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SUSITNA-WATANA HYDRO

1.1. Invasive Plant Study

1.2. Requestor of Proposed Study

Alaska Energy Authority (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 invasive plant study are to:

- assess the extent to which invasive plant species have already established in the Project area;
- determine whether any of the species present pose a significant ecological threat; and
- develop the basis for invasive terrestrial and aquatic plant introduction prevention and management plans to reduce the threat of invasives ~~in~~tied to Project impacts compromising natural resource values in the Project area.

The information to be obtained from the study includes:

- location and abundance data for invasive species documented in the study area from previous surveys and surveys conducted for the Susitna-Watana Hydropower Project (SWHP);
- maps depicting the locations of invasive species with information on the number of invasive species found at each location and an assessment of their abundance (acreage or percent cover); and
- an evaluation of the ecological risk of each species, based on the U.S. Department of Agriculture (USDA) invasive rankings (Carlson et al. 2008);

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.]

Resource agencies have become increasingly concerned about invasive plants in Alaska because of their potential to negatively impact wildlife habitat, recreational values, rare plant populations, and native plant species diversity. In addition, they can greatly increase land management costs as financial resources are diverted from other resource management needs to control the spread of invasive species. As a result, the Alaska Department of Natural Resources, in cooperation with the Division of Agriculture, is in the process of developing tools that relate to prevention, regulation, and enforcement of policies for prevention and control of the spread of invasive species (Graziano 2011). Tools already in place include the authority to declare pests, conduct inspections and quarantine infested areas and control (eradicate) infested areas.

The results of the invasive plant study will help identify the extent to which the study area is at risk for the establishment of invasive plant species and the degree to which invasive plant management may~~will~~ be required.

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.

No surveys of invasive vascular plants were conducted in the 1980s as part of the original Susitna Hydropower Study, primarily because the risk of invasive species was not considered a major concern at the time (AEA 2011). Resource agencies have become increasingly concerned, however, about the potential for invasive plant species to become established as a result of construction activities associated with new developments. As a result, the U.S. Forest Service, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service, Department of Natural Resources Plant Material Center, and Alaska Natural Heritage Program work in cooperation to support the Alaska Committee for Noxious and Invasive Plants Management (CNIPM) and the Strategic Plan for Noxious and Invasive Plants Management in Alaska (Hebert 2001). An outcome of the strategic plan was the development of the Alaska Exotic Plant Information Clearinghouse (AKEPIC) database. This geospatial database stores invasive species occurrence and location information from research and surveys conducted throughout Alaska. The CNIPM has provides internet updates regularly as new surveys are conducted (http://aknhp.uaa.alaska.edu/maps/akepic/).

Based on invasive plant surveys conducted along road systems near the Susitna River basin and on other regional surveys, 22 invasive plant species have been identified that potentially could occur in areas disturbed by development of the SWHP (AEA 2011). Areas particularly vulnerable to the establishment of invasive plants include quarry sites, road edges, work pads, and gravel river bars (which are naturally disturbed by flooding and ice scouring). A species of particular concern is *Melilotus alba* (white sweetclover), which establishes readily and often forms monoculture stands along roadsides, trails, and river bars. The ability of this species to colonize linear features on the landscape is especially problematic because linear features act as corridors for dispersal. *M. alba* already has been documented colonizing several of Alaska's glacially fed rivers, and low to moderate densities may promote the establishment of other exotic species, while high densities can negatively affect the establishment of both native and non-native species (Conn et al. 2011).

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.

As explained above, construction of the project will require establishment of road, work pads, quarry sites, and include other construction activities that may contribute to the spread of invasive plants to the project area. To assess the ecological risk of establishment of non-native species in Alaska, the USDA developed invasive rankings for selected plant species (Carlson et al. 2008). The overall rank score is based on sub-scores for ecological impact, biological characteristics (e.g., life history, potential for spread, allelopathy), distribution, and feasibility of control. The higher the overall score (ranging from 1–100), the greater the risk that a species will have negative ecological effects and lower likelihood it will be able to be controlled effectively. Thus, the invasive plant study is needed to determine the overall risk of invasive plant species in the SWHP study area and how construction activities and changes in plant

communities that result from project operations may increase the risk of invasive species establishment.

The invasive plant study will use survey results to identify high-risk areas for invasive plant establishment and for developing management strategies for minimizing the impact of invasive species on native plant communities and wildlife habitat functions. The vegetation and wildlife habitat mapping studies being conducted to support the SWHP will be used to help identify habitats that may be vulnerable to invasive species infestation.

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.

Prior to a field survey of the study area, recent aerial photography will be reviewed to identify potential "hot spots" for invasive species. These include off-road vehicle trails, gravel roads, quarry sites, and other disturbances that may harbor invasives or are at risk for establishing invasives in association with the construction and operation of the SWHP.

The field survey will be conducted following AKEPIC User Manual (AKNHP 2008) guidelines. Suspected invasive species will be collected and the locations of populations marked with a hand-held GPS receiver. Non-native species that are not considered invasive also will be noted. If possible, population estimates will be made or the degree of infestation at each location ranked qualitatively as low (1–10 individuals), medium (10–40% cover of assessment area), or high (> 40% cover of assessment area). The distribution and size of an area where invasive species are present may be highly variable, so using a standard assessment area size (e.g., 10-m radius) may not be applicable. Thus, the geographic limits of an infested area may be used for the assessment boundaries; for example, the area may be as small as 0.01 acre or up to 2 acres. Species will be identified using Hultén (1968) and *Identification of Non-native Plants in Alaska* (AKNHP 2010). Collected specimens of selected species will submitted to the University of Alaska Herbarium to confirm identifications. The data will be made available for entry into the CNIPM database.

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.

The invasive plant study will be conducted in cooperation with the other botanical studies being performed for the SWHP to minimize logistical costs, which are expected to be high, given the remoteness of the study area. All wetlands and vegetation study survey crews will document any invasive species encountered during their field assessments. A review of aerial photography of the Project area prior to the field survey also will help control costs by prioritizing sites to visit in the ground survey effort. Since no invasives species surveys have been conducted in the Project area, a desktop review of the existing literature will not be sufficient for determining the risk of invasiveness and for developing prevention and management plans for invasive species. The approximate projected cost for this study is on the order of $250,000.

1.3.8. Literature Cited

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