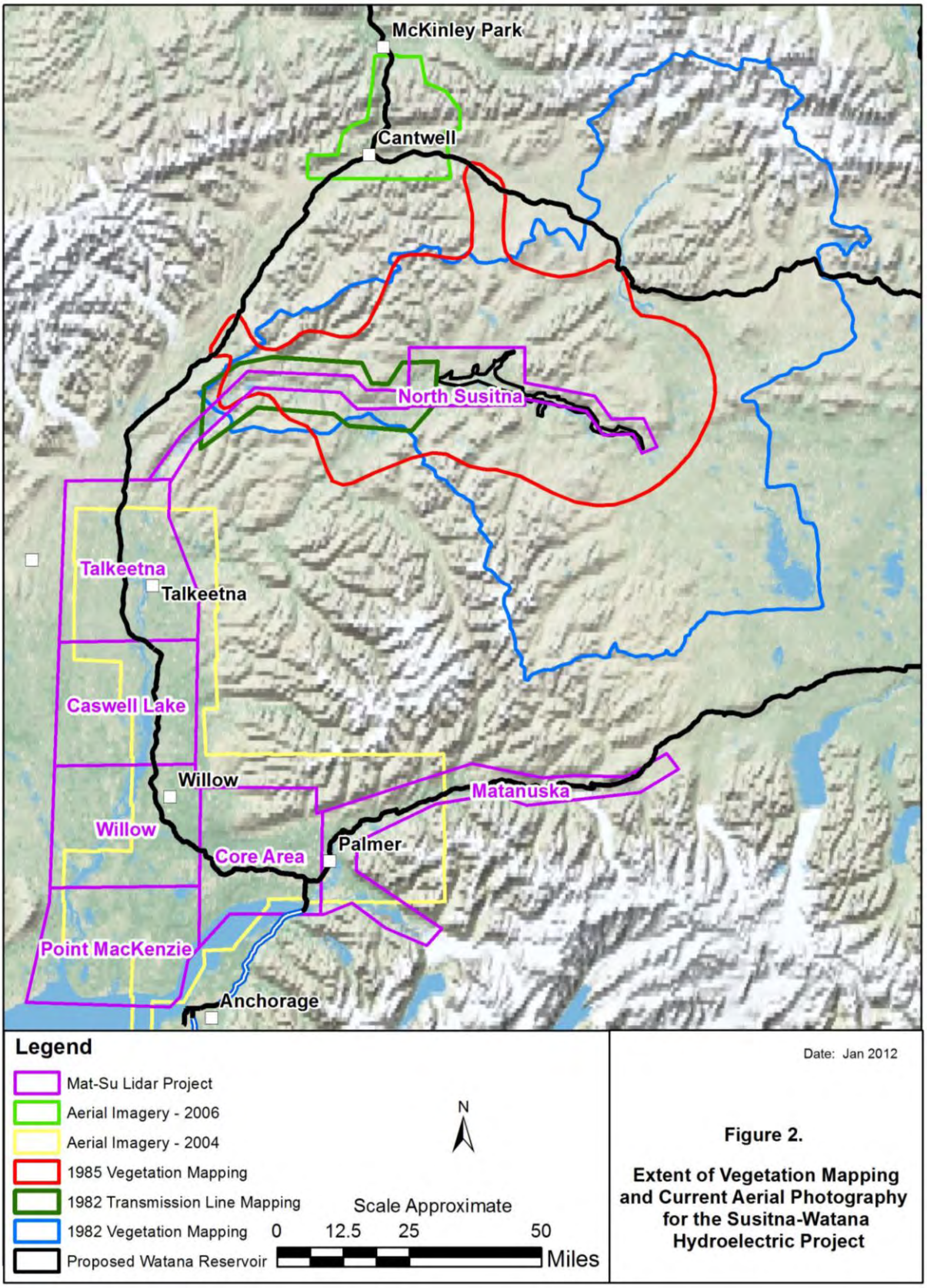

Figure 2.

Extent of Vegetation Mapping and Current Aerial Photography for the Susitna-Watana Hydroelectric Project