



January 19, 2007

VIA ELECTRONIC FILING

Ms. Magalie Roman Salas
Secretary
Federal Energy Regulatory Commission
Mail Code DLC, HL-11.2
888 First Street, NE Room 1A
Washington, DC 20426

Northern Lights, Inc.
Revised Proposed Study Plan
Lake Creek Project (FERC No. 2594)

Dear Secretary Salas:

Northern Lights, Inc. (NLI) herein electronically files with the Federal Energy Regulatory Commission (Commission) the Revised Proposed Study Plan (RSP) for relicensing of the 4.5 megawatt (MW) Lake Creek Project (FERC No. 2594). The Project is located on Lake Creek in Lincoln County, Montana; its current license expires November 30, 2011.

NLI is using the Commission's Integrated Licensing Process (ILP) as established in regulations issued July 23, 2003 (Final Rule, Order No. 2002) and found at Title 18 of the U.S. Code of Federal Regulations (CFR), Part 5. This RSP was prepared in accordance with 18 CFR §5.11 and §5.13.

NLI is providing electronic copies of this RSP to all active participants in the ILP and is sending notices of this documents availability to the rest of the Lake Creek mailing list by U.S. Mail. Electronic copies of the RSP will be available on the Lake Creek Relicensing website (<http://www.norlight.org/LCRelicensing/>), as well as on the Commission's eLibrary.

If there are any questions or comments regarding the RSP or any information provided by the Licensee, please contact Mark Contor, Northern Lights, Inc., P.O. Box 269, 421 Chevy Street, Sagle, ID 83860, Phone: 1.800.326.9594 x 134 or (208) 263-5141, or by email at LCRelicensing@norlight.org.

Sincerely,

NORTHERN LIGHTS, INC.



Mark Contor
Operations Manager

cc: Allan Creamer, Federal Energy Regulatory Commission
Kevin Greenleaf, Kootenai Tribe of Idaho
Paul Hanna, U.S. Fish and Wildlife Service
Mike Hensler, Montana Dept. of Fish, Wildlife & Parks
Quentin A. Lawson, Federal Energy Regulatory Commission
Christian J. Levine, Montana Department of Environmental Quality
Jeremiah L. Maher, Kleinschmidt Associates
Sean Murphy, Federal Energy Regulatory Commission
Amee Rief, U.S. Forest Service
Douglas Spaeth, U.S. Forest Service
Jim Vashro, Montana Dept. of Fish, Wildlife & Parks
Stan Wilmoth, Montana State Historic Preservation Office

NORTHERN LIGHTS, INC.

Sagle, Idaho

REVISED PROPOSED STUDY PLAN FOR THE LAKE CREEK HYDROELECTRIC PROJECT (FERC PROJECT NO. 2594)

January 19, 2007

Prepared by:

Kleinschmidt
Energy & Water Resource Consultants

NORTHERN LIGHTS, INC.
Sagle, Idaho

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**NORTHERN LIGHTS, INC.
SAGLE, IDAHO**

**REVISED PROPOSED STUDY PLAN
FOR THE LAKE CREEK HYDROELECTRIC PROJECT
(FERC PROJECT NO. 2594)**

1.0 INTRODUCTION

Northern Lights, Inc. (NLI) hereby submits this Revised Proposed Study Plan (RSP) for the 4.5 megawatt (MW) Lake Creek Project. The Project is licensed as Federal Energy Regulatory Commission (FERC) No. 2594 (Project). The Project is located on Lake Creek in Lincoln County, Montana; its current license expires November 30, 2011. NLI is a nonprofit cooperative owned by its members. NLI owns and operates the Project, and delivers the energy from the Project directly to its members and customers.

NLI is using FERC's Integrated Licensing Process (ILP), as established in 18 CFR §5, to relicense the Project. The ILP requires the filing of an RSP within 30 days following the deadline for filing comments on the Proposed Study Plan (PSP), in this case within 30 days of January 10, 2007. The information required in the PSP/RSP is specified in 18 CFR § 5.11.

NLI prepared the RSP after receiving comments from FERC staff, Tribal staff and other federal and state agency staff at a Study Plan meeting held November 1, 2006, informal comments from the agencies and Tribes and from written comments. The Pre-Application Document (PAD) filed with FERC on May 31, 2006 provides a complete description of the project, including its structures, operations, and affected resources. Electronic copies of the PAD are available on FERC's website (www.ferc.gov) or NLI's website (<http://www.norlight.org/LCRelicensing/docs/index.htm>).

2.0 BACKGROUND AND PROCESS TO DATE

Prior to the filing of the PAD in May, 2006, NLI began preparations for the relicensing of the Project by first sending out a "PAD Questionnaire" to all potential stakeholders, including the Kootenai Tribe of Idaho (KTI), the Confederated Salish and

Kootenai Tribes (CSKT) and state, federal and local agencies. The questionnaire solicited information from the stakeholders regarding the Project and its potential effect on the environment. In July 2005, NLI held public and agency meetings to provide background on the Project, educate stakeholders on the ILP, and again solicit information about the Project. Using the information gathered at the meetings and through the PAD questionnaire, NLI began the preparation of the PAD. Throughout the PAD's preparation, NLI remained in contact with the agencies and tribes and solicited information and advice from them.

The PAD identified several areas where information related to the Project was lacking; information that might be necessary to evaluate the potential effects of the Project. To provide timely data for the Project's relicensing, NLI independently consulted with the Tribes and agencies to develop study plans and studies for implementation during the 2006 field season with approval of the agencies and tribe, but prior to the formal FERC process. Those studies are included in this RSP and were included in the PAD.

Following the filing of the PAD, FERC prepared Scoping Document 1 (SD1) and scheduled and held Scoping Meetings and a Project site visit on August 9, 2006. Several additional potential studies were identified during scoping. Following those meetings, NLI continued to work closely with stakeholders to develop potential proposed study plans. Comments on SD1 and the PAD were due August 31, 2006. The National Park Service, whose comments were unrelated to development of the PSP, filed formal comments on SD 1. NLI received informal comments from the Montana Department of Fish, Wildlife & Parks (MTFWP) requesting the inclusion of three studies in the PSP related to fisheries and habitat. Based upon MTFWP requests and informal discussions with the agencies and Tribes, NLI developed and distributed draft plans to the agencies and tribes for review. NLI held a conference call among the agencies and KTI on September 26, 2006 to review the draft study plans and to discuss any additional issues.

NLI electronically filed the Proposed Study Plan with FERC on October 13, 2006. On November 1, 2006, NLI held an Initial Study Plan meeting at the United States Fish

and Wildlife Service (USFWS) offices in Creston Montana. Representatives of NLI and their consultants, along with FERC staff and representatives of the KTI, USFWS, MTFWP and the Montana Department of Environmental Quality (MTDEQ) attended the meeting. Following that meeting, NLI revised several of the individual study plans to accommodate agency requests and concerns. NLI provided the revised study plans to the participants in the Initial Study Plan meeting on December 11, 2006.

NLI received letters of comment on the PSP from FERC and the USFWS on January 10, 2007. NLI addresses those letters in Section 4.

3.0 PROPOSED STUDIES

Appendix A of this RSP provides all of the individual studies proposed by NLI to gather additional information needed to analyze the potential effects of the continued operation of the Project on the natural and social environments. NLI implemented some of these studies early (2006 field season) and others are either undergoing implementation or are scheduled for implementation pending FERC approval. Table 1 provides a listing of each study and its relationship to issues identified in the PAD, as well as each study's status or proposed schedule.

Table 1. Revised Proposed Study Plans for the Lake Creek Project

Resource Issue(s) from PAD ¹		Study Plan Title	Study Report No.	Status
B-1.	Botanical RT&E species	Birds and Wildlife Additional Information Gathering	Study Report W-1	Completed August 2006, Report pending.
M-1.	Terrestrial RT&E species			
F-5.	Fish Species composition and habitat availability (including potential sculpin habitat) in the bypassed reach	Bypassed Reach Aquatic Habitat	Study Report F-1	Completed August 2006, Report pending.
F-6.	Potential spawning habitat for bull trout and kokanee in the bypass reach.			
F-4.	Downstream passage of juvenile and/or adult bull trout	Bypassed Reach Flow Data Collection	Study Report F-2	Initiated in October 2005, continuing through August 2007.
F-6.	Potential spawning habitat for bull trout and kokanee in the bypass reach.			
W-4.	Bypass Reach of Lake Creek water quality			
F-5.	Fish species composition and habitat availability (including potential sculpin habitat) in bypass reach	Bypassed Reach Habitat/Flow Evaluation (Wetted Perimeter)	Study Report F-3	Initiated in October 2006, Ongoing
F-6.	Potential spawning habitat for bull trout and kokanee in the bypass reach			
F-8.	Instream flow in bypass reach provided by dam leakage			
C-1.	No inventory of cultural resources	Cultural Resources Survey	Study Report C-1	Completed May 2006, Report Completed.
C-2.	No Historic Properties Management Plan			

¹ See Section 6.1 of the Pre-Application Document for the Lake Creek Hydroelectric Project.

Table 2. Revised Proposed Study Plans for the Lake Creek Project, continued.

Resource Issue(s) from PAD		Study Plan Title	Study Report No.	Status
F-2.	Fish species composition in Lake Creek Reservoir	Fisheries Survey	Study Report F-4	August and October 2006 work completed, Summer 2007 scheduled. Progress Report in Preparation
F-5.	Fish species composition and habitat availability in the bypassed reach of Lake Creek			
F-7.	Reptile and amphibian use of Project Area	Herpetology	Study Report W-2	Completed August 2006, Report pending.
F-3.	Potential entrainment and/or impingement of fish, especially bull trout	Intake and Spill Velocity Analysis; Characterization of Spill Flows	Study Report F-5	Data collected at Project intake, analysis ongoing.
F-4.	Downstream passage of juvenile and/or adult bull trout			
W-2.	Reservoir Sediment Contamination	Physical Characteristics of Lake Creek Reservoir	Study Report R-1	Completed August 2006, Report pending.
W-3.	Lake Creek water quality			
F-3.	Potential entrainment and/or impingement of fish, especially bull trout	Potential Bull Trout Protection, Mitigation, and Enhancement (PM&E) Feasibility	Study Report F-6	Proposed
W-2.	Reservoir sediment contamination	Water Quality Study Plan	Study Report WQ-1	2006 WQ data collected, raw data available; Progress report in prep; Additional data collection scheduled for 2007.
W-3.	Lake Creek water quality.			

Table 3. Revised Proposed Study Plans for the Lake Creek Project, continued.

Resource Issue(s) from PAD		Study Plan Title	Study Report No.	Status
W-3.	Lake Creek water quality.	Water Temperature Study Plan	Study Report WQ-2	Temperature monitors placed October 2006. Data collected through August 2007
W-4.	Bypass Reach of Lake Creek water quality			
B-2.	Wetlands within the Project Boundary	Wetlands Mapping and Characterization	Study Report W-3	Completed August 2006, Report pending.

4.0 COMMENTS ON PROPOSED STUDY PLAN

NLI received comments on the PSP from USFWS and FERC on January 10, 2007. Appendix B contains the letters of comment.

FERC staff had no further comments on the PSP beyond the discussion at the Initial Study Plan meeting.

The USFWS provided NLI a letter requesting an estimation of numbers of fish entrained during operation of the Project and the identification of potential protection, mitigation or habitat enhancement measures (PM&E measures) related to the effects of entrainment. NLI has addressed the request for entrainment estimates in the reporting associated with both the “Bypassed Reach Habitat/Flow Evaluation” and the “Intake and Spill Velocity Analysis; Characterization of Spill Flows” study plans. NLI addresses potential PM&E measures in the “Potential Bull Trout Protection, Mitigation, and Enhancement (PM&E) Feasibility Study Plan.”

5.0 INITIAL STUDY PLAN MEETING AND ADDITIONAL MEETINGS RELATED TO THE REVISED PROPOSED STUDY PLAN

NLI held the Initial Study Plan Meeting as required by the ILP on November 01, 2006 at the USFWS offices in Creston, Montana. NLI does not anticipate additional formal meetings related to the RSP. NLI does anticipate additional informal meetings and communications with the appropriate Tribes and agencies as it prepares to implement and subsequently implements the remaining studies.

6.0 PROGRESS REPORTS, STUDY REPORTING, STUDY REPORT MEETINGS

NLI is completing Progress Reports’ on the studies implemented during 2006 and anticipates providing those reports to the agencies and tribes, as well as posting them on NLI’s Relicensing Website (<http://www.norlight.org/LCRelicensing/docs/index.htm>) in early 2007. Ongoing data collection activities are reported to the agencies or other stakeholders upon request. The formal Initial Study Report is scheduled for preparation following the 2007 field season but in no case later than one year following FERC’s approval of the final study plan. NLI will schedule the Initial Study Report Meeting once the date for the availability of the Initial Study

Report is known. As needed, NLI will file updated study reports within the time limits provided in 18CFR § 5.15(f).

7.0 REQUESTED STUDIES NOT ADOPTED

NLI received no formal requests for additional studies in the RSP. NLI has accommodated all informal requests for studies and reporting data as requested by the participating entities.

Appendix A

Study Plans

Appendix B

Letters of Comment

Appendix A

Study Plans

Lake Creek Project, FERC No. 2594

Birds and Wildlife Additional Information Gathering Study Plan

Study Plan Name: Birds and Wildlife Additional Information Gathering Study

Draft Date: April 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD), May 31, 2006, identified birds and wildlife that MAY inhabit the Project Area based upon general field studies and data gathered in northwest Montana. No specific surveys have been conducted in the Project Area. The consulting agencies identified the following issues:

- **Resource Issue B-1** – Botanical RT&E species
- **Resource Issue M-1** – Terrestrial RT&E species

FERC and the agencies indicated that having a better understanding of species using the Project Area would enhance understanding of the Project's potential effect on the resources. Northern Lights, Inc. (NLI) proposes no specific study related to bird and wildlife use of the Project area, rather NLI has incorporated into other field studies provisions related to the recordation of bird and wildlife use of the Project and notations related to their use of habitat within the Project.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The Federal Energy Regulatory Commission (FERC), and Montana Fish, Wildlife, and Parks (MTFWP) all have responsibilities for protecting wildlife resources. FERC must carefully consider the effects of continued Project operations on wildlife resources and must balance the uses of the Project. This data gathering will enhance the knowledge of species use of the Project Area.

3.0 BACKGROUND AND EXISTING INFORMATION

Section 5 of the PAD provides background information on the birds and wildlife potentially using the Project Area.

4.0 PROJECT NEXUS

Lake Creek reservoir has affected the habitat available in the Project Vicinity. Open water at the reservoir and the abundant wetlands around the reservoir are relatively rare in the Project Vicinity. Additionally, Lake Creek below the reservoir has affected by alteration of the creek's hydrology, again potentially affecting the type and availability of habitat in that reach.

5.0 *STUDY AREA AND STUDY SITES*

The Lake Creek Project Area is the focus for this study.

6.0 *PROPOSED METHODOLOGY*

Anecdotal notes and recordation will occur during the course of Wetland Mapping, Bypass Habitat, and Herpetology studies.

7.0 *CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE*

Anecdotal documentation of observed species during the performance of other studies is an accepted means of documenting species use of the project.

8.0 *PRODUCTS*

A brief report listing bird and wildlife species observed and the habitat they used in the Project Area will be produced at the end of the 2006 field season in conjunction with other more formal studies.

9.0 *LEVEL OF EFFORT AND COST*

NLI estimates the cost to complete a two-day visual survey and prepare the necessary reports at \$8,500.

10.0 *SCHEDULE*

Fieldwork is scheduled for summer 2006. Data analysis and report writing are scheduled for fall 2006. This information will be included in a Initial Study Report and/or shared with the agencies following data analysis in the late fall of 2006 or early 2007.

11.0 *REFERENCES*

See Section 5 of the PAD.

Lake Creek Project, FERC No. 2594

Bypassed Reach Aquatic Habitat Study Plan

Study Plan Name: Bypassed Reach Aquatic Habitat Study

Draft Date: April 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD) identifies issue(s) associated with aquatic habitat in the 0.5-mile bypassed reach for which the existing, relevant, and reasonably available information was insufficient to address the issue(s). The consulting agencies identified the following issues:

- **Resource Issue F-5** – Fish Species composition and habitat availability (including potential sculpin habitat) in the bypassed reach.
- **Resource Issues F-6** – Potential spawning habitat for bull trout and kokanee in the bypass reach.

The goal of this study is to develop the additional information necessary to address the identified issue(s). The study will evaluate existing habitat conditions in the 0.5-mile bypass reach through the implementation of a habitat mapping survey. The survey will include an assessment of the distribution and abundance of habitat types in the bypassed reach, as well as an evaluation of physical characteristics (*e.g.*, substrate and woody debris distribution).

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The State of Montana and the U.S. Fish & Wildlife Service (USFWS) are active stakeholders in the recovery plan for bull trout, a federally protected species that occurs in Lake Creek. The USFWS listed all Columbia River basin bull trout for protection under the Endangered Species Act (ESA) in 1998 (Department of Interior, 1998). In September 2005, the USFWS issued their final ruling defining critical habitat for Columbia River bull trout that included 56 riverine miles and 1,384 acres of lakes in the Kootenai River basin in western Montana and northern Idaho (Department of Interior, 2005). In 2000, the State of Montana developed its Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin (State of Montana, 2000) to protect and restore core habitat that contains the best remaining spawning and early rearing habitat for bull trout. Lake Creek also supports torrent sculpin and westslope cutthroat trout, which are species of concern in the State of Montana (Hendricks, 1997).

3.0 BACKGROUND AND EXISTING INFORMATION

There is little or no known information that describes habitat in the part of Lake Creek bypassed by the Project. In 1981, the U.S. Department of Agriculture (USDA)

inventoried physical habitat in the 17.3 river miles below Bull Lake. In general, the report indicated that riverine habitat in Lake Creek was in excellent condition. The USDA report concluded that Lake Creek represented a model stream that could be used as a template for assessing the quality of other streams in the region. However, recent land use practices (*e.g.*, housing developments, logging, and road construction) decades have likely affected the quality of aquatic habitat in the Lake Creek drainage.

4.0 PROJECT NEXUS

Although the Project operates in a run-of-river fashion, the natural hydrology of Lake Creek was altered when the impoundment was constructed in 1917. The dam and impoundment have altered hydrologic and geomorphic processes in Lake Creek, which in turn may directly affect habitat downstream of the dam.

5.0 STUDY AREA AND STUDY SITES

Investigators will inventory aquatic habitat in the bypassed reach from the dam to Powerhouse 2 (downstream powerhouse). Total length of the survey reach is approximately 0.5 river miles.

6.0 PROPOSED METHODOLOGY

The U.S. Forest Service (USFS) has established protocols for evaluating riverine habitat as part of long-term monitoring programs for the Upper Columbia River Basin and for the Pacific Northwest (USFS 1989, USFS 2005). This study reflects the USFS protocols.

Data Collection Techniques

Biologists will perform a pedestrian habitat mapping survey from Powerhouse 2 to the face of the Lake Creek dam, a distance of approximately 0.5 river miles. Habitat types will be classified as low-gradient riffle, high-gradient riffle, run, pool, or cascade. Each individual habitat unit will be measured longitudinally along the thalweg using standard hip-chains. Average width will be visually estimated and calibrated by field measurements at every 5th unit. Maximum and average pool depth will be measured in the field. Dominant substrate, sub-dominant substrate, and instream cover will be characterized for each unit. Spawning gravel (≥ 0.25 inches, ≤ 2.5 inches) within the bankfull channel (in and out of the wetted channel) will be measured to estimate total area (square-feet). Individual pieces of large woody debris (≥ 6 inches in diameter and ≥ 10 feet in length) and woody debris jams will be tallied. Active sources of erosion will be noted and photographed. Geographic coordinates will be taken at the beginning and end points of each habitat type, at spawning gravel areas, and at woody debris jams where satellite reception allows. A GARMIN hand-held GPS unit will be used to gather spatial data.

Data Analyses

All habitat data will be archived and presented in tabular or graphical format. Relative percent of each habitat type will be calculated. Investigators will create a GIS map to show the location and spatial distribution of habitat types and features.

Description of Wildlife Species

Although NLI has not proposed a specific “wildlife study” during the study investigators will note wildlife and bird species observed directly or by sign (*e.g.*, calls, scat, tracks, and dens). A separate study will survey reptiles and amphibians (see Herpetology study plan for details). Investigators will record all mammal and bird species encountered. In addition, this study will include descriptions of any notable terrestrial habitat features, including the location of unique community types and rare, threatened, or endangered species (RTE).

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

NLI proposes to model this habitat mapping effort after standard USFS methods developed for the Upper Columbia River Basin and the Pacific Northwest (USFS 1989, USFS 2005). This study will employ generally accepted practices for evaluating riverine habitat quality and distribution. The study methodology is consistent with generally accepted habitat mapping sampling principles and practices.

8.0 PRODUCTS

Data and analyses from the habitat mapping will be included in an Initial Study Report and/or shared with the agencies following data analysis in the fall of 2006 or early 2007. A summary of the information and findings will be included in the Application for New License, Exhibit E.

9.0 SCHEDULE

Background research and logistic planning will occur in early summer 2006 with fieldwork scheduled for late summer 2006. Data analysis and report writing are scheduled for fall 2006. This information will be included in a Initial Study Report and/or shared with the agencies following data analysis in the late fall of 2006 or early 2007.

10.0 LEVEL OF EFFORT AND COST

NLI estimates the cost of conducting this study as approximately \$13,100.

11.0 REFERENCES (Related to Existing Information)

Department of Interior. 1998. 50 CFR Part 17. Volume 63. No. 111. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Klamath River and Columbia River Distinct Population Segments of Bull Trout.

Department of Interior. 2005. 50 CFR Part 17. Volume 70. No. 185. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Bull Trout.

Hendricks, P. 1997. Status, Distribution, and Biology of Sculpins (Cottidae) in Montana: A Review. Online Publication - <http://nhp.nris.state.mt.us/>

State of Montana. 2000. Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin, Montana. Online Publication - <http://fwp.state.mt.us/default.html>.

United States Forest Service. 1989. Stream Habitat Classification and Inventory Procedures for Northern California. 16 pp.

United States Forest Service. 2005. Effectiveness Monitoring for Streams and Riparian Areas within the Upper Columbia River Basin – Sampling Protocol for Stream Channel Attributes. 68 pp.

Lake Creek Project, FERC No. 2594

Bypassed Reach Flow Data Collection Study Plan

Study Plan Name: Bypassed Reach Flow Data Collection Study

Draft Date: September 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD), May 31, 2006, identified a lack of information regarding the stream flows in the bypassed reach of Lake Creek. The resource agencies identified the following issues:

- **Resource Issue F-4** – Downstream passage of juvenile and/or adult bull trout
- **Resource Issue F-6** – Potential spawning habitat for bull trout and kokanee in the bypass reach.
- **Resource Issue W-4** – Bypass Reach of Lake Creek Water Quality

Northern Lights, Inc. (NLI) proposes to install temporary gaging equipment below the Lake Creek dam at a location to measure leakage and spills from the Project. The gage data will facilitate the assessment of aquatic habitat in the bypassed reach of Lake Creek.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The Federal Energy Regulatory Commission (FERC), and Montana Fish, Wildlife, and Parks (MTFWP) and the United States Fish and Wildlife Service (USFWS) all have responsibilities for protecting wildlife resources. FERC must carefully consider the effects of continued Project operations on wildlife resources and must balance the uses of the Project. The State of Montana and the U.S. Fish & Wildlife Service are active stakeholders in the recovery plan for bull trout, a federally protected species that occurs in Lake Creek. The USFWS listed all Columbia River basin bull trout for protection under the Endangered Species Act (ESA) in 1998 (Department of Interior, 1998). In September 2005, the USFWS issued their final ruling defining critical habitat for Columbia River bull trout that included 56 riverine miles and 1,384 acres of lakes in the Kootenai River basin in western Montana and northern Idaho (Department of Interior, 2005). In 2000, the State of Montana developed its Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin (State of Montana, 2000) to protect and restore core habitat that contains the best remaining spawning and early rearing habitat for bull trout. Lake Creek also supports torrent sculpin and westslope cutthroat trout, which are species of concern in the State of Montana (Hendricks, 1997).

3.0 BACKGROUND AND EXISTING INFORMATION

There is little or no known data measuring the flows in the bypassed reach of Lake Creek, which is below Lake Creek Dam and above the Project powerhouses. The Project operates as a run-of-river Project and typically only spills when flows exceed the Project's capacity of 578 cfs. Consequently, except when stream flows are in excess of this capacity, flows in the bypassed reach are limited to leakage through the dam and groundwater contributions.

4.0 PROJECT NEXUS

Although the Project operates in a run-of-river fashion, construction of the dam in 1917 altered the hydrology of Lake Creek. Project operations bypass approximately one-half mile of Lake Creek. Project operations result in a reduction of instream flow in the bypassed reach of Lake Creek, which reduction may affect the aquatic habitat in that reach.

5.0 STUDY AREA AND STUDY SITES

NLI will install stream flow monitoring device downstream of Lake Creek Dam, but above the Lake Creek falls.

6.0 PROPOSED METHODOLOGY

NLI installed temporary digital flow monitoring equipment in Lake Creek below Lake Creek Dam on October 11, 2005 and will continue monitoring flows through summer 2007. NLI periodically downloads data from the equipment and reproduces the data in tabular form. NLI may temporarily remove equipment at the onset of spring run-off in 2007 to avoid loss or destruction of the equipment as occurred in spring 2006. NLI will return equipment to the monitoring site as flows and safety dictate. Flows through the bypassed reach during run-off may be estimated by subtracting Project diversions from the total flow recorded at the USGS gaging station just downstream from the Project.

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

Measuring streamflow is a standard practice to aid in evaluation of the potential effects of a hydroelectric project's operations on aquatic habitat.

8.0 PRODUCTS

Researchers will reproduce the data from the recorders in tabular form and share it with the agencies as available. Data will be included in informal reports to the agencies following data analysis in the fall of 2006. Following the second field season scheduled for summer 2007, Licensee will prepare a report for inclusion in the Initial Study Report scheduled for fall 2007. Licensee will use the findings in preparing the Application for New License, Exhibit E.

9.0 LEVEL OF EFFORT AND COST

NLI estimates the cost of installing the equipment, maintaining the equipment, periodically downloading the data and preparing tabular reports at approximately \$25,100.

10.0 SCHEDULE

NLI installed stream flow recording equipment in October 2005. Data collected to date will be prepared in tabular form in the fall of 2006. NLI anticipates an additional data download in early spring 2007 just prior to run-off and then a final download in late summer 2007.

11.0 REFERENCES

Department of Interior. 1998. 50 CFR Part 17. Volume 63. No. 111. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Klamath River and Columbia River Distinct Population Segments of Bull Trout.

Department of Interior. 2005. 50 CFR Part 17. Volume 70. No. 185. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Bull Trout.

Hendricks, P. 1997. Status, Distribution, and Biology of Sculpins (Cottidae) in Montana: A Review. Online Publication - <http://nhp.nris.state.mt.us/>

State of Montana. 2000. Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin, Montana. Online Publication - <http://fwp.state.mt.us/default.html>

Lake Creek Project, FERC No. 2594

Bypassed Reach Habitat/Flow Evaluation Study Plan (Wetted Perimeter)

Study Plan Name: Bypassed Reach Habitat/Flow Evaluation Study (Wetted Perimeter)

Study Plan Date: September 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD) identifies a lack of information related to aquatic habitat in the 0.5-mile bypassed reach of Lake Creek for which the existing, relevant, and reasonably available information was insufficient to address the issue(s). The consulting agencies identified the following issues:

- **Resource Issue F-5** – Fish species composition and habitat availability (including potential sculpin habitat) in bypass reach.
- **Resource Issue F-6** – Potential spawning habitat for bull trout and kokanee in the bypass reach.
- **Resource Issue F-8** – Instream flow and habitat in bypass reach provided by dam leakage.

The goal of this study is to develop additional information necessary to address the identified issues.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The State of Montana and the U.S. Fish & Wildlife Service (USFWS) are active stakeholders in the recovery plan for bull trout, a federally protected species that occurs in Lake Creek. The USFWS listed all Columbia River basin bull trout for protection under the Endangered Species Act (ESA) in 1998 (Department of Interior, 1998). In September 2005, the USFWS issued their final ruling defining critical habitat for Columbia River bull trout that included 56 riverine miles and 1,384 acres of lakes in the Kootenai River basin in western Montana and northern Idaho (Department of Interior, 2005). In 2000, the State of Montana developed its Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin (State of Montana, 2000) to protect and restore core habitat that contains the best remaining spawning and early rearing habitat for bull trout.

3.0 BACKGROUND AND EXISTING INFORMATION

There is relatively little information that describes habitat in the part of Lake Creek bypassed by the Project. Newspaper articles from 1915 and earlier report extensive stream clearing in Lake Creek to support log runs from Lake Creek to a log holding pond near the site of the present Project powerhouses and then on to the Kootenai River. In

1981, the U.S. Department of Agriculture (USDA) inventoried physical habitat in Lake Creek in the 17.3 river miles below Bull Lake. In general, the report indicated that riverine habitat in Lake Creek was in excellent condition (USDA, 1981). The USDA report concluded that Lake Creek represented a model stream that could be used as a template for assessing the quality of other streams in the region. More recent land use activity in the Lake Creek watershed (e.g., increased residential development, logging, road construction, and the re-operation of the Troy Mine) has likely decreased habitat quality in Lake Creek (*pers. comm.*, Mike Hensler, MTFWP).

A survey conducted by the Licensee in August 2006 in the bypassed reach found little gravel suitable for salmonid spawning. Substrates are dominated by large boulders and bedrock. The distribution and abundance of habitat types in the bypassed reach is presented in Table 1.

Table 1. Available aquatic habitat in the 0.5-mile bypassed reach of Lake Creek with leakage flow (Study Report F-1).

Habitat Type	Total Length by Habitat Type in the Bypassed Reach (feet)	Percent of Reach
Low Gradient Riffle	325	12%
High Gradient Riffle	463	17%
Pool	1,494	56%
Run	266	10%
Chute	121	5%
Total	2,669	100%

An electrofishing survey conducted by the Licensee in August 2006 identified eleven fish species inhabiting the bypassed reach of Lake Creek (Table 2).

Table 2. Fish Species identified in bypassed reach of Lake Creek, August 2006 (Study Report F-4).

Species	No. Captured	Relative Percent
Brown Trout	47	31%
Bull Trout	36	24%
Torrent Sculpin	23	15%
Longnose Sucker	14	9%
Longnose Dace	12	8%
Rainbow Trout	11	7%
Brook Trout	4	2%
Redside Shiner	2	1%
Mountain Whitefish	2	1%
Bull/Brook Hybrid	1	1%
Peamouth	1	1%
Slimy Sculpin	1	1%
Total Catch	154	-

Though the Project operates as a “run of river” facility, flows under the Project capacity are diverted for power production. Water leaking from the dam and from groundwater flow, (typically between 1 and 2 cfs when creek flow does not exceed capacity) supports existing aquatic biota and habitat in the bypassed reach.

4.0 PROJECT NEXUS

Although the Project operates in a run-of-river fashion, the natural hydrology of Lake Creek was altered when the impoundment was constructed in 1917. Operations of the Project have likely altered hydrologic and geomorphic processes in portions of the bypassed reach of Lake Creek.

5.0 STUDY AREA AND STUDY SITES

Investigators will assess the relationship between available habitat and flow in the 0.5-mile bypassed reach of Lake Creek.

6.0 PROPOSED METHODOLOGY

Field Studies

Northern Lights, Inc. (NLI) proposes a hybrid methodology using aspects of a flow demonstration analysis and a modified wetted perimeter analysis to assess the relationship between flow and aquatic habitat in the bypassed reach. Researchers will establish and survey five transects in typical riffle habitat in the bypassed reach. Four calibration flows (1.5, 6.6, 19.5, and 69 cfs) will then be released to obtain information pertaining to water surface elevations at each of the five established cross-sections. Researchers will use this information to determine changes in wetted perimeter in 1-cfs

increments from 1 to 69 cfs using standard modeling software. Along with field measurements, photographs of each transect at each flow will be used to document conditions. Water depth and velocity will also be measured, modeled, or calculated at each flow to assess changes in physical habitat associated with increased flow in the bypassed reach.

Data Analysis

The U.S. Army Corps of Engineers' Hydrologic Engineering Centers River Analysis System (HEC-RAS) program will be used to calculate wetted perimeter for the four calibration flows measured in the field. HEC-RAS will then be used to determine the change in wetted perimeter at each cross-section in 1 cfs increments from 1 to 69 cfs. Average values for each cross-section at each flow increment will be used to generate a composite graphic depicting the wetted perimeter vs. discharge relationship in the Lake Creek bypass reach.

Figures, tables, and graphs depicting changes in wetted perimeter will be developed and presented in the ensuing report.

In addition, an analysis of the effects of variable flow releases on water depth and water velocity will be conducted to assess the suitability of specific habitat variables for bull trout. Habitat suitability criteria (HSC) for juvenile and young-of-year bull trout, if available from existing literature, will be used to evaluate the suitability of habitat conditions (*e.g.*, depth, velocity, and substrate) in the bypass reach at variable flow releases. If HSC are not available for juvenile and young-of-year bull trout, an appropriate surrogate salmonid species (*e.g.*, brook trout) will be used to assess the effects of variable flow releases on habitat suitability in the Lake Creek bypass reach.

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

Analyses, as described above, are commonly used to estimate changes in habitat based upon specified reservoir releases.

8.0 PRODUCTS

Field work is scheduled for fall 2006. Following collection of field data, analyses of the study will be provided as a draft report to the agencies in spring 2007 and included in an Initial Study Report in the fall of 2007. A summary of the information and findings will be included in the Application for New License, Exhibit E.

9.0 SCHEDULE

Background research and logistic planning will occur in early late summer and fall of 2006 with fieldwork scheduled for October 2006. Data analysis and report writing are scheduled for winter 2006 and early 2007. Data and analyses from the study will be provided as a draft report to the agencies in spring 2007 and included in an Initial Study Report in the fall of 2007.

10.0 LEVEL OF EFFORT AND COST

NLI estimates the cost of conducting this study as approximately \$26,200.

11.0 REFERENCES

Department of Interior. 1998. 50 CFR Part 17. Volume 63. No. 111. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Klamath River and Columbia River Distinct Population Segments of Bull Trout.

Department of Interior. 2005. 50 CFR Part 17. Volume 70. No. 185. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Bull Trout.

State of Montana. 2000. Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin, Montana. Online Publication - <http://fwp.state.mt.us/default.html>

United States Department of Agriculture. 1981. Lake Creek Natural Resources & Physical Features Inventory. Bozeman, Montana. 9 pp.

Lake Creek Project, FERC No. 2594

Cultural Resources Survey Study Plan

Study Plan Name: Cultural Resources Survey Study

Draft Date: April 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD) identifies a lack of information related to aquatic habitat in the 0.5-mile bypassed reach of Lake Creek and for which the existing, relevant, and reasonably available information was insufficient to address the issue(s). The consulting agencies identified the following issues:

- **Resource Issue C-1** – No Inventory of Cultural Resources
- **Resource Issue C-2** – No Historic Properties Management Plan

We have designed the cultural resources survey to identify, locate, and evaluate any archaeological sites and historic architectural resources within the Area of Potential Effects (APE), which we have defined as all land within the Project Boundary plus that portion of Lake Creek bypassed by the Project facilities. In accordance with Section 106 of the National Historic Preservation Act of 1966 (as amended), any action that take place within the APE must be assessed in terms of its potential to affect any building, structure, district, or archaeological site that is listed on or is eligible for the National Register of Historic Places (NRHP). This Phase I survey will cover the entire APE including the border of land around the impoundment, the powerhouse area, as well as the by-passed portion of Lake Creek that lies outside the Project boundary. This study does not include additional investigation, research or recovery of any significant discoveries.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

It is impossible to assess the potential impact of continuing and proposed Project operations on historic properties without knowledge of what those historic properties are. The proposed survey will identify and locate any cultural resources in the APE, both archaeological and above-ground, and will evaluate these cultural resources, if any, for their eligibility for the NRHP.

As the lead agency, the Federal Energy Regulatory Commission (FERC) is responsible for fulfilling the requirements of Section 106 in its decision to issue a new license to the Project. As provided by the regulations that implement Section 106 (36 CFR 800), the Montana State Historic Preservation Officer (SHPO) represents the interests of the State of Montana and its citizens, and advises and assists FERC in determining the significance of cultural resources within the APE. As a state agency with deep experience in the

prehistory and history of the state of Montana, the SHPO is in the best position to determine the significance of cultural resources and to evaluate the impact of continuing or projected Project operation upon any historic property. The SHPO will ensure that the proposed scope of the cultural resources study is adequate to provide the information that it needs to evaluate the impact of Project operations on historic properties, and will review the study report and concur in its recommendations.

In addition, FERC is responsible for consulting with any Indian tribes that demonstrate a historic connection to the Project area. The Kootenai Tribe has a historical connection to the Lake Creek area; with its particular knowledge of the area, it will be in a position to assist in the identification and evaluation of archaeological sites and properties of traditional cultural significance. An archaeologist affiliated with the Tribe may participate in the fieldwork for the cultural resources survey. The Tribe also will be afforded an opportunity to comment upon the report.

3.0 BACKGROUND AND EXISTING INFORMATION

Given its proximity to the Kootenai National Forest, many individual archaeological sites surrounding the Lake Creek Project have been identified and studied. These studies have resulted in number of individual site reports submitted by the U.S. Forest Service to the SHPO. In addition, one full-scale archaeological study was conducted at the Libby Dam-Koocanusa Reservoir in the mid-1980s (Thom 1987). Based on these studies, it is clear that the entire Lake Creek watershed has the potential to contain archaeological resources. Despite this, the area within and immediately bordering the Project, being in private hands, has never been surveyed for archaeological or other historic resources.

In addition, there have been historical studies of the Lake Creek region. In particular, the history of the Lake Creek Project has been studied, particularly for its association with the history of mining in the region (Calvi *n.d.*; Light *et al.* 1993). These studies, however, have not sought to evaluate the Project for its eligibility for the NRHP. While its history is clear, the integrity of the Project has not been evaluated from a historic architectural and engineering perspective; the integrity of the Project will be a key component in determining the eligibility of the Project for the NRHP.

4.0 PROJECT NEXUS

The proposed cultural resources survey will identify what, if any, historic properties exist within the APE for the Lake Creek Project. This information will be applied to the Section 106 process for determining the potential for adverse effects to historic properties created by the continued operation of the Project. Once the potential effects are determined, the information that is developed during the course of the survey will be used as the basis for preparing a Historic Properties Management Plan (not part of this study) which will guide the Licensee's actions relating to Section 106 during the term of the new license.

5.0 STUDY AREA AND STUDY SITES

The proposed cultural resources survey will include all lands within the defined APE and that are accessible by foot and have the potential to contain intact archaeological and/or historic architectural resources.

6.0 PROPOSED METHODOLOGY

One archaeologist and one architectural historian will carry out the survey and develop the associated report. The archaeological portion of the study will consist of a pedestrian survey along the shoreline of the impoundment. The investigators will walk the narrow strip of land between the reservoir and the Project Boundary to locate any cultural material that suggests a prehistoric or historic presence. Those areas identified as having high or moderate potential for archaeological resources will be given a more intensive coverage. High prehistoric probability areas will be subsurface tested. Generally, shovel slices are utilized on lacustrine terraces where the lack of rock occurs naturally. This technique relies on hearing the shovel hit large artifact types such as fire cracked rock, a prevalent site indicator in the project area. Shovel skims are typically 0.5 to 1 meter square and 30 centimeters deep. Shovel turnovers are used in areas of high probability where rocks occur. This shovel testing includes screening of the sediment for possible site discovery. Shovel turnover units are excavated down to a depth of 3 sterile levels (1 level =10 centimeters) or 3 sterile levels below the last cultural material encountered. All shovel tested areas will be mapped and designated as positive or negative on the inventory map. Investigators will log and note any significant discoveries but will not perform additional Phase II type investigations, recovery or other work. Results of all testing will be documented in the report including information on depth of shovel test, soil composition, and artifacts recovered if any.

The architectural portion of the survey will include an inspection of the interior and exterior of the powerhouses, dam, penstock, and other appurtenant facilities. The survey will include a walkover of the powerhouse complex to update the existing site report (Light *et al.* 1993) and document any new information related to the site. Investigators will document the structures, landscape overviews, and the interiors and exteriors of buildings with black and white 35mm film photography and with digital photography. The architectural survey will determine the level of physical and historical integrity of the complex and relate that integrity to the history of the Project.

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

The survey will be carried out in accord with practices defined out by the Montana SHPO in Baumler and Olsen (2003). The SHPO has reviewed and concurred with the proposed scope of work of the study.

8.0 PRODUCTS

The investigators will prepare one draft report for comment by the SHPO, and tribes. Following review a final Cultural Resources Inventory report will be provided to the SHPO, tribes and FERC. The report will contain a description of the Project, a statement of the methods used in the survey, a prehistoric and historic cultural overview of the region and the Project, the results of the survey (*i.e.*, descriptions of any archaeological

sites or historic architectural resources that are identified), and recommendations regarding eligibility for the NRHP. The report also will contain maps showing the general location of the area and any archaeological sites and historic architectural resources that are identified.

9.0 LEVEL OF EFFORT AND COST

The proposed cultural resources survey represents the level of study necessary to provide the information on the location of historic properties within the APE and to assess the effects of the continued operations of the Project. The cost of the survey as proposed will be approximately \$24,500.

10.0 SCHEDULE

Kleinschmidt expects that fieldwork for the proposed survey will take place during the month of April 2006, and will be carried out by one archaeologist and one architectural historian. A draft report will be issued by July 2006. Pending review by the Montana SHPO and pertinent Indian tribes, a final report will be issued by October 2006.

11.0 REFERENCES

Baumler, Mark, and Arnie Olsen. "Consulting with the Montana SHPO: Guidelines and Procedures for Cultural Resource Review and Consultation under the National Historic Preservation Act and the Montana State Antiquities Act." Montana State Historic Preservation Office Planning Bulletin No. 21. Originally published 2000; revised 2003. Available at the Montana SHPO internet web site, <http://www.his.state.mt.us/shpo/archaeology/consultingwith.asp> (accessed April 6, 2006).

Calvi, James, "Lake City, Troy and West Troy, Montana (1891-1896)." Unpublished typescript ms, in possession of the author. No date.

Light, Timothy. Montana Cultural Resource Inventory Form, "Montana Light & Power Co. Power Station and Troy Dam," with amendments by Jim Calvi (1991) and Mary Coryell (1993). Unpublished inventory form filed with the Montana State Historic Preservation Office, Helena.

Thom, Alston V. "Prehistoric Land Use in the Northern Rocky Mountains: Perspectives from the Middle Kootenai River Valley." Center for Northwestern Archaeology, Washington State University, 1987.

Lake Creek Project, FERC No. 2594

Fisheries Study Plan

Study Plan Name: Fisheries Study

Draft Date: September 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD) identifies potential issues associated with Project fisheries for which the existing, relevant, and reasonably available information was insufficient to analyze. During consultation, the resource agencies identified the following issues related to the fishery resource:

- **Resource Issue F-2** – Fish species composition in Lake Creek Reservoir.
- **Resource Issue F-5** – Fish species composition and habitat availability in the bypassed reach of Lake Creek.

The goal of this study is to obtain additional information related to Project fisheries to address the identified resource issue(s). Specifically, this study will involve standard fish sampling surveys in the Lake Creek Reservoir and Lake Creek bypass reach to assess fish species composition, relative abundance, and spatial distribution.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The State of Montana and the U.S. Fish & Wildlife Service (USFWS) are active stakeholders in the recovery plan for bull trout, a federally protected species that occurs in Lake Creek. The USFWS listed all Columbia River basin bull trout for protection under the Endangered Species Act (ESA) in 1998 (Department of Interior, 1998). In September 2005, the USFWS issued their final ruling defining critical habitat for Columbia River bull trout, which included 56 riverine miles and 1,384 acres of lakes in the Kootenai River basin in western Montana and northern Idaho (Department of Interior, 2005). In 2000, the State of Montana developed a Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin (State of Montana, 2000) to protect and restore core habitats that contain the best remaining spawning and early rearing habitat for bull trout.

Lake Creek is also known to support torrent sculpin and westslope cutthroat trout, which are species of concern in the State of Montana (State of Montana, 2006).

3.0 BACKGROUND AND EXISTING INFORMATION

There is little information describing existing fishery resources in the Project Area, although general surveys in the Lake Creek watershed have been conducted in the past by Montana Department of Fish, Wildlife, and Parks (MTFWP) and others. In August 2006,

Northern Lights, Inc. (NLI) completed its first year of backpack electrofishing, gill net surveys, and minnow trapping at the Lake Creek Project. The electrofishing survey indicated that the bypass reach is dominated by juvenile salmonids, primarily brown trout and bull trout (Table 1). Initial gill net surveys indicate that the impoundment is dominated by brown trout and mountain whitefish (Table 1).

Table 1. Results of fish sampling in the Lake Creek Project bypassed reach and impoundment, Lake Creek, Montana, 2006.

Species	Bypass Reach (EFISH)		Impoundment (Gill Nets)	
	No. Captured	Relative Percent	No. Captured	Relative Percent
Brown Trout	47	30%	49	50%
Bull Trout	36	23%	5	-
Torrent Sculpin	23	15%	-	-
Longnose Sucker	14	9%	-	-
Longnose Dace	12	8%	-	-
Rainbow Trout	11	7%	3	3%
Brook Trout	4	3%	-	-
Redside Shiner	2	1%	-	-
Mountain Whitefish	2	1%	35	43%
Bull/Brook Hybrid	1	1%	-	-
Peamouth	1	1%	1	3%
Slimy Sculpin	1	1%	-	-
Westslope Cutthroat	-	-	3	
Northern pikeminnow			2	
Total	154	100%	98	100%

The majority of bull trout in Lake Creek occur as a unique form of adfluvial fish that move *downstream* from Bull Lake to spawning areas in Keeler Creek, a tributary of Lake Creek approximately 6 river miles upstream of the Project Area. In portions of Lake Creek below Bull Lake, MTFWP has reported that bull trout potentially occur as a resident form. Anecdotal reports indicate adult bull trout from the mainstem Kootenai River may occasionally use the lower 0.75 miles of Lake Creek in the fall to feed on spawning kokanee salmon, though in recent years kokanee numbers in Lake Creek are much reduced. Further upstream movement is blocked by the 40-ft. waterfall at river mile 0.75. Bull trout occurring in the bypassed reach are likely young-of-year fish that have been moved downstream during high spring river flow. Ninety-five percent of all bull trout captured (35 of 37) were 65 millimeters or less (total length). The majority of bull trout (n = 29, or 78 percent) and brown trout (n = 27, or 57 percent) were captured in the large spill pool directly below the dam (Table 3).

4.0 PROJECT NEXUS

Although the Project operates in a run-of-river fashion, the hydrology and morphology of Lake Creek were altered when the impoundment was constructed in 1917. Because the dam and impoundment have altered hydrologic and geomorphic processes in Lake Creek, habitat quality and fishery resources in the Project Area may be affected by Project operations. Additionally, the Project hydro facilities may affect fishery resources by altering downstream migration behavior and/or by entrainment through Project facilities.

5.0 STUDY AREA AND STUDY SITES

NLI will conduct field investigations in Lake Creek Reservoir and in the 0.5-mile bypassed reach of Lake Creek below the dam as described further below.

6.0 PROPOSED METHODOLOGY

Investigators will deploy gill nets and minnow traps in the impoundment and use standard backpack electrofishing techniques to sample fish in the bypassed reach of Lake Creek. If requested by either the USFWS or MTFWP, investigators will collect genetic materials for analysis by the agencies from bull trout found below the waterfall in the bypassed reach of Lake Creek. Genetic material collection will only take place in the presence of a representative of at least one of the agencies.

Data Collection Techniques

Impoundment – Gill netting took place in the reservoir in August 2006 and October 2006. Four experimental mesh gill nets were fished in the impoundment for one 18 to 24 hour overnight set. Each net will be 125 feet in length with five panels varying from ½” to 2 ½” mesh size. A second year of gill net surveys will be conducted in 2007. NLI will coordinate with MTFWP for the use of gill nets within the impoundment in accordance with MTFWP protocols for gill netting.

NLI also deployed minnow traps in the reservoir in October 2006 and will do so again in 2007 in an effort to capture juvenile fish at locations inaccessible for gill netting. Eight minnow traps will be deployed for a 24-36 hour period in the deeper holes of the impoundment and along shoreline margin habitat. Minnow traps will be checked periodically as needed depending on catch rates. If necessary, a second night of minnow trapping will be conducted depending on catch rates.

Bypass Reach – NLI conducted an electrofishing survey in the bypassed reach in August 2006 in the following habitat units:

- Three units (run, pool, riffle) in the vicinity and upstream of the Project’s powerhouses,
- One unit (pool) directly upstream of the Barrier Falls, and
- Two units (pool and riffle) directly below Lake Creek dam.

The same six habitat units will be sampled again in 2007. Investigators will conduct a 1-pass electrofishing survey in each unit moving in an upstream direction to determine

presence / absence of fish species. Fish will be identified, enumerated, and measured for total length in the field prior to release.

Data Analyses

Species composition, relative percent, spatial distribution, and length-frequency information will be presented. NLI will present all fisheries data in tabular and/or graphic form.

7.0 *CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE*

This study will employ generally accepted practices for evaluating fish species in riverine waters. The study methodology is consistent with generally accepted fish sampling principles and practices.

8.0 *PRODUCTS*

Data and analyses from fisheries surveys will be included in informal reports to the agencies. Following the second field season scheduled for summer 2007, Licensee will prepare a report for inclusion in the Initial Study Report scheduled for fall 2007. A summary of the information and findings will be included in the Application for New License, Exhibit E.

9.0 *SCHEDULE*

NLI conducted preliminary field investigations in August 2006 and October 2006 in the Lake Creek Reservoir and in the 0.5-mile bypassed reach of Lake Creek below the dam. Backpack electrofishing, gill netting, and minnow trapping are planned for 2007. Data preparation and analysis are scheduled after each field session. Data analysis will be shared with the agencies as available. This information will be included in an Initial Study Report scheduled for fall 2007.

10.0 *LEVEL OF EFFORT AND COST*

NLI estimates the cost of conducting impoundment and bypass reach fisheries surveys and collecting physical data related to Lake Creek Reservoir as approximately \$37,500.

11.0 *REFERENCES*

Department of Interior. 1998. 50 CFR Part 17. Volume 63. No. 111. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Klamath River and Columbia River Distinct Population Segments of Bull Trout.

Department of Interior. 2005. 50 CFR Part 17. Volume 70. No. 185. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Bull Trout.

Hendricks, P. 1997. Status, Distribution, and Biology of Sculpins (Cottidae) in Montana: A Review. Online Publication - <http://nhp.nris.state.mt.us/>. Date Accessed – May 15, 2006.

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State of Montana. 2006. Natural Heritage Program Datababse. Online Publication. <http://nhp.nris.state.mt.us/>. Date Accessed – May 15, 2006.

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Lake Creek Project, FERC No. 2594

Intake and Spill Velocity Analysis; Characterization of Spill Flows Study Plan

Study Plan Name: Intake and Spill Velocity Analysis; Characterization of Spill Flows Study

Draft Date: September 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD), May 31, 2006, identified a lack of information pertaining to stream velocity at the intake of the Project's flowline and a general lack of information related to flow conditions at the Project during high flows.

- **Resource Issue F-3** – Potential entrainment and or impingement of fish, especially bull trout.
- **Resource Issue F-4** – Downstream passage of juvenile and/or adult bull trout.

Northern Lights, Inc. (NLI) proposes to measure water velocity in front of the intake during high-flows in Lake Creek and will characterize the velocity and flow through the dam during the same period. NLI will use the data in conjunction with characterizing the effect of continued Project operations on the resources.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The Federal Energy Regulatory Commission (FERC), and Montana Fish, Wildlife, and Parks (MTFWP) and the United States Fish and Wildlife Service (USFWS) all have responsibilities for protecting wildlife resources. FERC must carefully consider the effects of continued Project operations on wildlife resources and must balance the uses of the Project. The State of Montana and the U.S. Fish & Wildlife Service are active stakeholders in the recovery plan for bull trout, a federally protected species that occurs in Lake Creek. The USFWS listed all Columbia River basin bull trout for protection under the Endangered Species Act (ESA) in 1998 (Department of Interior, 1998). In September 2005, the USFWS issued their final ruling defining critical habitat for Columbia River bull trout that included 56 riverine miles and 1,384 acres of lakes in the Kootenai River basin in western Montana and northern Idaho (Department of Interior, 2005). In 2000, the State of Montana developed its Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin (State of Montana, 2000) to protect and restore core habitat that contains the best remaining spawning and early rearing habitat for bull trout. Lake Creek also supports torrent sculpin and westslope cutthroat trout, which are species of concern in the State of Montana (Hendricks, 1997).

3.0 BACKGROUND AND EXISTING INFORMATION

There is little or no known data pertaining to approach velocity flows at the intake of the Lake Creek Project. There is little or no known data pertaining to flows through the Project's gates during high flows.

4.0 PROJECT NEXUS

Although the Project operates in a run-of-river fashion, construction of the dam in 1917 altered the hydrology of Lake Creek. The Project typically uses all flows less than 578cfs in its operations. The Project facilities bypass approximately one-half mile of Lake Creek.

5.0 STUDY AREA AND STUDY SITES

The Study Area includes the dam and powerhouse intake structures.

6.0 PROPOSED METHODOLOGY

NLI will use standard electronic velocity meters to obtain water velocity information in front of the Project's intake. Researchers will measure velocities across the face of the intake at 2 to 2.5-foot intervals in both a vertical and horizontal direction. The dimensions of the intake are approximately 9 feet (depth) by 21 feet (width) with 1-inch clear spacing. NLI proposes to review the flow velocities at the dam during the same period based upon gate measurements and stream flow. Part of this assessment will analyze the distribution of flow between the gates and the intake structure during high flows. The goal is to 'characterize' the nature of the flows at the Project dam during high flow periods when most downstream movement of fish is expected.

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

It is a standard practice to measure intake velocity at hydroelectric facilities with handheld velocity meters. Characterizing flows through a dam's gates based upon gate measurements and known flow is a standard engineering practice.

8.0 PRODUCTS

Data will be included in informal reports to the agencies following data analysis in the fall of 2006. Licensee will prepare a report for inclusion in the Initial Study Report scheduled for fall 2007. Licensee will use the findings in preparing the Application for New License, Exhibit E.

9.0 LEVEL OF EFFORT AND COST

NLI estimates the cost of collecting velocity measurements and preparing tabular reports at approximately \$6,000

10.0 SCHEDULE

Measurements are scheduled for May 2006. Data analyses are scheduled for fall 2006.

11.0 REFERENCES

Department of Interior. 1998. 50 CFR Part 17. Volume 63. No. 111. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Klamath River and Columbia River Distinct Population Segments of Bull Trout.

Department of Interior. 2005. 50 CFR Part 17. Volume 70. No. 185. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Bull Trout.

Hendricks, P. 1997. Status, Distribution, and Biology of Sculpins (Cottidae) in Montana: A Review. Online Publication - <http://nhp.nris.state.mt.us/>

State of Montana. 2000. Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin, Montana. Online Publication - <http://fwp.state.mt.us/default.html>

Lake Creek Project, FERC No. 2594

Herpetology Study Plan

Study Plan Name: Herpetology Study

Draft Date: April 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD), May 31, 2006, identified issue(s) associated with reptiles and amphibians for which the existing, relevant, and reasonably available information was insufficient to determine if the Project affected the resource. The resource agencies identified the following issue:

- **Resource Issue F-7** – Reptile and amphibian use of Project Area

FERC and the agencies have indicated that knowing which species of reptiles and amphibians are present within or affected by the Project is necessary, before assessing any effects of continued Project operation. The goal of this study is to gather the additional information necessary to determine species use of the Project Area.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

Montana Fish, Wildlife, and Parks (MTFWP), United States Fish and Wildlife Service (USFWS), have responsibilities for protecting herpetological resources. FERC must consider the effects of continued Project operations on wildlife resources and must balance the uses of the Project. The MTFWP is responsible for managing wildlife species within Montana and special considerations apply to RTE species. The USFWS is primarily concerned with potential RTE species located within the Project Area. This study will provide the necessary information to assess the effects of the Project on herpetological resources.

3.0 BACKGROUND AND EXISTING INFORMATION

The Lake Creek PAD indicates that littoral areas of the Project Area provide potential breeding habitat for the rare Coeur d'Alene salamander as well as other amphibian species such as tailed frogs, Columbia spotted frogs, and tiger and long-toed salamanders. The agencies noted that there is little documentation related to reptile and amphibian use of Lake Creek in the Project Vicinity. A list of Montana reptile and amphibian species were compiled using range and generalized habitat descriptions to list species that may be encountered during field surveys (Table 1).

Table 1. Reptile and amphibian species and the type of habitat they may utilize within the Project Area (Ganser 1981, MNHP 2006).

Amphibians			
Common Name	Species Name	Status	Habitat
Long-toed salamander	<i>Ambystoma macrodactylum</i>	None	Sagebrush to Alpine habitats up to 3000 m elevation. Breed in ponds or lakes.
Coeur d'Alene salamander	<i>Plethodon idahoensis</i>	USFS: Sensitive MTFWP: Species of Concern	Springs, seeps, waterfall spray zones, and stream edges (specifically streamside talus)
Tiger Salamander	<i>Ambystoma tigrinum</i>	None	primarily prairie and agricultural habitat
Columbia spotted frog	<i>Rana luteiventris</i>	None	Riparian and wetland habitat
Bullfrog	<i>Rana catesbeiana</i>	None	large calm bodies of water
Northern Leopard Frog	<i>Rana pipiens</i>	None	low elevation wetted areas
Pacific chorus frog	<i>Pseudacris regilla</i>	None	Found in temporary pools of lower elevation forests and intermountain valleys shortly after snowmelt.
Tailed frog	<i>Ascaphus montanus</i>	None	Found in and along small, swift, cold mountain streams.
Boreal (western) toad	<i>Bufo boreas</i>	USFS: Sensitive MTFWP: Species of Concern	Found in a variety of habitats.
Reptiles			
Common Name	Species Name	Status	Habitat
Northern Alligator Lizard	<i>Elgaria coerulea</i>	USFS: None MTFWP: Species of Concern	South facing talus slopes and canopies of douglas fir, ponderosa pine, and shrubs.
Western Skink	<i>Eumeces skiltonianus</i>	USFS: None MTFWP: Species of Concern	Open ponderosa pine forest near talus
Western Terrestrial Garter Snake	<i>Thamnophis elegans</i>	None	All habitats, but commonly at low elevations near water
Common Garter Snake	<i>Thamnophis sirtalis</i>	None	All habitats, but commonly at low elevations near water
Rubber Boa	<i>Charina bottae</i>	None	Usually found under rocks and logs in forests
Racer	<i>Coluber constrictor</i>	None	Open shortgrass prairie or forest
Painted Turtle	<i>Chrysemys picta</i>	None	Shallow soft-bottomed bodies of water

4.0 PROJECT NEXUS

The presence of reptile and amphibian species of Lake Creek is unknown. Several Montana species of concern and federally sensitive species may potentially utilize the habitat within the Project Area. An assessment of the effects of Project operations on local wildlife may only occur once identification of reptile and amphibian species and their habitats has occurred. This study will provide the necessary background information to understand the Project effects.

5.0 STUDY AREA AND STUDY SITES

The Lake Creek Project Area is the focus for this study. The Project is located on Lake Creek, which is a tributary of the Kootenai River. Open-water, wetland, and upland habitat make up the approximately 200 acres of Project area. The periphery of the 30-acre reservoir and the bypass reach of Lake Creek are the study sites for this herpetological survey.

6.0 PROPOSED METHODOLOGY

The survey will occur during the summer of 2006. A reconnaissance survey will establish the location and amount of different habitats within the Project Area. After determining the type and extent of available habitat, investigators will use the following methods described for each habitat; however, investigators also will record any occurrence of reptiles and amphibians as they observe them during other field studies within the Project area.

Terrestrial Survey

Investigators will use the time-constrained search method described by Corn and Bury (1990) to survey terrestrial habitat. Time-constrained searches are more effective than plot searches for determining presence or absence of species and for providing initial data on the types of habitats occupied because investigators can examine larger areas and target productive microhabitats (Bury and Corn 1991). This field method suggests that 6-8 person hours of collecting were sufficient for detecting species diversity within approximately a 0.5-acre area. During this time, investigators will lift potential cover objects such as logs, rocks, and debris piles, search the area underneath, and identify any amphibians and reptiles found. Investigators will replace all objects close to original positions to limit disturbing the habitat. Use of this method will include surveys in wetland, riparian, and upland habitat.

Aquatic Survey

Investigators will determine presence or absence of western painted turtle by observation of basking turtles. Painted turtles bask on logs and debris throughout the day (Ernst *et. al.* 1994, MNHP 2006) these observations will be made throughout fieldwork, including wetland, herpetological, and fishery surveys. If investigators do not observe turtles, they will analyze habitat suitability data obtained during fisheries and wetland surveys. Investigators will sample amphibians in aquatic habitat according to Bury and Corn (1991) in lotic habitat and according to Olsen, Leonard, and Bury (1997) for lentic habitat.

Lotic Habitat – Investigators will sample any small tributaries to Lake Creek reservoir along a 33 ft transect of the stream, because this length is sufficient to determine occurrence of aquatic amphibians. Investigators will mark the transect length along the streambank and will conduct a brief terrestrial amphibian and reptile survey within a 1.5 ft buffer to the streams shore. Upon completion of this terrestrial survey, investigators will begin the stream survey. Starting at the downstream end of the transect one investigator will lift out rocks, logs, and debris and place them on shore while, the other investigator will use a D-frame net downstream of the objects being lifted to collect any amphibians trying to escape. Investigators may also survey streams for aquatic amphibians using electroshocking equipment (Bury and Corn 1991). Investigators will also survey the bypass reach of Lake Creek using either of the methods described. Consequently, investigators will also target amphibians during fisheries surveys.

Lentic Habitat – For consistency lentic habitat will also be surveyed along a 33 ft shoreline transect. The number and location of transects will be determined based on habitat availability. Investigators will sample several locations on Lake Creek Reservoir. Again each transect will be marked along shore and a 1.5 ft terrestrial buffer will be searched for amphibians and reptiles. Following the terrestrial search, investigators will use a D-frame net, seine, or electroshocking equipment to collect the amphibians located within the aquatic transect. Investigators expect to find mostly larval forms of amphibians during surveys of lentic habitat.

Description of Wildlife Species

Although NLI has not proposed a specific “wildlife study” during the study investigators will note wildlife and bird species observed directly or by sign (*e.g.*, calls, scat, tracks, and dens). A separate study will survey reptiles and amphibians (see Herpetology study plan for details). Investigators will record all mammal and bird species encountered. In addition, this study will include descriptions of any notable terrestrial habitat features, including the location of unique community types and rare, threatened, or endangered species (RTE).

7.0 *CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE*

The methods described above have been the basis for numerous other surveys proposed for other FERC relicensing projects (DTA 2005; ERI 2004, FERC 2105 2001, EDID 2002).

8.0 *PRODUCTS*

The report will include a GIS map of the locations and species located within the Project Area. A written discussion of the habitat use and potential habitat resources located within the Project Area will also be included.

9.0 *LEVEL OF EFFORT AND COST*

NLI estimates the cost of conducting the herpetological surveys as approximately \$9,400.

10.0 SCHEDULE

Fieldwork will occur during the summer of 2006. Data analysis and report writing are scheduled for fall 2006. This information will be included in a Initial Study Report and/or shared with the agencies following data analysis in the late fall of 2006 or early 2007.

11.0 REFERENCES

- Bury, R.B. and P.S. Corn. 1991. Sampling methods for amphibians in streams in the Pacific Northwest. Gen Tech. Rep. PNW-GTR-275. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, 29 pp.
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- Devine Tarbell & Associates, Inc. (DTA). 2005. Amphibian survey study plan for Energy Northwest's Packwood Lake hydroelectric project FERC No. 2244. Lewis County, Washington.
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- El Dorado Irrigation District (EDID). 2002. Protocols for conducting El Dorado Irrigation District project 184 amphibian surveys. El Dorado County, California.
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- Olson, D.H., W.P. Leonard, and R.B. Bury (ed.). 1997. Sampling amphibians in lentic habitats. Society for Northwestern Vertebrate Biology, Northwest Fauna (4).

Lake Creek Project, FERC No. 2594

Physical Characteristics of Lake Creek Reservoir Study Plan

Study Plan Name: Physical Characteristics of Lake Creek Reservoir Study

Draft Date: April 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD) identifies a lack of data associated with the physical characteristics of Lake Creek reservoir for which the existing, relevant, and reasonably available information was insufficient to address the following issues:

- **Resource Issue W-2** – Reservoir Sediment Contamination
- **Resource Issue W-3** – Lake Creek Water Quality

Northern Lights, Inc. (NLI) identified that there was little existing information describing the physical characteristics of the reservoir such as maximum depth, mean depth, water temperature, and dissolved oxygen within the reservoir.

The goal of this study is to develop additional information necessary to document some of the physical characteristics of Lake Creek Reservoir. Specifically, this study will collect data related to depth and dissolved oxygen. NLI will use the information collected to update baseline information for Lake Creek Reservoir.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

Resource Agencies, the Federal Energy Regulatory Commission (FERC) and NLI all have an interest in understanding the nature of Lake Creek Reservoir and how it may affect a number of resources. To understand issues related to water quality, fisheries, wetlands and wildlife, NLI must have a basic knowledge of some of the physical parameters of the reservoir.

3.0 BACKGROUND AND EXISTING INFORMATION

There is little or no known information describing the physical characteristics of Lake Creek Reservoir other than surface area and approximate capacity.

4.0 PROJECT NEXUS

Although the Project operates in a run-of-river fashion, the hydrology and morphology of Lake Creek were altered when the impoundment was constructed in 1917. Lake Creek Reservoir provides different habitat for fish and wildlife and has created wetlands. Water retention also has the potential to alter some of the physical characteristics of the water such as dissolved oxygen.

5.0 STUDY AREA AND STUDY SITES

NLI will conduct field investigations in Lake Creek Reservoir.

6.0 PROPOSED METHODOLOGY

NLI will collect depth measurements along the face of the dam and at five additional transects across the reservoir. Transects will be spaced approximately 200 to 500 feet apart. NLI will record depths at approximately 15 to 25 foot intervals across each transect. Investigators will take measurements with a sounding weight or a handheld depth finder and will average readings to ascertain mean impoundment depth.

NLI will also collect DO and temperature information at four stations in the Lake Creek Reservoir to characterize conditions in the reservoir and to assess whether thermal stratification occurs. NLI will use a handheld YSI 85 DO and Temperature meter to collect DO and temperature readings. Stations will be set-up longitudinally from the dam face to the upper portion of the reservoir or in the deeper holes of the reservoir where stratification could occur. Investigators will construct four DO and temperature profiles from the collected data.

NLI will present all information pertaining to DO, temperature, and depth, in a tabular or graphic format.

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

This study will employ generally accepted practices for measuring physical characteristics of reservoirs.

8.0 PRODUCTS

Data and analyses will be included in an Initial Study Report and/or shared with the agencies following data analysis in the fall of 2006 or early 2007. A summary of the information and findings will be included in the Application for New License, Exhibit E.

9.0 SCHEDULE

Background research and logistic planning will occur in early summer 2006 with fieldwork scheduled for late summer 2006. Data analysis and report writing are scheduled for fall 2006. This information will be included in a Initial Study Report and/or shared with the agencies following data analysis in the late fall of 2006 or early 2007.

10.0 LEVEL OF EFFORT AND COST

NLI estimates the costs of gathering the described data and preparing the necessary reports as approximately \$2,000.

Lake Creek Project, FERC No. 2594

Potential Bull Trout Protection, Mitigation, and Enhancement (PM&E) Feasibility Study Plan

Study Plan Name: Potential Bull Trout PM&E Feasibility Study

Draft Date: November 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD) identifies issue(s) associated with the potential entrainment of bull trout in the Project facilities for which the existing, relevant, and reasonably available information was insufficient to address the issue(s). The consulting agencies identified the following issue:

- **Resource Issue F-3** - Potential entrainment and/or impingement of fish, especially bull trout.

The goal of this feasibility analysis is to identify and evaluate different activities that may protect bull trout from entrainment or mitigate their loss through habitat enhancement activities. The report will provide a preliminary feasibility analysis of each activity. Additional field studies are planned in the fall of 2006 and summer 2007 to continue to assess the presence of salmonids, especially bull trout, in the reservoir and bypassed reach of Lake Creek, which will aid in this PM & E evaluation.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The State of Montana and the U.S. Fish & Wildlife Service (USFWS) are active stakeholders in the recovery plan for bull trout, a federally protected species that occurs in Lake Creek. The USFWS listed all Columbia River basin bull trout for protection under the Endangered Species Act (ESA) in 1998 (Department of Interior, 1998). In September 2005, the USFWS issued their final ruling defining critical habitat for Columbia River bull trout that included 56 riverine miles and 1,384 acres of lakes in the Kootenai River basin in western Montana and northern Idaho (Department of Interior, 2005). In 2000, the State of Montana developed its Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin (State of Montana, 2000) to protect and restore core habitat that contains the best remaining spawning and early rearing habitat for bull trout.

3.0 BACKGROUND AND EXISTING INFORMATION

The Lake Creek/Bull Lake bull trout population is unique and remains generally isolated from the rest of the Kootenai River drainage by a 40-ft barrier waterfall. (See Section 5.3 of the Lake Creek Pre-Application Document for further background information). Fishery studies conducted by the Licensee in 2006 in the Lake Creek Reservoir and in the

bypassed reach of Lake Creek (between the dam and the powerhouses) revealed the presence of young-of-year bull trout in the bypassed reach both above and below the barrier waterfall, but no adult or sub-adults. After informal discussions with the agencies, there is general agreement that these fish were likely transported through the Lake Creek Project facilities during the 2006 spring freshet. Several sub-adult bull trout (<330 mm) were also captured in the reservoir in October 2006.

Our current understanding of bull trout life history in the Project Vicinity is that adult bull trout migrate downstream from Bull Lake to spawn in Keeler Creek, approximately six miles upstream of the Project. Juveniles eventually outmigrate from Keeler Creek and move back upstream to Bull Lake (adfluvial life history). Other bull trout may outmigrate from Keeler Creek and remain in Lake Creek (fluvial life history). There may also be a resident population of bull trout in Lake Creek, although the presence of resident or fluvial populations in Lake Creek has not been confirmed. Regardless, juvenile bull trout found in the bypassed reach of Lake Creek are likely fish that were moved downstream during high water rather and are not part of a downstream migration from the upper watershed.

It is reasonable to assume that if juvenile fish pass over the dam during high water, some may also be entrained in the Project facilities and subsequently passed through the turbines. If entrained, some of these fish may suffer injury or mortality as a result of that passage, though for turbines such as Lake Creek Powerhouse #2, survival for juvenile salmonids can be as high as 98 percent (Franke et al., 1997; Muir et al., 2001). Actual survivability of juvenile trout passing through the Lake Creek Project likely varies depending on fish size, which powerhouse they enter, and the current hydraulic conditions.

4.0 PROJECT NEXUS

The Project operates in a run-of-river fashion, impounding a small 30-acre reservoir upstream. During high spring flows, juvenile bull trout are likely moved downstream from the upper watershed. Though not documented, the Licensee concedes that if juvenile salmonids pass over the dam and into the bypassed reach of Lake Creek, others may be entrained in the hydro system and subsequently passed through the Project turbines. Some of these fish may suffer injury or mortality as a result of that passage. Adult and sub-adult bull trout are prevented from passing into the penstock by a one-inch clear space trash rack; although they are free to pass over the dam through the Project spill gates.

5.0 STUDY AREA AND STUDY SITES

The Licensee will evaluate the feasibility of activities and programs that may minimize or mitigate for any effect that the Project may have on bull trout in the Lake Creek Project Area. Additionally, the Licensee will evaluate the feasibility of activities that may effectively enhance the bull trout population in other areas of the Lake Creek watershed.

6.0 *PROPOSED METHODOLOGY*

The Licensee will identify and analyze methods and opportunities to reduce or eliminate potential bull trout entrainment that may be occurring at the Project. Additionally, the Licensee will identify potential mitigation activities that could be implemented to benefit the Lake Creek bull trout population either in the Lake Creek Project Area or in areas of the watershed above or below the Project, where restoration efforts may be of a higher priority (e.g., Keeler Creek).

The Licensee will provide a preliminary feasibility analysis of each activity. The costs, effectiveness, benefits, and logistics for each method or program will be evaluated. The types of activities for evaluation include, but are not limited to: appropriate fish screening devices; altered hydro operations; and, habitat improvements in the bypassed reach, reservoir, upstream in Lake Creek or, in tributaries to Lake Creek.

7.0 *CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE*

Identifying and evaluating the feasibility of potential measures to mitigate for the effects of anthropogenic activity in aquatic ecosystems is a standard approach used by state and federal agencies and the scientific community in general. Evaluations of this type are generally referenced in EAs, BAs, and BOs as well as license applications.

8.0 *PRODUCTS*

Licensee will prepare a draft report of potential protection, mitigation and enhancement (PM&E) activities for discussion with the agencies by summer 2007. A final report will be included in the Initial Study Plan Report in the fall of 2007. A summary of the information and findings will be included in the Application for New License, Exhibit E.

9.0 *SCHEDULE*

Licensee will begin the process of identifying potential activities in the fall of 2006. A draft report for discussion with the tribes and stakeholders will be prepared by summer 2007. Following discussions with the tribe and agencies, Licensee will prepare a report for inclusion in the Initial Study Plan Report in the fall of 2007.

10.0 *LEVEL OF EFFORT AND COST*

NLI estimates the cost of conducting this study as approximately \$11,000.

11.0 *REFERENCES*

Department of Interior. 1998. 50 CFR Part 17. Volume 63. No. 111. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Klamath River and Columbia River Distinct Population Segments of Bull Trout.

Department of Interior. 2005. 50 CFR Part 17. Volume 70. No. 185. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Bull Trout.

Franke, G. F., Webb, D. R., Fisher, R. K., Mathur, D., Hopping, P. N., March, P. A., Headrick, M. R., Laczó, I. T., Ventikos, Y., and F. Sotiropoulos. 1997. Development of environmentally advanced hydropower turbine system design concepts. Prepared for U.S. Dept. Energy, Idaho Operations Office Contract DE-AC07-94ID13223.

Muir, W. D., Smith, S. G., Williams, J. G., and B. P. Sanford. 2001. Survival of Juvenile Salmonids Passing through Bypass Systems, Turbines, and Spillways with and without Flow Deflectors at Snake River Dams. *North American Journal of Fisheries Management*. 21:135-146.

State of Montana. 2000. Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin, Montana. Online Publication - <http://fwp.state.mt.us/default.html>

Lake Creek Project, FERC No. 2594

Water Quality Study Plan

Study Plan Name: Water Quality - Lake Creek and Lake Creek Reservoir Study

Draft Date: April 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD) identifies issue(s) associated with water quality for which the existing, relevant, and reasonably available information was insufficient to address the issue(s). The consulting agencies identified the following issues:

- **Resource Issue W-2** – Reservoir Sediment Contamination.
- **Resource Issue W-3** – Lake Creek Project Water Quality.

The goal of this study is to develop the additional information necessary to address the identified issue(s). Specifically, this study will update baseline information and evaluate concentrations of metals and nutrients in areas of Lake Creek within the Project boundary or potentially affected by Project operations.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The Montana Department of Environmental Quality (MTDEQ) establishes numeric water quality standards consistent with Section 75-5-301 of the Montana Water Quality Act and Section 303(c) of the Federal Clean Water Act (MTDEQ, 2006).

3.0 BACKGROUND AND EXISTING INFORMATION

The State of Montana and the Environmental Protection Agency (EPA) listed Lake Creek and several of its tributaries as impaired in its 2004 Clean Water Act 303(d) report (MTDEQ, 2005b). The source of these pollutants was identified as mine tailings and mining resource extractions from upstream of the Project.

Readily available information for this Project is dated. The United States Geological Survey (USGS) monitored water quality in Lake Creek, below the Lake Creek Dam, on a monthly basis from July 1976 to September 1978. Boron, cadmium, copper, lead, and mercury were all below detection limits. Zinc, chromium, and selenium were found to be above current water quality standards. More recent sampling by MTDEQ as part of the 303(d) listing process identified nitrogen and several metals at levels that warranted the impairment listing for Lake Creek; however, this information is not specific to the Project Area.

4.0 PROJECT NEXUS

Although the Project operates in a run-of-river fashion, the natural hydrology of Lake Creek was altered when the impoundment was constructed in 1917. The dam and impoundment affect Lake Creek’s hydrology, which may affect water quality at the Project.

5.0 STUDY AREA AND STUDY SITES

Northern Lights, Inc. (NLI) is proposing to collect water samples from three locations within the Project Area: approximately 200 feet upstream of the impoundment in the main channel of Lake Creek, within the impoundment, and approximately 200 feet below the outfall of Powerhouse Number 2 (see attached map of water quality stations).

6.0 PROPOSED METHODOLOGY

Data Collection Techniques

Investigators will take hand-grab samples at each identified location during four hydrologic periods: base flow, rising limb, peak flow, and falling limb conditions. Discharge during sampling will be estimated based on flow records at NLI’s gage located downstream of the Project. Sample methods will follow guidelines outlined by the State of Montana for the collection of grab-samples for water chemistry analysis (MTDEQ, 2005a). NLI will analyze each sample for the following parameters:

Recoverable Metals	Nutrients	Cation/Anion Balance	Other
Cadmium (Cd)	Total Nitrogen	Calcium (Ca)	Hardness
Copper (Cu)	Total Phosphorus	Magnesium (Mg)	Temperature
Iron (Fe)		Sodium (Na)	Conductivity
Led (Pb)		Potassium (K)	Dissolved Oxygen
Manganese (Mn)		Chloride (Cl)	pH
Zinc (Zn)		Sulfates (SO ₄)	
		Carbonates (CO ₃ & (HCO ₃))	

Data Analysis

Water samples will be preserved as necessary and transferred to Montana Environmental Laboratory, LLC in Kalispell, Montana for analysis using standard laboratory analytical techniques. The laboratory estimates that the results of each sample will be available approximately 2.5 to 3 weeks after submission. Data will be presented in tabular form and results will be compared to State of Montana numeric criteria for surface waters (MTDEQ, 2006). The effects of the project will be determined based upon comparisons of data from the upstream (receiving) station with the two downstream stations.

7.0 CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE

This study employs generally accepted practices for evaluating water quality at hydroelectric projects. The study methodology is consistent with generally accepted water quality sampling principles and practices.

8.0 PRODUCTS

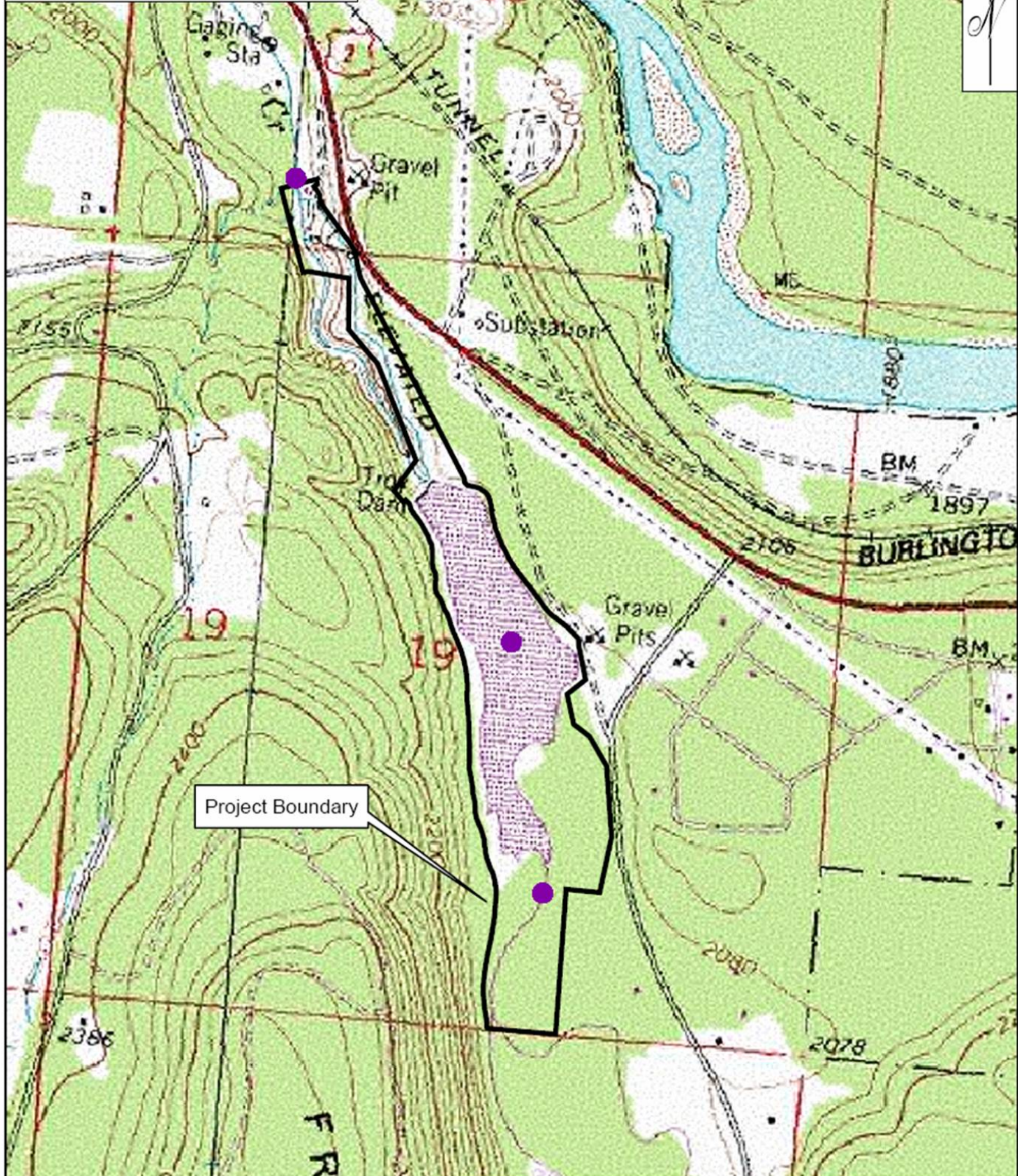
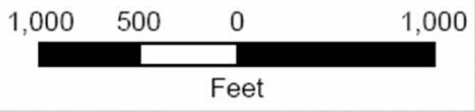
Data and analyses from this study will be included in periodic reports to MTDEQ and shared with the agencies following data analysis in the fall of 2006 and fall of 2007. A final report will be provided as part of the draft license application that will include raw data in tabular form, maps of sample sites, conditions during sampling, and a comparison of results to acceptable water quality for the State of Montana.

9.0 SCHEDULE

The schedule for field sampling will be dependent on the timing of the hydrograph in 2006. We anticipate commencing water quality collections in May (rising limb), and continuing in June (peak), July (falling limb), and September (base flow) of 2006. A similar schedule will be followed in 2007. The timing of our expected sampling is based on the average annual hydrograph for the Project during the past 10 years. NLI will provide the first informal report after collection of the final sample in the fall of 2006 and a second informal report after the fall 2007 sample. This information will be included in the Initial Study Report in the fall of 2007.

10.0 LEVEL OF EFFORT AND COST

NLI estimates the cost of collecting the water samples and data, water chemistry analyses and reporting as approximately \$22,500.



Project Boundary

● Proposed Water Quality Sample Sites

Scale: AS SHOWN
 Project No: 0000-000
 Filename: water_quality_sites.mxd
 Drawn By: SEK
 Date Drawn: 04-05-2006

Northern Lights
 Troy, Montana
 Lake Creek
 Proposed Water Quality
 Sample Sites
Kleinschmidt
 Energy & Water Resource Consultants
 75 Main St., PO Box 376
 Pittsfield, Maine 04967
 Telephone: (207) 487-3328
 Fax: (207) 487-3124
 www.KleinschmidtUSA.com

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11.0 REFERENCES

Montana Department of Environmental Quality (MTDEQ). 2006. Circular DEQ-7 Montana Numeric Water Quality Standards. Montana Department of Environmental Quality Planning, Prevention, and Assistance Division - Water Quality Standards Section. Accessed Online (04/03/2006).

Montana Department of Environmental Quality (MTDEQ). 2005a. Water Quality Planning Bureau. Field Procedures Manual for Water Quality Assessment Monitoring. Accessed Online (04/03/2006).

Montana Department of Environmental Quality (MTDEQ). 2005b. 2004 Montana Integrated Water Quality Report. Accessed Online (04/03/2006).
<http://nris.state.mt.us/wis/vironet/2004Home.html>

Lake Creek Project, FERC No. 2594

Water Temperature Study Plan

Study Plan Name: Water Temperature Study

Draft Date: September 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD) identifies that water temperature in Lake Creek may be affected by the operations of the Project and that the existing, relevant, and reasonably available information may be insufficient to analyze the issue. The consulting agencies identified the following issues:

- **Resource Issue W-3** - Lake Creek Water Quality
- **Resource Issue W-4** - Bypass Reach of Lake Creek Water Quality

The objective of this study is to monitor stream temperatures in the Lake Creek Project Area. Data will be used to evaluate any potential effects on aquatic life or habitat.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The State of Montana and the U.S. Fish & Wildlife Service (USFWS) are active stakeholders in the recovery plan for bull trout, a federally protected species that occurs in Lake Creek. The USFWS listed all Columbia River basin bull trout for protection under the ESA in 1998 (Department of Interior, 1998). In September 2005, the USFWS issued their final ruling defining critical habitat for Columbia River bull trout that included 56 riverine miles and 1,384 acres of lakes in the Kootenai River basin in western Montana and northern Idaho (Department of Interior, 2005). In 2000, the State of Montana developed its Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin (State of Montana, 2000) to protect and restore core habitat that contains the best remaining spawning and early rearing habitat for bull trout.

Kokanee are also known to move up Lake Creek from the Kootenai River in the fall and may attempt to spawn below the barrier falls on Lake Creek.

The Montana Department of Environmental Quality (MTDEQ) establishes numeric water quality standards consistent with Section 75-5-301 of the Montana Water Quality Act and Section 303(c) of the Federal Clean Water Act (MTDEQ, 2006).

3.0 BACKGROUND AND EXISTING INFORMATION

There is relatively little information that describes habitat in the part of Lake Creek bypassed by the Project. Annual water temperature ranges in the Project Area are

unknown. In 1981, the U.S. Department of Agriculture (USDA) inventoried physical habitat in the 17.3 river miles below Bull Lake. In general, the report indicated that riverine habitat in Lake Creek was in excellent condition. The USDA report concluded that Lake Creek represented a model stream that could be used as a template for assessing the quality of other streams in the region.

Even though the Project operates as a “run of river” facility, almost all flow, under the Project capacity, is diverted for power production. Because habitat in the bypassed reach is only supported by water leaking from the dam and from groundwater flow, (typically between 1 and 2 cfs), the reduced flows may create conditions that cause unnatural warming or cooling. Limited temperature monitoring in the summer of 2006 and during Licensee studies in August 2006, did not indicate any problems with warming; however, reduced flow in winter may permit supercooling of the stream’s rock substrate resulting in the formation of bottom ice that may disrupt salmonid reproduction. Water temperature during August 2006 field surveys ranged from 13.5°C in the lower bypassed reach to 16°C below the dam. Water temperature in the impoundment was 16°C.

4.0 PROJECT NEXUS

Although the Project operates in a run-of-river fashion, the natural hydrology of Lake Creek was altered when the impoundment was constructed in 1917. The dam and impoundment have altered hydrologic and geomorphic processes in Lake Creek, which in turn may directly affect water temperatures in and below the Project.

5.0 STUDY AREA AND STUDY SITES

The Study Area includes the entire Project as described in more detail under methodology.

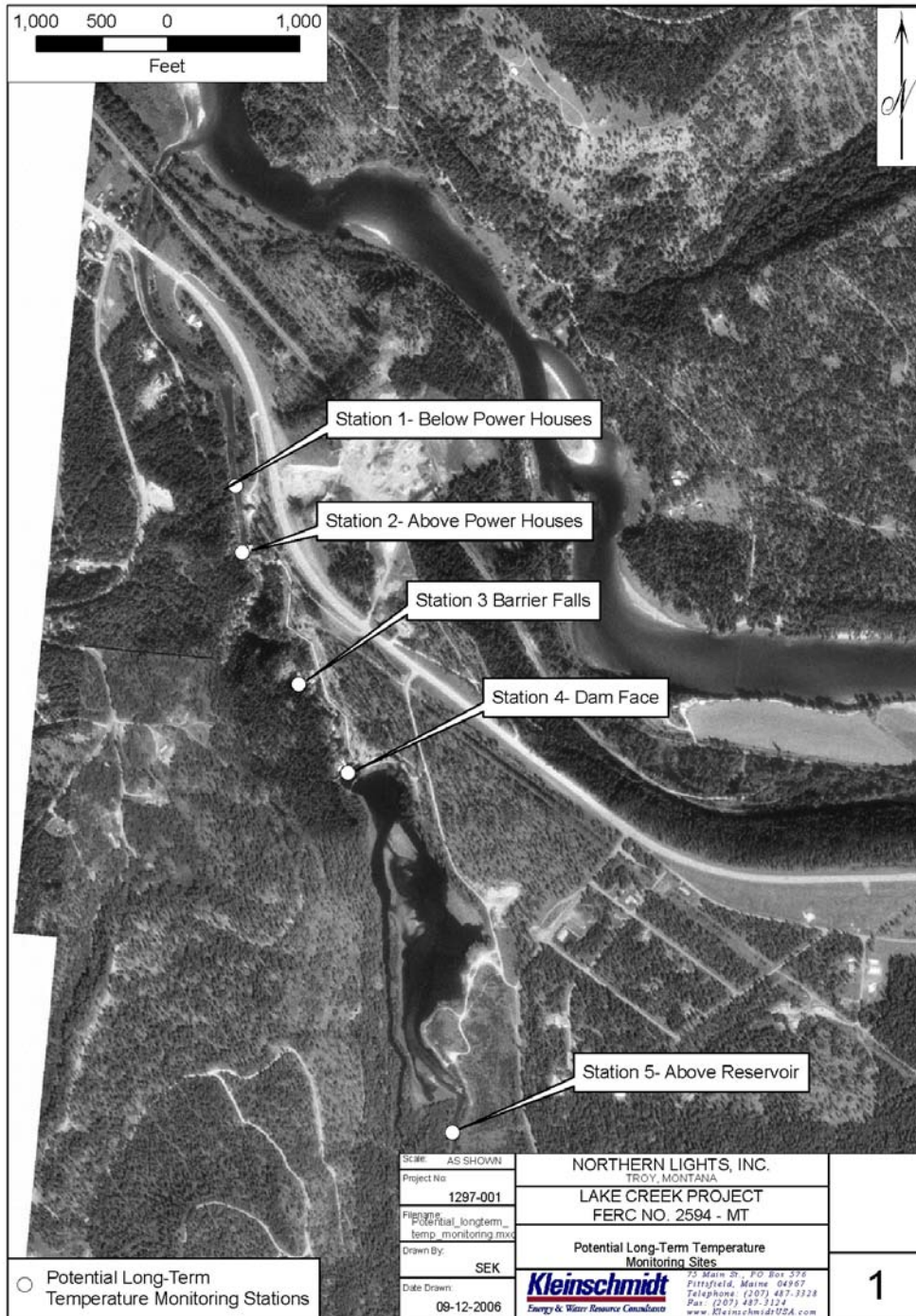
6.0 PROPOSED METHODOLOGY

Onset Tidbit data recording temperature sensors will be placed at five locations (see Figure 1) throughout the Project Area for a one-year period:

- Lake Creek – below the two Project powerhouses,
- Lake Creek Bypassed Reach – approximately 500 feet upstream of the Project’s powerhouses,
- Lake Creek Bypassed Reach – at Barrier Falls pool,
- Lake Creek Impoundment Dam Face - as close as possible to the source of leakage water that passes into the bypass reach, and
- Lake Creek – above the influence of the Project’s impoundment.

Data will be downloaded quarterly after installation to ensure data retrieval. Data analysis will consist of an evaluation of the mean, minimum, and maximum daily water temperatures for a one year period. Results from the sites will be compared to determine the effect of Project operations on water temperature.

Figure 1. Potential locations for 2006 - 2007 temperature monitoring stations, Lake Creek Project Area, Lake Creek, Montana.



7.0 ***CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE***

The deployment of long-term temperature monitoring devices is standard practice in the aquatic resources profession.

8.0 ***PRODUCTS***

Data and analysis from temperature monitoring will be included in an Initial Study Report and/or shared with the agencies following data analysis in the fall of 2007. A summary of the information and findings will be included in the Application for New License, Exhibit E.

9.0 ***SCHEDULE***

Background research and logistic planning will occur in late summer 2006 with temperature sensor placement scheduled for October 2006. Data analysis and report writing are scheduled for fall 2007. This information will be included in an Initial Study Report and/or shared with the agencies following data analysis in the fall of 2007.

10.0 ***LEVEL OF EFFORT AND COST***

Northern Lights, Inc. (NLI) estimates the cost of conducting this study as approximately \$9,500.

11.0 ***REFERENCES***

Department of Interior. 1998. 50 CFR Part 17. Volume 63. No. 111. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Klamath River and Columbia River Distinct Population Segments of Bull Trout.

Department of Interior. 2005. 50 CFR Part 17. Volume 70. No. 185. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Bull Trout.

State of Montana. 2000. Restoration Plan for Bull Trout in the Clark Fork River and Kootenai River Basin, Montana. Online Publication - <http://fwp.state.mt.us/default.html>

Lake Creek Project, FERC No. 2594

Wetland Mapping and Characterization Study Plan

Study Plan Name: Wetland Mapping and Characterization Study

Draft Date: April 2006

1.0 GOALS AND OBJECTIVES OF STUDY

The Lake Creek Project (Project) Pre-Application Document (PAD), May 31, 2006, identified issue(s) associated with wetlands for which the existing, relevant, and reasonably available information was insufficient to determine if the Project affected the resource. The consulting agencies identified the following issues:

- **Resource Issue B-2** - Wetlands within the Project Boundary

The Federal Energy Regulatory Commission (FERC) and the agencies have indicated that knowing the extent and nature of the wetlands within or affected by the Project is necessary, before assessing any effects of continued Project operation. The goal of this study is to develop the additional information necessary to locate, map, characterize, and identify the function of wetlands within the Project Area.

2.0 RELEVANT RESOURCE MANAGEMENT GOALS

The Federal Energy Regulatory Commission (FERC), Environmental Protection Agency (EPA), Montana Department of Environmental Quality (MDEQ), and Montana Fish, Wildlife, and Parks (MTFWP) all have responsibilities for protecting wetland resources. FERC must carefully consider the effects of continued Project operations on wetland resources and must balance the uses of the Project. The EPA regulates the discharge and fill materials of waters in the United States, including wetlands, under Section 401 of the Clean Water Act. This regulation also grants states and tribes authority over all federal permits or licenses that might result in a discharge into wetlands in their jurisdiction. The major federal licenses and permits subject to Section 401 are Section 402 and 404 permits (in non-delegated states), FERC hydropower licenses, and Rivers and Harbors Act Section 9 and 10 permits. States and Tribes make their regulatory decisions primarily by ensuring the activity will comply with state water quality standards. The MTFWP is responsible for maintaining the Montana Wetlands Legacy using In-Lieu-Fees for aquatic resources restoration to settle regulatory enforcements and wetland mitigation.

This study will provide the necessary information to assess the effects of the Project on wetlands resources.

3.0 BACKGROUND AND EXISTING INFORMATION

The Lake Creek PAD indicates that National Wetlands Inventory (NWI) data is not available for the Lake Creek Project Area; however, the United States Geological Survey (USGS) land cover data suggests that wetlands are limited in the vicinity. The Lake Creek impoundment is shallow in nature, and as such, has an extensive littoral zone that occupies much of its surface area. The extensive littoral zone of the Lake Creek impoundment represents virtually all of the wetland acreage within the project boundary. This zone is characterized by emergent and submerged aquatic vegetation, which are typically non-persistent (*i.e.*, stems do not remain visible above the water or ice/snow surface during winter months), but does include shoreline species like cattail that tend to be persistent. While no surveys of project wetlands have been conducted, typical emergent vegetation occurring in Lincoln County include shortawn foxtail, silverweed cinquefoil, cattails, dwarf birch, western water hemlock, common spikerush, small floating mannagrass, American mannagrass, water knotweed, and hardstem bulrush (MNRIS, 2005). The United States Department of Agriculture (USDA) soils maps indicate flood plain soils border the reservoir, providing ideal substrate for wetland growth (USDA, 2006).

In the absence of NWI maps or surveys of project wetlands, baseline data of the locations, extent, and community composition is virtually unknown for this reservoir. Wetland formation depends upon specific conditions related to hydrology, soils, and vegetative composition. Remote predictions rather than site evaluation are the current state of wetland knowledge. A site evaluation to monitor the effects of project operations cannot occur without development of an accurate baseline evaluation of the existing wetlands.

4.0 PROJECT NEXUS

Construction of Lake Creek dam altered the natural hydrology of Lake Creek when it was constructed in 1917. The dam and impoundment have affected the hydrology in Lake Creek, and have created a shallow reservoir that has permitted the development of wetlands around its perimeter. Project operations may affect the continued existence or nature of the wetlands. This study will provide the necessary background information to understand the Project effects.

5.0 STUDY AREA AND STUDY SITES

The Lake Creek Project Area is the focus for this study. The Project is located on Lake Creek, which is a tributary of the Kootenai River. The project area consists of approximately 200 acres of which a portion is the reservoir and surrounding wetlands. The periphery of the 30-acre reservoir is the study site for this wetland investigation.

6.0 PROPOSED METHODOLOGY

In the absence of NWI maps, preliminary planning for this study will use soils maps from the USDA, land cover data from the United States Geological Survey (USGS), and satellite images to focus searches in areas likely to contain wetland habitat. The wetland study will include the following components:

- Task A. Wetland mapping and inventory within the Project Area
- Task B. Description of wetland functions
- Task C. Description of wildlife species

Wetland Mapping and Inventory

Develop Preliminary Base Map – Investigators will download databases from the USDA, USGS, and satellite imagery to create a database in Arcview Geographic Information System (GIS). Initially, USDA soils data, USGS topography data, and distinct landmarks observed from satellite imagery will create a field map. Further investigation of areas containing hydric soils and limited slope will occur in the field.

Field Mapping – The field assessments will occur in summer 2006 to coincide with the peak growing season. A team of two biologists will survey the shoreline of the entire reservoir and map all wetlands encountered. Investigators will delineate the boundaries of each wetland using wetland characteristics described in the standard definitions and procedures outlined in the 1987 Army Corps of Engineers Wetland Delineation Manual (ACOE, 1987). The documentation of each wetland will include dominant species in the tree, shrub/sapling, and herb strata. Photographs and GPS points will document all rare plants encountered. Within each different plant community, investigators will take a core sample of the soil to a depth of 16 inches using a soil auger, probe, or tile spade (ACOE, 1987). Investigators will examine each sample for hydric characteristics such as gleying and mottling. Direct and indirect indicators of wetland hydrology will be recorded (*i.e.*, inundation, soil saturation, watermarks, shallow rooting, oxidized rhizospheres, *etc.*). Using the United States Fish and Wildlife Service (USFWS) Cowardin classification system, (*e.g.*, palustrine emergent, palustrine scrub-shrub, palustrine forested, palustrine unconsolidated bottom, riverine aquatic bed) investigators will classify all wetlands (Cowardin, 1979).

Mapping of each wetland will begin by outlining the boundary of the wetland with a Trimble Global Positioning System (GPS) at sub-meter accuracy. The investigators will log a sufficient number of GPS points to depict the boundary of each type of wetland within the Project Area. Points transferred to the GIS database will create the final wetland presentation including location, type, and extent.

Wetland Function

Analysis of wetland function will use the standard Army Corps of Engineers (ACOE) descriptive approach (also known as the ACOE Highway Methodology) (ACOE, 1993). The ACOE method is a descriptive (non-quantitative) approach for evaluating the functions and values of wetlands, which directs the user to identify the functions, and values associated with a particular wetland based on the presence or absence of certain characteristics. For each wetland type standard data will be recorded on the most important biotic (*e.g.*, plant and wildlife species and communities present, plant structure, and wildlife food sources) and abiotic (*e.g.*, soils, hydrology, and topographic position) wetland characteristics as the basis for identifying important wetland functions.

A functional analysis of each wetland is not necessary because wetland "types" are functionally similar. Investigators will identify the "principal", or most important, functions and values associated with each wetland or wetland type.

Description of Wildlife Species

Although a specific wildlife study is not proposed, the wetland study will note specific wildlife and bird species observed directly or by sign (*e.g.*, calls, scat, tracks, and dens). A separate study will survey reptiles and amphibians (see Herpetology study plan for details), but wetland surveys will include an initial wildlife reconnaissance of the study area. Investigators will also record all mammal and bird species encountered. In addition, this study will include descriptions of notable habitat features, such as beaver or muskrat lodges, vernal pools, and rookeries. This will include the location of unique community types and rare, threatened, or endangered species (RTE).

7.0 *CONSISTENCY WITH GENERALLY ACCEPTED SCIENTIFIC PRACTICE*

The procedures described above are based on standard procedures found in the ACOE wetland delineation manual (ACOE, 1987). Although wetland delineations can occur throughout the year, timing of this study will coincide with peak growth of vegetation near the end of the summer growing season. Investigators will conduct the survey during this time to describe the herbaceous plant community and produce maps that are more accurate.

8.0 *PRODUCTS*

The report will include a written discussion of the functional values of the types of wetlands, including wildlife species utilization and a GIS map of the locations and type of wetlands located within the Project Area. The appendices of this report will include field evaluation forms.

9.0 *LEVEL OF EFFORT AND COST*

Northern Lights, Inc. (NLI) estimates the cost of conducting this study as approximately \$10,600.

10.0 *SCHEDULE*

Background research and logistic planning will occur in early summer 2006 with fieldwork scheduled for late summer 2006. Data analysis and report writing are scheduled for fall 2006. This information will be included in a Initial Study Report and/or shared with the agencies following data analysis in the late fall of 2006 or early 2007.

11.0 *REFERENCES*

Cowardin, L.M., Carter, V., Golet, F.C., and LaRoe, E.T. 1979. Classification of wetlands and deepwater habitats of the United States. United States Department of the Interior, Fish and Wildlife Service. FWS/OBS-79/31.

Montana Natural Resources Inventory System (MNRIS). Interactive Mapping and Database Applications. <http://nris.state.mt.us/interactive.html>. October 19, 2005.

United States Army Corps of Engineers. 1993. The highway methodology workbook supplement. "Wetland functions and values: A descriptive approach." pp 1-39.

United States Army Corps of Engineers. 1987. Corps of Engineers wetland delineation manual. pp 1-143.

United States Department of Agriculture, Natural Resources Conservation Service, Soil Survey of Kootenai National Forest Area, Montana.
<http://nris.mt.gov/nrcs/soils/datapage.html>. April 4, 2006.

Appendix B

Letters of Comment

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426
January 10, 2007

OFFICE OF ENERGY PROJECTS

Project No. 2594-009 - Montana
Lake Creek Hydroelectric Project
Northern Lights, Inc

RE: Study Plan comments

To the Parties Addressed:

Please be informed that the Commission staff has no comments on the proposed study plans filed by Northern Lights, Inc. for the relicensing of the Lake Creek Project (P-2594-009). Staff's comments were provided at the November 1, 2006 Study Plan meeting.

If you have any questions regarding this matter, please contact Sean Murphy at (202) 502-6145 or sean.murphy@ferc.gov.

Sincerely,

Mark Pawlowski, Chief
Hydro East Branch 2

cc: Public Files
Mailing List



United States Department of the Interior

FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
MONTANA FIELD OFFICE
585 SHEPARD WAY
HELENA, MONTANA 59601
PHONE (406) 449-5225, FAX (406) 449-5339

M. 15 FERC (I)

January 4, 2007

Mr. Mark Contor
Northern Lights, INC.
P.O. Box 269
Sagle, ID 83860-0310

Subject: Final Study Plan Comments for Lake Creek Hydroelectric Project (FERC No. 2594)

Dear Mr. Contor:

The purpose of this letter is to provide the U.S. Fish and Wildlife Service's (Service) comments on Final Study Plan (Plan) for the Lake Creek Hydroelectric Project. We appreciate the opportunity to review and comment on the Plan.

The Service suggests the following for inclusion in the PM&E portion of your Plan:

1. To the maximum extent attainable, estimation of fish entrained during project operation; and
2. Identification of potential mitigation opportunities relative to fish impacts due to turbine entrainment, both onsite (e.g., fish screens, modified trash racks, operational modifications, habitat enhancement, etc.) and offsite (e.g., tributary habitat enhancement, provision of agency funding of habitat restoration activities, etc.).

We have no further comments on the Plan. The Service appreciates the continued cooperation between your company and the Service. We look forward to working with your company in an attempt to minimize the impacts on bull trout (*Salvelinus confluentus*) and other native fish from the operation and maintenance of the Lake Creek Hydroelectric Project.

Please contact Paul Hanna (406-758-6871) in our Kalispell Suboffice should you have questions regarding our comments.

Sincerely,

R. Mark Wilson
Field Supervisor

Cc: USFWS, Kalispell (Attn: Tim Bodurtha)