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SUSITNA-WATANA HYDRO

1.1. Wetland Mapping and Functional Assessment Study

1.2. Requestor of Proposed Study

Alaska Energy Authority (AEA) ~~AEA~~ anticipates a resource agency will request this study.

1.3. Responses to Study Request Criteria (18 CFR 5.9(b))

1.3.1. Describe the goals and objectives of each study proposal and the information to be obtained.

The goals and objectives of the multi-year Wetland Mapping Study are to:

- identify, delineate, and map wetlands in the Project area in GIS;
- determine functional values for the mapped wetland types;
- quantify the potential direct, indirect, and cumulative impacts to wetlands and wetland functions from Project construction;
- evaluate potential changes to wetlands and wetland functions from Project operations, maintenance, and related activities; and
- develop the factual basis for measures to avoid, minimize, and mitigate the expected Project-related impacts to wetlands and wetland functions.

The information to be obtained from the study includes:

- a summary of the types and areal coverage of waters and wetlands occurring in the Project area, along with descriptions of their plant community composition, hydrology, and dominant soil characteristics;
- maps showing the distribution of wetlands in the Project area and a geospatially referenced relational database of wetland data collected during the 2012, 2013, and 2014 field seasons, including representative photographs of vegetation types and soil characteristics; and
- an assessment (and ranking) of the functional values of wetlands in the Project area, based on hydrogeomorphic (HGM) classification principles, including evaluations of hydrology, water quality, wildlife and fisheries habitat, productivity, and capacity to support public needs, such as subsistence and recreation activities.

1.3.2. If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied. [Please include any regulatory citations and references that will assist in understanding the management goals.]

The wetland mapping study is being conducted to satisfy Environmental Protection Agency (EPA) 40 CFR Part 230 Section 404(b)(1) and Section 10 of the Rivers and Harbors Act of 1899 33 U.S.C. 403 regulations under the Clean Water Act. These regulations were developed "…to restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material." The Section 404 program is designed to minimize the loss or negative impact to the nation's waters and wetlands. The wetland mapping study also will help in developing compensatory mitigation measures that comply with the U.S. Army Corps of Engineers (USACE) 33 CFR Parts 325 and 332 and EPA 40 CFR Part 230 ruling, *Compensatory Mitigation for Losses of Aquatic Resources*. The rule was enacted to improve the planning, implementation, and management of compensatory mitigation projects by requiring measurable, ecosystem-based performance standards and

effective monitoring for all types of compensation. The results of the wetland mapping study will help to identify what factors should be included in the compensatory mitigation plan and the specific actions that will be implemented to satisfy mitigation requirements.

1.3.3. If the requestor is a not resource agency, explain any relevant public interest considerations in regard to the proposed study.

Alaska Energy Authority (AEA), as the license applicant, assumes that this study will be recommended by resource management agencies during the study plan development process.

1.3.4. Describe existing information concerning the subject of the study proposal, and the need for additional information.

Wetlands were mapped for the Alaska Power Authority (APA) Susitna Hydroelectric Project (SHP) in the 1980s through a cooperative agreement between U.S. Fish and Wildlife Service (USFWS) and the APA to produce a preliminary wetlands map for the SHP project area at a scale of 1:63,360. Those wetlands map data were based on the vegetation mapping completed by McKendrick et al. (1982), with some additional modification using stereoscopic photo-interpretation, and are now a part of the National Wetlands Inventory (NWI; USFWS 1984). The Alaska Vegetation Classification (AVC; Viereck and Dyrness 1980) vegetation classes that were mapped in the early 1980s were cross-referenced and converted into wetlands classes using the classification scheme of Cowardin et al. (1979).

Existing NWI data, which was acquired in the 1980s and covers the current Project area, is expected to be available in digital format by early 2012. Those NWI mapping data will help in understanding the types of wetlands that occur in the study area, but the mapping was not conducted at a scale sufficient for determining Project impacts on wetland resources. When mapping at the 1:63,360 scale, small drainages and other small wetland habitats are often overlooked. Additionally, ground verification of NWI wetlands maps is typically fairly limited. Because those NWI data are nearly 30 years old, and because vegetation, hydrological, and soil conditions likely have changed over that period (see below), an updated map of wetlands will be needed for the current Susitna-Watana Hydroelectric Project. NWI maps from the 1980s will not reflect recent landscape changes due to fire, insect outbreaks, development, and climate change. In particular, increases in woody shrub habitats, reductions in forest cover from fires and insect outbreaks, and permafrost degradation have been documented in recent decades in interior Alaska. These recent landscape changes will not be represented in wetlands mapping data from the 1980s.

1.3.5. Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.

Project construction and operation and maintenance activities may affect wetlands upstream from the dam site, and along access road and transmission line routes. Project effects will include direct, indirect, and cumulative effects on wetlands and their functions. Project activities will affect wetlands in the future inundation zone upstream of the dam and in construction areas, including access road/transmission line routes. The results of the wetland mapping study will be used to meet requirements for USACE permitting under the Clean Water Act. Following a complete assessment of wetlands in the Project area, avoidance, minimization, and mitigation measures will be developed in consultation with the USACE through the FERC ILP process to address likely adverse Project-induced impacts identified in the PAD (AEA 2011), including:

- direct wetland loss from fill placement for constructing roads, power plants, and other support structures;
- conversion of palustrine wetland systems to a lacustrine system by damming the Susitna River to create a reservoir;
- changes in the abundance and composition of riparian wetlands downstream of the dam due to changes in the hydrologic flow and periodicity of the Susitna River—wetland hydrology, plant species diversity, and vegetation composition are all likely to be altered;
- loss of wetland function, including changes in wetland canopy structure, soil biological productivity, water storage, and flood control; and
- indirect impacts from erosion, dust, permafrost degradation, landslides, and off-road vehicle use.

In the wetland mapping study, ABR vegetation ecologists will determine the number of acres of wetland habitats present and their distribution in the study area. This information will provide a basis for wetland and wetland function impact analyses, and the development of mitigation plans. Data from the wetland mapping study will also be used to augment information obtained in the vegetation and wildlife habitat mapping, riparian, rare plant, and invasive plant studies.

1.3.6. Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.

The study area for the mapping of wetlands will be formally defined in consultation with management agency personnel over the course of developing the 2013–2014 study plan, but a working study area for the 2012 season includes all areas within a 2-mile buffer surrounding the proposed reservoir impoundment zone, the infrastructure of the dam and powerhouse and supporting facilities, the access route and transmission-line corridors, and material sites.

In general, the wetlands mapping for the Project area will follow the protocols for preparing wetland maps that have been developed by the USFWS NWI program (USFWS 1995, Dahl et al. 2009), but the classification of wetlands will incorporate elements of several wetland classification systems (NWI, HGM, and a regional classification for the Cook, Inlet basin; see below). The minimum mapping polygon size for most upland and wetland habitats will be 0.5 acres, with smaller polygons (0.1 acre) delineated for water bodies and other wetlands of ecological importance. Wetland and upland boundaries will be delineated based on color signature, plant canopy, and surface relief, along with hydrological indicators such as drainage patterns and surface water connections. Wetland types will be defined based on a number of landscape, geomorphic, hydrological, and biological variables and will be classified as fine-scale wetland ecosystems (wetland ecotypes). For each map polygon delineating a wetland ecotype, attribute codes will be recorded in GIS so as to categorize the mapped wetlands according to several different wetland classification systems: the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979), HGM (Tiner 2003), and the wetland classification system developed by the Kenai Watershed Council specifically for lowlands in the Cook Inlet region (http://cookinletwetlands.info/). The latter system, developed by Mike Gracz, improves on the Cowardin system by incorporating region-specific landscape, geomorphic, and wetland function features into the classification. In the mapping of wetlands for the Project,

wetland ecotypes will be defined specifically for the Susitna basin using methods consistent with the Cook Inlet lowlands wetland classification system.

The field survey for verifying wetland and upland boundaries will be conducted using the standard three-parameter approach described in the 1987 Corps of Engineers Wetlands Delineation Manual (Environment Laboratory) and 2007 Regional Supplement (USACE 2007). To be classified as a wetland, a site must be dominated by hydrophytic plants, have hydric soils, and show evidence of a wetland hydrologic regime. The field survey will be conducted between 15 June and 15 September, which is well within the median dates of the onset of vegetation green-up in spring and vegetation senescence in fall, which are summarized in the 2007 Regional Supplement for the region in which Project area occurs.

In addition to the collection of field data needed to prepare a wetlands map for a Section 404 wetland permit application, field data will be collected that will be needed to conduct a wetland functional assessment for the mapped wetland ecotypes. The specific data elements needed for the wetland functional assessment have not yet been determined, but will be defined in consultation with management agencies over the next several weeks (i.e., before the 2012 field season starts). The set of wetland functions to be assessed will be tailored to those expected to be of most importance in remote regions of Alaska in which landscape disturbances are few. The final set of wetland functions to be assessed will be defined in consultation with management agencies during spring 2012.

1.3.7. Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

An alternative to a wetland mapping effort supported by field verification would be an office-based classification and mapping effort. The ability to accurately classify wetland habitats is greatly diminished, however, without a field survey to obtain ground verification data on plant community composition and hydrology. In addition, some plant communities (e.g., black spruce forest) occur in both wetland and uplands with very similar aerial photo-signatures. Thus, field data are needed to better differentiate these habitats. Ground data also are needed to prepare the wetland functional assessment, including collecting data on wildlife habitat use (evidence of browsing, stick nests etc.) and other ecosystem parameters that reflect wetland function.

The wetland mapping study is planned as a 3-year effort, with field sampling conducted each year by 4 observers (2 crews of 2 each) during the growing seasons in 2012, 2013, and 2014. Surveys would be conducted for approximately 20 days in each year, depending on the needs for additional ground-verification data (less extensive field surveys may be needed in 2014 as the mapping of the study area progresses). Field surveys will be conducted in conjunction with the vegetation and wildlife habitat mapping study to maximize efficiency and reduce costs. The study will involve extensive, office-based activities to delineate wetland boundaries in a GIS and to prepare study reports. The approximate projected cost for this study over the course of all three years is $1,600,000.

The wetland field surveys will be organized to acquire data from as many wetland habitats as possible in a way that maximizes efficiency, thereby controlling costs. The preliminary mapping effort (to be conducted in spring 2012) will be used to preselect sample transects and plots to the extent possible, although additional plots will be established in the field when additional field data are needed for a given area. Field plots will be sampled primarily along transects located within the prominent physiographic types, including riverine, lacustrine, lowland, and upland

areas. If possible, plots where vegetation data were collected in the 1980s will be resampled. Those data will be valuable for assessing the extent to which landscape characteristics have changed in the intervening years.

1.3.8. Literature Cited

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