



Mystic Lake Hydroelectric Project FERC Project No. 2301

Preliminary License Proposal (PLP) Appendix A Volume II: Public

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Protection, Mitigation, and Enhancement Work Plans

A-1 Water Quality

PPL Montana is proposing to continue to monitor water quality in the Project area to insure that the operation of the Mystic Project is not adversely affecting water quality.

The water quality monitoring program will measure water quality in the Mystic Hydroelectric Project area.

Three years of baseline water quality information are desired to form the foundation for a water quality monitoring program. One of the three years has been collected in pre-license studies (2005 data). Two additional years of information remain to be collected. Once the two additional years (2006 and 2007) of baseline information have been collected, the monitoring program will shift to a lower effort program (short program) until the new License is issued. Within a year after the License issuance, an evaluation of the baseline data will be performed and provide a post license long-term program to monitor water quality. The Mystic Fisheries, Aquatic Habitats, and Water Quality TAC will meet and develop the long-term monitoring plan and submit to the Commission within a year after the new License is issued.

Sampling Sites:

1. Chemical, Physical and Biological Sampling

Mystic Lake – Mid-lake - ML M (Hydrolab vertical profile)

Mystic Lake – Intake – ML I (water chemistry only)

West Rosebud Creek upper Bypass – WRC UB

West Rosebud Creek above powerhouse – WRC APH

West Rosebud Creek below powerhouse – WRC BPH

West Rosebud Creek below the Re-regulation Dam – WRC BWRD

2. *Didymosphenia genminata* (DG) Visual Survey

West Rosebud Creek - WRC

3. Water Temperature Monitoring

The water temperature will be monitored at four sites; WRC UB, WRC APH, WRC BPH and WRC BWRD for the years during the summers that fish are monitored in West Rosebud Lake and Emerald Lake. The powerhouse discharges water warmer than WRC bypass temperatures during the mid to late part of the summer. This is the time of the summer when temperature should be monitored.

Yearly Sampling Schedule

	<u>Water Chemistry</u>	<u>Aquatic Biology</u>	<u>Temperature</u>
2006	Full program	Yes	No
2007	Full program	Yes	No
2008	Short program*	No	Yes
2009 or Year of License	Short program (Eval., Dev.)**	No (Eval., Dev.)	No (Eval., Dev.)
2010 or Year after License	Implementation	Implementation	Imp.

* Fill vacant years before license is granted with short program after two years of full program to collect baseline data.

** Evaluation (report of existing conditions) and program development will occur in the year the license is received. The schedule will be adjusted so that the Program Evaluation/Development falls in the year the License is received.

Sample sites, collection dates (month) and parameters:

<u>Full Program</u>	<u>Chemistry</u>	<u>Biology</u>	<u>DG</u>	<u>Temperature</u>
ML M	Aug*	Aug		
ML I	Aug			
WRC UB				Apr-Oct
WRC APH	Apr, Jul, Oct	Oct		Apr-Oct
WRC BPH	Apr, Jul, Oct	Oct		Apr-Oct
WRC BWRD	Apr, Jul, Oct	Oct		Apr-Oct
WRC			Oct	

<u>Short Program (SP)</u>	<u>Chemistry</u>	<u>Biology</u>	<u>DG</u>
ML M	Aug		
ML I	Aug		
WRC APH	Apr, Jul, Oct		
WRC BPH	Apr, Jul, Oct		
WRC BWRD	Apr, Jul, Oct		
WRC			Oct

* All samples will be taken within the same 2 week period in the designated month every year.

Sampling Methods:

1. Lake Water Samples

Lake water samples for chemical and chlorophyll analysis will be collected with a non-contaminating Van Dorn Water Sampler. Mid-Lake water chemistry samples will be drawn from a composite of 4 sub-samples taken from depths of 0 (surface), 3, 50 and 100 ft. Powerhouse Intake water chemistry samples will be taken from the intake pipe centerline depth, approximately 61.25 ft below full reservoir elevation.

Phytoplankton chlorophyll samples will be drawn from a composite of several sub-samples collected from a zone of three times the Secchi depth or the top of the thermocline (determined from a Hydrolab profile when temperature changes greater than 0.5°C per 5 ft), whichever is shallower. The depth is usually approximately from the surface to 55-65 ft deep. Experience has shown a total sample volume of approximately 2000 mL is sufficient for the chlorophyll analysis method. The composite sample normally consists of 150 mL from each 5 ft depth interval.

Lake Hydrolab Measurements

Hydrolab parameters (dissolved oxygen, pH, temperature and specific conductivity) will be recorded at intervals of 5 ft from 0-80 ft depth and intervals of 10 ft from 90-150 ft depth.

Lake Phytoplankton and Zooplankton Samples

Phytoplankton and Zooplankton samples will be collected from individual vertical tows from 100 ft depth to the surface. Phytoplankton and zooplankton will be collected with an 80 micron mesh or finer net.

2. Stream Water Samples

Stream water samples will consist of the collection of depth integrated samples taken from a well mixed portion of the stream utilizing a DH 81A type rod-mounted sampler.

3. Water Sample QC

Sample bottles will be rinsed three times with native water prior to sampling. Samples will be taken in the upstream direction to avoid entrainment of sediment disturbed by wading. During sampling, the sampling device should be lowered and raised at a constant rate through the water column, carefully avoiding any disturbance of bottom sediments.

Samples will be transferred to a decontaminated Teflon churn splitter, stored with "blue ice", and sealed in a secure container (wrapped in plastic in a soft cooler) until processing. Processing and splitting of sample aliquots into sample bottles will occur as soon as all samples for the day have been taken. Filtration will be performed with a 0.45µm filter for dissolved parameters. All sample bottles will be virgin polyethylene bottles supplied by Energy Laboratories of Billings, Montana.

Samples will be clearly labeled with a waterproof marker or preprinted labels. Label information will include the site identification, date and time, sample type, preservative, and sampler's initials. Field notebooks will be completed for each location along with appropriate chain-of-custody forms. All samples will be immediately placed in a cooler chilled to 4°C for transport to the lab.

Quality control samples will also be analyzed for water quality parameters. These samples consist of one replicate for every ten samples, and one equipment blank for each sampling event. The replicate is a sequential sample taken at one of the locations as a control measure of field variability, sample processing procedures, and laboratory methodology. The equipment blank is a deionized water sample run through the DH59 sampler and churn splitter and analyzed for the full suite of water quality parameters. The blank primarily represents a quality control measure of lab methodology, but also integrates procedural aspects such as decontamination and sample handling.

4. Stream Biological Samples

Periphyton species composition and enumeration samples will be collected from all habitats within the sampling site in amounts proportional to the occurrence of different habitats at the site. Samples will be preserved with Lugol's (IKI) solution, "M3" fixative, buffered 4% formalin, 2% glutaraldehyde or other preservative.

Periphyton chlorophyll samples will be using the whole rock sampling method. A minimum of five stones will be collected and for each replicate. Five replicates (bottles of five stones) will be collected at each site. The samples will be transported in a cooler with ice, and stored in a freezer until analyzed.

Macroinvertebrate samples will be collected with a Hess sampler. Three replicates will be collected from each site. The location of each replicate will be recorded so that the following year's samples will not be taken from the same location. The entire sample (macroinvertebrates, vegetation, sediment, and debris) are preserved in 90% ETOH. Bottle labeling will be similar to that specified for water quality sampling.

5. *Didymosphenia geminata* Survey

The purpose of the DG survey is to document the extent of growth of this diatom in West Rosebud Creek. Although *Didymosphenia g.* is a native diatom it has developed characteristics of an invasive species in some areas. We plan to note once a year in October where bank-to-bank coverage is observed visually.

Program Parameters (short program parameters are noted SP):

Hydrolab - Field temperature, pH, Specific Conductivity, Dissolved Oxygen, (SP)
Field Turbidity (SP)
TSS – from same sample of turbidity measurement (SP)
TDS by calculation
Total Alkalinity (SP)
Bicarbonate
Chloride
Sulfate
Sodium
Potassium
Calcium
Magnesium
Manganese, RL* 5 ug
Nitrogen, Nitrate +Nitrite
Nitrogen, Total (persulfate) (SP)
Phosphorus, Ortho, unfiltered sample
Phosphorus, Total (SP)
Arsenic - Total Recoverable, weak digestion, RL 1 ug.
Cadmium - Total Recoverable, weak digestion, RL 0.08 ug.
Iron - Total Recoverable, weak digestion, RL 50 ug.
Copper - Total Recoverable, weak digestion, RL 1 ug. (SP)
Lead - Total Recoverable, weak digestion, RL .5 ug. (SP)
Zinc - Total Recoverable, weak digestion, RL 10 ug. (SP)

Phytoplankton Species Composition and Relative Abundance– vertical net tow
Zooplankton Species Composition and Relative Abundance – vertical net tow
Chlorophyll a – Lake - whole water and filter on site; Stream – whole rocks
Macroinvertebrates Species Composition and Relative Abundance and Metrics

*RL – Reporting Limit

A-2 Riparian

PPL Montana will establish permanent riparian transects along West Rosebud Creek in order to quantify riparian habitat and monitor trends. The riparian monitoring program is designed to identify changes in the riparian vegetation, if any, that result from changes in fluvial processes caused by operation of the Project. These permanent transects will allow changes in the riparian communities along West Rosebud Creek to be detected after subsequent readings every five years. This long-term riparian monitoring plan will start the first summer after the issuance of the new license and continue at 5-yr intervals for the term of the license. The Mystic Wildlife and Terrestrial TAC will meet within one year of completion of the monitoring to discuss progress and submit a report of the findings to the Commission.

The following sections describe the methodology, criteria, and location for the long-term riparian monitoring plan. First, a brief review of the Daubenmire method is provided followed by a thorough description of each modification established to suit the long-term riparian monitoring efforts in the Project area.

Daubenmire Method

The Daubenmire method of vegetation sampling involves systematically placing a 20x50 cm frame along a permanent transect (Daubenmire, 1959). This method collects species-specific data for canopy cover, frequency, and percent composition by canopy cover (USDA and USDI, 1999). The Daubenmire method is designed for measuring vegetative material less than waist height (USDA and USDI, 1999). Methods were excerpted from the 1999 Interagency Technical Report entitled *Sampling Vegetation Attributes*, and from the USFS' 2005 *Effectiveness Monitoring for Streams and Riparian Areas Within the Upper Columbia River Basin: Sampling Protocol*.

The transect is established permanently by driving a metal stake at each end of the transect, recording the coordinates and azimuth/distance from a landmark to the beginning point of the transect, and by taking general photos of the transect. A 200-foot tape is stretched between the permanently established stakes. The 20x50 cm frame is placed every four feet along the tape, on alternating sides. The 20x50 cm frame is marked to delineate six separate canopy cover classes (Table A.2-1). Some staff at the USFS has suggested that the number of cover classes be increased to twelve. PPL Montana will make a final decision about the number of cover classes to use, and their breakdown, at the time that the transects are set up in the field with the help of U.S. Forest Service specialists. The frame is placed along the tape 50 times and at each placement the canopy cover class is recorded for each species.

Table A.2-1 The Daubenmire canopy cover classes (Daubenmire, 1959)

Canopy Cover Class	Range of Coverage	Midpoint of Range
1	0-5%	2.5%
2	5-25%	15.0%
3	25-50%	37.5%
4	50-75%	62.5%
5	75-95%	85.0%
6	95-100%	97.5%

Modified Daubenmire Method

PPL Montana will modify the Daubenmire method to better sample riparian vegetation in Project area by:

- Increasing the size of the frame from 20x50 cm to 50x200 cm and doubling the distance between frame placements, however the frame will still be marked to delineate six separate canopy cover classes (Table A.2-1);
- Doubling the length of the transects, from 200 ft to 400 ft, to sample a wider range of fluvial surfaces;
- Performing line intercept sampling procedures along the transect measuring canopy cover for all species of shrubs and trees; and
- Tracking size class and height of species most affected by fluvial processes (cottonwoods and willows) encountered in the line intercept.

Records on each transect data form will be summarized to calculate canopy cover, frequency, and percent composition for each species on site (USDA and USDI, 1999). These data can be stratified by fluvial surface types, thus tracking plant/soil moisture relations. Any major changes over time in species cover by fluvial surface type can be related to changes in the hydrologic cycle. For example, if there is a lowering of the water table there may be a change in the vegetation composition in certain fluvial surface types for the species whose roots are no longer in contact with the water table. Tables A.2-2 and A.2-3 below present examples of the Daubenmire transect data sheet and transect summary sheet. Table A.2-4 presents a data sheet for the line intercept sampling procedure. Photos will be taken at established points at specific azimuths along with the tabular data to visually and quantifiably show changes in the riparian vegetation.

Table A.2-3. Daubenmire transect summary sheet (USDA and USDI, 1999)

Daubenmire Summary												Page ___ of ___	
Study Number	Date	Examiner	Allotment Name & Number		Number of Quadrats						Pasture		
Cover Class	Mid-Point	Species		Species		Species		Species		Species			
		N	U	N	U	N	U	N	U	N	U		
1	1-5%	2.5											
2	5-25%	15											
3	26-50%	37.5											
4	51-75%	62.5											
5	76-95%	85											
6	96-100%	97.5											
Total canopy													
Number of Samples													
% canopy cover													
Species composition													
Frequency													

Canopy cover for trees and taller shrubs will be captured by the addition of a line intercept, along each of the Daubenmire transects (Merritt, 2006). Line intercept will follow protocol provided by the USFS' Methodology Technical Guide: Line Intercept Transect Protocol. Measurements, to the nearest inch, will be made of the crown spread of each shrub and tree species which are bisected by the line. In order to determine if taller vegetation is bisected by the line, a densitometer will be utilized, holding it directly over the tape (Merritt, 2006). Size class and height of species most affected by fluvial processes (cottonwoods and willows) would be recorded along the line intercept transect (Manning, 2006). The data collected by the addition of the line intercept will provide a measure of species composition based on crown cover.

Site Selection Criteria

PPL Montana will establish four permanent modified Daubenmire riparian transects at two locations along West Rosebud Creek. The location of the two clusters of permanent transects will be determined on site based on established criteria. Based on evaluation of aerial photographs taken July 2005, there are three potential areas identified for the permanent transect clusters. Maps of these sites are available in Volume III in the order listed below as Figures A.2-1, A.2-2, A.2-3. The potential locations include:

- the north central portion of Section 6, Township 7S, Range 17E upstream from the Forest Service boundary of the USFS' West Rosebud grazing allotment;
- the southwest corner of Section 28, and northwest corner Section 33 T6 S R 17 E, in the area of the Pine Grove Campground;
- and the southwest portion of Section 2, Township 7S, Range 16E just downstream from the powerhouse in the shrub/sedge riparian type.

These sites were selected due to the low gradient nature of the stream reaches with wide floodplains, which have the greatest potential to be influenced by hydrologic alteration. The proposed riparian monitoring sites are located between the powerhouse downstream to the Forest Service boundary. The limited area for establishing monitoring sites was designed specifically to eliminate compounding factors such as private land use and grazing found downstream of the Forest Service lands. This scope will provide capability of a more powerful analysis as to whether the Project impacts the riparian area, especially if flows are altered to enhance whitewater boating recreation.

Once the two monitoring areas are selected, PPL Montana will establish four 400 foot permanent transects in each area. The exact locations for the cluster transects will be selected on site with the aid of USFS specialists. In the event USFS specialists are not available, transects will be established under the following criteria:

- Sites will be established in riparian areas associated with C or wider B channel types.
- Sites will be selected in areas with a minimum of other impacts (i.e. grazing, campsites).

- Areas influenced by water sources other than West Rosebud Creek (tributaries, springs, wet meadows) will be avoided.
- Transects will be established perpendicular to the slope of the valley.
- Transects will be positioned in a manner to sample the maximum variety of fluvial surfaces.

This riparian monitoring program is designed to look for changes in the riparian vegetation as a result of changes in fluvial processes caused by Project operations, if any. Therefore it is important to minimize other impacts in the sampling area.

The baseline for this monitoring plan will begin the first summer after the new license is issued with repeat monitoring once every 5 years at the established cluster transects for the duration of the license. The first reread of transects (repeated every five years) will allow the trajectory of the riparian vegetation to be visualized, and every other reread will further portray the long-term trend of the riparian vegetation. A potential problem with only using two time reference points to document trend is that the data may be skewed by confounding extraordinary events, such as extreme climate years or isolated disturbance events (fire, intense recreation use, grazing). Thus it will be necessary to evaluate the potential data short-falls upon repeated sampling. If riparian changes are detected during subsequent monitoring, PPL Montana will make a site visit to examine the riparian areas that have changed and make a determination if these changes appear to be Project-related. PPL Montana will invite the USFS to participate in the site visit and the effects determination.

A-3 Nonnative Plant Species - Weed Management

The objective of this PM&E measure is to develop a weed management plan (WMP) to monitor and manage noxious and nonnative weeds within the Mystic Project boundary in partnership with the USFS. The WMP will provide a framework to control those plant species that are listed as “noxious” by the State of Montana, and Stillwater and Carbon counties, and identify areas of cheatgrass, an “invasive species.”

PPL Montana proposes to work in partnership with the USFS in developing a WMP and in providing funding assistance and/or actions to implement this WMP for areas within the FERC Project boundary. The major steps in the weed management process are inventory, data analysis, management planning, and implementation. More detail about these steps is provided below.

Noxious Weeds Species to be Inventoried

The following sections list weed species that will be included in the noxious weed inventory within the Project boundary. The State of Montana maintains a list of 27 noxious species described in three categories below (Montana War on Weeds website, <http://mtwow.org/Weed-ID.html>, accessed 02/15/2006). Individual counties may list additional noxious species. Stillwater and Carbon County officials were contacted regarding these additional species when developing this PM&E measure.

State of Montana Category 1 noxious weeds are those which are currently established and generally widespread in many of the state’s counties. Notice that many of these species are in Table 1, as they have been previously identified in the Project area. Management criteria include awareness and education, containment and suppression of existing infestations, and prevention of new infestations. These weeds are capable of rapid spread and render land unfit for, or greatly limit, beneficial uses (Montana War on Weeds website, <http://mtwow.org/Weed-ID.html>, accessed 02/15/2006).

- Canada thistle (*Cirsium arvense*)
- Field bindweed (*Convolvulus arvensis*)
- Whitetop or hoary cress (*Cardaria draba*)
- Leafy spurge (*Euphorbia esula*)
- Russian knapweed (*Centaurea repens*)
- Spotted knapweed (*Centaurea maculosa*)
- Diffuse knapweed (*Centaurea diffusa*)
- Dalmatian toadflax (*Linaria dalmatica*)
- St. Johnswort (*Hypericum perforatum*)
- Sulfur cinquefoil (*Potentilla recta*)
- Common tansy (*Tanacetum vulgare*)
- Oxeye daisy (*Chrysanthemum leucanthemum*)
- Houndstongue (*Cynoglossum officinale*)
- Yellow toadflax (*Linaria vulgaris*).

State of Montana Category 2 noxious weeds are those which have recently been introduced into the state or are rapidly spreading from their current infestation sites. These weeds are

capable of rapid spread and invasion of lands, rendering lands unfit for beneficial uses. Management criteria include awareness and education, monitoring and containment of known infestations, and eradication where possible (Montana War on Weeds website, <http://mtwow.org/Weed-ID.html>, accessed 02/15/2006).

- Dyers woad (*Isatis tinctoria*)
- Purple loosestrife or lythrum (*Lythrum salicaria*, *L. virgatum*, and any hybrid crosses thereof)
- Tansy ragwort (*Senecio jacobea*)
- Meadow hawkweed complex (*Hieracium pratense*, *H. floribundum*, *H. piloselloides*)
- Orange hawkweed (*Hieracium aurantiacum*)
- Tall buttercup (*Ranunculus acris*)
- Tamarisk [saltcedar] (*Tamarix spp.*)
- Perennial pepperweed (*Lepidium latifolium*).

State of Montana Category 3 noxious weeds are those which have not been detected in the State or may be found in only small, scattered, localized infestations. Management criteria include awareness and education, early detection, and immediate action to eradicate infestations. These weeds are known pests in nearby states and are capable of rapid spread and render land unfit for beneficial uses (Montana War on Weeds website, <http://mtwow.org/Weed-ID.html>, accessed 02/15/2006)

- Yellow starthistle (*Centaurea solstitialis*)
- Common crupina (*Crupina vulgaris*)
- Rush skeletonweed (*Chondrilla juncea*)
- Eurasian watermilfoil (*Myriophyllum spicatum*)
- Yellow flag iris (*Iris pseudacorus*).

The Stillwater County noxious weed list matches the State of Montana list (J. Larson, Stillwater County, personal comm., 02/15/2006).

The Carbon County noxious weed list matches the State of Montana list with the addition of the following (B. Ostwald, Carbon County, personal comm., 02/15/2006).

- Absinth wormwood (*Artemisia absinthium*)
- Scotch thistle (*Onopordum acanthium*).

The inventory of the Project boundary will also include cheatgrass (*Bromus tectorum*), an invasive species, that was previously identified in the Project area (see Table A.3-1).

Weed Inventory

The first step in the development of the WMP will be an inventory and update of current weed infestations within the Project boundary.

Currently, the USFS sprays along the forest roads, spurs, and campgrounds for all of the noxious weeds listed in Table A.3-1 (K. Reid, Botanist, Custer National Forest, personal comm., 10/23/2003). The USFS does not spray in the vicinity of the PPL Montana Camp area surrounding the powerhouse or the 3-mile trail leading to Mystic Lake (S. Monahan, Beartooth Ranger District and K. Reid, Custer National Forest, personal comm., 10/23/03). American Enterprises, Inc (AEI) sprays noxious weeds annually around the PPL Montana Camp area. Spotted knapweed (*Centaurea maculosa*) and Canada thistle (*Cirsium arvense*) has also been observed and sprayed at the lake house (D. Robinson, PPL Montana, personal comm., 10/24/2003).

Table A.3-1. List of noxious and invasive weed species previously identified in the Project Area (Montana County Noxious Weeds List 2003; K. Reid, Botanist, Custer National Forest, personal comm., 10/23/2003).

Noxious Weed List	
Common Name	Scientific Name
Canada thistle	<i>Cirsium arvense</i>
Spotted knapweed	<i>Centaurea maculosa</i>
Dalmation toadflax	<i>Linaria dalmatica</i>
Sulfur cinquefoil	<i>Potentilla recta</i>
Common tansy	<i>Tanacetum vulgare</i>
Houndstongue	<i>Cynoglossum officinale</i>
Yellow toadflax	<i>Linaria vulgaris</i>
Meadow hawkweed	<i>Hieracium pratense</i>
Invasive Weed List	
Common Name	Scientific Name
Cheatgrass	<i>Bromus tectorum</i>

The list of noxious and invasive weed species identified in the Project area in Table A.3-1 will be updated to reflect new invasive species found on-site (in the Project boundary) over the life of the license.

In consultation with USFS, PPL Montana will map exotic plant species for designated areas within the Project boundary. Tabular and spatial data will follow USFS Terra protocol, including cover classes for the Greater Yellowstone Area (GYA).

Polygon and attribute data will be collected in the field using hand-drawn polygons on hard-copy maps and optionally by using mobile GPS technology to collect information and automate the entering of feature attributes. Deliverable files will be provided to the USFS as an ArcGIS region coverage for ease of merging to existing USFS datasets and to meet USFS protocol. The minimum attributes to be collected for each site will be consistent with USFS weed dataset field format definitions. PPL Montana will coordinate with the Custer National

Forest GIS specialist to accommodate this need. The fields will include Site ID, Person ID, Gross Acres, Infested Acres, Inventory Date, Project Name, Plant Symbol, Genus, Species, Vernacular, Cover Class, Size Class, Cover Set (inventory protocol used), State, Ownership, County, County Code, Dominant Life Form Code, Comments, Data Collection Method (i.e., GPS, buffered GPS, On-screen Digitized).

Infestations of less than five acres may be taken as a GPS point to later be buffered to a representative polygon size. Five to 40 acres may be delineated as a polygon and recorded by drawing or digitizing the boundaries of the infestation or taking GPS readings where terrain permits. Infestations larger than 40 acres may be delineated using ocular estimates and hand drawn on maps to later be on-screen digitized to a polygon feature. Infestations following linear features such as roads and streams may be recorded as a GPS line file to later be buffered to a representative polygon size.

Data Analysis

Upon returning from the field, data will be downloaded from hand-held units into GIS or digitized from hard copy maps. All point, line, and polygon features will be buffered/edited as needed. Location and size of infestations will be summarized, and final attributing of records will be completed. Spatial and tabular data of control efforts and annual monitoring in and around the compound will be provided to USFS annually. A complete inventory of the Project boundary will be conducted once every five years, starting the first summer after the License is issued.

Development of the WMP

Based on the inventory data PPL Montana, in consultation with the USFS and potentially others (i.e., Beartooth Weed Management Area, Northwestern Energy, adjacent private land owners) will develop a comprehensive WMP for areas within the Project boundary. This WMP will include results of the weed inventory, management goals and objectives for the area, priorities for weed management, action items, and monitoring plans. PPL Montana will also work with these entities to explore cost-share and collaboration opportunities for weed control in the general Project area.

Weed management priorities will be based on the actual or potential threat that weeds pose to the management goals within the Project boundary. Two factors will be used to set priorities—the weed species and the locations of weed infestations. Weed species are important because they vary considerably in the threat they pose to the resource values of the property. In addition, weed species vary greatly in their susceptibility to control measures. The location of a weed infestation is also very important. The highest priority weed patches will be those that are small and isolated from larger infestations of the same species and which occur on, or could affect, the highest-valued vegetation resources within the Project boundary.

Implementation of the WMP

Implementation will focus on prevention of new infestations and control of infestations while they are still small and manageable. In consultation with USFS Beartooth Ranger District staff, PPL Montana will follow current USFS weed management NEPA decisions, mitigation

measures, and best management practices for noxious weed prevention. PPL Montana will recommend an action only when careful consideration indicates that leaving the infestation unchecked would result in more damage than controlling it with best available methods.

PPL Montana will initiate the first weed inventory within one year after the issuance of the new License and repeat the inventory once every five years for the duration of the License within the Project boundary. This periodic review (once every five years) of the inventory and treated areas is necessary to evaluate the effectiveness of the WMP over the long-term. If management objectives are not being met, weed control actions may need to be modified. The Mystic Wildlife and Terrestrial TAC will meet within one year of completion of each weed inventory to discuss progress and submit a report of the findings to the Commission.

In order to monitor short-term effectiveness of control efforts, PPL Montana will contract with licensed commercial applicators to visit previous control sites and report on the effectiveness of their treatments. PPL Montana will report this information to the USFS on an annual basis and will include dates treated, treatment types, acres, and a map showing the locations of the treatments.

A-4 Bald Eagle Long-term Monitoring

Introduction

Management of bald eagle wintering and migration habitat should focus on freedom from human harassment. Risks to eagles include loss of perching, foraging, and roosting opportunities due to human disturbance (Greater Yellowstone Bald Eagle Working Group 1995). Monitoring seasons in the Greater Yellowstone Ecosystem include fall – Oct. 1 to Nov. 15, and winter – Nov. 16 to Feb. 28 (Harmata and Oakleaf 1992).

Objectives

Establish baseline of bald eagle use of West Rosebud Creek and associated water bodies from the Mystic Lake Trailhead to the outlet of Emerald Lake; determine disturbance effects of recreation on bald eagles.

Method

Drive road, looking for eagles along creek, lakes, and lake shores. Stop periodically and search through binoculars.

Survey

- Route: Mystic Lake trailhead parking area to outlet of Emerald Lake
- Monitor weekly or every other week from Oct. 1 to Feb. 28.
- Conduct monitoring for each of the first three years after license issuance, then once every five years for the term of the new Project License or until bald eagles are delisted.
- Record data on Midwinter Bald Eagle Survey Standardized Form adapted for Mystic Lake Hydroelectric Project. Include observed recreation activity, if any, along creek and at lakes during time of survey. This survey method is consistent with the Nationwide Midwinter Bald Eagle Survey. The Forest Service recognizes that some portions of West Rosebud Creek will not be visible from the road.
- If warranted, adapt future monitoring method and timing to better monitor disturbance effects of recreation on bald eagles.
- Report date and location of incidental sightings outside survey period to the Beartooth Ranger District wildlife biologist.

Progress of the measure will be filed with the Commission within one year of the completion of the first 3-yr survey, followed by subsequent reports within one year of the completion of each additional survey conducted on 5-year interval for the term of the license. The Mystic Wildlife and Terrestrial TAC will meet regularly to discuss progress of the PM&E measure.

**MIDWINTER BALD EAGLE SURVEY
STANDARDIZED SURVEY FORM
ADAPTED FOR MYSTIC LAKE HYDROELECTRIC PROJECT FERC No. 2301**

YEAR

Note: Please complete ALL sections of this form.

Survey Site Location

1. State: Montana Survey Site Number: _____

2. Drainage or Body of Water: West Rosebud Creek

3. Site Name:

4. County or Counties: Stillwater/Carbon

5. Start

Point: _____

6. End

Point: _____

7. Did this year's survey cover the same area that has been surveyed on this route in past years? (Circle One) **Y N**

Survey Procedures

1. Survey Date: _____ 2. Time at Start: _____ 3. Total time of survey
(minutes): _____

4. Roost or nonroost <circle one>

5. Continuous Route, Fixed Point, or Both

6. Total Miles Surveyed _____*

* The total miles surveyed should be the amount of shoreline or other habitat that is observed. For a route along a river, it is usually the one-way direction that the vehicle or aircraft travels along the river. On a lake or reservoir, it is the amount of shoreline habitat that is viewed (from one or many viewpoints).

7. Survey Method (*Circle All That Apply*): Road Vehicle Foot Travel Fixed Point Boat
Vehicle/Fixed Point Other _____

Survey Results

1. Total Bald Eagles Counted:_____ No. of Adults:_____ No. of Immatures: _____
No. of Unknown Age: _____

Location of bald eagles (plot on map if possible): _____

2. Total Golden Eagles Counted:_____ No. of Adults:_____ No. of
Immatures:_____

No. of Unknown Age: _____

3. Number of Unidentified Eagles Counted (*not identified to species*): _____

Recreation Use During Survey

Fisherman present during survey? Yes No

Locations and number at each location: _____

Estimated minimum distance to nearest bald eagle: _____

Other recreationists present during survey? Yes No

Locations and number at each location: _____

Estimated minimum distance to nearest bald eagle: _____

Observers

1. Name of Recorder: _____

2. No. of Observers: _____

3. Address: _____

City: _____ State: _____ Zip: _____ Email: _____

Phone: _____

4. Affiliation:

PPL Montana

US Forest Service

Other _____

General Weather and Ice Conditions

Temperature: _____ F. *Precipitation:* None Snowy Rainy

Was there fog at any time during the count? Yes No

Was there precipitation at any time during the count? Yes No

Wind: ___ No wind (calm or <1 mi/hr)
 ___ Light wind (breezy or 1-7 mi/hr)
 ___ Moderate wind (windy or 8-18 mi/hr)
 ___ Strong wind (gusty to >18 mi/hr)

Cloud Cover: Clear Foggy than Clear Foggy Partly Cloudy Cloudy then Clearing
 Cloudy

Some ice? Yes No *Percentage of ice cover over entire survey route:* _____%

How did this year's weather compare to past years?

Weather: Very Mild Mild Normal Harsh Very Harsh

Ice: Much Less Less Than Normal More Than Much More
 Than Normal Normal Normal Than Normal

Comments:

A-5 Harlequin Duck

Although adult Harlequin ducks are relatively tolerant to low levels of disturbance, areas chronically disturbed are abandoned. People fishing may present a problem, since people remain on streams for extended periods of time (Robertson and Goudie 1999).

Objective

Determine presence/non-detection of Harlequin ducks along West Rosebud Creek from the Forest boundary upstream to the powerhouse; determine disturbance effects of recreation on Harlequin ducks.

Survey Methodology

- Conduct at least two HADU surveys from May 1-25, at least one week apart (Hendricks and Reichel 1998).
- Conduct survey annually for first five years, then survey incrementally in future years if warranted.
- If pairs detected in May, return for brood survey in late June – early August (as per Jim Sparks, Wildlife Biologist, 2/2/2006).
- Method: Slowly hike upstream, scanning the creek and creek banks for Harlequin ducks. Stop periodically and scan through binoculars.
- Record data on standard Harlequin duck survey form.
- If warranted, adapt future survey method and timing to better monitor Harlequin duck presence and use of West Rosebud Creek, and disturbance effects of recreation on Harlequin ducks.

Progress of the measure will be filed with the Commission within one year of the completion of the 5-yr survey. The Mystic Wildlife and Terrestrial TAC will meet regularly to discuss progress of the PM&E measure.

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Harlequin Duck Survey Form

Date _____

Start time: _____ End time: _____ Surveyor(s): _____

Stream: ___ West Rosebud Creek _____

Begin point: _____ End point: _____

Weather: _____

(Temp., wind dir & speed, cloud cover, precip last 24hrs)

Survey type (circle one): FOOT BOAT AUTO Other: _____

Group # _____ # Individuals: _____

Location: _____

(Put on map if possible)

Sexes and Ages: _____

Marked?: _____

Circle as appropriate:

Activity	Habitat	Location	Substrate	Channel Type
LO Loafing	BA Backwater	IS Island	CL clay	ST Straight
SW Swimming	PO Pool	LO Loaf	SA Sand	ME Meander
SF Swim/feed	RI Riffle	BA Bank	GR Gravel	CU Curved
FL Flying	GL Glide	ED Edge	CO Cobble	BR Braided
OT Other	RU Run	BT Bank 1/3	BO Boulder	AB Abandoned
	RA Rapid	CE Center		
	PW Pocketwater	EY Eddy		
	LK Lake			

Bank Composition:

TR Trees	SA Sand
SH Shrub	SI Silt
GF Grass/Forb	GR Gravel
MO Tree/shrub mosaic	DE Debris
BE Bedrock	
