Susitna-Watana Hydroelectric Project Document
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SUSITNA-WATANA HYDRO

1.1. Waterbird Migration, Breeding, and Habitat Use

1.2. Requester of Proposed Study

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 goal of the waterbird study is to collect preconstruction baseline data on waterbirds migrating through and breeding in the Project area to enable assessment of the potential impacts from development of the Susitna-Watana Hydroelectric Project (Project) and to develop appropriate avoidance, minimization, and mitigation measures. As used here, "waterbirds" is applied broadly to include ducks, geese, swans, loons, grebes, cranes, cormorants, herons, gulls, and terns. Shorebirds frequently are included in the general category of waterbirds, but they are addressed separately for this Project under the landbird and shorebird study request. This study request includes Harlequin Duck, a species of conservation concern that requires specific survey methods to assess the breeding population.

Four objectives have been identified for this study:

1) Document the occurrence, distribution, abundance, productivity, and habitat use of waterbirds breeding in the Project area; and
2) Document the occurrence, distribution, abundance, habitat use, and seasonal timing of waterbirds migrating through the Project area in spring and fall.
3) Describe migratory routes and flight behaviors in relation to the location of Project infrastructure (primarily transmission lines) to assess the risk of collision mortality; and
4) Review available information to characterize food habits and diets of piscivorous furbearers (river otter and mink) as background for the separate mercury risk assessment study.

The information gained from this study will be used to quantitatively evaluate habitat loss and alteration for waterbirds in conjunction with the wildlife habitat mapping and to estimate the number of migrating and breeding waterbirds that could be affected by the Project for species with sufficient information.

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

Waterbirds are protected under the Federal Migratory Bird Treaty Act (MBTA), which prohibits "take" (including the birds themselves, nests, eggs, and feathers). The MBTA is enforced by the U.S. Fish and Wildlife Service (USFWS) and, in practice in Alaska, is used primarily to ensure that land-clearing activities occur outside of the bird nesting season to prevent destruction of bird nests, and to encourage development of appropriate avoidance and mitigation measures for federally regulated development projects and activities.

Since the original Alaska Power Authority Susitna Hydroelectric Project studies in the 1980s, concern has increased about continental population declines and various threats to the populations of some waterbird species. Both federal and state management agencies now maintain lists of bird species in Alaska that they consider to be of conservation concern (ADF&G 2006, USFWS 2008, Goldstein et al. 2009, BLM 2010). Most relevant to the Project is the recent memorandum of understanding (MOU) between FERC and the USFWS regarding the protection of migratory birds in accordance with Executive Order 13186 (FERC and USFWS 2011). That agreement was created to establish a voluntary framework to ensure that both agencies cooperate to conserve birds and their habitats by identifying and mitigating potential adverse effects resulting from the development of energy infrastructure. The MOU defines bird "species of concern" as those species that are listed as sensitive or of conservation concern by various management agencies, agency working groups, and non-governmental conservation organizations (FERC and USFWS 2011, AEA 2011). Given the recommendations in the MOU for minimizing impacts on birds and the number of such species that occur in the Project area (ABR, Inc. 2011, AEA 2011), it is expected that there will be concern about the potential effects on waterbirds from the Project, and that mitigation plans will be developed to avoid, minimize, or offset those impacts.

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

Wildlife resources are owned by the State of Alaska, and the Project could potentially affect these public interest resources.

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

Lakes, ponds, and wetlands in the Project area were surveyed for waterfowl and shorebirds in 1980 and 1981, using ground-census methods during the breeding season and aerial surveys during migration (Kessel et al. 1982). Brood surveys were conducted on foot in July 1981 to document the presence of breeding waterbirds (adults with young). Aerial surveys were conducted by helicopter for migrating waterbirds (loons, grebes, and waterfowl) in spring 1981 and fall 1980 and 1981. Little survey effort was expended along the middle reach of the Susitna downstream of Devil's Canyon to Talkeetna.

To quantify the use of water bodies by migrating waterbirds and identify those used most heavily by various species and groups, Kessel et al. (1982) developed a relative "importance value" for each surveyed water body in each season, incorporating the number of species, the number of birds, and the density of birds on the water body in relation to the overall numbers and densities recorded on the surveys. Kessel et al. (1982) compared the use of water bodies on the Susitna plateau with those in the upper Tanana River valley in east-central Alaska and concluded that the Susitna plateau, composed mostly of high-elevation subalpine habitats, was not a major migratory route for waterbirds.

Annual population surveys of breeding waterfowl are conducted by USFWS throughout Alaska, and several transects within the Stratum 2–Nelchina survey area are located in the upper Susitna River basin (Mallek and Groves 2009b), east of the proposed Watana reservoir. The westernmost transect (oriented northeast–southwest) parallels the Oshetna River and the northeast–southwest stretch of the Susitna River just upriver from the Oshetna. Ten transects, sampling 135 km² (52 mi²), extend from that western transect eastward across the Nelchina and Copper River basins to Chistochina and Indian River. Twelve species were recorded on surveys

of that area in 2009; the most abundant taxa were scaups, Bufflehead, scoters, Mallard, and American Wigeon (Mallek and Groves 2009a).

A complete census of Trumpeter Swans on their breeding grounds in Alaska began in 1968 and was repeated at 5-year intervals between 1975 and 2005 (Conant et al. 2007). Together, two survey areas (Unit 3–Gulkana and Unit 5–Cook Inlet) include the entire Susitna River basin (Conant et al. 2007). The population of Trumpeter Swans summering in Alaska has increased since 1975 and breeding has expanded into peripheral habitat. In Unit 3–Gulkana, the count of swans was highest in 1995 (~4,500 adults and young), with slightly lower numbers in 2000 and 2005. In Unit 5–Cook Inlet, the count of swans was highest in 2005 (~2,600 adults and young), an increase of over 1,000 from the 2000 census.

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.

Waterbirds would be affected primarily by the loss and alteration of habitats from development of the Project, but also by disturbance and displacement during project construction and operations. Such impacts are often treated as indirect effects. Direct impacts could occur from the mortality of waterbirds due to collisions with transmission lines and the possible ingestion of contaminants such as mercury or from accidental spills of petroleum products or other substances. Cumulative impacts on waterbirds could occur from additional loss or alteration of habitats, including habitat fragmentation, in areas downstream or along the Denali Highway. ~~Regional cumulative effects, however, are unlikely to be extensive because the proposed Project is located in a remote area where the primary developments include a few small lodge operations and dispersed remote dwellings~~.

The results of the waterbird study would provide current information on the occurrence and habitat use of waterbirds in the project area and would, in conjunction with wildlife habitat mapping, facilitate quantitative evaluations of the loss and alteration of breeding and staging habitats likely to result from the Project. Quantitative estimates of the number of breeding pairs that could be affected by the Project may be possible for those waterbirds with sufficient data to calculate densities (see Criterion 1.3.6 below).

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 primary method proposed for this study is to use aerial surveys to document the distribution and abundance of waterbirds during spring and fall migration and the breeding season. Standard aerial survey methods used by resource agencies and other organizations would be used and would allow data comparison with other areas of Alaska. Two years of data (see Criterion 1.3.7 below) would be collected to document use of the Project area by waterbirds and to provide insights into annual variability in species composition and the timing and magnitude of migration and nesting. Habitat-use evaluations can be conducted using the survey data for breeding waterbirds and migrants, enabling quantitative assessments of habitat loss and alteration, as described in Criterion 1.3.5 above.

Waterbirds use lakes, rivers, and flooded wetland areas during migration. A fixed-wing aircraft or helicopter would be used to conduct aerial surveys for birds during migration periods. Surveys would be conducted at 10-day intervals during the spring (April–May) and fall (late August–October) migration periods, resulting in about 6 surveys in spring and about 8 surveys in fall. The survey will be designed to fly a lake-to-lake pattern and to follow rivers parallel to the river course to allow observers to view waterfowl on the water and along the shoreline. A single observer records all data on a hand-held digital recorder, which is later transcribed into a computer database for analysis. Data can be summarized by species, species-group, lake group or river segment, date of survey, and survey area. Surveys results determine species composition, the timing of migration, and identify areas important to migrating waterbirds.

Surveys for breeding waterbirds, primarily waterfowl, would follow the current USFWS Standard Operating Procedures for Aerial Waterfowl Breeding Ground Population and Habitat Surveys (USFWS and CWS 1987). The survey is designed to follow transect lines that are spaced approximately 800 meters apart and aligned to cover the largest possible number of water bodies and wetlands. The placement of the transect lines are determined prior to the survey using aerial imagery or topographic maps. The survey is conducted in a fixed-wing aircraft with a pilot and two observers, one on each side of the aircraft. The observers look for waterbirds in a 400-meter swath on either side of the aircraft and record observations on hand-held digital recorders. Surveys should be flown in late May or early June when breeding pairs are visible on territories and not yet on nests. Survey timing can affect survey results because the nesting phenology of dabbling ducks is slightly earlier than diving ducks, and some dabbling duck species can be missed if the survey occurs too late, after the cryptically colored females are on nests and more brightly colored males have left the area. Two surveys, spaced about 2 weeks apart, would be conducted to target the peak timing of breeding for dabbling and diving ducks. Survey data can be used to calculate annual densities for each species of waterfowl.

Harlequin Ducks predominantly use streams for foraging and they nest in adjacent shoreline habitats. Male Harlequin Ducks are only present on breeding streams during a short period in spring when courting females, so a pre-nesting survey is scheduled at that time to quantify the number of nesting pairs occupying a stream. After nesting, successful females are visible on streams with their broods, and failed breeders often group together. Surveys for pre-nesting and brood-rearing Harlequin Ducks are flown in a helicopter with two observers seated on the same side. Surveys are generally flown in an upriver direction and the helicopter is positioned over the bank of the river to give the observers an unobstructed view of the entire width of the watercourse. To account for the annual variation that may occur in the occurrence of the peak number of breeding pairs and brood-rearing females on a stream, 2 years of pre-nesting and brood-rearing surveys are recommended. Two pre-nesting surveys, spaced 7–10 days apart, would be flown in late May each year and 2 brood-rearing surveys, spaced 7–10 days apart, would be conducted in late July–early August each year. Survey data can be used to calculate linear densities (ducks per kilometer) and to identify streams important to breeding Harlequin Ducks.

Information on waterbirds breeding in specific areas that would be directly affected by the Project infrastructure or activities would be collected by biologists conducting foot surveys of suitable water bodies and wetlands. These surveys would be conducted in early to midsummer during the brood-rearing period to record the presence of adults accompanied by broods of juveniles.

In addition to aerial surveys and ground-based brood-rearing surveys, the use of portable marine radars will be evaluated during study planning as a potential method for documenting

the migratory movements of birds through the Project area (Cooper et al. 1991, Gauthreaux and Belser 2003), for use in assessing the risk of collision mortality.

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 aerial survey effort for waterbirds would involve a 2-year sampling program starting in April 2013 and continuing through October 2014. Aerial surveys are the most cost-effective and efficient way to document the use of the Project area by waterbirds during migration and the breeding season. Although ground-based surveys are not a cost-effective and efficient alternative method to document waterbirds over a large area, they are effective in smaller, well-defined areas, such as areas proposed for facility construction.

Three different types of aerial surveys would be used for waterbirds during migration and the breeding season, involving different types of survey aircraft. Migration surveys can be conducted in a fixed-wing aircraft or a helicopter, the latter being more effective where the survey area is hilly or too restrictive for maneuvering in a fixed-wing aircraft. The migration surveys conducted for the original Susitna Hydroelectric Project were conducted principally by helicopter. A total of 14 migration surveys would occur at 10-day intervals in two seasonal periods (April–May and late August–October in 2013 and 2014), requiring one observer and a pilot.

Aerial surveys for breeding waterbirds occupying lakes and wetland areas are traditionally flown in a fixed-wing aircraft with two observers and a pilot. Surveys are flown in late May or early June and one survey will suffice to document breeding densities, although two surveys, spaced two weeks apart, would assure that peak densities of both dabbling and diving ducks are documented.

A small piston helicopter, such as the Robinson R44® (Robinson Helicopter Company, Torrance, California), is the preferred survey platform for Harlequin Duck surveys because the survey is flown at fairly slow speed along winding streams. Both pre-nesting and brood-rearing surveys serve to document the presence of breeding Harlequin Ducks and, because of annual variability in the timing of these breeding stages, two pre-nesting and two brood-rearing surveys would be flown to capture the period of peak abundance on streams. Pre-nesting surveys, spaced 7–10 days apart, would be flown in late May and brood-rearing surveys, spaced 7–10 days apart, would be conducted in late July–early August.

Deployment of portable marine radar units for migration studies would require sampling during the same migration periods described earlier for the aerial surveys. A helicopter would be required to sling the equipment to the sampling sites.

1.3.8. Literature Cited

ABR, Inc. 2011. Wildlife data-gap analysis for the proposed Susitna-Watana Hydroelectric Project. Draft report, August 16, 2011. Report for the Alaska Energy Authority by ABR, Inc.—Environmental Research & Services, Fairbanks, Alaska. 114 pp.

ADF&G (Alaska Department of Fish and Game). 2006. Our Wealth Maintained: A Strategy for Conserving Alaska's Diverse Wildlife and Fish Resources. Alaska Department of Fish and Game, Juneau, Alaska. 842 pp.

AEA (Alaska Energy Authority). 2011. Pre-Application Document: Susitna-Watana Hydroelectric Project, FERC Project No. 14241. December 2011. Prepared for the Federal Energy Regulatory Commission by the Alaska Energy Authority, Anchorage, Alaska.

BLM (Bureau of Land Management). 2010. BLM–Alaska sensitive animal and plant lists. Alaska State Office, Anchorage.

Conant, B., J. I. Hodges, D. J. Groves, and J. G. King. 2007. Alaska Trumpeter Swan status report, 2005. U. S. Fish and Wildlife Service, Juneau. 49 pp.

Cooper, B. A., R. H. Day, R. J. Ritchie, and C. L. Cranor. 1991. An improved marine radar system for studies of bird migration. Journal of Field Ornithology 62: 367–377.

FERC (Federal Energy Regulatory Commission) and USFWS (U.S. Fish and Wildlife Service). 2011. Memorandum of Understanding between the Federal Energy Regulatory Commission and the U.S. Department of the Interior United States Fish and Wildlife Service Regarding Implementation of Executive Order 13186, "Responsibilities of Federal Agencies to protect Migratory Birds." March 2011. 13 pp.

Gauthreaux, S. A., and C. G. Belser. 2003. Radar ornithology and biological conservation. The Auk 120: 266–277.

Goldstein, M.I., D. Martin, and M.C. Stensvold. 2009. U.S. Forest Service 2009. Alaska Region Sensitive Species List: Assessment and Proposed Revisions to the 2002 List. Juneau, Alaska. Available online: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev2_037658.pdf (accessed March 27, 2012).

Kessel, B., S. O. MacDonald, D. D. Gibson, B. A. Cooper, and B. A. Anderson. 1982. Susitna Hydroelectric Project environmental studies, Phase I final report—Subtask 7.11: Birds and non-game mammals. Report by University of Alaska Museum, Fairbanks, and Terrestrial Environmental Specialists, Inc., Phoenix, NY for Alaska Power Authority, Anchorage. 149 pp.

Mallek, E. J., and D. J. Groves. 2009a. Alaska–Yukon waterfowl breeding population survey. U.S. Fish and Wildlife Service, Fairbanks and Juneau, AK. 30 pp.

Mallek, E. J., and D. J. Groves. 2009b. Map of transects within Stratum 2 (Nelchina) of the Alaska–Yukon Waterfowl Breeding Population Survey [map of Interior Alaska portion of the survey]. 1 p.

USFWS (U.S. Fish and Wildlife Service). 2008. Birds of Conservation Concern, 2008. Division of Migratory Bird Management, Arlington, Virginia. 85 pp. Available online: http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf (accessed November 2011)

USFWS (U.S. Fish and Wildlife Service) and CWS (Environment Canada, Canadian Wildlife Service). 1987. Standard operating procedures for aerial breeding ground population and habitat surveys in North America. Migratory Bird and Habitat Research Laboratory, Patuxent Wildlife Research Center, Laurel, MD.