

***Preliminary Study Concepts and
2002 Data Collection Method
for Relicensing of the
Cooper Lake Project (FERC No. 2170)***

**Prepared by
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1 BACKGROUND

1.1 Introduction

Chugach Electric Association, Inc. (Chugach), has recently initiated the process to relicense its Cooper Lake Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) No. 2170. The existing operating license for the Project was issued on May 1, 1957, and is scheduled to expire on April 30, 2007. In accordance with FERC regulations, Chugach must file an application for a new license on or before April 30, 2005 (24 months before license expiration). Chugach has prepared this document to provide conceptual-level information on relicensing studies that it is currently envisioning conducting and to facilitate further study planning through ongoing consultation with relicensing participants over the next few months.

As part of the FERC relicensing process, an applicant for a new license for an existing hydropower facility must consult with resource agencies and other interested parties regarding studies needed to characterize the existing environment in the project area and address ongoing and future project impacts. As the first formal step in this consultation process, Chugach issued the Initial Consultation Package (ICP) for the Cooper Lake Project relicensing on June 7, 2002. The ICP contains a summary of existing information on project facilities, operations, and economics, as well as on project-area environmental resources. The purpose of the ICP is to help the license applicant and relicensing participants identify gaps in existing information that need to be filled to evaluate project impacts and identify studies to address these information needs. The second formal step in the consultation process was the joint agency/public meeting and site visit, held in Cooper Landing on July 9–10, 2002. The meeting / site visit in the FERC relicensing process is intended to provide agencies and other relicensing participants with the opportunity to comment verbally on the ICP for the record and to tour project facilities. The next formal consultation milestone in the process is the submission by relicensing participants of written comments on the ICP. The written comments are to include requests for studies that the commentors view as necessary to fill gaps in existing information to address possible project impacts. Based on FERC regulations, the comment letters for the Cooper Lake Project relicensing are due to Chugach by September 9 (60 days after the meeting / site visit).

In addition to the formal consultation steps, over the last several months, Chugach has engaged in periodic discussions with relicensing participants to obtain guidance on agency resource objectives, likely relicensing study needs, and appropriate near-term baseline data-collection efforts. Based on this input, the ICP included a general list of proposed relicensing studies (to be conducted starting in 2003) and a list of data collection to begin in 2002 to help document baseline conditions and plan for studies. Chugach's intent has been to develop full study plans based on the study requests it anticipated receiving in the ICP comment letters, results of the 2002 preliminary data collection, and input from a planned fall workshop with relicensing participants. However, at the July 9–10 meeting / site visit, agency representatives indicated that

it would be helpful as they draft their comment letters if Chugach could provide as much detail as possible at this point on anticipated relicensing studies. In addition, agency representatives indicated that additional information on planned 2002 data-collection efforts was needed to help agencies understand the scope and methods of these near-term efforts and gain a level of comfort that this work was going to be useful for upcoming relicensing studies.

The purpose of this document, therefore, is to provide additional detail regarding relicensing studies Chugach currently envisions conducting in 2003, as well as details regarding the scope and methods of near-term (2002) data collection. With the timing of issuance of this document, approximately 30 days prior to the September 9 deadline for comments on the ICP, Chugach hopes that the document will help relicensing participants develop their written study requests. The timing of this document and participants' comment letters will also facilitate development of detailed draft study plans for participant review this fall, rather than in early 2003, as had previously been planned.

As noted above, there are two general components of information presented in this document. The first is a description, rationale, and general study approach for relicensing studies Chugach envisions conducting in 2003. This information is *not* intended to provide the level of detail that will be included in future detailed study plans. Before development of the draft study plan for each study, Chugach needs the input from agencies that will be provided in the September 9 comment letters in order to avoid the premature investment of substantial time and effort to develop a detailed study plan for an area of study (or proposing a particular methodology) that would not meet agency information needs or that agencies would otherwise view as inadequate or inappropriate.

The second general aspect of this document comprises details regarding the scope and methodologies of 2002 ("baseline") data-collection efforts to support planning and implementation of the proposed relicensing studies. These details reflect input from agency representatives at meetings in mid-May 2002, the recommendations of resource experts from HDR Alaska, Inc. (Chugach's lead contractor for the environmental studies for relicensing), and subsequent discussions between HDR and individual agency resource experts.

1.2 Approach to 2002 Data Collection

The purpose of the data collection being conducted in 2002 is to characterize existing (baseline) conditions as the basis for developing and conducting more in-depth studies beginning in 2003 to assess possible Project impacts. The 2002 data collection is aimed at ensuring that the necessary foundation is in place to develop focused study plans and conduct studies in 2003.

To help identify appropriate data-collection efforts for 2002, Chugach and its environmental resource consultants met with agency resource experts in May 2002 to obtain guidance on which "baseline-type" data-collection efforts would be appropriate to conduct during this preliminary field season and would be advantageous to have completed prior to beginning formal relicensing studies in 2003.

After the meeting with agency resource experts in May and during the joint agency/public meeting in July, study leads from HDR consulted individually with agency experts to discuss

specific data-collection methods and activities. These discussions were aimed both at communicating more fully Chugach's plans for the 2002 data collection and at obtaining further detailed guidance from agencies regarding the scope and preferred methods for these efforts. The 2002 data-collection efforts described in the sections below were selected by Chugach and its team on the basis of this input, as well as consideration of anticipated needs for 2003 studies, and scheduling and budget constraints.

1.3 Approach to 2003 Studies

The studies that Chugach currently envisions conducting during the relicensing process, beginning in 2003, also are described in this document. Chugach has identified these studies based in large part on input received from agency representatives during preliminary outreach conducted in late 2001 and during meetings held to date in 2002 with relicensing participants (including a meeting in March on the relicensing process, the meeting in May to discuss 2002 data collection and potential relicensing studies, and the joint meeting in July). In addition, the current list of anticipated relicensing studies reflects the understanding of Project operations and relicensing requirements by Chugach and its relicensing team, including the HDR resource study leads.

As mentioned above, Chugach will be developing detailed study plans after reaching agreement with relicensing participants on the general proposed study approaches. The study plans will be written to incorporate the guidance received during the preliminary consultation that has been conducted to date as well as the study requests that will be included in the September 9 ICP comment letters. The study plans will also be based on the results of the preliminary information gathering in 2002, which will be used to help refine the study approach.

The detailed study plans will be issued in draft form for review and comment by relicensing participants. Chugach currently anticipates that draft study plans will be issued in early October for discussion with relicensing participants at a workshop in November. Following the workshop, and based on comments received on the draft study plans, the study plans will be finalized. The target for finalizing the study plans is by the end of December 2002.

1.4 Summary of Project Facilities and Operations

1.4.1 Facilities

The Project facilities are located on Cooper Creek, Cooper Lake, and Kenai Lake. The powerhouse, penstock and intake structures are located on State-owned land. The dam and reservoir are located within the Chugach National Forest. The Project transmission line from Kenai Lake (Quartz Creek Substation) to Anchorage crosses land located in both the Kenai Peninsula and Anchorage boroughs and owned by a number of different entities, including Chugach National Forest and the State of Alaska.

The primary components of the Project are:

- Cooper Lake Dam, a rock-and-fill structure across Cooper Creek at the outlet of Cooper Lake.

- Cooper Lake, a natural lake that has been increased in area to 3,100 acres by the dam.
Note: Since 1985, the water surface of the reservoir has been maintained at an elevation 16 feet below licensed normal maximum pool elevation of 1,210 feet mean sea level (msl) for dam safety considerations. The current surface area of the reservoir at the current full pool elevation of 1,194 feet msl is 2,600 acres.
- An intake structure, located approximately 5 miles southeast of the dam. Elevation of the invert of the opening to the tunnel/penstock is at 1,151 feet msl (43 feet below the water surface at the current full pool elevation).
- A tunnel, conduit, and penstock extending 10,300 feet east from Cooper Lake to the Cooper Lake Powerhouse on Kenai Lake.
- Cooper Lake Powerhouse, containing two turbine/generator units, each rated at 9.69 MW (upgraded from 7.5 MW in 2000).
- A 6.3-mile-long 69-kV transmission line from the Cooper Lake Powerhouse to the Quartz Creek Substation.
- Switching and transformer facilities in the Quartz Creek Substation.
- A 90-mile-long 115-kV transmission line from the Quartz Creek Substation to the Anchorage Substation.

1.4.2 Operations

The Project stores all inflow to Cooper Lake and diverts the entire natural outflow from the reservoir through the tunnel/penstock to the powerhouse, which discharges into Kenai Lake. The diverted natural flow ranges on average from around 8 cfs during late winter / early spring to about 280 cfs during early summer snowmelt, based on calculated inflows to Cooper Lake. Average annual inflow to / discharge from the reservoir is approximately 72,500 acre-feet.

Construction of Cooper Lake Dam eliminated the direct lake outflow to Cooper Creek and modified the historic water level fluctuation of Cooper Lake. Prior to dam construction, the lake surface elevation fluctuated approximately 1 to 2 feet during an average year with an average elevation of 1,168 msl. The reservoir now fluctuates an average of 11.2 feet annually and has an annual average elevation of 1,181 feet msl (Cooper Creek Watershed Analysis, USFS 2002). The reservoir is typically at its lowest elevation in May each year and then slowly rises toward its highest level, typically in December. In conjunction with relicensing of the Project, Chugach is proposing modifications to Cooper Lake Dam and spillway that would allow the dam to be able to safely pass the Probable Maximum Flood (PMF). These modifications would also allow the reservoir level to be raised from its current normal maximum elevation of 1,194 feet msl to a normal maximum of 1,206 feet msl. Future operations under this proposal would entail water surface fluctuation at an average higher reservoir level and could also entail a greater range of annual fluctuation in some years.

Chugach has taken note of the interest expressed by various relicensing participants in exploring other alternative Project operating scenarios, in particular, the possibility of re-establishing some quantity of flow from Cooper Lake into Cooper Creek under the new Project license. To develop information to accommodate this interest, Chugach is proposing to conduct various relicensing studies that will evaluate the potential implications of re-establishing flows from Cooper Lake into Cooper Creek.

Electricity generated at the powerhouse (which averages approximately 50,500 megawatt-hours per year) is transmitted to the Quartz Creek Substation, where it is transferred to the transmission line extending to the Anchorage Substation.

2 FISH AND AQUATIC RESOURCE STUDIES

A suite of studies is proposed for assessing current fish and aquatic resources in the Project area and evaluating existing and/or potential future impacts of continued Project operations on these resources. The proposed studies would be conducted beginning in 2003, and results of preliminary data collection in 2002 will be used to guide the planning for these studies. Detailed study plans will be developed and implemented for the topics described below after receipt of the September 9 comment letters. Associated data-collection efforts the 2002 field season also are described below.

2.1 Cooper Creek Existing Conditions

2.1.1 Proposed Studies and General Approaches

Studies will be conducted to characterize existing habitat and fish use in Cooper Creek. By defining current conditions, these studies will provide data essential for evaluating Project effects and potential future scenarios. Two primary research areas are currently proposed:

- Existing habitat mapping/description. Fish habitat in Cooper Creek will be mapped and characterized in accordance with generally accepted, standard protocol. At an August 8, 2002, meeting regarding fish study approaches and methodologies, resource agency experts jointly recommended that the USFS protocol for habitat mapping be used for Cooper Creek. This methodology entails mapping stream habitat features against a set of habitat definitions for particular stream types, and also calls for collecting periodic measurements of physical stream characteristics such as gradient and cross-sectional profile. Based on the agencies' preference, Chugach will use the USFS protocol for this study. Also as recommended by the agencies, stream habitat along the entire length of Cooper Creek will be mapped. The goal of the effort will be to map most of the stream at the USFS protocol's "Tier 3" level. However, as discussed during the meeting, the protocol will be tailored in terms of level of detail of the mapping according to the physical characteristics of the various stream reaches. For example, reaches comprising the falls and other steep canyon sections may be mapped in relatively less detail (Tier 3), while selected reaches with more critical fish habitat, such as the alluvial fan at the lower end of the creek, may be mapped to a higher level of detail, using the criteria for Tier 4. The basemap for the habitat mapping will be developed from digitized USGS maps and existing aerial photography, which can be assembled relatively quickly so that the field work can be completed this summer / early fall before high flows resume. An

enhanced basemap will also be developed using low-level aerial photography this fall, after leaf fall; the field data will be transferred to the enhanced map for digitizing and study planning.

- Description of existing fish use within designated habitats. Fish use of the creek will be evaluated for each species present through stream surveys. Agency fish biologists have jointly recommended conducting fish surveys within each of the major habitat types in the creek (e.g., pools and riffles), to characterize fish density for each habitat type and (by extrapolation using the habitat mapping described above) the creek as a whole. ADF&G has specifically expressed a preference for use of the Hankin and Reeves methodology, which involves statistically selecting representative areas to sample, systematically sampling fish in each area to obtain an estimate of fish density for each habitat type. Based on this recommendation, Chugach proposes to use the Hankin and Reeves (or comparable) methodology for this study. Because of the wide range of physical stream characteristics along Cooper Creek, however, the methodology may need to be tailored to accommodate the practicality of applying the method for each stream segment type. Possible methods to be employed include snorkeling, minnow trap depletion, and/or electroshocking. Results of the surveys will be used to estimate relative density of fish of various life history stages within the respective habitat types. Overall fish numbers will be estimated from the surface areas of habitat types.

2.1.2 2002 Data Collection Activities and Methods

Agency fish biologists have emphasized the importance of conducting the stream habitat surveys in Cooper Creek as a cornerstone of planning for future study efforts, including the hydraulic modeling described in Section 2.2, below. For this reason, Chugach plans to accomplish the habitat mapping in 2002 using the USFS protocol. Representatives from the USFS have expressed willingness to assist in this effort by working in the field with the habitat mapping team on application of the USFS protocol. The low-level aerial photography for development of the enhanced basemap is also a proposed activity for this field season. The photography would likely be accomplished by helicopter in October, under conditions to minimize effects of canyon shading, which would obscure the visibility of channel features.

For the description of existing fish use, fieldwork in 2002 will focus on evaluating sampling methodologies in Cooper Creek to determine which approaches will be most effective and practical in this setting. Techniques to be tested will include snorkeling, minnow trap depletion, and backpack electroshocking.

2.2 Hydrology and Water Quality

2.2.1 Proposed Studies and General Approaches

Discussions to date with agency representatives suggest that hydraulic modeling would be a useful and important approach for evaluating existing physical stream conditions and potential conditions in Cooper Creek under alternative flow scenarios. The current and potential future effects of Project operations on Cooper Creek hydrology and water quality are therefore

proposed to be assessed using a combination of studies. These studies would include evaluation of specific water quality characteristics of Cooper Creek and Cooper Lake (seasonal reservoir temperature information is essential for downstream temperature modeling) and characterization of Cooper Creek hydrology and stream habitat for application to hydraulic modeling. The results of preliminary information gathering in 2002 (described below), further discussions with the resource agencies, comments received in the comment letters due September 9, and recommendations of Chugach's relicensing and resource experts will be used to develop a formal study plan for the 2003 field season. Currently, the following general study efforts are proposed for 2003:

- Track water quality in Cooper Creek with emphasis on sediment-related parameters.
- Continue monitoring begun in 2002 of flow and temperature in the Cooper Creek drainage and in Cooper Lake. Improve the 2002 data collection installations as necessary.
- Collect data for hydraulic modeling efforts on Cooper Creek in accordance with guidance from agencies. Agencies have indicated in general that use of the Instream Flow Incremental Methodology (IFIM), including aspects such as physical habitat modeling (using the PHABSIM or similar model) and temperature modeling (using the SNTMP model), is the preferred approach. The IFIM modeling efforts will allow description of current conditions and prediction of conditions under alternative flow and temperature regimes. The hydraulic modeling will also allow evaluation of the potential effects of periodic large flow events in the creek (either uncontrolled events such as spill resulting from a large storm, or controlled events such as "flushing flows" to remove accumulations of fine sediments) — information that agency representatives have indicated is also necessary for the relicensing analysis. At the August 8 meeting with agency representatives, agencies expressed that it would be necessary to have the results of the habitat mapping available before specifics of the IFIM study (e.g., transect placement) can be determined.
- Collect stream habitat data on Cooper Creek (see preceding study description).

2.2.2 2002 Data Collection Activities and Methods

Reconnaissance and preliminary physical data collection to support 2003 hydraulic modeling work is underway. These preliminary efforts include general stream reconnaissance (to collect stream measurements and reconnaissance-level mesohabitat information), installation of flow and temperature monitoring equipment, and preliminary water surface elevation survey and flow measurements. In addition, as noted above in section 2.1.2, habitat mapping in Cooper Creek will be completed in 2002, which will provide information necessary for developing the final hydraulic modeling study plan.

During the stream reconnaissance work this summer, sites for temperature and flow monitoring were located on Cooper Creek above Stetson Creek and on Stetson Creek near its confluence with Cooper Creek. The proposed monitoring locations were discussed with agency representatives at the August 8 meeting. Temperature and flow monitoring stations will be installed on Cooper Creek above Stetson Creek and on Stetson Creek in August 2002. Each station's instrumentation will include a Dryden Instrumentation R2 data logger, a pressure

transducer to measure water level (accuracy 0.01 ft.), and a thermistor temperature sensor (accuracy 0.1° C). The monitoring stations on Cooper Creek and Stetson Creek will continuously record data at 1-hour intervals. Control sections will be established for the flow monitoring stations on upper Cooper Creek and Stetson Creek. Discharge measurements will be made at the control sections to create a stream flow-rating curve for each station.

In addition to the two monitoring stations in Cooper and Stetson creeks, a temperature monitoring station will be installed at the northwest end of Cooper Lake to obtain reservoir temperature profiles near the dam. A thermistor string, weighted and suspended within the reservoir, will be connected to a Dryden Instrumentation R2 data logger located onshore. The thermistor string will include seven thermistors, spaced at 3-meter intervals beginning at 0.5 m below the reservoir surface, with an additional thermistor located at depth of 1.5 m (i.e., the thermistors will be placed at depths of 0.5 m, 1.5 m, 3 m, 6 m, 9 m, 12 m, and 15 m). The reservoir temperature monitoring station will continuously record data at 4-hour intervals.

2.3 Prediction of Cooper Creek Fish Habitat and Use Under Alternative Streamflow Scenarios

This proposed study would be conducted using updates to existing data and the habitat mapping and hydraulic modeling outlined in the preceding study descriptions. The purpose of the study is to evaluate potential fish habitat and use of Cooper Creek under alternative streamflow scenarios, for comparison to existing conditions.

At the May meetings with relicensing participants to get suggestions on potential relicensing studies, and at the August 8 meeting with agency fish biologists to discuss specific methodologies, agency representatives suggested the use of paired stream analysis as an additional, qualitative means of evaluating potential fish use in Cooper Creek under alternative flow/temperature scenarios. Chugach, however, does not propose to use the paired stream analysis approach because of concern that the effort would be extensive, duplicative, and unlikely to provide definitive results to assess potential conditions in Cooper Creek. The rationale for this position is as follows:

- First, comparing other streams to Cooper Creek would involve the same type of habitat mapping and fish use studies described in section 2.1 for other streams or stream reaches as the basis for comparison. These studies involve extensive field effort and would add significantly to the time and cost of the Cooper Creek assessment.
- Second, the approach is not likely to contribute significant information about either baseline conditions or the outcome of future operation scenarios for the following reasons:
 - All streams are different, and questions of comparability would always be present. Locating a truly comparable stream is unlikely. Initial reconnaissance of the full length of Cooper Creek has demonstrated that the creek consists of at least five very different segments (lake to falls, falls/cascade area, lower falls to Stetson Creek, canyon segment, and lower alluvial fan segment). Comparable stream analysis would, at best, only address one of those segments. Even for specific reaches, the comparability is probably limited. For example, Juneau Creek is south facing which would call into question any

comparison to north-facing Cooper Creek, even on a reach-by-reach basis. Further, unlike for other potentially comparable streams in the area, Cooper Creek's alluvial fan has been significantly impacted by hydraulic mining, which would limit the ability to use paired stream analysis to determine the effects of an altered flow/temperature regime in Cooper Creek.

- The baseline being described for the purposes of relicensing is the existing condition not the historical condition, which a paired stream analysis would be best used to estimate.
- While it would require extensive field effort, the comparative approach would nevertheless yield only a qualitative comparison, and thus would not provide information sufficient to quantitatively predict the effects of specific alternatives for Cooper Creek.
- Third, the agency-recommended hydraulic modeling that Chugach is proposing to use will be an extensive effort in and of itself, and will allow rigorous evaluation of potential alternative habitat configuration options (e.g., associated with alternative flow and temperature regimes) for Cooper Creek.

2.4 Littoral Zone Benthic Fauna Investigation

The purpose of this study will be to evaluate benthic fauna in the reservoir level fluctuation zone around Cooper Lake. Benthic fauna within the shallow water zone potentially affected by reservoir fluctuation provide food for fish and birds and are an indicator of reservoir productivity. This study, therefore, will be used to evaluate the effect of reservoir fluctuation on productivity in Cooper Lake and will be integral to planned assessments of use of the shallow areas of the reservoir for feeding by fish and water birds. The results of this study may also provide insight into the potential effects associated with the proposed increase in maximum reservoir elevation and fluctuation zone.

Proposed study efforts to begin in 2003 would involve sampling macroinvertebrates in shoreline habitats affected by reservoir level fluctuations. The sampling would be conducted at several characteristic sites around Cooper Lake. Methods would be developed from those described in EPA's Lake and Reservoir Bioassessment and Biocriteria Technical Guidance Document and coordination with agency experts. The results from this study would be used to describe the baseline condition and estimate potential Project impacts on the shallow water food resource for both fish and water birds. No preliminary data-collection efforts associated with this study are planned for the 2002 field season.

2.5 Cooper Lake Fish Life History with Emphasis on Resources Possibly Affected by Fluctuating Lake Levels

2.5.1 Proposed Studies and General Approaches

Discussions with agency experts to date indicate general agreement that insufficient information currently exists to adequately describe life history information for the char and trout populations in Cooper Lake, to evaluate the existing resource and possible Project-related effects. Because of the potentially complex nature of the studies needed to develop this information, significant

preliminary data collection in 2002 will be critical to the detailed planning for these studies. Cooper Lake fish life history studies currently envisioned for 2003 include the following general components:

- Location of rainbow trout spawning areas. Visual foot surveys in 2002 (see section 2.5.2 below) of rainbow trout spawning areas in tributaries to Cooper Lake will be repeated in 2003.
- Location of Arctic char spawning areas. This study component will be integral with the study efforts described in the next two bullets. The proposed study will focus on identifying the Arctic char spawning areas in the zone of the reservoir affected by reservoir level fluctuation. Possible methodologies to locate spawning areas could include radiotagging or hydroacoustic surveys. At the August 8 meeting with agency fish biologists, however, a number of logistical factors were identified that will need additional consideration in developing the final study approach. In particular, it may be difficult to track the char during the spawning season, which occurs in late fall during the time when ice is beginning to form on the reservoir. For this reason, agency representatives recommended a comprehensive review of available literature on spawning habits and preferences of Arctic char to help assess potential spawning areas in Cooper Lake and define appropriate approaches for this study element.
- Characterization of seasonal fish distribution (including juveniles) in the shallow water zone. This study component will involve observation and trapping of fish in the zone affected by reservoir fluctuation, and documentation of species and life stage of the fish captured.
- Arctic char population studies. Population studies would be conducted in conjunction with the study components described above and would be used to describe baseline conditions against which to compare future conditions under the proposed new operating regime. These population studies would yield information about Arctic char numbers in Cooper Lake, based on study of fish inhabiting shallow water areas of the reservoir. The population studies would be conducted using mark-and-recapture sampling. Arctic char would be captured using seines or shoreline-oriented trap nets in spring and fall, when the fish are expected to be present in shallow areas of the reservoir. The trapping would be conducted in conjunction with study of Arctic char spawning area locations and study of fish use of the shallow water zone.

2.5.2 2002 Data Collection Activities and Methods

Two primary aspects of the Cooper Lake fish life history study will be conducted in 2002: reconnaissance identification of rainbow trout spawning area locations, and field-method development for studies of Arctic char in 2003.

Field surveys to identify rainbow trout spawning areas in Cooper Lake has been completed. Surveys of tributary streams to the reservoir were conducted on June 6–7 and June 17–18, 2002. During the earlier survey period, the reservoir was about 2/3 ice covered and streams on the south end of the reservoir were accessed on foot. During the latter survey period, boat access was possible and all tributary streams entering the reservoir were observed. In all cases the

streams were visually surveyed to an elevation that was estimated to be at least as high as the maximum proposed reservoir operating elevation (1,206 feet msl). All fish observed were noted, the coordinates of spawning locations were recorded using a Global Positioning System (GPS) receiver, and habitat features were generally described.

Additional preliminary field work will be conducted in fall 2002 to provide background information to enhance planning efforts for the 2003 Cooper Lake Fish Life History Study. Field effort planned for September–November will emphasize the testing of non-lethal capture methods for resident Arctic char and rainbow trout and identification of general locations of fish concentration in the fall. Seines and shoreline-oriented trap nets of various designs will be deployed in selected areas where capture is likely to be most successful (shallow zones). All fish captured will be tagged or marked with fin clips so that subsequent capture periods (e.g., spring 2003) may provide the basis for a mark-and-recapture population estimate.

2.6 Evaluation of Project Effects on Fish Use and Habitat in the Kenai River between Kenai Lake and Cooper Creek

2.6.1 Proposed Studies and General Approaches

This proposed study will assess whether the Project's effect of increasing flow by 100 cfs, on average, in the reach of the Kenai River between Kenai Lake and the confluence with Cooper Creek has a significant enough effect during low-flow winter months (based on historic gage records) that the potential reduction of these flows to allow flow to be returned to Cooper Creek would need to be taken into account in the relicensing decision. The proposed evaluation includes review of existing information on fish use (to be conducted in 2002) and evaluation of habitat sensitivity to flow changes within the range attributable to Project operations.

Characterization of habitat sensitivity to flow changes will likely be based, at least initially, on review of existing cross sections, such as the cross section at the USGS stream gage location in this reach; additional cross sections will be surveyed if needed. Emphasis in the analysis would be on the use of a simple hydraulic model that will look primarily at wetted perimeter as an indicator of changes to winter incubation habitat in the range affected by Project flows.

Existing information reviewed in 2002, including hydrologic information and literature on existing fish use, together with input from further discussions with agency experts, the September 9 comment letters, and recommendations of Chugach's relicensing and resource experts, will provide guidance regarding methodologies that would be appropriate for evaluating existing Project effects and potential effects under alternative flow scenarios.

2.6.2 2002 Data Collection Activities and Methods

Preliminary work in 2002 will be focused on review existing information to support study plan development. Existing hydrologic information, including USGS gage records for the reach of the Kenai River below Kenai Lake, will be reviewed to help focus the future work to quantify the sensitivity of this reach to Project-related flow fluctuations. In addition, knowledge of existing fish use is essential for identifying key species and evaluating the possible effects on key fish habitats of the Project as well as potential effects on these habitats associated with any future Project-related changes to the Kenai River flow regime. Existing information relative to fish

utilization of the section of the Kenai River between Kenai Lake and Cooper Creek will be reviewed and evaluated. Emphasis will be on determining critical habitats that might be affected by altered winter flow (i.e., annual low-flow period). A recommendation will be made regarding the adequacy of the existing data and the potential need for more information regarding existing fish use and habitat in this reach.

2.7 Effect of Project Releases on Porcupine Creek

The Project penstock crosses Porcupine Creek, a tributary to Kenai Lake. A valved piping system on the penstock is used periodically (approximately every five years) to drain the penstock/tunnel for inspection. It was also used to maintain a safe reservoir level while the powerhouse was off line during the 2000–2001 upgrades of the turbine/generator units. During normal use, the valves are adjusted to prevent the discharge into Porcupine Creek from reaching levels that would cause erosion of the piping, streambed or road crossing.

The purpose of this study is to assess the possible effect on fish use and habitat in Porcupine Creek as a result of the periodic flow releases into the creek. The proposed study would involve a general evaluation of fish populations and habitat value in the creek using standardized methods, and an assessment of physical changes resulting from the periodic controlled flow additions. No data collection is planned for this study for 2002. A detailed study plan will be developed based on further discussions with the resource agencies, input from the September 9 comment letters, and recommendations of Chugach's relicensing and resource experts.

2.8 Entrainment Analysis

2.8.1 Proposed Studies and General Approaches

The potential for entrainment at the Project intake in Cooper Lake is proposed to be assessed using existing information from the following sources: physical characteristics of the intake structure; bathymetry and morphology of Cooper Lake near the intake; existing information regarding the life history and distribution of fish in Cooper Lake; existing data from dive surveys conducted at the intake vicinity; literature regarding responses of fish to entrainment conditions; and the documented entrainment experiences of comparable hydroelectric facilities. Specific risk factors would be identified. The end product would be an analysis of the degree of entrainment-related risk posed by the Project to fish and other aquatic organisms.

2.8.2 2002 Data Collection Activities and Methods

The analysis is not dependent on field work and will be conducted during the winter of 2002–2003.

2.9 Evaluation of Project-Related Use of the Quartz Creek to Anchorage Transmission Line Corridor on Fish Habitat in Streams Crossed by the Transmission Line

At the August 8 meeting with agency fish biologists, ADF&G indicated that information was needed to determine the possible Project-related effects of use of the Quartz Creek to Anchorage

transmission line corridor, such as for maintenance of the transmission lines or for routine vegetation management, on streams that are crossed by the transmission line access roads. In general, Chugach strives to avoid crossing streams during transmission line related activities; for example, for the most part, only existing access roads that do not cross streams are used. Another factor that helps limit Project-related impact to streams in the vicinity of the transmission line is the lack of a roadway along the length of transmission line; the transmission line can only be accessed in small sections from any given access road off the highway. However, currently there is no comprehensive description of streams in the vicinity of the transmission line corridor or their relation to Project-related transmission line access and maintenance routes.

To more quantitatively characterize possible Project-related effects to streams along the transmission line corridor, Chugach proposes as an initial step to develop an inventory of streams crossed by the transmission line. The inventory would be developed using existing aerial photography, with field verification to be conducted during routine helicopter surveys of the line if needed. In addition, Chugach has recently completed an inventory of all access roads used for facilities maintenance or vegetation management activities along the transmission line. Based on the inventory of streams crossed by roads associated with Project-related use, the need for site-specific stream evaluations will be determined.

Chugach proposes that the stream inventory and any site-specific work would be conducted in 2003.

3 TERRESTRIAL RESOURCE STUDIES

3.1 Vegetation and Habitat — Cooper Lake

3.1.1 Proposed Studies and General Approaches

Study of vegetation and habitat around Cooper Lake is proposed to understand the processes that control changes in shoreline habitats due to reservoir level fluctuations, and to evaluate ongoing and potential future effects of Project operations on these habitats. The information from this study also will be used in conjunction with proposed study of water birds at Cooper Lake (described in section 3.3).

The existing FERC license for the Project authorized a normal maximum reservoir elevation for Cooper Lake of 1,210 feet msl. Vegetation below this elevation was cleared and burned in 1959 in preparation for reservoir filling. Because the reservoir has been maintained well below the licensed full pool level for most of the license term, however (with an average reservoir level of 1,181 msl), vegetation above the current maximum pool elevation of 1,194 feet msl has become re-established in some areas with early succession species. In the shoreline areas that are susceptible to water level fluctuations, the vegetation has been altered from historic conditions. Steeper areas and outcroppings have become barren, while in some low-gradient areas, herbaceous forbs and mudflats have replaced the historic woody vegetation.

Information on historic and/or existing vegetation in the Project area is available from several sources. The USFS (Cooper Creek Watershed Analysis, USFS 2002) analyzed vegetation for the following dates and conditions:

- 1950–1951: pre-dam conditions, water surface elevation at 1168
- 1961 and 1962: “original” operation level, water surface elevation at 1210 to 1213
- 1974: current conditions, water surface elevation at 1175
- 1993: current conditions, water surface elevation at 1181

In addition to the aerial photography used for that analysis, various Geographic Information System (GIS) vegetation coverages are available from the U.S. Geological Survey (USGS), Alaska Department of Fish and Game (ADF&G), and the U.S. Forest Service (USFS).

The goals of the vegetation and habitat technical studies are to:

- document existing habitat conditions.
- evaluate the ongoing effects of reservoir water level water fluctuations on vegetation.
- evaluate the effects of existing reservoir water level water fluctuations to assess the potential short- and long-term effects on shoreline vegetation of increasing the mean water surface elevation in conjunction with the proposed dam modifications.
- develop the information needed to prepare a Biological Evaluation for plants in areas that could be effected by the proposed operational changes.
- develop information integral to related terrestrial resource studies (e.g., water bird study)

Preliminary data-gathering efforts this year, along with further discussions with the resource agencies, input from the September 9 comment letters, and recommendations of Chugach’s relicensing and resource experts, will be used to guide the planning for the 2003 field season. The goals of the 2003 season will be to complete the assessment of the effects of existing water level fluctuations on vegetation and evaluate the potential short- and long-term effects of a higher reservoir operating level on water regimes, vegetation, habitats, and sensitive plants.

The 2003 vegetation and habitat studies on Cooper Lake will likely entail the following:

- Fill any data gaps defined in 2002 for refinement of existing vegetation mapping.
- Define potential wetland hydrology sources (surface runoff, snow melt, littoral) using aerial photos and by ground-truthing.
- Delineate wetlands potentially affected by reservoir level changes.
- Collect any additional data needed to understand shoreline erosion.

- Conduct a sensitive plant survey. The survey will follow USFS protocol and be performed for all areas that would be inundated (or subsequently affected) under proposed future operations.

The compiled information will be analyzed to predict the effect of increased water surface elevations on the vegetative communities. Information considered will include vegetation type, elevation relative to mean, maximum and minimum water levels during the growing season, topography, and factors found to be influential in causing or preventing shoreline erosion. GIS technology will be used to evaluate these factors by identifying areas (polygons) with similar characteristics, estimating future water regimes based on an existing digital elevation model of the area and proposed Project operations, and then predicting the future vegetation change. The vegetative communities lost and created under future operations will then be determined.

A Biological Evaluation for plants will be prepared based on the results of the sensitive plant survey.

3.1.2 2002 Data Collection Activities and Methods

The data-gathering effort in 2002 will entail the following:

- Acquire existing vegetation and topographic information for Cooper Lake.
- Initiate ground-truthing of the existing habitat mapping in the Cooper Lake area.
- Determine the degree of mapping refinement needed for the Cooper Lake area.
- Analyze factors affecting current reservoir shoreline erosion.
- Identify additional information required to evaluate the effect of potential future operational changes.
- Develop the protocols for 2003 vegetation, habitat, and sensitive plant studies.

All readily available GIS and paper-copy data pertinent to vegetation and topography and selected aerial photos will be obtained in 2002. These coverages will be sought for the entire Project area (including Cooper Creek and the Project transmission line; see study descriptions below). Known pertinent GIS-based mapping includes detailed current and pre-dam vegetation around Cooper Lake, slide hazards, various types of vegetation mapping for the entire Project area, wetlands, remote sensing products, and a digital elevation model. Additional habitat mapping may be available from natural resource agencies.

Initial ground-truthing of current vegetation mapping in the reservoir area will be conducted in mid-July and August 2002 in areas along the present shoreline and within the area of potential future inundation at the proposed higher reservoir level. These communities will be described and classified by dominant plant species, generally following the Vegetation Reconnaissance Level Sampling Procedure (Version 93A) of Chugach National Forest. Field plot locations will be recorded using a GPS. The vegetative communities defined in the field will then be compared

to USFS GIS-based vegetation coverage. If needed, coverage modifications will be made to reflect the data collected in the 2002 season. This reconnaissance will provide an indication of the need for additional data collection in 2003.

Factors that may affect erosion, such as bank slope, substrate, aspect, wind fetch, and adjacent vegetation type, will be noted during other fieldwork activities in July and August (e.g., water bird surveys) in representative parts of the shoreline. Historic reservoir elevation data provided by Chugach will also be used to understand the flooding and drying regime that has influenced shoreline areas. The digital elevation model, vegetation mapping, reservoir elevation data, and factors examined in the field will be analyzed to hypothesize explanations for the patterns of erosion and vegetation loss observed around Cooper Lake. If the explanations are not definitive, additional data needs will be defined.

3.2 Vegetation and Habitat — Cooper Creek

3.2.1 Proposed Studies and General Approaches

Study of vegetation and habitat along Cooper Creek is proposed to evaluate the effects that could be associated with potential flow releases from the dam. As part of its Cooper Creek Watershed Analysis (USFS 2002), the USFS has completed detailed vegetation mapping and an analysis of pre- and post-Project vegetation on the alluvial fan at the mouth of Cooper Creek. This analysis documents the changes in vegetation on the alluvial fan that occurred in response to the reduction in streamflow that occurred with completion of the Cooper Lake Dam. Similarly, changes in vegetation along the creek could occur with future flow releases from the dam, as contemplated in the relicensing studies being proposed.

Information on historic and/or existing vegetation in the Project area is available from several sources, including recent and historical aerial photography and various GIS vegetation coverages available from the USGS, ADF&G, and USFS.

The goals of the Cooper Creek vegetation and habitat technical studies are to:

- document existing vegetation and habitat conditions.
- evaluate the potential effects of alternative flow regimes in Cooper Creek.
- develop the information needed to prepare a Biological Evaluation for plants that may be affected by operational changes.
- develop information integral to related terrestrial resource studies (e.g., water bird study).

Preliminary data-gathering efforts this year, along with further discussions with the resource agencies, input from the September 9 comment letters, and recommendations of Chugach's relicensing and resource experts, will be used to guide the planning for the 2003 field season. The goals of the 2003 season will be to complete the assessment of the potential effects of flow releases from the dam on vegetation, habitats, and sensitive plants along Cooper Creek.

The 2003 vegetation and habitat studies on Cooper Creek will likely entail the following:

- Fill any data gaps defined in 2002 for refinement of existing vegetation mapping.
- Identify vegetative communities potentially affected by water surface modifications at representative locations in the creek.
- Conduct a sensitive plant survey. The survey will follow USFS protocol and be performed for all areas that could be affected by potential higher flows in Cooper Creek.

The compiled information will be analyzed to predict the vegetation/habitat effects of increased streamflow with potential alternative flow releases from the dam. Information considered will include vegetation type and vegetation elevation relative to existing and potential future maximum water surface elevations in the stream during the growing season. Any information gathered during the fisheries habitat evaluation (e.g. creek cross sections) would also be used to assist in this evaluation.

3.2.2 2002 Data Collection Activities and Methods

The data-gathering effort in 2002 will entail the following:

- Acquire existing vegetation and topographic information for Cooper Creek using available GIS coverages and aerial photos.
- Initiate ground-truthing of the existing habitat mapping along Cooper Creek.
- Determine the degree of mapping refinement needed.
- Identify additional information required to evaluate the effect of potential future operational changes.
- Develop the protocols for 2003 vegetation habitat, and sensitive plant studies.

All readily available GIS and paper-copy data pertinent to vegetation and topography and selected aerial photos will be obtained in 2002.

3.3 Water Birds

3.3.1 Proposed Studies and General Approaches

A study of water birds in the Project area is proposed. This study will be used to describe existing conditions and evaluate the current and potential future effects of Project operations on water bird nesting and use of Cooper Lake and Cooper Creek. During the months of May through August, the approximate water bird nesting and fledging season, the reservoir increases an average of 9 feet. The overall goal of the water bird study is to evaluate the ongoing effects of reservoir level fluctuations on nesting success and assess the potential short- and long-term effects of increasing the mean reservoir surface elevation. In addition, current water bird use of

Cooper Creek will be evaluated and potential effects on water birds that could be associated with modification to the existing flow regime will be assessed.

For this study, water birds are defined as freshwater waterfowl (ducks, geese), water associated raptors (eagles), shorebirds (pipers and plovers), gulls, loons, and terns. Harlequin ducks, mergansers, and mallard ducks have reportedly been observed on Cooper Creek and may use areas along the creek for nesting. In addition, previous reports indicate that Cooper Lake has been used for nesting by the following water bird species:

- Mallards
- Greater scaups
- Least sandpipers
- Common loons
- Mew gulls
- Arctic terns
- Barrow's goldeneyes
- Green-winged teals

The initial, reconnaissance phase of data-collection for the water bird study will be completed during the 2002 field season, and results of this preliminary information gathering, along with further discussions with the resource agencies, input from the September 9 comment letters, and recommendations of Chugach's relicensing and resource experts, will be used to develop a formal study for the 2003 water bird nesting season.

The results of fieldwork to be conducted during the 2003 field season will be used to:

- assess the effects of Cooper Lake water level fluctuations on water bird nesting success.
- evaluate the potential effects of a raised water level on future nesting habitat and viability on the reservoir.
- assess the potential effects of a modified streamflow regime on water bird habitat in Cooper Creek.

Given the relatively large shoreline area around the reservoir, representative transects would likely be selected for survey. Each survey transect would be selected so that all observed and anticipated species are included. For example, two of the islands may be selected for a detailed mew gull survey, and a section (1 mile) of rocky shoreline may be selected to represent spotted sandpiper nesting. With specific species such as the loon, a shoreline-wide survey will likely be performed to identify any nests. Other species (e.g., bald eagle) may only be noted as observed, without species specific surveys being performed.

For most areas and species, the 2003 season will likely involve marking of transects or areas to be surveyed and denoted. During the first weeks of the anticipated nesting season, nests will be

identified and permanently marked with an identification number. Subsequent field visits are proposed to record the vertical distance above the water surface of all nests, habitat, number of eggs, suspected predation, and hatching success.

The species targeted in this survey are born precocial or semi-precocial, and are mobile after a just a few days. Chicks can typically swim early on to escape predation. For this reason, the proposed study focuses on the reservoir level as it pertains to hatching success and not fledging success.

A vegetation inventory and analysis is also proposed as a separate, although related, study (see preceding study description). This vegetation inventory would be used to map potential water bird habitats and assess potential effects of the proposed increase in maximum reservoir elevation and range of water level fluctuation. The habitat would be divided into broad categories such as rocky island, rocky shore, mudflats, and ponded/emergent.

Field observations of water birds and habitat would be tied to 2003 water surface elevations and reservoir elevations during past years to evaluate the timing of water level rise as it pertains to habitat and/or nesting loss. The estimated changes in water surface elevation from the proposed reservoir operation regime would then be used to predict the associated future change in habitat quantity and to project short- and long-term changes in the habitat structure, focused on the water bird nesting season.

3.3.2 2002 Data Collection Activities and Methods

Reconnaissance-level data collection conducted in 2002 related to water bird nesting will be used to develop a formal monitoring plan for the 2003 nesting season. Objectives of the 2002 data-collection efforts are to:

- identify species present on Cooper Lake and Cooper Creek.
- identify nesting species.
- identify the approximate location of bird nests.
- determine egg laying, incubation, and fledging times.
- observe the effect of water level fluctuations on nest success.
- observe other factors that may affect nesting success (e.g., predation).
- determine the most effective methods and representative locations for 2003 field study.

Bi-weekly surveys will be conducted from the second week of June through bird dispersal (anticipated to be early to mid-August). Surveys will be conducted of the entire shoreline and islands at varied times of day and week. Islands will be accessed by boat and the shoreline will be surveyed on foot and by boat with intermittent shoreline surveys as appropriate. A majority of the field collection will focus on the southern end of the reservoir (from the intake structure

south), which has the highest variety of habitats, including islands. However, the remaining shoreline will also be surveyed to determine presence/absence of water birds. Cooper Creek will be intermittently surveyed during the summer for presence of water bird species and observations noted.

Data will be collected using standardized data-collection sheets. These sheets will be used to record observation location, species/sex observed, nesting, number of eggs, nest distance from water, chick number and age, habitat description and animal behavior. Existing information regarding water bird use of similar lakes in the area will be collected from appropriate agencies.

A GPS receiver will be used as appropriate to locate nest or suspected nest locations and elevation. The GPS information will be cross-referenced to data notes to rectify GPS variability. The nests will then be mapped using GIS technology. Daily elevation data provided by Chugach will also be used to evaluate water level fluctuations against collected data, and determine rates of habitat inundation through the nesting season.

3.4 Terrestrial Wildlife — Cooper Lake and Cooper Creek

3.4.1 Proposed Studies and General Approaches

Proposed studies to describe migratory bird and mammal use in habitats affected by current and potential future Project operations will be based, at least initially, largely on reconnaissance-level observations and existing information on habitat preferences for species present in the Project area. These studies will help describe the possible effects of reservoir level fluctuations and other Project operations on terrestrial species in the Project area. Reconnaissance-level observations and existing information collected in 2002, along with further discussions with the resource agencies, input from the September 9 comment letters, and recommendations of Chugach's relicensing and resource experts, will be used to refine study plans for 2003.

Proposed study efforts related to terrestrial wildlife in the Cooper Lake and Cooper Creek areas include the following:

- Describe mammal use in habitats affected by current and potential future Project operations based on existing information on habitat preferences. This study effort will entail reconnaissance-level/incidental observations of animals and animal tracks around Cooper Lake and Cooper Creek. An aerial survey for large mammals (bears, moose) is anticipated for fall 2003. In addition, access to islands in Cooper Lake will be described in conjunction with other field efforts (e.g., habitat mapping and water bird studies).
- Describe migratory bird use in habitats affected by current and potential future Project operations based on existing information on habitat preferences and reconnaissance-level observations.
- Perform a bald eagle survey in 2003 (or possibly 2004); it will be necessary to have the most current data on bald eagle distribution in the Project area for preparation of the license application.

- Describe brown bear use (denning, foraging, migration corridor) of the Project area. This study component will involve tracking the Interagency Brown Bear Study Team work and consulting with ADF&G on brown bear sightings in the Project area. Incidental evidence of bear use in Project area also will be collected.
- Apply the habitat model being prepared by USFS and Interagency Brown Bear Study Team to habitat data collected in 2002–2003 to assess the possible impacts of Project-related human disturbance on brown bears in the Project area.

3.4.2 2002 Data Collection Activities and Methods

Initial-phase data collection to be conducted in 2002 will include reconnaissance-level/incidental observations of bears, other mammals, birds, and animal tracks around Cooper Lake and Cooper Creek; describing access to islands in Cooper Lake (in conjunction with the habitat mapping and water bird studies); tracking the interagency brown bear study; and consulting with ADF&G on bear sightings. This information together with further discussions with the resource agencies, input from the September 9 comment letters, and recommendations of Chugach’s relicensing and resource experts, will be used to design the formal study plans for 2003.

3.5 Vegetation/Habitat and Terrestrial Wildlife — Transmission Line

Terrestrial resources along the 6.3-mile-long transmission line from the powerhouse to the Quartz Creek Substation and the 90-mile-long Project transmission line from the Quartz Creek Substation to the Anchorage Substation will be characterized and assessed as part of the Project relicensing, to document existing conditions and evaluate the potential ongoing effects on vegetation/habitat associated with continued vegetation management along the transmission line rights-of-way (ROWs). Work in 2002 will be limited to preliminary data-gathering and consultation to guide development of formal study plan(s) for studies to be conducted in 2003.

Proposed components of the study of terrestrial resources associated with the transmission lines include the following:

- Characterize existing vegetation and habitat along the transmission line, using existing information, verified through ground-truthing. Existing information that will be useful for this study component includes recent aerial photography and various GIS-based vegetation coverages available from the USGS, ADF&G, and USFS.
- Evaluate the effects on vegetation and habitat of Chugach’s vegetation management practices along the transmission line ROW. Vegetation changes along the transmission line will be documented and discussed with respect to past and future maintenance practices.
- Document the effects of spruce bark beetle on wildlife habitat along the transmission line.
- Perform a bald eagle survey in 2003 (or 2004) along the transmission line.
- Consult the U.S. Fish and Wildlife Service (USFWS) database on powerline bird strikes, and consult ADF&G concerning possible migratory pathways through Portage Pass.

- Describe brown bear use of the transmission line corridor, through tracking of the interagency brown bear study and consulting with ADF&G on bear sightings. Incidental evidence of bear use of the transmission line corridor also will be collected during site visits to the corridor for other study efforts (e.g., ground truthing of existing vegetation mapping).
- Apply the habitat model being prepared by USFS and Interagency Brown Bear Study Team to habitat data collected in 2002–2003 to assess the possible impacts of Project-related human disturbance on brown bears along the transmission line.
- Investigate possible ongoing effects of the transmission line and ROW on wildlife, for example associated with use of access roads and routine vegetation management activities.

4 RECREATION AND VISUAL RESOURCE STUDIES

Issues related to visual resources and recreation use are intertwined with respect to the relicensing action for the Cooper Lake Hydroelectric Project. For example, changes in recreation patterns can influence the provision of recreation-related facilities or access, which in turn can affect the visual characteristics of the forest. Further, consideration of relicensing alternatives for both these resources must recognize the combination of federal and State land management authorities. The proposed studies described below are intended to develop information regarding existing recreation and visual resources in the Project area and ongoing and potential future effects of the Project on these resources. In the case of recreation resources, the assessment for relicensing will also consider how recreation opportunities associated with the Project fit into and help meet the existing and projected demand for recreation use in the region.

Planning for studies to evaluate recreation and visual resources associated with the Project is occurring through discussions with agency experts. Formal study plans and instruments for these resource studies will be developed following input from the comment letters that Chugach will receive from relicensing participants in September.

4.1 Recreation Resources

4.1.1 Proposed Studies and General Approaches

The Revised Chugach National Forest Land and Resource Management Plan (July 2002) evaluates use within the Forest with respect to the “Recreation Opportunity Spectrum.” The recreation opportunities within the Forest are broad, and the Forest management plan recognizes past and current uses that include winter snowmobiling and skiing as well as summer activities such as fishing, hiking, and camping. The Forest management plan also recognizes that the opportunities are provided by existing road access into the Forest, as well as existing trails, parking lots, and campsites. While the Forest Plan recognizes the current uses and sets forth plans for modest expansion in the future, primary emphasis is placed on the Kenai River and the opportunities that it provides.

In order to characterize existing recreation use associated with the Project and to understand how the Project provides opportunities for recreation activities to meet existing and projected future demand, the following steps are currently envisioned:

- Literature search/review and analysis of raw National Visitor Use Monitoring program (NVUM) data pertaining to the Project area, which would provide information on trends for recreation use in the Project area. Chugach National Forest has indicated an interest in participating in and/or conducting this analysis (Pat Reed, Statistician, Chugach National Forest, personal communication July 2002).
- Review/analysis of other recreation use data for the Project area, such as occupancy records for Cooper Creek Campground and recreation use data available from other entities, such as the Alaska Department of Natural Resources (ADNR).
- Field surveys of recreation users in the Project area. On-site surveys of recreation users of the Project area would be conducted in winter and in summer to determine information specific to recreation use at the Project.

The primary effort proposed for this recreation resource evaluation would be a field survey of visitors to the Project area regarding recreational use in the area. The survey is proposed to begin in late 2002 and continue into 2003. Development of the survey approach and instrument will include close coordination with USFS and ADNR personnel to ensure that it will be consistent with USFS and State policy and that the survey data will be useful for the purposes of these agencies.

The proposed field survey would target those constituents and recreation users for which existing data are inadequate to meet the needs of the relicensing process. It would be specifically tailored to address those issues identified through input from relicensing participants. Recreation user information pertinent to the field survey would include origin/destination of visit, time duration of recreation activity, type of activity, and group size. Specific areas that could be targeted could include the Cooper Creek Campground, the existing parking areas along the Project access road, the parking area at Cooper Lake, trails within the study area, and popular recreation access points along the Quartz Creek to Anchorage transmission line corridor.

A further component of the analysis will be the determination of existing and potential future Project-related effects on recreation opportunities and use in the area. This study component would likely include the evaluation of how recreation use described from the analysis of NVUM data and field survey data matches existing and projected use as described in the Chugach Forest Land and Resource Management Plan and as contemplated in the Kenai River Comprehensive Management Plan. Projected trends in recreation use will be evaluated with respect to the ability of existing recreation opportunities in the area (including those provided by the Project) to comply with existing management plans and objectives.

Another component of the recreation resource study will be to evaluate the effect of alternative Project operations on recreation resources. In particular, the proposed increase in maximum reservoir level and potential increase in the range of annual reservoir level fluctuation may have effects on recreation, such as access to the reservoir surface for winter snowmobiling. In

addition, potential changes to the flow regime in Cooper Creek could have effects on recreational fishing in the creek, and to trail and campground use along the creek.

Information gathering (existing information and survey) for the recreation resource evaluation is proposed to occur in the fall/winter of 2002/2003 and in the summer of 2003, followed by comprehensive data analysis to be finalized by the end of 2003.

4.1.2 2002 Data Collection Activities and Methods

Study activities in 2002 for the recreation resources evaluation will focus on development of the survey instrument and survey approach, through coordination with agency experts. The survey form will be tested to assess its ability to yield reliable results prior to implementation of the actual survey. In addition to beginning the fall/winter use survey in late 2002, data collection this year will include analysis of existing conditions and trends, using existing data.

4.2 Visual Resources

4.2.1 Proposed Studies and General Approaches

The evaluation of visual resources in the Project area will essentially comprise an inventory and assessment of Project-related features to determine visual characteristics in the context of the surrounding landscape. The study approach proposed for visual resources will comply with methodologies described in the USFS's Agricultural Handbook Number 701, "Landscape Aesthetics, A handbook for Scenery Management" (USFS 1995).

A major component of the visual resource evaluation will be the collection of baseline photographic information from key viewpoints. The photography will emphasize the powerhouse, the 6.3-mile-long transmission line from the powerhouse to the Quartz Creek Substation, and the 90-mile-long transmission line from Quartz Creek to Anchorage. In addition, the reservoir shoreline fluctuation zone will be photographed to document reservoir levels at different times of year.

Because some of the Quartz Creek to Anchorage transmission corridor extends outside federal land (such as through Chugach State Park), coordination with ADNR personnel will be conducted to obtain guidance on preferred methods and components of visual resource assessments of Project facilities located on State lands. Chugach suggests that use of the USFS methodology could be appropriate for application to non-Forest lands because the State does not employ similar objective techniques for visual resource evaluation. Use of this methodology on State land as well as within the Forest will also ensure consistency of analysis for all portions of the transmission line corridor.

An additional component of the proposed visual resource evaluation will be documentation of the original rationale for the existing locations and configuration of Project facilities, including the transmission lines. Chugach will review its files for any documentation that may exist regarding original consultation with the USFS and other land owners to determine original aesthetic considerations and other rationale for the existing placement of the facilities.

4.2.2 2002 Data Collection Activities and Methods

Data-collection activities to be conducted in 2002 for the visual resource assessment will be limited to collecting the baseline photographic information by photographing the powerhouse and transmission lines from key viewpoints. These viewpoints include the following:

- Russian Lakes Trail (reservoir)
- Cooper Lake parking area (reservoir)
- Seward Highway MP S22.9 (power plant)
- Snug Harbor Road, Various locations (powerline)
- Quartz Creek Campground (powerline, power plant)
- Seward Highway, Various locations (powerline)
- Powerline Pass Trail (powerline)
- Indian Trail (powerline)

In addition, preliminary work in 2002 will include continuing discussions with agency representatives, including ADNR with regard to the approach to visual assessment of the portion of the transmission line on State lands.

5 HISTORICAL AND ARCHAEOLOGICAL RESOURCE STUDIES

5.1 Proposed Studies and General Approaches

Evaluation of Project effects on environmental resources in the context of relicensing includes description of historical and archaeological resources in the Project area and analysis of the potential ongoing and future effects of Project operations on these resources. The general components of the proposed cultural resources study are described below and will be refined based on further discussions with resource agencies, input from the September 9 comment letters, and recommendations of Chugach's relicensing and resource experts.

Proposed components of the cultural resources study for relicensing include the following:

- Coordination with Native groups and other interested parties. Consultation with these entities is required for any federal action (in this case, a FERC relicensing) that could affect historical and archaeological resources. Chugach and its cultural resource consultants will coordinate with FERC, USFS, and the Alaska State Historic Preservation Officer (SHPO) to determine the approach to consultation, to define an Area of Potential Effect (APE), and to determine the need for field surveys.
- Background Research. All pertinent archeological and historical literature and records of the Alaska Heritage Resources Survey (AHRS) will be reviewed to compile information about the Project's APE. This effort will focus on determining if there are any known buildings, structures, and objects in the APE that are potentially eligible for the National Register of

Historic Places (NRHP). Information will also be sought from groups and individuals likely to have knowledge of, or concerns with, historic properties in the area. Specific attention will be given to properties of concern to Native tribes and organizations. Attention will be paid to concerns about any properties of religious and/or cultural significance within the APE, regardless of who may own such properties.

- **Identification of Historic Properties.** The principal goal of the cultural resources evaluation will be the identification of historical and archeological resources in the APE that could be affected by continued operation of the Project or by development of new Project facilities. “Identification” includes identifying properties and determining whether or not they are listed on, or eligible for inclusion in, the NRHP. The standard for identification is a reasonable and good faith effort, including (as necessary) background research, consultation, oral history interviews, reconnaissance investigations, and intensive field surveys. The ultimate product of the work will be information that can be used in preparing a Historic Properties Management Plan for the next license term for the Project.
- **Reconnaissance Field Surveys.** Reconnaissance-level surveys, focusing initially on the Cooper Lake shoreline, the portions of the Cooper Creek drainage that could potentially be affected by re-establishing flow from the dam or other Project-related effects, and the Project transmission lines; may be done to help define study areas and determine if more intensive surveys are warranted. A reconnaissance survey is an extensive rather than intensive “walk-over” conducted with little or no subsurface testing. A reconnaissance survey is a sampling that may locate some (but not all) of the properties which could be affected by a Project and allows an evaluation of their significance.
- **Intensive Field Surveys.** Areas within the APE identified during the background research, agency coordination, and reconnaissance investigations will be intensively surveyed, if warranted. The goal of the intensive field surveys would be to locate all previously unknown, but potentially NRHP-eligible properties. These surveys would include systematic pedestrian examinations of the ground surface and subsurface testing. Subsurface testing would be the principal method for field sampling, although surface collecting and mapping would also be used to establish site boundaries.
- **Determinations of Eligibility.** The findings of the information review and field surveys will form the basis for recommendations regarding the NRHP eligibility of any historic properties. Based on these recommendations, FERC will then consult with the SHPO to make any determinations regarding the properties. Each determination of eligibility will include a description and evaluation of the property; a statement of significance; a selected list of sources; and maps, photographs, and other illustrations. Consideration will be given to both the criteria of significance and integrity of the site. Each determination will consider the historic context of the property, including its relation to other known historic properties. The question of adequacy of information to evaluate a property will be considered in relation to historic contexts. In some cases, research may be necessary to establish contexts. Some properties may not warrant an individual eligibility determination, but may prove to be a contributing element of a larger historic district — such as the Squilantnu Archeological District — that does meet the criteria.

- Documentation. Results of the work will be assembled in a survey report with graphics as supporting documentation. Reports will be submitted in two volumes. One volume will be suitable for release to the public as an appendix to the license application and the other (for which distribution will be restricted) will contain sensitive information such as site-specific maps, figures, and text.
- Human Remains. In the event that human remains are discovered during the course of fieldwork, Chugach and the land management agency will be notified immediately. The land management agency will notify other parties, including SHPO, federal agencies, and appropriate Native groups.

All work will be done in accordance with 36 CFR Part 800 (<http://www.achp.gov/regs.html>), FERC hydropower licensing regulations (18 CFR Chapter 1, Part 4), the Secretary of the Interior's Standards and Guidelines (1983:44722), and the Advisory Council on Historic Preservation's general guidelines for identification and testing procedures as set forth in Treatment of Archaeological Properties, A Handbook. Field notes, samples, artifacts and other collected data will be curated with the University of Alaska Museum in Fairbanks unless otherwise specified.

5.2 2002 Data Collection Activities and Methods

Study activities in 2002 will entail review of existing information and consultation with Native groups and other interested parties, as described above.

6 LAND USE AND ACCESS STUDIES

The issues surrounding land use and access in the Project area are closely tied to comprehensive land use plans for the area, and relicensing efforts must take into account the combination of federal and State land management authorities. Primary issues in this context include Project-related land use, access, and management activities along the 6.3-mile-long transmission line from the powerhouse to the Quartz Creek Substation and the 90-mile-long Project transmission line from Quartz Creek to Anchorage. Another land-use issue is Project-related use of the Snug Harbor Road, which provides access to the powerhouse and the south end of Cooper Lake.

Except for preliminary coordination with agencies and compilation of existing GIS-based land-use mapping for the Project area (including the Project transmission lines), study efforts related to land use and access will begin in 2003. Formal study plans to address land use and access issues will be developed based on further discussions with the USFS and other resource agencies, input from the September 9 comment letters, and recommendations of Chugach's relicensing and resource experts.

Proposed study components related to land use and access include the following:

- Compile surrounding land use mapping (GIS layer) to describe current surrounding land-use status. Chugach will rely on use of existing GIS-based information to complete this study aspect.

- Acquire mapping of easements. Accurate description of the location of all easements within the Project area is necessary to evaluate possible Project impacts on land ownership and use.
- Determine consistency of Project facilities and operations with existing land management plans.
- Review the design of Snug Harbor Road and evaluate its appropriateness for multiple uses. This study component will take into consideration the management/use status of the road and recreational/development trends that could affect use of the road during the next license term.

7 ENGINEERING STUDIES

In addition to the environmental resource studies described above, Chugach and its engineering consultants (Montgomery Watson Harza) will conduct engineering analyses to provide information on Project operations that will be integral to analysis of Project effects. In 2002 and 2003, a document will be prepared to provide a written description of the historical and current operation of the Project as well as the future operation of the Project that would be associated with the proposed modifications to Cooper Lake Dam to address concerns with the dam's ability to pass the Probable Maximum Flood. Factors that will be described will include descriptions of seasonal and annual reservoir level fluctuations, and expected potential and frequency of uncontrolled spill with operation of the reservoir at a higher normal maximum elevation. This document will be made available to relicensing participants, and the descriptions of existing and future Project operations will be taken into consideration in the final study plans for the relicensing studies described above.

8 CONCLUSION

In summary, the general study approaches and preliminary methodologies described above reflect consultation to date with relicensing participants regarding issues and information needs related to relicensing of the Cooper Lake Hydroelectric Project, as well as Chugach's understanding of its responsibilities for developing information necessary to support an application for a new license for the Project. Chugach hopes that the information provided in this document will be of value to agencies and other relicensing participants as they develop study requests to be included in the September 9 comment letters on the ICP.

After receipt of the comment letters, Chugach will prepare formal draft study plans for the various relicensing studies. The target is to issue the draft study plans to relicensing participants for their review in early October. The study plans will then be discussed at a workshop in November, with a goal to finalize the study plans by the end of 2002. As noted previously, this schedule depends on timely receipt of the ICP comment letters in early September, because the study requests and preferred methodologies to be included with these letters will be critical factors in guiding development of the formal study plans.

Chugach currently anticipates holding a follow-up workshop in early 2003 to review final plans and schedule for 2003 fieldwork and reporting.