VEGETATION AND WILDLIFE HABITAT MAPPING STUDY – 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 of other proposed studies will provide information needed to support the FERC's National Environmental Policy Act (NEPA) analysis for the Project license.

Construction and operation of the Project as described in the Pre-application Document (PAD, AEA 2011) will affect vegetation cover and wildlife habitats both upstream and downstream of the proposed dam site, and along access and transmission line routes. This study plan outlines the objectives and methods for characterizing the existing Project area vegetation and wildlife habitat in order to evaluate potential Project-related effects. This study will initiate a multi-year effort, which will include data collection activities beginning in 2012.

STUDY OBJECTIVES

The overall, multi-year objectives of the Vegetation and Wildlife Habitat Mapping Study are to:

- Characterize the vegetation communities and wildlife habitat in the Project area;
- Quantify the potential impacts due to Project construction;
- Evaluate potential changes to the vegetation communities and wildlife habitat from Project maintenance and operations and related activities;
- Develop potential protection, mitigation and enhancement (PME) measures to address Project-related impacts to plant communities and wildlife habitat; and

A complete assessment of the Project area vegetation and wildlife habitat will be completed as aerial imagery becomes available and the Project area is refined (e.g., preferred alternative access and transmission corridors). The study objective for 2012 is to develop a vegetation map using existing habitat delineations, current aerial imagery, and field verification.

STUDY AREA

The study area includes all areas that will be directly altered or disturbed by Project construction and operations. This includes the reservoir inundation zone up to an elevation of 2,200 feet above mean sea level (msl), facility site locations, one of three potential access corridors, and two of three potential transmission corridors. The study area also encompasses all temporary disturbance areas, borrow areas, and the area surrounding proposed facilities, access roads, and transmission line corridors as shown in Figure 1-1 from the PAD (AEA 2011).

EXISTING INFORMATION

Several different groups of researchers contributed to vegetation mapping for the Alaska Power Authority Susitna Hydroelectric Project (SHP) in the 1980s (AEA 2011). In all cases, maps were photo-interpreted based on field data and hand-drawn on mylar or acetate over aerial photos and topographic maps. The University of Alaska Agricultural Experiment Station (UAAES) mapped vegetation communities classified

to Level III of the first version of the Alaska Vegetation Classification (AVC, Viereck and Dyrness 1980) during 1980–1982, based on field work conducted in 1980 (McKendrick et al. 1982).

The UAAES mapping covered a narrow corridor confined to the Susitna floodplain upstream from Talkeetna, expanded outward to the basin level at Devils Canyon, and continued upstream from there (AEA 2011). Map scales were 1:24,000 for the areas that would have been impacted directly and 1:250,000 for the remainder of the basin. In addition, the area extending 16 km (10 mi) in all directions from the upper Susitna River between Gold Creek and the mouth of the Maclaren River was mapped at a scale of 1:63,360. A 1:24,000-scale map of "apparent wetlands" also was produced, as well as two other 1:63,360-scale maps for the proposed SHP northern (Healy to Fairbanks) and SHP southern (Willow to Cook Inlet) transmission-line corridors. Both of these transmission corridors are outside of the current Project area. The 1:63,360-scale map area includes the SHP central transmission-line corridor which ran along both sides of the Susitna River between the original Watana Dam site to Gold Creek (Figure 2).

The mapping completed by Ray A. Kreig and Associates (1987) covered parts of the upper and middle Susitna basin, from near the mouth of the Oshetna River (upstream of the Watana Dam site) to just downstream of the Devils Canyon Dam site. That mapping effort focused on habitats important for moose forage. Mapping was performed at the 1:63,360 scale and incorporated previous mapping results (McKendrick et al. 1982). Existing ground data and photography provided by Alaska Department of Fish & Game (ADF&G), Bureau of Land Management, and the U.S. Forest Service, as well as newly obtained ground and aerial data was also included. Vegetation types with high forage values (mainly shrub and forest types) were mapped to AVC Level IV (vegetation combined community-scale classification). Each map polygon was assigned values for understory cover of willows, dwarf birch, and alder, and a limited ground-truthing survey was conducted. A relational database of attributes for every polygon was developed and exported in digital format to floppy disk, and those data were provided to ADF&G.

Complete orthophoto imagery may not be available for delineations of the FERC Project area during early 2012. If new aerial photography for the entire Project area is flown in summer 2012 it will likely be available in late 2012. Complete SPOT 2.5-meter resolution imagery for the upper and middle Susitna River basin may be available in late 2012.

METHODS

Thematic maps of vegetation and wildlife habitats are important tools that can be used to define baseline conditions and help predict impacts to both botanical and wildlife resources from proposed energy projects like the proposed Susitna-Watana Hydroelectric Project. For botanical and wildlife resources, the goal is to characterize vegetation and wildlife habitats in the project area to quantify potential impacts from project construction, long-term changes from project operations, and to plan mitigation and post-construction monitoring measures. The mapping of vegetation and wildlife habitats is a critical study component for the Project because the wildlife habitats delineated in this effort will be used to quantitatively assess the impacts of habitat loss and alteration for all birds and mammals evaluated during the FERC licensing and NEPA processes. These assessments of habitat loss often are the primary basis for evaluating impacts to wildlife, and especially for the more uncommon birds and mammals, for which there typically are few observations to determine specific locations used in the Project area. Moreover, uncommon birds and mammals often are of most concern to management agencies due to their rarity, and hence are more susceptible to population-level impacts from proposed developments.

An integrated approach to mapping vegetation and wildlife habitats will be used based on methods developed for Ecological Land Surveys (ELS) studies conducted in tundra, boreal forest, and coastal regions in Alaska (see Jorgenson et. al. 2002 for an example study in south-central Alaska). This approach involves mapping terrain units such as vegetation type, physiography, surface form, and disturbance type, and combining them into units with ecological importance (in this case wildlife

habitats). The integrated terrain unit (ITU) mapping methods are flexible and well suited to the use of existing GIS data layers for terrain units.

The method of combining various ITUs allows for the preparation of a number of thematic maps depending on the specific needs of the proposed project. For the Project, a vegetation map at Level IV of the Alaska Vegetation Classification (Viereck et al. 1992), and a wildlife habitat map based on the best combination of ITUs will be produced to yield a habitat map that accurately reflects use by wildlife. A concerted effort will be made to incorporate data from existing vegetation mapping layers (McKendrick et al. 1982, Kreig and Associates 1987). The methodology developed by ABR for mapping vegetation and wildlife habitat maps (see below) is consistent with the plot sampling methods described in *Plant Community Types and the Chugach National Forest: Southcentral Alaska* (DeVelice et. al. 1999) and *Vegetation Reconnaissance Level Sampling Procedure* (DeVelice and Hubbard 1993). The aim in all these vegetation study programs is to sample homogenous plant communities and to relate vegetation and landcover types to measurable biophysical features on the landscape.

TASK 1: REVIEW AND COMPILE EXISTING INFORMATION TO DEVELOP MAPPING MATERIALS

All historical and current geographic project layers will be managed using a combined ArcGIS geodatabase. Much of the required data has already been compiled, including existing high-quality aerial photography, National Wetland Inventory (NWI) mapping, existing vegetation mapping, and rare or invasive plant species documented in the area. The existing vegetation data-layers (from the mapping efforts in the 1980s) will be updated to current GIS software formats and evaluated for consistency with the available current digital photography. Once the existing data has been compiled and evaluated, the integrated mapping methods will be modified to include historical data.

TASK 2: COMPLETE PRELIMINARY MAPPING

Prior to the field season, the existing 1980s vegetation map layers will be modified manually in GIS to accurately reflect the available imagery within the current project boundaries. Using a minimum mapping size of 1.0 acre for vegetated areas and 0.25 acres for waterbodies, the vegetation map polygons will be updated and coded with Level IV Viereck vegetation types (Viereck et al. 1992), and preliminary physiography, surface form, and disturbance types. Ground-verification plots to be surveyed during summer 2012 will be selected to cover the range of mapped types on the preliminary mapping, focusing on the areas covered by high-quality digital imagery. Areas not covered by preliminary mapping or high-quality digital imagery also will be sampled during summer 2012, but in these areas we will focus the plot sampling on large, easily identifiable landcover types.

TASK 3: COMPLETE GROUND VERIFICATION

The 2012 field season study plans will focus on sampling the range of landcover types identified in the preliminary mapping phase (above) so as to refine the scope for field work for the 2013 and 2014 seasons. Since project-wide imagery will not be available for either the preliminary mapping phase or the 2012 field season, the study area will focus on the footprint areas that are currently covered by 1foot pixel resolution imagery obtained by the Mat-Su LiDAR mapping project and publicly on AlaskaMapped.org. Limited ground verification points will be planned for areas outside the immediate project footprint area sufficient to effectively plan future field seasons.

To maximize efficiency in data collection, a ground verification plot will include all data necessary for vegetation and wildlife habitat mapping. If necessary, plots may also include data collection consistent with U.S. Army Corps of Engineers (USACE) requirements for wetland delineations (USACE 1987, USACE 2007). Data will be recorded digitally in the field using a standardized data entry form designed

to link directly to a standardized relational database. At each ground verification location, visual cover estimates will be made for all plant species present. Site characteristics such as plant community structure, physiography, surface form and phenological observations also will be recorded. Any incidental wildlife use and rare and invasive plant information will be documented and a small soil pit dug. The USACE wetlands determination methodology requires a standard 10-meter radius plot size in which visual cover estimates are made for individual plant species, this plot size is suitable for the vegetation and wildlife habitat sampling.

ANALYSIS

Once the preliminary map has been verified using data obtained from the 2012 field effort the various attributes assigned to each polygon will be combined to produce a large number of basic habitat types. The basic habitats are aggregated into a smaller set of derived habitat types that share similar characteristics considered important to wildlife, such as the expected levels of available food sources and cover for escape and/or shelter. These factors can be directly related to the quantity and quality of vegetation, soils, hydrology, microtopography, and/or microclimates present. When the aggregation process is complete, a number of summary statistics may be generated using standard ArcGIS geoprocessing techniques. The basic results include total acreages of vegetation and wildlife habitats within the study area, mapping error rates and comparisons with the 1987 map (Kreig and Associates 1987). The basic quantitative analysis of the baseline conditions in the study area will provide the basis for calculating projected project impacts, estimating changes to vegetation and wildlife habitat due to facility maintenance and operations, and mitigation and environmental amelioration planning.

LOGISTICAL SUPPORT AND HEALTH AND SAFETY

The field survey will be coordinated with the Wetlands Habitat Mapping Study using the following schedule, transportation, and personnel:

- 2 (2-person) field crews will perform each field survey;
- two 12-day field surveys (24 days total, including travel time) will be conducted starting approximately 15 June 2012 and ending 15 August 2012; and
- field logistics will require a 4 passenger helicopter with approximately 4 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, an ABR 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 to 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 construction, facilities, and operation and maintenance will affect vegetation both upstream and downstream of the proposed dam, as well as along access and transmission line routes. Project effects will include direct, indirect, and cumulative effects to vegetation. This study will characterize and quantify direct loss of vegetation communities and wildlife habitat within the Project footprint; evaluate baseline wildlife habitat in the Project vicinity; and evaluate potential direct and indirect effects of Project maintenance and operations on vegetation communities and wildlife habitat. This is a multi-year study that will begin in 2012 for 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 introduction of invasive plants due to Project construction.
- Potential changes in rare plant populations related to the development of the reservoir, access and transmission facilities, and construction and operation activities including erosion and dust deposition.

This study will provide an analysis of the number of acres and distribution of vegetation types to provide a basis for vegetation and wildlife habitat impact analyses and development of mitigation measures. Wildlife use is related to the types and distribution of vegetation communities; therefore, results of this study will be necessary to evaluate baseline and future wildlife use of the Project area. Results of this study will also be used to supplement the Wetlands Mapping Study, Rare Plant Study and Invasive Plant Study. This study will identify wetlands and vegetation communities where rare or sensitive plants are likely to be found to focus future field efforts. During field visits, site locations of all incidental observations of rare or sensitive plants, wildlife species, or significant wildlife habitat features (e.g. raptor nests) will be documented and communicated to the Botanical and Wildlife Resources Program leads.

PRODUCTS

Study products to be delivered in 2012 will include:

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 Wildlife Resources Program Lead, and the licensing participants to meet the needs for developing the 2013-2014 Vegetation and Wildlife Habitat Study Plan. Each memo will summarize progress, identify data gaps, and indicate coordination efforts with other studies.

Summary of extent and adequacy of existing aerial imagery. The current aerial imagery does not cover the entire Project area, and the existing imagery may not represent the appropriate time of year or be at a sufficient resolution for vegetation mapping. The study lead will identify remaining data gaps such that additional aerial imagery can be obtained in 2012. The study area will be refined based on available existing data.

Geospatially-referenced vegetation site data. A geospatially-referenced relational database of historic data used in the analysis and data collected during 2012 field season, including representative photographs of vegetation communities will be prepared. This database will form the basis for additional data collection in 2013-2014. All field data must be associated with location information collected using a Global Positioning System (GPS) receiver in unprojected geographic coordinates (latitude/longitude) and the WGS84 datum. Naming conventions of files and data fields, spatial resolution, and metadata descriptions must meet the Alaska Department of Natural Resources (ADNR) standards established for the Susitna-Watana Hydroelectric Project.

Vegetation maps in ArcGIS software. Draft vegetation maps will be developed and delivered periodically according to the schedule indicated below. The vegetation map will continue to be developed during the 2013-2014 field season. Naming conventions of files and data fields and metadata must meet the ADNR standards established for the Susitna-Watana Hydroelectric Project.

Summary of interim results. A brief interim report, including the database and vegetation map 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 final technical memorandum summarizing all of the 2012 results will be presented to resource agency personnel and other licensing participants, along with spatial data products. All map and spatial data products will be delivered in the two-dimensional Alaska Albers Conical Equal Area projection, and North American Datum of 1983 (NAD 83) horizontal datum consistent with ADNR standards.

SCHEDULE

This is a multi-year study. The following schedule is for the 2012 scope of work. The schedule for the 2013-2014 components will be further developed with AEA during the final 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 vegetation map in ArcGIS software
    2) Geospatially-referenced relational database
    3) Brief summary
- Draft vegetation map in ArcGIS software – November 9, 2012
- Original QC'd Data – November 9, 2011
- QC'd geospatially-referenced relational database – November 9, 2012

- Final Technical Memorandum on 2012 Activity – November 9, 2012.

REFERENCES

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Steese Highway
Taylor Highway
Alaska 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
Portage Creek
Devil Creek
Deadman Creek
Tsusena Creek
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
N
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