

# Susitna-Watana Hydroelectric Project Document

## ARLIS Uniform Cover Page

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### 1.1. Brown Bear and Black Bear Distribution, Abundance, 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 study is to obtain sufficient information on brown bears (*Ursus arctos*) and American black bears (*Ursus americanus*), which are important predators and game animals in the region, to use in evaluating Project-related effects and identifying measures to avoid, minimize, or mitigate those effects.

The study area encompasses the proposed Project reservoir impoundment zone and potential access and transmission-line routes from the west and the north (AEA 2011), which is referred to here as the greater Project area. Most of the area is within Game Management Unit (GMU) subunits 13E and 13A. Some work would be conducted downstream from the proposed Watana dam site, primarily in tributary drainages that contain spawning runs of anadromous fishes.

Project development will inundate or modify habitats used seasonally by brown bears and black bears. In addition, the associated development infrastructure and human activities in the area during construction and operation will have indirect effects on bears through changes in prey populations including moose, caribou, and salmon and changes, disturbance, and changes in human hunting patterns. Data collected through this bear study will provide information on the value of lost or altered habitat for bears in the area.

Three primary objectives have been identified for this study:

- 1) Estimate the current populations of brown bears and black bears in the greater Project area, using existing data from ADF&G;
- 2) Evaluate bear use of streams supporting spawning by anadromous fishes in potentially altered habitats downstream of the proposed dam; and
- 3) Synthesize historical and current data on bear movements and seasonal habitat use in the greater Project area, including the substantial body of data gathered by radio-tracking during the 1980s, as a continuation of 2012 study W-S1 (AEA 2012a).

#### 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.]

ADF&G is responsible for the management, protection, maintenance, and improvement of Alaska's fish and game resources in the interest of the economy and general well-being of the State (AS 16.05.020). ADF&G monitors bear populations and manages subsistence and sport hunting for bears on State lands (5 AAC 85.015 and 85.020), through regulations set by the Board of Game (AS 16.05.255). The Federal Subsistence Board, which comprises representatives from the U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Bureau of Indian Affairs, and U.S. Forest Service, oversees the Federal

Subsistence Management Program (57 FR 22940; 36 CFR Parts 242.1–28; 50 CFR Parts 100.1–28), with responsibility for managing subsistence resources on Federal public lands, including bears, for rural residents of Alaska.

The ADF&G management objective for brown bears in GMU 13 is to maintain a minimum population of 350 (Tobey and Schwanke 2009). The management objective for black bears in GMU 13 is to maintain the existing population of black bears with a sex structure that will sustain a harvest of at least 60 percent males (Tobey 2008). Bears in GMU 13 are of interest both as predators of caribou and moose and as important game species.

GMU 13 is an intensive management area where predator control measures are implemented to increase caribou and moose populations. In GMU 13, predator control measures have included land-and-shoot harvest of wolves and liberalized regulations for the harvest of wolves and bears. ADF&G has concluded that adequate data generally are available for brown bears and black bears in the greater Project area to evaluate potential impacts of the Project, but “information on downstream use of habitat and the importance of salmon in bear diets in conjunction with impacts to salmonids would aid in identifying potential impacts to bears downstream of the dam” (M. Burch, ADF&G memorandum to AEA, 22 November 2011). ADF&G does not consider bear dens to be “sensitive” locations because they are seldom reused (M. Burch, ADF&G memorandum to AEA, 20 December 2011).

**1.3.3. If the requester is not a 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.**

The original Alaska Power Authority Susitna Hydroelectric Project (SHP) included studies of the population size and density, demography, seasonal movements, dispersal, den locations, and predation rates on moose calves by both brown and black bears from 1980 to 1985 (ABR, Inc. 2011). No studies of bears were conducted downstream from Devils Canyon. The density of brown bears in the upstream area was estimated to be 29.7 bears/1,000 km<sup>2</sup> (Miller 1987). Approximately 12 percent of the relocations ( $n = 1,720$ ) of radio-collared brown bears occurred in the area that would have been inundated by the SHP Low Watana reservoir; bears used that area twice as frequently as expected both in the spring and for all months combined. This pattern of use was evident for males and most females, but not for females accompanied by cubs of the year (COY). Bears spent the highest proportion of time in the Watana impoundment zone during June, when they foraged on south-facing slopes for roots, new vegetation, and overwintered berries, and preyed on moose calves. Females with COY tended to stay at higher elevations, possibly to reduce the risk of predation on cubs by male brown bears (Miller et al. 1997).

Brown bears preyed on moose calves from late May to early June, with predation rates declining substantially by mid-July (Ballard et al. 1990). In addition to moose calves, the Susitna bear population had access to salmon, which is unusual for brown bears in interior Alaska. Bears, especially males, moved to the Prairie Creek drainage, southwest of Stephan Lake (between the Devils Canyon and Watana dam sites), during July and early August to feed on spawning Chinook salmon (LGL 1985). Despite the availability of protein-rich animal foods,

berry production appeared to be a major factor limiting brown bear productivity in the Susitna study area (LGL 1985). Miller (1987) estimated berry abundance and canopy coverage within and above both impoundment zones proposed for the original SHP. Horsetails (*Equisetum* spp.), an important spring food, were more abundant outside the impoundment zones, but some sites with abundant horsetails would have been inundated by the proposed reservoirs (Helm and Mayer 1985). An ADF&G study of brown bear movements and demography in GMU 13A is nearing conclusion; that study area is located south of the proposed reservoir inundation zone for this Project.

The density of black bears was estimated to be 90 bears/1000 km<sup>2</sup> in the 1980s (Miller 1987); that density estimate has not been updated since (Tobey 2008). Although black bears in the upper basin occasionally ate moose calves, berries appeared to be their most important food source (LGL 1985). Black bears spent most of their time in forested areas along creek bottoms, but moved out into adjacent shrublands during late summer as they foraged for berries, particularly in the area between Tsusena and Deadman creeks (Miller 1987).

**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.**

The Project ~~is likely to will~~ result in wildlife habitat loss and alteration, blockage of movements of mammals, disturbance, and changes in human activity and access due to construction and operation of the Project. Bears often pose management challenges for large development projects in Alaska because of their attraction to areas of human activity and associated waste-handling facilities; proper disposal of anthropogenic wastes is important for minimizing such problems.

The bear study addresses the following direct, indirect, and cumulative effects of the project (AEA 2011):

- W1: Potential direct loss and alteration of wildlife habitats, including key habitat features, from Project construction and operation;
- W2: Potential direct physical and behavioral blockage and alteration of movements due to reservoir water and ice conditions, access and transmission-line corridors, and new patterns of human activities;
- W3: Potential changes in wildlife mortality rates due to Project-related fluctuations in water and ice conditions in the reservoir zone and downstream river reaches;
- W4: Potential cumulative impacts of changes in predator and prey abundance and distribution related to increased human activities and habitat changes resulting from Project development; and
- W5: Potential indirect impacts on wildlife from changes in hunting, vehicular use, noise, and other disturbance due to increased human presence resulting from Project development.

The study results would provide the following information for the licensing process:

- Providing baseline data on ecologically important large mammals in the Project area;
- Providing habitat-use data for developing habitat evaluation criteria; distribution during harvest periods for the separate wildlife harvest analysis study beginning in 2012 (AEA

2012b); abundance, productivity, and potential impacts for subsistence users; survival and mortality for predator-prey relationships and mortality risk assessments; and

- Providing a basis for impact assessment; developing any necessary protection, mitigation, and enhancement measures; and developing resource management and monitoring plans.

**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.**

A multi-faceted approach will be used to address the need for current information on bears in the Project area:

- Reanalysis of 1980s data and synthesis with current data from ongoing ADF&G telemetry studies and other regional management studies will provide additional data on bear populations, movements, and habitat use (AEA 2012a).
- Surveys of bear use of spawning streams in the middle reach of the Susitna River and associated tributaries downstream from the proposed Watana dam site will be conducted to assess the use of those resources for bears in the Project area. The surveys would be conducted by monitoring streams using a combination of ground-based stream surveys incorporating time-lapse photography and DNA sampling from hair snares to quantify the bear population using the downstream area. Hair snares would be deployed along game trails and scent stations in a grid pattern centered on the Susitna River (downstream from the dam site and upstream from Talkeetna). DNA analysis of the hair samples would provide information on the sex and species of bear, the number of different individuals, and stable isotope signatures. The isotopic signature would be used to classify the proportion of the diet made up of salmon, terrestrial meat, or vegetation (Fortin et al. 2007). If adequate samples are obtained, mark-recapture analysis of the hair samples would provide a population estimate of the number of bears using the sampling area (Immel and Anthony 2008, Gardner et al. 2010).
- Evaluation of berry resources in the reservoir inundation zone can be accomplished during the concurrent mapping efforts for vegetation, wetlands, and wildlife habitats to assess the distribution and abundance of berry plants as forage for bears.

**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.**

Synthesis of existing data (AEA 2012a) is a cost-effective method to assess many of the potential impacts of the proposed Project on bears. An extensive amount of movement data were gathered from telemetry surveys in the 1980s and a current study by ADF&G is drawing to a close in the Nelchina study area in GMU subunit 13A, which is located south of the reservoir impoundment zone.

Bear use of salmon-spawning streams in a large area of forested habitat can be difficult to assess. Sightability of bears from aerial surveys of forests is low and the large Project area makes direct observations from the ground problematic. Stable-isotope analysis of bear hair provides an indirect estimate of the major components of bear diets without requiring capture and handling of bears. Approximately 1 to 2 weeks of field time by a crew of two biologists

would be required in mid-summer to establish the hair-snare grid between the proposed dam site and Talkeetna. The hair-snare stations then would be checked at weekly intervals during late summer, when use of the area is expected to be highest.

Collection of data on berry distribution and abundance in the reservoir impoundment zone would be conducted during the vegetation and wetland field surveys, eliminating the need for separate field surveys.

The current content of this Study Plan Request reflects agency comments to FERC and statements made during work group meetings convened by AEA. The schedule, staff assignments, and costs will be detailed further in the proposed 2013–2014 study plan.

### 1.3.8. Literature Cited

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