



Mystic Lake Hydroelectric Project FERC Project No. 2301

Biological Evaluation of Forest Service Sensitive Species Volume VI - Public

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Section 1 - Introduction

The biological evaluation provides written documentation of the review process and the analysis of effects on Forest Service sensitive and management indicator species for the proposed re-licensing of Mystic Lake Hydroelectric Project FERC No. 2301.

1.1 Project and Evaluation Area

The Mystic Lake Hydroelectric Project No. 2301 (hereafter referred to as the Project) is situated in south-central Montana, primarily located in Stillwater County with a very small portion within Carbon County. Stillwater County is primarily rural or undeveloped with about 8,000 residents and low population density of 4.6 persons per square mile. The Project area is approximately 17 miles north of the Wyoming-Montana State line and about 40 miles southwest of Columbus, Montana. The nearest metropolitan area is Billings, Montana, approximately 70 miles to the northeast, with a population of about 90,000 people.

Mystic Lake is located in the Beartooth Mountain Range and surrounded on three sides by the Absaroka-Beartooth Wilderness. Mystic Lake is located at the head of a high mountain canyon at an elevation of 7,673.5 feet (ft) above mean sea level (amsl) in the upper reaches of West Rosebud Creek (Figure 1.1-1). Within West Rosebud Creek drainage (213.4 square miles), Mystic Lake is the fourth and largest lake in a chain of six hydraulically connected lakes (listed in order going downstream: Star, Silver, Island, Mystic, West Rosebud, and Emerald lakes). There are a total of 84 lakes within the West Rosebud Creek drainage, 14 of which are outside the designated Wilderness Area (Marcuson and Poore 1991). Six tributaries drain into Mystic Lake: West Rosebud, Fish, Huckleberry, and three unnamed creeks arbitrarily assigned identification numbers 7, 8, and 10 (Schollenberger 1984). The Beartooth Ranger District of the Custer National Forest manages approximately 124.7 square miles of the West Rosebud Creek drainage while the remaining 88.7 square miles is privately-owned land.

The Project area encompasses those waters and surrounding land within the West Rosebud Creek drainage, extending from the confluence with Fiddler Creek upstream to Island Lake, which could potentially be directly or indirectly affected by the Project. The waterways include Mystic Lake (Figure 1.1-1), approximately 22 miles of West Rosebud Creek from the outlet of Mystic Lake downstream to the confluence with Fiddler Creek, as well as two lakes within the 22-mile reach, West Rosebud Lake and Emerald Lake. However, neither Emerald Lake nor West Rosebud Creek downstream of West Rosebud Lake are located within the FERC Project boundary.

The FERC Project boundary (also referred to as Project boundary) is more limited than the Project area (Figure 1.1-1). The present FERC Project boundary is narrowly defined to include Mystic Lake and dam, the flow line, the penstock, the distribution lines from Mystic Lake Dam downstream to the powerhouse, the powerhouse and associated camp buildings for operations and maintenance, West Rosebud Lake and Re-regulation Dam, and two transmission lines (A-line and B-line) starting at the powerhouse extending 5.3-miles downstream to NorthWestern Energy's Line Creek Substation. Emerald Lake is not within the FERC Project boundary. The boundary at Mystic Lake is defined by the high water mark or elevation 7,673.5 ft amsl. The boundary at West Rosebud Lake is defined at 6,399.9 ft amsl. The total land acreage within the FERC Project boundary is 611.06 acres.

The evaluation area expands beyond the Project area and FERC Project boundary. The evaluation area varies depending on the species and its habitat and life history requirements. This assessment evaluates each species habitat requirements and the potential affects of the Project within the immediate area (Project area) and beyond as appropriate.

1.2 Proposed Action

Currently, PPL Montana is in the process of three operation and maintenance enhancement projects that include the following: 1) install a fish valve to protect resources in the bypass reach (a 30% design of the fish valve was filed with FERC on April 1, 2006), 2) modify transmission lines to meet raptor safety standards as line repairs are made, and 3) automate flow data collection and install a real-time USGS approved gage station just downstream of West Rosebud Lake. These projects will not materially alter or modify the impacts of the current facilities, daily operations, or maintenance activities but will improve efficiency of data collection and operations, and meet current standards for raptor safety.

PPL Montana proposes no change to the present operation of Mystic Lake, West Rosebud Lake, or West Rosebud Creek below the Re-regulation Dam described in the existing Mystic Project License. However, PPL Montana has agreed to work with agencies (MFWP, MDEQ, USFS) and American Whitewater over the next three years to develop a Whitewater Flow Plan for West Rosebud Creek below the Re-regulation Dam to file with the Commission by December 15, 2009. This plan may propose planned summer whitewater boating flows, conditions permitting and pending agency and Commission approval.

Other than proposed fish valve (flow restoration) modifications (see section 2.3.2.3), PPL Montana does not anticipate any significant rehabilitation of this Project during the term of the new License. Replacement of equipment will be on an as-needed basis determined by mechanical condition, safety issues, efficiency, or improvements to the operational control of the current facility. In addition, PPL Montana does not anticipate any operational changes at the Mystic Project. The Project will be run as both a baseload and a peaking facility depending on electrical demands and water availability.

PPL Montana is not proposing to add generation capacity or to implement any significant modifications to the operational regime or Project structures (other than the new fish valve) under the new License. Thus, the footprint on the landscape and Project impacts will essentially remain as they currently exist.

1.2.1 Project Facilities

Prior to 1926, Mystic Lake was a natural body of water occupying 342.5 surface acres (138.7 ha). In 1926, Montana Power Company (MPC) built a dam, adding approximately 104.2 surface acres (42.2 ha) (Schollenberger 1984). Today, at the full pool elevation of 7,673.5 ft amsl, Mystic Lake occupies 446.7 acres (181 ha) with a maximum depth of 205 ft (Marcuson and Poore 1991). At low pool, elevation 7,612 ft amsl, the lake occupies approximately one-third fewer acres (Marcuson and Poore 1991). The useable storage at Mystic Lake is 20,800 acre-ft (MPC 1968). This is the volume of water between full pool elevation and low pool elevation, a 61.5 ft elevation difference. The total estimated cumulative volume of the lake varies due to some discrepancies in the various data sets used to generate the estimate, but the current estimate is approximately 47,000 acre-ft at full pool. Residence times also vary due to fluctuations in pool elevation, inflows and outflows.

Plant generation is 12.5 MW (nameplate rating). However, the nominal maximum generation is 10.5 MW due to friction losses in the water conveyance system. The Project consists of the following facilities: an arch-type dam (Mystic Lake Dam), an earthfill dike, a concrete intake structure, a flow line, a penstock, a surge tower, a tram and railroad, a housing compound, a powerhouse, distribution and transmission lines, and the Re-regulation Dam. Two of these components, the arch dam and earthfill dike, raise the elevation of the natural Mystic Lake by about 50 ft. The Re-regulation Dam is located one and one-half miles downstream from the powerhouse on West Rosebud Lake and re-regulates (attenuates) varying flows from the powerhouse during peaking operations.

1.2.1.1 Earthfill Dike

A concrete core earth dike 145 ft long and 15 ft high blocks the natural outlet to Mystic Lake. The concrete core wall is un-reinforced. It is 2 ft wide at the top and increases uniformly to 5 ft wide at the base. The foundation for the wall was constructed into the bedrock by excavating a cutoff trench between 2 and 4 ft deep.

The upstream slope of the earthfill dike is 3 ft horizontal to 1 ft vertical, and the downstream slope is 2 ft horizontal to 1 ft vertical. A layer of clay was placed over part of the bedrock upstream of the core wall. Finer material was placed adjacent to the core wall, and coarser sand and gravel towards the surface of both the upstream and downstream shells. A one-foot thick layer of riprap protects the upstream slope, and a 6-inch thick layer of reinforced

concrete protects the downstream slope. The top of the concrete core wall is at elevation 7,675.0 ft amsl, and a 12-inch high timber board is installed along the crest to prevent overtopping the dike. The timber raises the effective crest of the earthfill dam to elevation 7,676.0 ft amsl.

1.2.1.2 Arch Dam

At the new outlet to Mystic Lake is a concrete arch-type dam 368 ft long and 45 ft high with a spillway 300.5 ft long. The bedrock at the site was excavated in a trench to a suitable foundation. The dam thickness varies from 5 ft just below the crest to 10.5 ft at the base, and the radius of curvature varies between 180 ft and 147 ft.

The arch terminates in concrete gravity sections. The right abutment (facing upstream), constructed against the rock wall of the valley, is 5 ft long and 3 ft wide at the top, with a top elevation of 7,674.0 ft amsl. The left abutment is 60 ft long, 3 ft wide at the top, and 12 ft 10 inches high, with a batter of ½:1 on the downstream side. The top has an elevation of 7,674.0 ft amsl. A considerable amount of excavation spoil has been dumped against the right, downstream face of the arch dam. In 1990, the left abutment was reinforced with ten anchor bars.

The overflow crest of the arch dam is at elevation 7,670.0 ft amsl, but the pond elevation is raised by flashboards that provide flow control to the normal maximum operating level of 7,673.5 ft amsl. The flashboard configuration consists of 3 timbers each 12 inches high and 1 timber 6 inches high. There are 50 flashboard bays supporting the flashboards in 4-inch by 4-inch steel I-beams at 6.0-foot centers along the crest. A walkway extends approximately 260 ft from the left abutment, along the crest above the flashboards, and is used for access to install and remove the boards.

The dam is equipped with a low level outworks that consists of a 10-inch valve that can be opened to drain water from a depression between the original lakebed and the dam. The low-level outlet works provides a mechanism to drain the pool that collects behind the dam that cannot be drained via the main intake structure.

1.2.1.3 Concrete Intake Structure

Water is diverted from the lake through a 33-foot long by 7-foot high by 9-foot wide reinforced concrete culvert into an intake structure located behind a rock ridge at the left abutment of the earthfill dike. The centerline of the intake entrance is about 60 ft below the full pond surface of the lake and is equipped with trashracks and an 8-foot by 8-foot 8-inch motor operated slide gate. The gate can be operated either manually or electrically from the gatehouse or remotely from the powerhouse below. It closes automatically upon loss of downstream pressure. Full closure requires approximately eight minutes.

1.2.1.4 Flow Line

Upon passing through the intake structure, water enters a 1,005-foot long tunnel driven through quartzite rock. The tunnel terminates on the right side of the canyon (facing upstream), at a concrete portal valve house that joins it to a 57-inch diameter steel pipeline. At the portal valve house, an 18-inch valve and an 8-inch minimum release valve tap off the flow line. The minimum release valve (fish valve) is used to ensure minimum flows are maintained in the bypass reach upstream of the powerhouse.

The flow line is supported on steel saddles placed on concrete footings and connected with dresser type couplings. An inverted siphon near the middle of the flow line detours around an unstable area of the hillside, which resulted from rock fall and subsequent washout of the flow line bench in 1978. The inverted siphon system, used to bypass flow around the slide area, was installed in 1983. The original wood stave section of the flow line between the inverted siphon and the surge tank was replaced with a 5-foot diameter steel flow line in 1988. The remaining section of wood stave flow line between the rock tunnel and the inverted siphon was also replaced with a 5-foot diameter steel line in 1990. The flow line carries the water 9,012 ft around the mountainside to a point above the powerhouse where it terminates at a surge tank.

Currently, the Project has no mechanism in place to restore flow into the bypass reach if the flow line is accidentally breached under conditions where the lake elevation is less than 7,670 ft amsl. There exists a small low-level outlet works structure (fish valve) that allows small amounts (about 8-10 cfs) of water to be manually released from within the forebay. When the lake level is below about 7,650 ft amsl, the fish valve is also unavailable to augment flows in the bypass reach if flows through the flow line must be stopped completely. PPL Montana filed a 30% fish valve design (developed by GEI Consultants, Inc.) with FERC on April 1, 2006. The design incorporates a mechanism at the fish valve that would allow timely restoration of flows to the bypass reach in the event a penstock breach or some other emergency requires flows through the flow line to be halted for extended periods.

1.2.1.5 Surge Tank

The Johnson surge tank is 12 ft in diameter and 118.5 ft high. The flow line enters the surge tank at elevation 7,569 ft amsl near the base of the tank. The surge tank is equipped with a butterfly valve at the outlet that feeds a single, Kellogg butt-welded steel pressure pipe (penstock). The water in the flow line and surge tank can be maintained when de-watering the penstock by closing the butterfly valve. The valve can be operated locally or remotely from the powerhouse. It also has the ability to close automatically upon loss of downstream pressure in two minutes.

1.2.1.6 Penstock

From the surge tank, the flow drops to the powerhouse through a single penstock varying in diameter from 48 inches to 42 inches over 2,566 ft of its length. Then, approximately 123 ft upstream of the turbines the penstock bifurcates into two 28-inch diameter branches that supply each individual turbine. The wall thickness of the penstock(s) varies from one-half inch at the top to one and one-quarter at the bottom where the pressure guarantee is 650 pounds.

1.2.1.7 Powerhouse

The powerhouse is situated at elevation 6,550 ft amsl on the right bank (facing upstream) of West Rosebud Creek. It is a reinforced concrete structure 60 ft wide, 85 ft long, and 56 ft high. The building is constructed on three levels: a foundation level containing the turbine nozzles and turbine pit, a generator level (main floor), and an electrical equipment floor.

The powerhouse contains two Pelton waterwheel turbines each nameplate rated at 7,500 hp at 300 rpm under a net effective head of 1,050 ft. The elevation of the centerline of the water wheel jet is 6,545 ft amsl. The water wheels are mounted directly on a flange end of the generator shaft. There are two Westinghouse generators, each with an original nameplate rating of 6,250 kVA at 0.8 power factor, 3 phase, 60 cycle, 300 rpm, and 6,600 volts. In 1979-1980 the generators were rewound to 7,500 kVA.

Each generator has a direct connected exciter rated 50 kW, 125 volts. Each exciter will carry two generators. A spare motor-driven exciter rated at 50 kW and 125 volts is also located on the main floor of the powerhouse.

The operating room is located in the center portion of the building on the main floor. The 6,600 volts station bus is situated to the back of the operating room. Near each end of the building on the main floor is a Pauwels 12.5 kVA transformer to step up the generation voltage to 55,000 volts. Additionally, a 40-ton capacity traveling crane serves the powerhouse.

The second floor of the powerhouse is constructed over the portion occupied by the transformers, and other similar equipment on the main floor. The entire high-tension switches; control bus and equipment are located on this second floor indoors. This floor is 22 ft wide and runs the length of the building. The two end spaces are occupied by high-tension oil circuit breakers on the two outgoing transmission lines.

The nameplate rating for plant generation is 12.5 MW at a gross head of 1,128.5 ft with a total discharge of 169 cubic feet per second (cfs). The nominal maximum generation is 10.5 MW with a discharge of 152 cfs.

1.2.1.8 Tailrace

Flow through the water wheels is discharged through two 6 ft by 7 ft concrete tunnels that extend from the powerhouse to West Rosebud Creek. Tunnel No. 1 is 32 ft long and No. 2 is 68 ft long.

1.2.1.9 Re-regulation Dam

In 1978, a small Re-regulation Dam (hereafter referred to as the Re-regulation Dam) was constructed near the outlet of West Rosebud Lake, on the West Rosebud Creek about 1.5 miles downstream of the powerhouse. The dam is an earthfill embankment approximately 18 ft high and 420 ft long at the crest. The center portion of the dam has a concrete spillway structure that includes a 4 ft wide outlet valve chamber and a 36 ft wide flashboard section.

The dam impounds between 320 and 410 acre-ft of water between elevations 6,394 and 6,396 ft amsl. The FERC Project boundary is at 6,399.9 ft amsl. By raising and lowering the level of West Rosebud Lake, this structure re-regulates (attenuates) occasional peaking flow releases (169 cfs maximum) through Mystic Lake powerhouse (used for daily peaking) to around a 71.5 cfs average daily outflow from West Rosebud Lake.

PPL Montana is in the process of establishing a new USGS certified flow gage below the Re-regulation Dam with real-time flow data available through the USGS website for use by PPL Montana, resource agencies and the general public.

1.2.1.10 Dam Access

Tram: Due to the inaccessible terrain occupied by this development, an electric hoist-powered tram is constructed along the steel penstock. This tram provides motorized access by PPL Montana personnel to the steel pipeline from the powerhouse. The tram consists of a rail-mounted car hauled by a cable and hoist located in a motor house at the top of the penstock on a bench adjacent to the surge tank. The tram is not available for public use.

Railroad: Access for PPL Montana personnel between the dam and the penstock is provided by two locomotives running on a narrow gage railroad track constructed parallel to the flow line.

PPL Montana's Trail to Surge Tower: There is a trail on the same side of the canyon as the tram and flow line that is available and used by PPL Montana personnel to reach the flow line and Mystic Lake Dam if the tram is not operational. This trail is not regularly used by the public and is maintained by PPL Montana.

Mystic Lake Trail: A third option allowing public access to Mystic Lake Dam is a footpath three miles long rising 1,100 ft from the powerhouse to the dam running up the side of the

canyon opposite the flow line. This trail is not used as the primary access route to Mystic Lake Dam by PPL Montana personnel.

1.2.1.11 Camp

Due to the remote location of this generating facility, housing is provided for operations and maintenance employees. This “camp” includes four houses of 1920s vintage that have been remodeled on an as-needed basis. This area is referred to as the *PPL Montana Camp* throughout this document.

1.2.1.12 Distribution Lines

There are two distribution lines included with the Project; one provides power to the dam area and the other provides power to the surge tower area. The distribution line from the powerhouse to the dam is 9,363 ft long, single-phase, 4,160 volts of fiberglass pole side pin construction. The distribution line from the powerhouse to the surge tower is 2,068 ft long, three-phase, 4,160 volts of fiberglass pole side pin construction.

1.2.1.13 Primary Transmission Lines

The Project is connected to the NorthWestern Energy’s Line Creek switchyard (transmission grid) by two 50 kV lines each of which are approximately 5.3 miles (27,984 ft) long. The north line is referenced as the “A” line or the Mystic-Columbus Line and consists of 107 poles. The south line is referenced as the “B” line or the Mystic-Red Lodge line and consists of 112 poles. The right-of-way for the A-line and the B-line is 25 ft each side of the center line. The Federal Lands (USFS) associated with the power line right-of-ways totals 31.45 acres. The permit for the power line right-of-ways was issued to PPL Montana on August 9, 2001.

1.2.1.14 Plant Hydraulic Capacity and Generation

The maximum (summer) dependable capacity of the Mystic Lake plant is about 10.5 MW at a flow of around 152 cfs. Average annual generation is 56,770,010 kWh. The monthly average generation is 4,730,833 kWh.

1.2.2 Project Operations

The Mystic Lake annual operation stores water during runoff, maintains a summer pool for recreation, fisheries habitat, and aesthetics, and then draws the lake level down about 61.5 ft (18.8 m) through the winter to provide winter storage power and minimum flow benefits. Mystic Lake draft rates are planned to maintain lake elevation and meet downstream flow license requirements.

In addition, the Project may provide hourly peaking or load following where the Project maximizes or minimizes generation during a 24-hour period. Load following operations may occur whenever economically beneficial or when load is required to enhance electric system stability or reliability. The elevation of West Rosebud Lake fluctuates on average less than 2 ft, between 6,394 and 6,396 ft amsl, during peaking operations.

1.2.2.1 Existing License Requirements

The existing license requires Mystic Lake elevation to be maintained within 10 ft (3 m) of maximum pool elevation (7,673.5 ft amsl) from July 10 to September 15 of each year. The lake is generally filled by mid-July soon after spring runoff decreases and inflows drop below turbine capacity and the threat of flooding has passed. The lake is maintained near full pool for recreation, fisheries habitat, and aesthetics through the summer. The lake is then drafted through the fall and winter to provide generation, downstream minimum flows, and flood control storage for the following spring. Mystic Lake has approximately 21,000 acre-ft of usable storage in 61.5 ft of drawdown between full (7,673.5 ft) and minimum (7,612 ft amsl) pool elevation (Federal Power Commission 1975). Mystic Lake generally reaches its lowest elevation (7,612 ft amsl) by mid-March. Mystic Lake is also drafted below the natural lake outlet barrier, just upstream of the dam, before the winter-freeze to prevent excessive ice pressure on the dam structure.

Present license minimum bypass reach flow requirements at the upper weir just above the powerhouse are 10 cfs during June, July, and August and 3 cfs during the rest of the year (September through May). These minimum flows protect fisheries and aquatic resources between Mystic Lake and the powerhouse. When Mystic Lake Dam is spilling less than 10 cfs into the bypass reach, the outlet valve (fish valve or bypass valve) can be used to provide up to an additional 10 cfs to meet the minimum 10 cfs flow requirement.

License required minimum flow in West Rosebud Creek below the Re-regulation Dam is 20 cfs, or lower when natural inflow conditions are less than 20 cfs.

1.2.2.2 Project Generation and Outflow Records

For the 24-year period of record where detailed generation and outflow records were available and analyzed, the following summary results were obtained. The facility generates its maximum output in July and minimum in April. These values closely correspond to available flow. On average, including outages, the facility generated about 1,611 kWh for each second foot day (1 sfd = 1 cfs for 24 hours) of water that was put through the turbines. A summary of the Project generation vs. outflow is presented in Table 1.2-1 below.

Table 1.2-1. Table of monthly average daily generation vs. monthly average daily flow, 1979-2002.

Month	Average Daily Generation (kWh)	Average Daily Reported Water Use (cfs)	kWh/sfd
Jan	91,536	57	1,621
Feb	75,089	48	1,566
Mar	64,879	43	1,501
Apr	47,079	25	1,363
May	84,569	54	1,571
Jun	185,247	125	1,484
Jul	232,219	136	1,710
Aug	221,191	131	1,692
Sep	154,321	89	1,741
Oct	135,125	79	1,708
Nov	134,639	79	1,704
Dec	106,175	64	1,673

1.2.2.3 Fish Valve Contribution to Bypass Reach Flows

The upper weir (near the powerhouse) has traditionally been the location where bypass reach flows have been measured to maintain minimum flows for compliance purposes. The question has been raised as to whether or not the flows measured at the lowermost reach of the bypass reach are reflective of the actual flows at the upstream end of the bypass reach. PPL Montana was asked to determine the proportion of water released by the fish valve relative to the amount of water that is measured at the upper weir. The following text summarizes the data analysis from two summer seasons (2004-2005) and one winter season (December 2005-March 2006) in the bypass reach. The goal of this analysis was to differentiate between the flow emitted by the fish valve vs. flow originating from other sources. The complete analysis was filed with FERC on April 3, 2006 (*Study No. 6 Hydrologic Characterization of the West Rosebud Creek Bypass Reach Between Mystic Lake Dam and the Powerhouse – 2006 April Final Report*) is available at the Mystic Lake website (mysticlakeproject.com).

Whenever the Project is spilling over the dam, there is no need to operate the fish valve since the flows throughout the entire bypass reach are well above the 10 cfs minimum required flow. Based on the analysis, it is evident that fish valve releases in summer months are sometimes low relative to flow from other sources such as leakage, tributary inflows (e.g. Maxi Creek), and other sources. This conclusion is based on the observation that changes in the fish valve position result in highly correlated changes in the observed flow at the upper weir. In many cases, the fish valve is closed for extended periods during summer months when no intentional spill is coming from the dam, but when the lake elevation is above crest. In this case, significant leakage from the dam flashboards could be responsible for the reduced need for additional fish valve release flows. The data clearly indicate that during the summer, significant portions of the required 10 cfs minimum flows are from origins other

than the fish valve. If bypass flows become low enough, as SCADA data has shown, operators will adjust the fish valve to compensate and increase flows to make certain that the 10 cfs minimum flow is sustained, but for most of the summer, the fish valve is often completely closed, and all bypass flow is provided by leakage, tributary inflows and sources other than the fish valve.

Flow data from the fish valve and the upper weir were gathered through the winter of 2005 and into the spring of 2006. Additional analyses were performed to gauge the proportion of fish valve flows to bypass flows under these low flow, low runoff, and low lake elevation conditions. Although the analysis for winter conditions was slightly complicated by icing events at the upper weir, which seriously impaired accurate measurement of the flow during several days over the winter, an evident change in stage corresponding to the two changes in fish valve position was observed in the data set. Less head at lower lake elevations result in a decreased amount of flow being released from the fish valve in comparison to the amount of flow that is released at comparable valve settings at higher pool elevations. However, releases from the fish valve were adequate, even at low pool, to maintain the 3 cfs minimum instream flow in the bypass during the winter of 2005 – 2006, as measured at the upper weir.

In summary, there are often water sources other than the fish valve that are providing flow to the bypass reach during the summer and winter months. However, when measured flows at the upper weir indicate minimum requirements are not being met, the fish valve can be opened to augment flows in the bypass reach to obtain minimum flows whether these flows are 10 cfs in the summer or 3 cfs the rest of the year. The main limitation to measuring flow accurately in the winter occurs when extreme cold air freezes the upper weir.

1.2.3 Proposed Project Operations and Maintenance Plan

1.2.3.1 Operations

As mentioned previously, PPL Montana proposes no change to the present operation of Mystic Lake, West Rosebud Lake, or West Rosebud Creek below the Re-regulation Dam described in the existing Mystic Project License. However, PPL Montana has agreed to work with agencies (MFWP, MDEQ, USFS) and American Whitewater over the next three years to develop a Whitewater Flow Plan for West Rosebud Creek below the Re-regulation Dam to file with the Commission by December 15, 2009. This plan may propose planned summer whitewater boating flows, conditions permitting and pending agency and Commission approval.

Operational Plan for the Bypass Reach

PPL Montana, USFS, MFWP and MDEQ have consulted on the appropriate instream flow for the bypass reach for the Project under the new License that reflects current operations.

Based on agency consultation, assessment of bypass reach fisheries, and review of historic bypass reach minimum flow data (1992-2002), PPL Montana proposes:

- During summer months (June, July & August) PPL Montana will provide **10 cfs** minimum flow as measured at the upper weir.
- During fall, winter, and spring months (September through May) PPL Montana will provide **5 cfs** minimum flow with an option of providing up to 11 days (randomly selected) each month of **4 cfs** as measured at the upper weir.
- During the entire year PPL Montana will ramp descending bypass reach flows below 10 cfs at 2 cfs per hour.

PPL Montana also proposes to include standard FERC exception language for flow conditions beyond the control of the Licensee.

PPL Montana will provide flow ramping rates from the Mystic fish valve at no more than 2 cfs per hour to the bypass reach during planned flow decreases (e.g. summer 10 cfs to winter minimum on August 31) or during other flow reductions when flow in the bypass reach is less than 10 cfs. There will be no ramp rate requirements for the bypass reach at flows above 10 cfs.

1.2.3.2 Maintenance

Other than proposed fish valve (flow restoration) modifications, PPL Montana does not anticipate any significant rehabilitation of this Project during the term of the new License. Replacement of equipment will be on an as-needed basis determined by mechanical condition, safety issues, efficiency, or improvements to the operational control of the current facility. In addition, PPL Montana does not anticipate any operational changes at the Mystic Project. The Project will be run as both a baseload and a peaking facility depending on electrical demands and water availability.

PPL Montana is not proposing to add generation capacity or to implement any significant modifications to the operational regime or Project structures (other than the new fish valve) under the new License. Thus, the footprint on the landscape and Project impacts will essentially remain as they currently exist.

1.2.4 Consultation Framework

Mystic Lake Project Technical Advisory Committees (TACs):

- Mystic Fisheries, Aquatic Habitats and Water Quality TAC (MFWP, USFS, MDEQ, and PPL Montana)
- Mystic Wildlife and Terrestrial Habitats TAC (USFS, MFWP, and PPL Montana)

- Mystic Recreation, Land-Use and Aesthetics TAC (MFWP, USFS, American Whitewater, and PPL Montana)
- Mystic Cultural Resources TAC (USFS, Montana SHPO, and PPL Montana)

For each TAC, PPL Montana will be responsible for managing PM&E funding, the FERC licensing process, and providing technical input related to the implementation of PM&E measures for fisheries, aquatic habitats and water quality, recreation, land-use and aesthetics, wildlife and terrestrial habitats and cultural resources for the Mystic Lake Project. PPL Montana will bear ultimate responsibility for ensuring that consultation and PM&E measures are implemented in a manner consistent with requirements of the Mystic Project License. In consultation with TAC members, PPL Montana will convene, facilitate and chair TAC meetings to fulfill consultation and implementation requirements of the License. The four TACs will meet on an as-needed basis to review and develop annual PM&E plans and coordinate the implementation of License PM&E measures. Although the four TACs will meet independently to address their respective PM&E measures, individual TACs may jointly meet with other TACs to more efficiently accomplish PM&E measures.

All TAC meetings will be open to the general public and non-governmental organizations (NGO's). Subcommittees and working groups may be organized as appropriate and may include staff of PPL Montana, TAC agencies, NGO's, outside consultants or others. Any such subcommittees or working groups will be advisory to their respective TACs. PPL Montana will seek to attain consensus among the members of each TAC in implementing PM&E and related license obligations. Multiple representatives of PPL Montana, TAC Agencies and the public may actively participate in TAC meetings. However, PPL Montana and each TAC agency and public will designate one person to officially represent their organization at each TAC meeting. All parties will be encouraged to commit to a good-faith effort to resolve any differences in a timely and cooperative manner.

1.2.5 Public/Recreational Use

Recreational use (vehicle and trail) on Forest Service lands encompassing the Project was monitored and quantified in 2005 between June and September. Vehicles were counted as they crossed the Forest boundary near Pine Grove Campground. During this study period, vehicles crossing the Forest boundary ranged from 263 to 704 per week with an average of 365. Trail counters were installed at four locations: 1) Mystic Lake Trail, 2) Phantom Creek, 3) Huckleberry Creek, and 4) Island Lake Trails. Phantom, Huckleberry, and Island Lake trails are all located above the Mystic Lake Trail. The majority of trail use occurred on the Mystic Lake Trail (72%). An estimated 3,600 people used the Mystic Lake Trail between July 2 and September 28. Approximately 60% of hikers only used the Mystic Lake Trail compared to the upper trails. While recreational use was relatively constant during the majority of the season, there was a notable spike during the 4th of July weekend and decline after Labor Day weekend. Recreational use in the winter is limited in the fall-spring

(October-June) due to accessibility to the area and snow at the higher elevations. There will be minimal human impact during these months. The primary season for recreational activity in the Project area occurs between June and September. During this time period, there is potential for human-wildlife interactions or human disturbance that may displace or impact wildlife species.

Section 2 - Species Assessment

2.1 Introduction

As mentioned earlier, the biological evaluation expands beyond the Project area and FERC Project boundary. The evaluation area varies depending on the species and its habitat and life history requirements. This species assessment evaluates each species habitat requirements and the potential affects of the Project within the immediate area (Project area) and beyond as appropriate.

2.2 Forest Service Sensitive Species

There are 37 species listed on the updated Forest Service Northern Region Sensitive Species List (Table 2.2-1) (Available 7/20/05: <http://www.fs.fed.us.r1/projects/wwfrp/sens-species>; K. Reid, Botanist, Custer National Forest, personal comm., 2/7/06).

Options in determination of effects for Forest Service sensitive species are: 1) No impact; 2) May impact individuals, but not likely to cause a trend to Federal listing or loss of viability; 3) Likely to result in a trend to Federal listing or loss of viability; and 4) Beneficial impact. There is “no impact” to sensitive species determined to be absent from the Project area. Presence in the Project area is determined based on the presence of suitable habitat.

The only sensitive species known to be present in the Project area include the northern goshawk and the North American wolverine (Table 2.2-1). Determination of effect for these species is *no impact*.

Table 2.2-1. List of all sensitive species known or suspected to be present on the Custer National Forest according to the Forest Service Northern Region Sensitive Species List (2/14/2006); suitable habitat present in Beartooth Ranger District; presence in Project area; and determination of effect. No insect has been listed as a sensitive species in the Custer National Forest. (Sensitive Species List Available 2/14/06: <http://www.fs.fed.us.r1/projects/wwfrp/sens-species>)

Species	Suitable Habitat in Ranger District	Present in Ranger District	Present in Project Area	Determination
Birds				
American Peregrine Falcon (<i>Falco peregrinus anatum</i>)	Yes	Yes	No	No Impact
Baird's Sparrow (<i>Ammodramus bairdii</i>)	Yes	No	No	No Impact

Species	Suitable Habitat in Ranger District	Present in Ranger District	Present in Project Area	Determination
Black-backed woodpecker (<i>Picoides arcticus</i>)	Yes	No	No	No Impact
Blue-Gray Gnatcatcher (<i>Poliophtila caerulea</i>)	No	No	No	No Impact
Burrowing Owl (<i>Athene cunicularia</i>)	Yes	Yes	No	No Impact
Harlequin Duck (<i>Histrionicus histrionicus</i>)	Yes	Yes	No	No Impact
Loggerhead Shrike (<i>Lanius ludovicianus</i>)	Yes	Yes	No	No Impact
Long-Billed Curlew (<i>Numenius americanus</i>)	Yes	Yes	No	No Impact
Northern Goshawk (<i>Accipiter gentilis</i>)	Yes	Yes	Yes	No Impact
Mammals				
Black-tailed Prairie Dog (<i>Cynomys ludovicianus</i>)	No	No	No	No Impact
Long-Eared Myotis (<i>Myotis evotis</i>)	Yes	Yes	No	No Impact
Long-Legged Myotis (<i>Myotis volans</i>)	Yes	Yes	No	No Impact
North American Wolverine (<i>Gulo gulo luscus</i>)	Yes	Yes	Yes	No Impact
Pallid Bat (<i>Antrozous pallidus</i>)	No	No	No	No Impact
Spotted Bat (<i>Euderma maculatum</i>)	Yes	Yes	No	No Impact
Townsend's Big-Eared Bat (<i>Corynorhinus townsendii</i>)	Yes	Yes	No	No Impact
White-tailed Prairie Dog (<i>Cynomys leucurus</i>)	Yes	Yes	No	No Impact
Amphibians				
Great Plains Toad (<i>Bufo cognatus</i>)	No	No	No	No Impact
Northern Leopard Frog (<i>Rana pipiens</i>)	Yes	Yes	No	No Impact
Plains Spadefoot (<i>Spea bombifrons</i>)	No	No	No	No Impact
Western Toad (<i>Bufo boreas</i>)	No	No	No	No Impact
Reptiles				
Greater Short-horned Lizard (<i>Phrynosoma hernandesi</i>)	Yes	Potential	No	No Impact
Milk Snake (<i>Lampropeltis triangulum</i>)	No	No	No	No Impact

Species	Suitable Habitat in Ranger District	Present in Ranger District	Present in Project Area	Determination
Western Hognose Snake (<i>Heterodon nasicus</i>)	No	No	No	No Impact
Fish				
Northern Redbelly Dace (<i>Phoxinus eos</i>)	No	No	No	No Impact
Sturgeon Chub (<i>Macrhybopsis gelida</i>)	No	No	No	No Impact
Yellowstone Cutthroat Trout (<i>Oncorhynchus clarki bouvieri</i>)	Yes	Yes	No	No Impact
Insects – There are no sensitive insect species listed in Montana under the USFS Region 1 Sensitive Species List (03/31/2005).				
Plants (Beartooth District Sensitive Plants verified by K. Reid, Custer National Forest, personal comm., 2005 & 2006)				
Musk-root (<i>Adoxa moshatellina</i>)	Yes	Yes	Potential	No Impact
Small yellow lady’s slipper (<i>Cypripedium parviflorum</i>)	Yes	Potential	Potential	No Impact
Stream orchid (<i>Epipactis gigantea</i>)	Yes	Potential	Potential	No Impact
Hiker’s gentian (<i>Gentianopsis simplex</i>)	Yes	Yes	Potential	No Impact
Mealy primrose (<i>Primula incana</i>)	Yes	Potential	Potential	No Impact
Beartooth goldenweed (<i>Haplopappus carthamoides var. subsquarrosus</i>)	Yes	Yes	No	No Impact
Hall’s rush (<i>Juncus hallii</i>)	Yes	Potential	No	No Impact
Jove’s Buttercup (<i>Ranunculus jovis</i>)	Yes	Potential	Potential	No Impact
Barratt’s willow (<i>Salix barrattiana</i>)	Yes	Yes	No	No Impact
Shoshonea (<i>Shoshonea pulvinata</i>)	Yes	Yes	No	No Impact

2.2.1 Birds

American Peregrine Falcon

Peregrine falcon distribution is limited by the availability of suitable nesting sites and a ready supply of prey. The Peregrine falcon prefers large cliffs for nesting, but will also use steep slopes, river cutbanks, or low rocks and mounds. In Montana, nesting sites are generally near major river drainages. Peregrine falcons do not maneuver well in trees, thus common hunting grounds include open areas such as meadows, river bottoms, marshes, lakes, and croplands.

Their primary prey base consists of medium-size passerines. Peregrine falcons may travel several miles from the nest for food.

Peregrine falcons arrive in northern breeding areas late April-early May; departure begins late August-early September. Peregrine falcons breed at 2-3 years and tend to create lifelong pair bonds. In Montana the nesting season is reported to be in June and July (Johnsgard 1986 cited in http://fwp.mt.gov/fieldguide/detail_ABNKD06070.aspx). Currently, there are an estimated 57⁺ nesting pairs in Montana (D. Flath, personal comm., 8/26/05).

Although suitable habitat exists in West Rosebud Creek drainage, at present, there is no known nesting site in the drainage. The closest documented nesting site is in the East Rosebud Creek drainage. This active nesting site is monitored annually (B. Pitman, Wildlife Biologist, Beartooth Ranger District, personal comm., 2003).

Potential nesting habitat will not be affected by the re-licensing of the Project, therefore, the project will not impact the Peregrine falcon or its potential habitat in the West Rosebud Creek drainage.

Baird's Sparrow

Montana is included as part of the summer range for the Baird's sparrow. Within Montana, the species is found from west of Great Falls eastwardly to North Dakota and south along that border (<http://biology.dbs.umt.edu/landbird/mbc/mtpif/mtbrds.htm>). The majority of sightings occur north of the Missouri River in native mixed-grass prairie, which is the preferred habitat type. Nonnative grasses, invasive species, livestock overgrazing, and fire suppression have reduced the quality and areas of suitable habitat available to the Baird's sparrow. Prairie grasslands are not present in the West Rosebud Creek drainage, thus suitable habitat for the Baird's sparrow is not present. Therefore, it is unlikely the Baird's sparrow utilizes the drainage for summer habitat.

Due to lack of suitable habitat in the Project area, the re-licensing of the Project will not impact the Baird's sparrow.

Black-backed woodpecker

The black-backed woodpecker is rare in most of its range. Their distribution includes forested habitats of Montana from the Rocky Mountain Front westward (<http://biology.dbs.umt.edu/landbird/mbc/mtpif/mtbbwo.htm>). The black-backed woodpecker is associated with early-post fire habitats consisting of boreal and montane coniferous forests.

No black-backed woodpeckers have been documented on the Beartooth Ranger District, but some burned areas (e.g. East Rosebud Creek drainage) in the district may provide suitable habitat.

Due to lack of suitable habitat in the Project area, re-licensing of the Project will not impact the black-backed woodpecker or its habitat.

Blue-gray Gnatcatcher

Long-term land bird monitoring surveys conducted in southeastern Montana in 2002 and 2003 detected blue-gray gnatcatchers in the southern portion of the Pryor Mountains, where direct evidence of breeding has been documented. Lenard et al. (2003) show this area as containing the only known breeding population of this species in Montana. Blue-gray gnatcatchers inhabit a wide range of habitats that typically include broad-leaved trees and shrubs. The species rarely occupies conifer-dominated habitats (Ellison 1992). The individuals detected in the Pryor Mountains occurred mainly in juniper woodlands, but one individual was also detected in a drainage dominated by mature cottonwoods.

The Project area contains no juniper woodlands and little broad-leaved vegetation. The lack of suitable habitat indicates that blue-gray gnatcatchers are not expected to occupy the Project area. Thus, Project re-licensing will have no impact on the blue-gray gnatcatcher.

Burrowing Owl

Burrowing owl population declines have been linked to the declines in the number and extent of prairie dog colonies (Knowles 1999, <http://biology.dbs.umt.edu/landbird/mbcp/mtpif/mtbuow.htm>). In Montana, suitable habitat is limited to the eastern two-thirds of the state where species such as black-tailed prairie dogs are present. Black-tailed prairie dog habitat is not available in the Project area.

No boreal owls have been documented in the West Rosebud Creek drainage. Suitable habitat and prey base for burrowing owls is not available in the Project area; therefore, the re-licensing of the Project will not impact the burrowing owl.

Harlequin Duck

The Pacific population of Harlequin ducks is estimated at about 1 million individuals. In Montana, there are an estimated 110 to 200 breeding pairs (Harlequin Duck Working Group 1993 as cited in NatureServe 2005, Hendricks and Reichel 1998). Montana Natural Heritage database (NatureServe 2005) has documented Harlequin ducks in Carbon, Flathead, Glacier, Granite, Lewis and Clark, Lincoln, Mineral, Missoula, Park, Pondera, Powell, Sanders, Sweet Grass, and Teton counties. The primary breeding areas for Harlequin ducks in Montana include the following locations: 1) tributaries of the lower Clark Fork River; 2)

tributaries of the North, Middle, and South Forks of the Flathead River; 3) streams coming off the east front of the Rocky Mountains; and 4) the Boulder River (citations from Hendricks and Reichel 1998). The Pacific North American Harlequin duck populations in Idaho, Montana, and Wyoming appear to be stable while other populations are declining (NatureServe 2005).

The Harlequin duck spends winter months (mid-September until April/May) along the Pacific coast before moving to the interior to nest in headwater mountain streams (Hendricks and Reichel 1998, Bellrose 1976). Streams of second order or greater with stream gradients between 1-7%, some riffle or slow water areas, and rocky banks describe common nesting sites for the Harlequin duck (Bellrose 1976). Forest habitat surrounding the stream often includes willow shrub or pole or immature-sized lodgepole pine, Engelmann spruce, and Douglas-fir (<http://biology.dbs.umt.edu/landbird/mbc/mtpif/mthadu.htm>). Habitat components creating safe loafing sites often include mid-stream rocks, logs, islands, or stream-side gravel bars (Hendricks and Reichel 1998).

In Montana, Harlequin ducks arrive from late April to early May (http://fwp.mt.gov/fieldguide/detail_ABNJB15010.aspx). Egg-laying takes place between April 30 and July 4 with the later dates on the streams north of Yellowstone National Park. Male Harlequin ducks often abandon their mate during incubation period in early June or July (Bellrose 1976, http://fwp.mt.gov/fieldguide/detail_ABNJB15010.aspx). Females and young leave the nest site for wintering areas along the west coast from late July to early September (http://fwp.mt.gov/fieldguide/detail_ABNJB15010.aspx). This timing can be influenced by elevation and spring runoff, and vary by several weeks between years (Hendricks and Reichel 1998).

The main threats to Harlequin duck productivity and breeding habitat include destruction to riparian habitat, watershed stability, and hydrologic regime from activities such as mining, roads, timber harvest, water diversions or impoundments, shoreline development, or recreational activity in breeding areas (NatureServe 2005). Studies on the impacts of human activities and the consequential disturbance to Harlequin ducks during the breeding season are not fully known or quantified (Hendricks and Reichel 1998). Some studies have found boating to have a significant negative correlation with numbers of ducks present in a medium sized stream, however, statistical data analyses regarding the impact of fishing and human presence is currently lacking and these activities are only suggested to cause disturbance to the species (Hendricks and Reichel 1998).

Beyond physical degradation to breeding habitat or human disturbance there are several other factors that limit recolonization and increase risk and vulnerability of local extirpation of the Harlequin duck. These factors include: 1) high female natal site fidelity; 2) high adult site fidelity; 3) pair bonds developing on the wintering grounds; 4) low levels of movement on the breeding grounds; 5) relatively advanced age at first reproduction; 6) little chance of

re-nesting after about 2 weeks following the start of incubation; 7) low irregular levels of reproductive success; 8) patches of suitable habitat which are highly fragmented; 9) sensitivity to disturbance; 10) the clumped distribution of pairs, even in apparently homogeneous habitat; 11) declined range-wide and regional population levels; 11) relatively small and isolated regional populations; and 12) use of coastal wintering habitat immediately offshore (often less than 100 m) (Hendricks and Reichel 1998).

Harlequin ducks have been reported in various drainages on the Beartooth Ranger District, and potential habitat is available in West Rosebud Creek drainage. In 2005, Beartooth Ranger District received anecdotal information (unconfirmed) that Harlequin ducks were present at Emerald Lake (within the Project area, but not in Project boundary) and on Reeves Lake (privately owned, non-Project). These sightings in the Project area have not been confirmed.

The Project area is not recognized as a primary breeding area for Harlequin ducks, however, there is potential that the species may be present in the area and breed along West Rosebud Creek. While human interactions and potential disturbance during brooding time (July – September) is limited in the bypass reach, summer recreation and human presence increases near the stream downstream of the powerhouse during this time period due to the presence of recreational fishing opportunities along the stream and lakes, Emerald and Pine Grove campgrounds, and whitewater kayaking downstream of West Rosebud Lake.

Currently, there has been no confirmed sighting of the species (Harlequin duck) in the Project area. Thus, there will be no impact to the Harlequin duck induced by re-licensing of the Project.

Loggerhead Shrike

The loggerhead shrike is present in Montana, east of the Continental Divide. Preferred habitat includes drier, open areas with woody nesting strata nearby. This habitat type may include grassland prairie with scattered trees, riparian areas or woody draws, cultivated lands with shelterbelts, or even badlands with few shrubs, in addition to the sagebrush shrubland and shrubsteppe habitats (<http://biology.dbs.umt.edu/landbird/mhcp/mtpif/mtlosh.htm>).

Suitable habitat near the Project is probably limited for loggerhead shrike. Re-licensing of the Project will not affect any potential habitat. Therefore, there will be no impact to the loggerhead shrike.

Long-billed Curlew

The long-billed curlew is a neotropical migrant that is found breeding and migrating throughout Montana. In Montana, the long-billed curlew is more common east of the Rockies, particularly along the Rocky Mountain Front. During migration period, peak

numbers occur in August and September (<http://biology.dbs.umt.edu/landbird/mbcip/mtpif/mtlbcu.htm>). Montana’s bird distribution database indicates the long-billed curlew is present in Stillwater and Carbon counties (<http://fwp.state.mt.us/fieldguide/mediaDisplay.aspx?id=2170&elcode=ABNNF07070>), but their presence is well downstream of the Project area. Preferred habitat for this species includes prairie and grasslands, particularly the presence of native short grasses.

Suitable habitat for the species is not present within the Project area. Therefore, the relicensing of the Project will not impact the long-billed curlew.

Northern Goshawk

The northern goshawk is considered a sensitive species and management indicator species in the Custer National Forest. The northern goshawk is a solitary bird until breeding season when the adults form ‘pair bonds.’ The adults split this bond once the young fledge at about three months. Breeding season in Montana extends from mid-May to mid-August (Montana Natural Heritage Program Biological Conservation Database, February 2006).

In Montana, the northern goshawk uses a variety of mature and old growth forest habitats. Nest stands are typically characterized by a closed canopy and open understory. The one known nest on the Beartooth Ranger District is in a mature lodgepole pine stand in the Beartooth Mountains (B. Pitman, Wildlife Biologist, USFS Custer National Forest, Beartooth Ranger District, personal comm., 2005).

To date no systematic survey has been conducted to document the reproductive status of the northern goshawk in the West Rosebud Creek drainage (B. Pitman, Wildlife Biologist, USFS Custer National Forest, Beartooth Ranger District, personal comm., 2003). However, suitable habitat was identified using aerial photos (1:4800) taken in the summer of 2005 and via a query using the USFS Timber Stand Management Record System (TSMRS) database, Custer National Forest Stratum Codes, and Beartooth Ranger District Definitions. The queries were conducted only for the lower West Rosebud Creek drainage (downstream of Mystic Lake Dam) and included the following:

- Queried for Size Class = sawtimber for conifer tree species except whitebark pine
 - Sawtimber stands are those where at least 10% of the crown cover is trees greater than or equal to 5” dbh (diameter at breast height) and the crown cover of trees 9 inches dbh and larger is at least equal to that of trees 5 to 8.9 inches dbh.
- Queried the above for well-stocked (i.e. crown cover greater than or equal to 70%).

In Figure 2.2.-1, the areas marked in yellow are characterized as “highly suitable” compared to the areas marked in orange, which are less suitable. The majority of the highly suitable nesting habitat for the northern goshawk is located away from the road or in the Wilderness

Area. There is only a small portion of the highly suitable habitat within the vicinity of the Pine Grove Campground and Emerald Lake campground (non-Project facilities) that could experience more human activity than other locations, if the species is present, due to proximity.

General information about other raptors indicates human activities such as road building, logging, site preparation and herbicide and pesticide application may have adverse impacts (Desimone and Hays 2004). The main factor that adversely affects the northern goshawk is habitat loss from timber harvest or development in riparian areas. Additionally, the northern goshawk occurs in low-density populations thus increasing their vulnerability to population loss (http://www.ut.blm.gov/vernalrmpguide/state_blm_species.htm). Research has also suggested that weather patterns and prey abundance may influence northern goshawk populations more than spatial patterns such as habitat attributes (McLaren et al. 2002).

Information regarding the affects of human disturbance to the northern goshawk during breeding season is limited (Desimone and Hays 2004). One study found trapping and handling birds for research during nesting did not lead to nest abandonment (Squires and Reynolds 1997). While the same authors reported another instance where two cases of nest failure was attributed to the presence of humans. In a third case, goshawks were observed to be extremely aggressive toward humans, when present around their nests during breeding season (Elderkin 1999, <http://www.gov.ns.ca/natr/wildlife/conserva/20-01-4.htm>). Thus, it seems that the type, timing, duration, frequency of human disturbance may have varying impacts to the species.

In the Project area, the main concern about impacts to the northern goshawk is directly linked to recreational use and presence of people at the campgrounds and trails (non-Project facilities) in the Project area. However, at this time there is no known northern goshawk nest located near any of the campground facilities, within the Project area, or in the West Rosebud Creek drainage. At this time, there does not appear to be any conclusive evidence that recreation conducted in the Project area has or will adversely impact individuals.

Since no nests are currently known to be present in the drainage, no known direct Project effects to northern goshawk nesting or foraging habitat have been identified, no proposals for the re-licensing of the Project to degrade (e.g. will not increase road size or add roads, not harvest timber) any potential nesting habitat, and the majority of potential and highly suitable nesting habitat is located within the boundary of the Wilderness Area; the re-licensing of the Project will not impact potential Northern goshawk.

2.2.2 Mammals

Black-tailed Prairie Dog

The black-tailed prairie dog is widely distributed east of the Continental Divide in Montana (Knowles 1999). Suitable habitat for the black-tailed prairie dog includes short-grass prairie lands. This habitat type is not present within the Project area or in other areas surrounding the Project area. Therefore, re-licensing of the Project will have no impact on the black-tailed prairie dog.

White-tailed Prairie Dog

The white-tailed prairie dog has a more limited distribution compared to the black-tailed prairie dog. The white-tailed prairie dog occurs in the dry valleys between the Beartooth and Pryor Mountains (Knowles 1999). In the Beartooth Ranger District there is one white-tailed prairie dog colony (~90 acres) (Knowles 1999). However this colony is not in the Project area or in the near vicinity.

Suitable habitat, such as grass/shrubland areas, is not present in the West Rosebud Creek drainage; therefore, the re-licensing of the Project will not impact the white-tailed prairie dog.

North American Wolverine

Outside of Alaska, Montana and Idaho are the only states thought to have significant numbers of wolverines (Foresman 2001). In Montana, wolverines are most common in the western one-third of the state and occupy habitat types dominated by grand fir, alpine fir, Douglas fir, lodgepole pine, ponderosa pine, and western larch (Foresman 2001). Wolverine sightings are reported on rare occasion on the Beartooth Ranger District, including one approximately 14 miles (22.5 km) southeast of the Project area in 2004 (B. Pitman, Wildlife Biologist, Beartooth Ranger District, personal comm., 9/2005).

The West Rosebud Creek drainage provides potential foraging habitat for wolverines, and the talus slopes provide denning habitat. Individual wolverines may potentially travel through the Project area. However, activities and facilities associated with the Project do not affect foraging conditions or denning habitat. Therefore, the re-licensing of the Project will not impact the wolverine or any potential habitat in the Project area.

Long-eared Myotis

The range for long-eared myotis encompasses the temperate west of North America including most of Montana where suitable habitat exists. Foraging habitat includes forested habitats such as Douglas fir and spruce-fir. Roosts are typically found in rocky areas, abandoned buildings, mines, caves, and under rocks on scree slopes (Adams 2003). Hibernation takes place in caves and mines. Long-eared myotis have been found in southeastern Montana including in caves of the Pryor Mountains in Carbon County (Foresman 2001). Although, none have been observed in Stillwater County or near the Project area, there is potential for their occurrence based on availability of habitat.

Project activities and facilities do not affect bat foraging conditions, roosting habitat, or hibernacula. The re-licensing of the Project will not impact the long-eared myotis or any potential habitat in the Project area.

Long-legged Myotis

The long-legged myotis typically inhabits montane coniferous forests but has also been observed in riparian cottonwood woodlands along the Yellowstone River (Foresman 2001). Summer roosts are found on the underside of tree bark, caves, or buildings (Adams 2003). This bat has also been observed at elevations greater than 6,000 ft in Montana (Foresman 2001). In Montana the long-legged myotis has been observed overwintering in mines in Richland County, Montana. No colony or resident population has been documented near the Project area, but the long-legged myotis has also been observed in Carbon County. The long-legged myotis has also been designated as likely occurring in Stillwater County (Foresman 2001).

As with the Long-eared myotis, project activities and facilities do not affect foraging conditions, roosting habitat, or hibernacula. The re-licensing of the Project will not impact the long-legged myotis or potential habitat in the Project area.

Pallid Bat

The pallid bat is not common in Montana and was first documented in the Pryor Mountains, Carbon County in 1980 (Foresman 2001). Since the first findings of the pallid bat in 1980, additional research has produced 24 additional individuals, all of which were from the Pryor Mountains. Presence of both sexes in this area suggests breeding may occur in this region, however no bats were found in any of the caves monitored (Foresman 2001).

Preferred habitats of the pallid bat include arid and semi-arid regions. The species is also known to sometimes inhabit oak and pine forests (Foresman 2001). Daytime roosts are predominately in rock cavities and buildings, whereas night roosting occurs in open shelters such as porches, bridges, and cave or mine openings (Genter and Jurist 1995).

Suitable roosting habitat and foraging habitat is available in the Beartooth Ranger District, specifically in the Pryor Mountains, Carbon County. However, suitable habitat does not exist in the vicinity of the Project area. Therefore, the re-licensing of the Project will not impact the Pallid bat.

Spotted Bat

Spotted bats may occur in open ponderosa pine and piñon-juniper as well as in deserts and other arid terrain. The range of the spotted bat is widespread, but the species is not common. Sightings of the spotted bat have been limited to the Pryor Mountains in Carbon County. Day roosting typically occurs in fractured sedimentary cliffs, and openings in drier ponderosa pine forests provide foraging habitat. Spotted bats are territorial and space themselves along regular foraging routes in suitable habitat. Specific foraging habitat requirements are not well understood, but previous studies have shown that spotted bats feed almost exclusively on moths.

There are only 3 records of observations of the spotted bat in Montana (Foresman 2001). A single adult was found flying into a house in Billings in 1949 (Nicholson 1950) and two individuals were captured in 1990 in the Pryor Mountains, Carbon County (Worthington 1991). In 1990, there were also additional spotted bats heard in the Bighorn Canyon National Recreation Area (Worthington 1991). In addition to the above observations, Spotted bats were heard or recorded at nine sites during bat surveys conducted from 2001 to 2003 in south-central Montana (Hendricks et al. 2004). No spotted bats have been detected or recorded in Stillwater County.

As a result of the preferred habitat type of spotted bats, this species most likely does not occur near the Project area. Therefore, the re-licensing of the Project will not impact the spotted bat.

Townsend's Big-Eared Bat

The Townsend's big-eared bat has been observed throughout Montana, but is considered rare (Adams 2003). The Townsend's big-eared bat has a limited statewide distribution with only four known breeding colonies in the state (none identified to be within the Project area) and several confirmed hibernacula (Genter and Jurist 1995). Currently, resident populations are known to exist in the Lewis and Clark Caverns in Jefferson County, abandoned coal mines in the Bull Mountains of Musselshell County (Foresman 2001), Azure Cave located in the Little Rocky Mountains of Phillips County (Hendricks 1998), and a private abandoned mine shaft in Missoula County (Foresman 2001). The largest colony of this species in Montana exists in Azure Cave located in north central Montana. The largest colony known to exist in the United States is in Jewel Cave near Rapid City, South Dakota (Foresman 2001). In addition,

bat surveys conducted in the Pryor Mountains have detected Townsend's big-eared bats along the Beartooth District/Bureau of Land Management boundary. The bats were detected in caves and under cottonwoods in a canyon bottom (Worthington 1991, Hendricks et al. 2004).

The Townsend's big-eared bat utilizes a variety xeric and mesic of habitats in its range, including conifer forests, piñon-juniper woodlands, and desert shrublands. Extreme deserts and the highest elevations are the only habitat types that the species appears to be absent from. The Townsend's big-eared bat is one of three bat species that overwinter in Montana. In general the greatest threat to Townsend's big-eared bats is their vulnerability to disturbance and loss of habitat (e.g. traditional roosts) such as caves and abandoned mines.

Roosting habitat consisting of caves or abandon mines is limited in the near vicinity of the Project area. Buildings near the Powerhouse may provide roosting habitat. No bats were detected during a survey in May 2004 conducted by PPL Montana and the Forest Service. However, lack of detections does not necessarily mean bats were absent from the area.

Potential exists for Townsend's big-eared bats to inhabit the Project vicinity. However, project activities and facilities do not affect foraging conditions, roosting habitat, or hibernacula. Thus, the re-licensing of the Project will not impact the Townsend's big-eared bat.

2.2.3 Amphibians

Great Plains Toad

The Great Plains toad is primarily found in the eastern two-thirds of Montana east of the Continental Divide. The highest elevation at which the toad has been documented is 3,600 ft in the Wolf Mountains of Big Horn County. The Great Plains toad is often found on the plateaus between and flanking the Yellowstone and Missouri Rivers. The species has been documented in about 60 locations in eastern Montana, which does not include Stillwater or Carbon counties (Werner et al. 2004). The lowest elevation of West Rosebud Creek within the Forest boundary is approximately 5,360 ft, well above the known elevation of the species. Additionally, the Project area elevation appears to be beyond the range of the Great Plains toad. Due to the lack of suitable habitat in the Project area, the re-licensing of the Project will not impact the Great Plains Toad.

Northern Leopard Frog

Historically, the northern leopard frog occurred on both sides of the Continental Divide in Montana. Currently, the northern leopard frog is found primarily in the prairie regions of the eastern two-thirds of Montana east of the Continental Divide. This frog has been documented in all but seven Montana counties (six of which are west of the Continental Divide), at

elevations up to 6,700 feet in Judith Basin County. The northern leopard frog has been documented in Stillwater and Carbon counties at lower elevations, not near the Project area (Werner et al. 2004). During a survey in May 2004 conducted by PPL Montana and the Forest Service, no northern leopard frog was observed however one spotted frog (*Rana lutiventris*) was encountered at one of the beaver ponds (12T 0601843 5012053) that is hydrologically disconnected from West Rosebud Creek.

Habitats used by northern leopard frog in Montana include wet meadows, cattail marshes, and grassy shorelines (Werner et al. 2004). Habitat in the Project area around the shorelines and shallow water areas of West Rosebud and Emerald lakes are mostly rocky, with a gravel and sand substrate that provide essentially no opportunity for submergent or emergent vegetation which is necessary for attachment of egg masses (D. Flath, APEX, 5/22/2004). The only opportunities for amphibian breeding sites in the Project area seem to be in beaver ponds, active or inactive. Some beaver ponds are hydrologically connected to West Rosebud Creek, but several observed during the May 2004 study were hydrologically disconnected from West Rosebud Creek. Since the minimal amount of amphibian habitat present in the Project area is associated with beaver ponds constructed along tributaries to West Rosebud Creek, operation and management of the Project would not adversely affect the northern leopard frog. Therefore, the re-licensing of the Project will not impact the northern leopard frog or potential habitat for the species.

Plains Spadefoot

Documentation of the plains spadefoot in Montana has been sparse in central and eastern Montana, including mountain valleys of the upper Missouri River watershed. The highest elevation at which the plains spadefoot has been observed is just over 5,000 ft in Beaverhead County (Werner et al. 2004). The species has been observed in parts of Carbon County, but not in the vicinity of the Project. Presence of this species is not expected in the West Rosebud Creek drainage or the Project area due to elevation and lack of prairie habitat. Thus, the re-licensing of the Project will not impact the plains spadefoot.

Western Toad

The Western toad occurs on both sides of the Continental Divide in Montana, which includes the Beartooth Plateau. The highest elevation at which this species is documented is 9,220 feet in the Madison Range of Gallatin County. The western toad has been documented in Carbon County near the boundary of Stillwater County, but no observations have been documented in Stillwater County. Typical habitat for the western toad includes coniferous forests and subalpine meadows, lakes, ponds, and marshes (Werner et al. 2004). These habitat types exist within the Project area (e.g., West Rosebud and Emerald lakes, beaver ponds, wetlands) and may provide suitable habitat. However, no western toad was found during a survey conducted by PPL Montana and the USFS in May 2004. Since potential habitat is available

within the Project area and the re-licensing of the Project will not propose any alteration to current operations, the Project will not impact the western toad or any potential habitat for the species.

2.2.4 Reptiles

Greater short-horned lizard

The greater short-horned lizard occur in the eastern two-thirds of Montana east of the Continental Divide primarily in the prairies, but occasionally into the mountain foothills along the upper Missouri headwaters. The highest elevation documented is 6,500 ft in the Pryor Mountains in Carbon County. The greater short-horned lizard has been documented in Stillwater County, but downstream of the Project area (Werner et al. 2004).

Preferred habitat such as sagebrush and short-grass prairies are not present in the vicinity of the Project, therefore this species most likely does not inhabit the Project area. Due to the lack of suitable habitat, the re-licensing of the Project will have not impact on the greater short-horned lizard.

Milk Snake

There are nine subspecies of the milk snake that inhabit the United States. In Montana, the subspecies, pale milk snake (*Lampropeltis triagulum multistriata*), occurs in central and southeastern portions of Montana. The extent of its distribution in Montana is not currently known due to its nocturnal habits. The highest elevation at which the snake has been documented in Montana is 3,960 ft near Bluewater Fish Hatchery east of Bridger in Carbon County. Other unverified reports indicate that the milk snake may be located at slightly higher elevations. Typical habitat for the milk snake includes sandstone outcroppings, riparian zones, cedar-juniper hillsides, and margins of agricultural lands (Werner et al. 2004).

Suitable habitat is not likely common or available in the Project area and the milk snake is unlikely to be present in the West Rosebud Creek drainage. Therefore re-licensing of the Project will not impact the milk snake.

Western Hognose Snake

The western hognose snake is found east of the Continental Divide along the major river systems and their tributaries in Montana. Preferred habitat types include exposed riverbanks, sandstone outcroppings, and old riverbeds. The highest elevation in Montana at which a western hognose snake has been documented is 4,060 ft near Rapelji in Stillwater County. The distribution of the western hognose snake is in the lower elevation and larger drainages downstream of West Rosebud Creek (Werner et al. 2004). Suitable habitat is not available in the Project area since the Project area is at a much higher elevation (> 6,000 ft) compared to

where western hognose snakes are known to occur. In addition, the small number of ponds, marshes, lakes, and other water bodies containing suitable amphibian habitat suggests there is most likely a limited source of prey to support the western hognose snake. Therefore, the re-licensing of the Project will not impact the western hognose snake.

2.2.5 Fish

Northern Redbelly Dace

The northern redbelly dace is not present in the West Rosebud Creek drainage (<http://www.fisheries.org/AFSmontana/SSCpages/Redbelly%20dace%20hybrid.htm>). Therefore, the re-licensing of the Project will not impact the northern redbelly dace.

Sturgeon Chub

The sturgeon chub is not present in the West Rosebud Creek drainage (http://www.fisheries.org/AFSmontana/SSCpages/sturgeon_chubstatus.htm). Therefore, the re-licensing of the Project will not impact the sturgeon chub.

Yellowstone Cutthroat Trout

In Montana, Yellowstone cutthroat trout were historically found in the Yellowstone River basin including portions of the Clarks Fork of the Yellowstone, Bighorn River, and Tongue River tributaries (Behnke 1992, Varley and Gresswell 1988). The species was believed to occupy 2-6 lakes in Montana historically, whereas today over 100 lakes in the state support genetically pure Yellowstone cutthroat trout as a result of stocking (http://www.fisheries.org/AFSmontana/SSCpages/yellowstone_cutthroat_trout.htm). With this historic range, it is possible the species was present in West Rosebud Creek drainage. However, no data is available to confirm their historic presence.

Currently, the closest population of Yellowstone cutthroat trout to the Project area is located in Bad Canyon Creek, a tributary to the Stillwater River located several miles upstream of the West Rosebud Creek confluence with the Stillwater River (Available 3/2006: http://mountain-prairie.fws.gov/species/fish/yct/archive/Microsoft%20Word%20-%20Final_version%20of%20Conservation%20Program.pdf). Most of the remaining indigenous populations of Yellowstone cutthroat trout in Montana inhabit headwater streams in the Upper Yellowstone River drainage upstream of Big Timber, though the Yellowstone River mainstem also supports large numbers of this subspecies (Clancy 1988).

Current fish distribution in the various lakes within the West Rosebud Creek drainage is presented in Figure 2.2-2. In Mystic Lake and upstream of Mystic Lake, the fishery includes rainbow x Yellowstone cutthroat trout hybrids. Genetic samples were collected from Mystic and Silver lakes in the West Rosebud drainage in 2000 and 2001 to assess the contribution of

rainbow and Yellowstone cutthroat trout genetics in the population. Fish in Mystic Lake were identified as rainbow x cutthroat hybrids with only 13% Yellowstone genes. Fish from Silver Lake were also hybrids with a similar proportion of cutthroat genes (14%) (MFWP 2005).

Below Mystic Lake Dam, the fishery in West Rosebud Creek drainage includes wild populations of brown and brook trout, mountain whitefish, and longnose suckers. To date there are no conservation populations of Yellowstone cutthroat trout identified in the West Rosebud Creek drainage or any future plans to reintroduce the species to the drainage. There is however one conservation population located in Bad Canyon Creek (Available 3/2006: http://mountain-prairie.fws.gov/species/fish/yct/archive/Microsoft%20Word%20-%20Final_version%20of%20Conservation%20Program.pdf).

Although Yellowstone cutthroat trout are not currently present in West Rosebud Creek, physical stream attributes in West Rosebud Creek do not appear to be limiting factors. Maximum summer temperatures remain within the optimal temperature range (thermograph data collected in 2005 by PPL Montana, see section 2.2.1.3). Optimal temperatures for Yellowstone cutthroat trout range between 4 and 15 °C, although the species has been documented in waters ranging from 0 to 27 °C (Varley and Gresswell 1988, <http://www.greateryellowstone.org/issues/issue.php?threatID=17>). The shape of the annual hydrograph remains intact even though the Project as shifted the peak of the hydrograph and reduced the duration of the peak. In addition, the Project increases the amount of water in the stream during baseflow conditions providing improved overwintering salmonid habitat.

Since there is no Yellowstone cutthroat trout population present in the West Rosebud Creek drainage, the re-licensing of the Project will not impact the Yellowstone cutthroat trout.

2.2.6 Plants

Sensitive Plants Species

Sensitive plants potentially known or suspected to occur in Beartooth Ranger District along with habitat type, closest known population, potential of occurrence, and determination of effects are listed in table 2.2-2. Based on habitat requirements and known habitat types within the Project area, Beartooth goldenweed, Hall's rush, Barratt's willow, and Shoshonea most likely do not occur in the Project area. Based on habitat requirements and known occurrences (Table 2.2-2), there is potential for musk-root, Jove's buttercup, small yellow lady's slipper, false helliborine, hiker's gentian and mealy primrose to occur in the Project area. Although these five plant species were not found during surveys conducted in June 2005 (refer to results from Study No. 11 filed with FERC on October 3, 2005 available on Mystic Lake Project website, mysticlakeproject.com), this does not mean the species are not present.

Table 2.2-2. List of sensitive plants in the Beartooth Ranger District (R1 1999 sensitive plant list; K. Reid, Botanist, Custer National Forest, personal comm., 2005 & 2006).

Species	Elevation (ft)	Habitat	Closest known population	Life-form	Potential of Occurrence in Project Area	Determination of Effects
Jove’s Buttercup (<i>Ranunculus jovis</i>)		Sagebrush grasslands to open forest slopes in the montane and subalpine zones.	Head of Crooked Cr.-Pryor Mtns. – approx. 100 air miles.	Perennial	Moderate	No Impact
Musk-root (<i>Adoxa moschatellina</i>)	4,400-6,000	Vernally moist places in the mountains at the bottom of undisturbed, open rock slides that have cold air drainage.	East Rosebud Creek and Spread Creek – approx. 30 air miles.	Perennial Forb	High	No Impact
Small yellow lady’s slipper (<i>Cypripedium parviflorum</i>)	2,520 – 6,200	Fens, damp mossy woods, seepage areas, and moist forest-meadow ecotones in valley to lower montane.	Stillwater Co. (State)– approx. 30 air miles	Perennial Forb	High	No Impact
False helliborine (<i>Epipactis gigantea</i>)	2,900 – 6,200	Streambanks, fens with springs/seeps, often near thermal waters	Bluewater Fish Hatchery – approx. 70 air miles	Perennial Forb	Moderate	No Impact
Hiker’s gentian (<i>Gentianopsis simplex</i>)	4,460 – 8,400	Fens, meadows, and seeps, usually in areas of crystalline parent material, in the montane and subalpine zones.	East Rosebud – approx. 30 air miles	Annual Forb	High	No Impact
Mealy primrose (<i>Primula incana</i>)		Wet meadows, springs and shores, often where alkaline; calcareous bog meadows; wet meadows & quaking bogs; NOT found in alpine or subalpine areas.	Historically known to occur in East Rosebud, but not recently documented	Perennial Forb	High	No Impact

Species	Elevation (ft)	Habitat	Closest known population	Life-form	Potential of Occurrence in Project Area	Determination of Effects
Beartooth goldenweed (<i>Haplopappus carthamoides</i> var. <i>subsquarrosus</i>)	5,520 – 7,200	Grasslands and sagebrush steppe and sandy calcareous soils in the foothills and montane zones.	East Front of the Beartooth Mountains and foothills of Pryor Mountains in Sage Creek	Perennial Forb	No	No impact
Halls' rush (<i>Juncus hallii</i>)	4,000 – 8,860	Moist to dry meadows and slopes from valley to montane.	Madison Range in Madison County	Perennial grass-like	No	No Impact
Barratt's willow (<i>Salix barrattiana</i>)	6,800 – 10,500	Forms extensive thickets in alpine habitats. Grows on boggy meadows, moist open hillsides in mountains, lakeshores, streambanks, rockslides and recent alluvial deposits. Soils range from very calcareous to very acidic.	Line Creek Plateau near the Wyoming state line	Shrub	No	No Impact
Shoshonea (<i>Shoshonea pulvinata</i>)	6,440 – 7,800	Open, exposed limestone outcrops, ridgetops and canyon rims, in thin rocky soils.	Pryor Mountains in Carbon County	Perennial Forb	No	No impact

At the time of the summer survey in 2005, Jove's buttercup was not included in the sensitive species list. Although habitat requirements (sagebrush grasslands to open forest slopes) for this species differ greatly from several of the other sensitive species listed in Table 2.2-2, there is potential for Jove's buttercup to be present in the Project area. There are currently 11 known occurrences of this species in southern Montana representing five counties including: Beaverhead, Carbon, Gallatin, Madison, and Park. Management areas within the counties where the species was observed include the Absaroka-Beartooth Wilderness, Beaverhead-Deerlodge National Forests (Madison Ranger District), Custer National Forest (Beartooth Ranger District), Gallatin National Forest (Gardiner Ranger District), Gallatin National Forest (Hebgen Lake Ranger District) Sheep Experiment Stations, and Yellowstone National Park (<http://mtnhp.org/plants/plantguide.asp>).

Sensitive plants that occur in riparian habitat types may be impacted from hydrological changes induced by the Project. However, habitat requirements for the sensitive plant species listed in table 2.2-2 do not indicate the species are dependent upon riparian habitats adjacent to or impacted by the water elevations of Mystic Lake, West Rosebud Lake, or the hydrologic regime of West Rosebud Creek. The species requiring wetter habitat conditions appear to be more dependent on local springs, seeps, and wetlands hydrologically disconnected from the lakes (Mystic Lake, West Rosebud Lake, Emerald Lake) and West Rosebud Creek in the Project area. During wetland surveys conducted by Jones et al. (2001) and riparian surveys conducted by ERG and GEI personnel in 2005, no sensitive species were identified in the Project area.

Nonnative Plant Species

Nonnative plant species pose a threat to the native plant communities along West Rosebud Creek. The 2005 summer survey by GEI and ERG personnel found plant communities in the bypass reach in excellent condition. The plant species present at inventoried sites were of native species expected in these habitats. Introduced species had not migrated into these riparian sites. In contrast, nonnative species were observed along West Rosebud Creek below the powerhouse with the greatest density observed near the Forest Service boundary.

Nonnative plants are introduced to the Project area via human activity and presence, birds, animals, and wind. The presence of nonnative species is an indirect effect of the Project. The road to the Project allows for vehicle traffic and opportunity for recreational activity. Introduction of nonnative plants is often associated with the human presence and seeds being transported via vehicles, shoes, clothes, animals, camping gear, etc. Nonnative plant species often displace native plant communities and reduce available or palatable food source for wildlife.

A list of noxious and invasive weed species identified as established and generally present in the Project area is provided in Table 2.2-3. Currently, the Forest Service sprays along the forest road, spurs, and campgrounds for all of the noxious weeds listed (personal comm., K. Reid, Botanist, Custer National Forest, 10/23/2003). The Forest Service does not spray in the vicinity of the PPL Montana Camp surrounding the powerhouse or the 3-mile trail leading to Mystic Lake (personal comm., S. Monahan, Beartooth Ranger District and K. Reid, Custer National Forest, 10/23/03). American Enterprises, Inc (AEI) sprays noxious weeds (for example, knapweed) annually around the PPL Montana Camp. Canada thistle has also been observed and sprayed at the Lake house (personal comm., D. Robinson, PPL Montana, 10/24/2003). Meadow hawkweed was recently (2005 field season) identified as common near the Forest Service boundary and added to the list of invasive weed species to monitor and manage.

Table 22-3. 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>

At this time no sensitive plant species have been identified in the Project area and there is no evidence of Project effects to sensitive species. Within the Project area there are wetland or riparian habitat types with suitable habitat available for these species. Therefore, the re-licensing of the Project will not impact any of the listed sensitive plant species.

The Custer National Forest prepared a weed treatment environmental impact statement proposing to continue control of undesirable vegetation (weeds) through the integration of mechanical, biological, and ground and aerial (helicopter) herbicide control methods. At this time, the Custer National Forest is treating weeds under decisions made in the 1987 Custer National Forest Noxious Weed Environmental Impact Statement and Records of Decision.

The current proposal by the Forest Service is to obtain desired conditions outlined in the Forest Plan, by:

- Protecting the natural condition and biodiversity of the Custer National Forest by preventing or limiting the spread of aggressive, nonnative plant species that displace native vegetation
- Promptly eliminating new invaders (species not previously reported in the area) before they become established
- Reducing known and potential weed seed sources on trailheads and campsites, along main roads and trails, within power line corridors, and in wildlife and livestock use areas.
- Preventing or limiting the spread of established weed into areas containing little or no infestation.
- Protecting sensitive and unique habitats including the Absaroka-Beartooth wilderness, West Fork of Rock Creek, critical winter ranges, research natural areas, riparian areas, and sensitive plant populations. (68 FR 49429)

2.3 Forest Service Management Indicator Species

Forest Service Management Indicator Species are listed in table 2.3-1. There are a total of six species that are all present in the Project area, however the re-licensing of the Project will have no effect to the species or its respective habitat.

Table 2.3-1. List of the Forest Service Management Indicator Species on the Custer National Forest.

Species	Type of Indicator	Present in Project Area	Determination
Northern Goshawk	Habitat Indicator	Yes	No Effect
White-tailed Deer (<i>Odocoileus virginianus</i>)	Habitat Indicator & Key Species	Yes	No Effect
Ruffed Grouse (<i>Bonasa umbellus</i>)	Habitat Indicator	Yes	No Effect
Elk (<i>Cervus elaphus</i>)	Key Species	Yes	No Effect
Mule Deer (<i>Odocoileus hemionus</i>)	Key Species	Yes	No Effect
Bighorn Sheep (<i>Ovis Canadensis</i>)	Key Species	Yes	No Effect

2.3.1 White-tailed Deer (Habitat Indicator and Key Species)

White-tailed deer typically occur in the Project area downstream from the Forest boundary, but their use of habitat upstream is increasing. Winter range, according to MFWP GIS data, is located around the Fiddler Creek drainage downstream of the Project area (MFWP 1997). Project activities and facilities do not affect forage availability or other habitat conditions. The re-licensing of the Project will have no effect on white-tailed deer or its habitat in the West Rosebud Creek drainage.

2.3.2 Mule Deer (Key Species)

Mule deer occur within the Project area. The Project area is classified as year-round range for mule deer with sections downstream of the Project described as the range where “90% of the individuals are located during five winters out of ten from the first heavy snowfall to spring green-up, or during a site-specific period of winter” (MFWP 2004). Project activities and facilities do not affect forage availability or fawning and winter habitat conditions. The re-licensing of the Project will have no effect on mule deer or its habitat in the West Rosebud Creek drainage.

2.3.3 Elk (Key Species)

Other than limited fall use above Mystic Lake, elk rarely occupy the West Rosebud Creek drainage upstream from the Forest boundary. According to GIS data from MFWP (1999), the Project area provides summer range habitat for elk, but winter range is downstream of the Line Creek substation. Project activities and facilities do not affect forage availability or calving and winter habitat conditions. The re-licensing of the Project will have no effect on elk or its habitat.

2.3.4 Bighorn Sheep (Key Species)

According to MFWP GIS data (2003), the local bighorn sheep population is estimated at 75 individuals. The winter range (November 15 – March 1) includes the Project area (Figure 2.3-1), however field observations indicate bighorn sheep typically winter on the Beartooth Plateau adjacent to the Project area and may occupy the Project area during spring and early summer (B. Pitman, Wildlife Biologist, Custer National Forest, personal comm., 2004). Project activities and facilities do not affect forage availability or lambing and winter habitat conditions. Re-licensing of the Project will have no effect on the bighorn sheep or its habitat.

2.3.5 Ruffed Grouse (Habitat Indicator)

In Montana, ruffed grouse are most common west of the Continental Divide, and restricted to the isolated mountain ranges and major drainages of central and south-central Montana (Montana Bird Distribution Committee 1996). Ruffed grouse in eastern Montana typically inhabit drier montane woodlands near aspen stands (http://biology.dbs.umt.edu/land_bird/mbc/mtpif/mtrugr.htm).

Ruffed grouse have been observed in Stillwater and Carbon counties (Montana Bird Distribution committee 1996). In addition, an individual ruffed grouse was heard in the Project area during a survey conducted by PPL Montana and the Forest Service in May 2004 (http://www.mysticlakeproject.com/pdfs/May%2018_19%202004%20summary.pdf). The

species may occur in aspen communities and adjacent conifer stands throughout the West Rosebud Creek drainage.

Project activities and facilities do not affect forage availability or habitat conditions for ruffed grouse. Re-licensing of the Project will have no effect on ruffed grouse or to the species habitat.

2.3.6 Northern Goshawk (*Habitat Indicator*)

See narrative under sensitive species, section 2.2.1.

Section 3 - Compliance with National Forest Plan

Custer National Forest management standards for wildlife and fish within Management Area F (includes all of the developed recreation sites on the Forest) encourage ‘management activities that contribute to the opportunity of wildlife and fish related recreation...’ (Custer National Forest Management Plan 1986). The Project area provides opportunity for wildlife and fish related recreation via the Mystic Lake Trail and campground facilities at Emerald Lake and Pine Grove Campground. The road to the Project provides easy access for a myriad of recreational activities such as hiking, camping, boating, fishing, hunting, kayaking, etc. These opportunities are encouraged by the presence of the Project and are in compliance with the Custer National Forest Management Plan (1986).

Section 4 - Conservation Measures

4.1 Harlequin duck

The main threats to harlequin duck productivity and breeding habitat include destruction to riparian habitat, watershed stability, and hydrologic regime from activities such as mining, roads, timber harvest, water diversions or impoundments, shoreline development, or recreational activity in breeding areas (NatureServe 2005).

Harlequin ducks have been reported in various drainages on the Beartooth Ranger District, and potential habitat is available in West Rosebud Creek drainage for the Harlequin duck. In 2005, Beartooth Ranger District received anecdotal information (unconfirmed) that harlequin ducks were present at Emerald Lake (within the Project area) and on Reeves Lake (privately owned). These sightings in the Project area have not been confirmed.

The Project area is not recognized as a primary breeding area for Harlequin ducks, however, there is potential that the species may be present in the area and breed along West Rosebud Creek. Future Project operations are not expected to adversely impact riparian habitat (potential nesting areas) adjacent to West Rosebud Creek.

Human disturbance related to recreation at Project and non-Project facilities in the summer increases downstream of the powerhouse during brooding time (July –September) due to the presence of recreational fishing opportunities along the stream and lakes, Emerald and Pine Grove campgrounds, and whitewater kayaking downstream of West Rosebud Lake. In contrast, human interactions and potential disturbance during this time is limited in the bypass reach.

In collaboration with the Forest Service, PPL Montana has agreed to conduct surveys to determine presence/non-detection of Harlequin ducks along West Rosebud Creek from the Forest boundary upstream to the powerhouse. If present, PPL Montana will continue to monitor and assess disturbance effects of recreation on Harlequin ducks. This conservation measure is presented in Section 8, Appendix A, of this document.

Section 5 - Conclusion

The determination of effects was no impact for all Forest Service sensitive species and management indicator species presented in tables 2.2-1, 2.2-2, and 2.3-1. However, there was one conservation measure developed by PPL Montana in collaboration with the Forest Service to assess the presence/non-detection of the Harlequin duck (see Appendix A in Section 8). At this time, there is no verified documentation of the species presence in the Project area. However, based on anecdotal information, the species was identified in the area in the summer of 2005. PPL Montana has agreed to conduct a monitoring program to determine the presence/non-detection of the species and potential Project impacts if the presence of the species is verified.

Section 6 - Acronyms

Acronym	Name
A-B	Absaroka-Beartooth Wilderness
ADA	Americans with Disabilities Act
AEI	American Enterprises, Inc.
AGB	Allen Grade Bridge
amsl	above mean seal level
APE	Area of Potential Effect
BA	Biological Assessment
BLM	Bureau of Land Management
BMU	Bear Management Units
BO	Biological Opinion
BZ	Backshore Zone
°C	degrees Celsius
CaCO ₃	Calcium Carbonate
CCC	Civilian Conservation Corps
CEII	Critical Energy Infrastructure Information
cfs	cubic feet per second
CNF	Custer National Forest
CNFP	Custer National Forest Management Plan
Commission	Federal Energy Regulatory Commission
COY	cub-of-the-year
CPUE	catch-per-unit-effort
CRM	Cultural Resource Management
CRSP	Cultural Resource Study Plan
DNA	deoxyribonucleic acid
DOI	Department of Interior
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERG	Ecosystem Research Group
ESA	Endangered Species Act
EST	Eastern Shoshone Tribe
°F	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FLA	Final Licensing Application

Acronym	Name
FOIA	Freedom of Information Act
FPA	Federal Power Act
ft	feet
FWP	Fish, Wildlife, and Parks
FWS	Fish and Wildlife Service
FZ	Fluctuation Zone
g	grams
GIS	Geographic Information System
GPOR	Generation point of receipt
GYA	Greater Yellowstone Area
ha	hectares
H-A&E	Historic Architectural and Engineering Properties
HADU	Harlequin duck
HAP	Historic Archaeological Properties
HPMP	Historic Properties Management Plan
HUC	Hydrological Unit Code
ILP	Integrated Licensing Process
lbs	pounds
km	kilometer
kVA	kilovolt-amperes
kW	kilowatt
kWh	kilowatt hour
M	meters
m ³	cubic meters
MDEQ	Montana Department of Environmental Quality
MDOL	Montana Department of Livestock
MEPA	Montana Environmental Policy Act
MFWP	Montana Department of Fish, Wildlife and Parks
mg/L	milligrams per liter (mg/L = ppm, parts per million)
mm	millimeters
MDNRC	Montana Department of Natural Resources and Conservation
MOU	Memorandum of Understanding
MPC	Montana Power Company
MSHPO	Montana State Historic Preservation Officer
MW	megawatt
N	Nitrogen
NEPA	National Environmental Protection Act
NGO	Non-governmental organization
NIP	Non-Internet Public

Acronym	Name
NO ₂	Nitrite
NO ₃	Nitrate
NOI	Notification of Intent
NPS	National Park Service
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Units
OHV	Off Highway Vehicles
P	Phosphorus
PAD	Pre-Application Document
PAP	Prehistoric Archaeological Properties
PCB	Polychlorinated Byphenyl
PCR	Polymerase chain reaction
PFC	Proper Functioning Condition
PGC	Pine Grove Campground
pH	pH = - log [H ⁺]
PINE	Paired interspersed nuclear deoxyribonucleic acid elements
PM&E	Protections, Mitigation, and Enhancement
POF	Plant Operating Facilities
RIK	Replacements-In-Kind
RG	Resource Group
RLUA	Recreation, Land Use, and Aesthetics
rpm	revolutions per minute
RUSLE	Revised Universal Soil Loss Equation
SCADA	Supervisory Control and Data Acquisition
SCMP	Stillwater County Master Plan
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SD	Standard deviation
sfd	second foot day
SHPO	State Historic Preservation Officer
s.u.	standard units
TAC	Technical Advisory Committee
TCP	Traditional Cultural Properties
TDG	Total Dissolved Gases
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen

Acronym	Name
TU	Trout Unlimited
µmhos/cm	micromhos per centimeter, (1 µS/cm = 1 µmho/cm)
µS/cm	microSiemens per centimeter (Specific Conductivity)
USDI	United States Department of Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VQO	Visual Quality Objective
WMP	Weed Management Plan
WQC	Water Quality Certificate
WQS	Water Quality Standards
WRL	West Rosebud Lake
YNP	Yellowstone National Park

Section 7 - References

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Section 8 - Appendix A

8.1 Harlequin Duck Survey

Although adult Harlequin ducks are relatively tolerant to low levels of disturbance, areas chronically disturbed are often 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 conservation measure.

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	
