UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Upper Peninsula Power Company Project No. 10855-118 – Michigan

NOTICE OF AVAILABILITY OF ENVIRONMENTAL ASSESSMENT

(June 3, 2008)

In accordance with the National Environmental Policy Act of 1969, as amended, and the Federal Energy Regulatory Commission's (Commission) regulations (18 CFR Part 380), the Office of Energy Projects has prepared an environmental assessment (EA) regarding Upper Peninsula Power Company's request to rebuild the Silver Lake Development of the Dead River Hydroelectric Project (FERC No. 10855) located on the Dead River in Marquette County, Michigan. This EA concludes that the proposed reconstruction, with staff's recommended mitigation measures, would not constitute a major Federal action significantly affecting the quality of the human environment.

Copies of the EA are available for review in the Public Reference Room of the Commission's offices at 888 First Street, NE, Washington, DC. The EA also may be viewed on the Commission's Internet website (www.ferc.gov) using the "eLibrary" link. Enter the docket number (P-10855) in the docket number field to access the document. For assistance with eLibrary, contact ferconlinesupport@ferc.gov or call toll-free at (866) 208-3676, or for TTY contact (202) 502-8659.

For further information regarding this notice, please contact B. Peter Yarrington at (202) 502-6129 or by email at peter.yarrington@ferc.gov.

Kimberly D. Bose,
Secretary.

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ENVIRONMENTAL ASSESSMENT

REBUILDING THE DEAD RIVER PROJECT'S SILVER LAKE DEVELOPMENT

Dead River Hydroelectric Project
Project No. 10855
Michigan

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Administration and Compliance
888 First Street, N.E.
Washington, DC 20426

June 2008

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LIST OF ACRONYMS

APE	Area of Potential Effect
AVD	Archaeological Services, Inc.
BOC	Board of Consultants
BP	(years) before present
ºC	degrees Celsius
cfs	cubic feet per second
CEII	Critical Energy Infrastructure Information
Commission or FERC	Federal Energy Regulatory Commission
CY	cubic yard
D2SI	Division of Dam Safety and Inspections
dB	decibel
DO	dissolved oxygen
EA	environmental assessment
EFH	essential fish habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESCP	Erosion and Sedimentation Control Plan
°F	degrees Fahrenheit
FPA	Federal Power Act
Form 80 Report	FERC's Licensed Hydropower Development Recreation Report
FWS	U.S. Fish and Wildlife Service
GIS	geographic information system
IMA	Institute for Minnesota Archaeology
KBIC	Keweenaw Bay Indian Community
KME	King & MacGregor Environmental, Inc.
mg/L	milligrams per liter
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MDOT	Michigan Department of Transportation
NAAQS	national ambient air quality standards
NAVD	North American Vertical Datum
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NGVD	National Geodetic Vertical Datum
NRHP	National Register of Historic Places
PMF	probable maximum flood
SHPO	State Historic Preservation Officer
SPCC	Spill Prevention Control and Countermeasure Plan
TCP	Traditional Cultural Property
TDS	total dissolved solids

UPPCO or licensee	Upper Peninsula Power Company
USGS	U.S. Geological Survey
WQC	water quality certification

SUMMARY

The Dead River Hydroelectric Project (FERC No. 10855), located in the Upper Peninsula of Michigan, is a hydroelectric facility with an upper storage reservoir (Silver Lake Storage Reservoir) and two lower reservoirs, Hoist and McClure, both which have generating facilities. On May 14, 2003, an emergency fuse plug on Silver Lake Storage Reservoir activated during a high inflow period. The fuse plug was a design feature of the development to prevent overtopping of the Main Dam. However, after the fuse plug activation, the foundation below the plug eroded beyond its anticipated elevation, resulting in a breach which was approximately 335 feet wide and had an elevation of 1,453 feet (National Geodetic Vertical Datum [NGVD]) at its lowest point. As a result of this event, the storage reservoir is now a fraction of its original size and has not been able to supplement and regulate flows to downstream reservoirs and generation facilities.

On January 23, 2008, Upper Peninsula Power Company (UPPCO or licensee) filed design drawings and technical specifications, along with an Environmental Report (PRA, 2008) in support of its application to rebuild Silver Lake Development. The licensee's Proposed Action involves rebuilding Silver Lake Development by constructing a new dam (Dam No. 2) in place of the emergency fuse plug, and raising the height of the Main Dam and the series of smaller dikes that contain the reservoir. It would add a new spillway that would be lower and narrower than the existing spillway, and fill in the existing spillway, converting it into a section of the Main Dam. Finally, the licensee would also construct a new dike at a low area on the perimeter of the reservoir.[1] The rebuilt Silver Lake Development would meet Federal and State dam safety requirements for passing the Probably Maximum Flood at the site.

The surface area and storage volume of the reconstructed storage reservoir would be approximately the same as before the breach, at 1,464 acres and 33,513 acre-feet, respectively. The Proposed Action would not result in any physical or operational changes to the project below Silver Lake Development.

Once authorized, construction is expected to take approximately 6 months. In order to determine the impacts and identify any mitigation measures that may be necessary as a result of the proposed rebuilding of Silver Lake Development, Commission staff prepared this environmental assessment (EA).

The Proposed Action includes an additional drawdown of the storage reservoir for some construction, and pumping water from the reservoir to continue to meet the Dead

[1] Dams and dikes can be very similar structures. However, a dam generally retains water, while a dike is used to limit where water can go. In many cases, a dike does not have water against it until water levels reach a certain elevation.

River Project's minimum flow requirements during the first few weeks of the reconstruction. To minimize impacts to fisheries and aquatic resources, staff recommends that the licensee consult with the Michigan Department of Natural Resources (MDNR), Michigan Department of Environmental Quality (MDEQ) and the U.S. Fish and Wildlife Service (FWS), as appropriate, on plans to provide continuous minimum flows below the development when necessary, prevent fish entrainment during pumping, and provide fish salvaging during changes in water level elevations.

In order to avoid the development of poor water quality after post-construction refill, staff recommends that the licensee develop a post-construction reservoir refill plan, in consultation with the agencies, to be approved by the Commission's Division of Dam Safety and Inspections. This plan would involve slowly refilling the reservoir and also removing at least 50 percent of the existing vegetation. To enhance mussel recolonization after the refill, if determined to be necessary, staff recommends that the license develop a mussel restocking program with MDNR and FWS, if the agencies agree that restocking is necessary.

To help ensure that the Proposed Action would not result in any material adverse impacts on water quality, and to reduce any effects to wetlands, the licensee would comply with the conditions of the MDEQ's June 2, 2008 Section 401 Water Quality Certification permit.

Staff also recommends that the cultural sites within the construction zone and reservoir fluctuation zone be flagged to avoid impacts and a full National Register of Historic Places (NRHP) evaluation of these sites should be undertaken prior to construction activity. If any of the sites are determined to be eligible for the NRHP and impacts to these sites cannot be avoided, appropriate mitigation measures should be developed by the licensee in consultation with the Commission, the State Historic Preservation Officer, and the participating tribes. Following consultation, the licensee should file a revision of the 2004 Historic Properties Management Plan with the Commission for approval. These evaluations should be undertaken prior to construction near the flagged sites and refill of the reservoir.

Lastly, because the licensee's proposal to rebuild the Silver Lake Development under Part 12 includes minor changes to project features and the project boundary, the licensee would need to file, for Commission approval, As-Built Exhibits A, F, and G.

The rebuilding of Silver Lake Development would be conducted under Part 12 of the Commission's regulations and would enhance operation of the Dead River Hydroelectric Project. The proposed construction would occur in the same area as the existing Silver Lake Development, and would result in a similar reservoir surface area and volume of water to that which existed before the May 2003 fuse plug activation. The licensee indicates that once the development is rebuilt, the development would be operated in compliance with the project license.

Operation of the Silver Lake Storage Reservoir enhances the generation at downstream hydroelectric facilities, re-regulates Silver Lake Storage Reservoir for better runoff control, and provides a stable base flow for the reach between Silver Lake Development and Hoist Storage Reservoir. The licensee's proposed erosion control measures and implementation of best management practices, together with staff's recommended mitigation measures should reduce, to the extent possible, impacts associated with the construction activities.

Based on our independent analysis as described in this EA, we find that the proposed rebuilding of the Silver Lake Development of the Dead River Project, with the addition of staff's recommended measures, would not constitute a major federal action significantly affecting the quality of the human environment.

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ENVIRONMENTAL ASSESSMENT

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Administration and Compliance

Dead River Hydroelectric Project
FERC Project No. 10855
Michigan

1.0 APPLICATION

Application Type:	Proposal to rebuild the Silver Lake Development of the Dead River Hydroelectric Project
Date Filed:	January 23, 2008, supplemented March 20, 2008 and April 2, 2008.
Applicant's Name:	Upper Peninsula Power Company (UPPCO or licensee)
Water Body:	Dead River
County and State:	Marquette County, Michigan
Federal Lands:	The project does not occupy any federal lands

The Dead River Hydroelectric Project is located on the Dead River, in the Upper Peninsula of Michigan, and consists of three reservoirs (see Figure 1). The upper reservoir, Silver Lake Storage Reservoir, does not have any power-generating facilities. The lower reservoirs, Hoist and McClure, have generating facilities. Silver Lake Storage Reservoir is approximately 2.7 miles long, with a permitted capacity of 33,513 acre-feet. Silver Lake Storage Reservoir is used to optimize generation at the project's downstream locations, maintain minimum flows, and provide environmental benefits in the area. There are two other reservoirs, Forestville and Tourist Park, downstream of the Dead River Project, which are part of the Commission-licensed Marquette Hydroelectric Project, FERC Project No. 2589[2]. After flowing through the Dead River and Marquette projects, the Dead River reaches Lake Superior, in Marquette, Michigan.

On May 14, 2003, an emergency fuse plug on Silver Lake Storage Reservoir activated, resulting in the release of a large quantity of water, rock, and sediment downstream, causing significant downstream flooding, erosion, scouring, and deposition of eroded sediments in downstream areas. Riparian areas, the river channel, and fisheries

[2] The city of Marquette is the licensee for the Marquette Hydroelectric Project.

were significantly affected. A River Recovery Project for areas below the development has been implemented, but project features will need to be rebuilt to allow reservoir refilling. The licensee proposes to rebuild Silver Lake Development, constructing a new dam (Dam No. 2) in place of the emergency fuse plug, constructing a new closure dike structure, raising the height of the Main Dam and a series of smaller dikes that contain the reservoir, adding a new spillway, and covering and raising the current service spillway to the height of the Main Dam, ending its function as a spillway. Construction initiation and completion are proposed for the summer 2008 construction season.

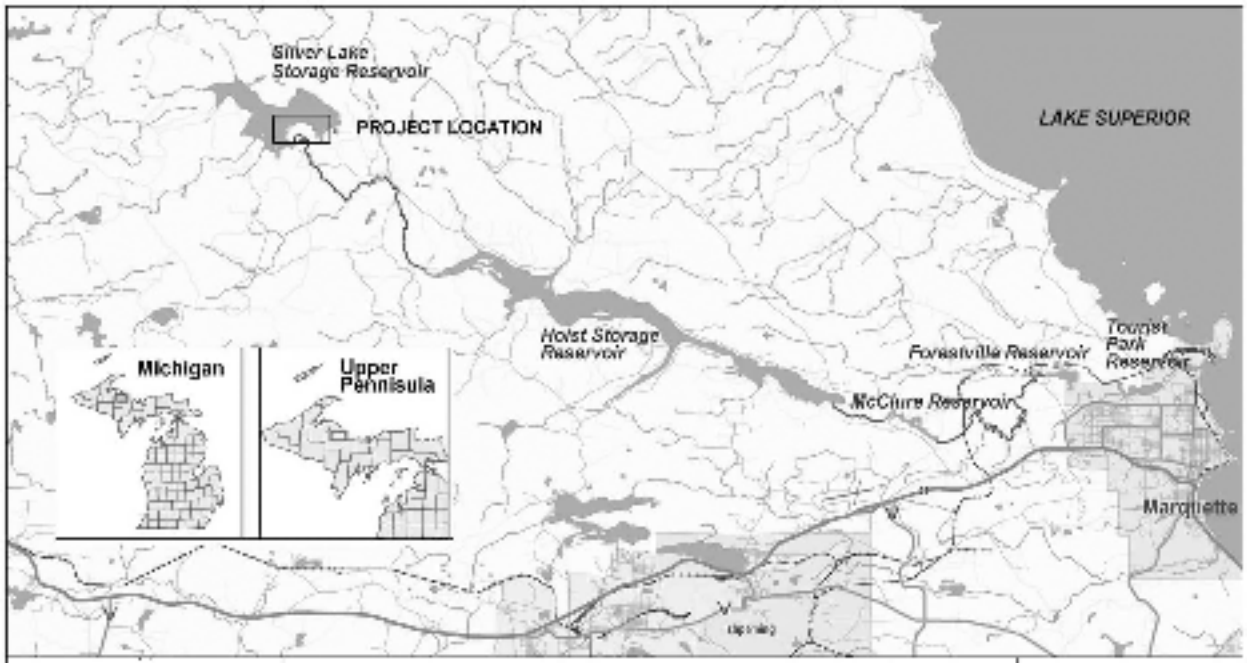

Figure 1. Project location. (Source: EPRO, 2007, as modified by staff)

The Commission, under authority of the Federal Power Act (FPA), licenses and oversees the operation of non-federal hydropower projects in the United States. As part of its oversight capacity, the Commission implements a Dam Safety Program, through its Division of Dam Safety and Inspections (D2SI), to ensure that Commission-licensed projects comply with Federal Dam Safety Standards and are designed, constructed, and operated safely. Under 18 CFR Part 12, the D2SI or the Regional Engineer has the authority to, among other things, require a licensee to take action to repair or modify project works for the purpose of achieving or protecting the safety, stability and integrity of project works. The current project is proposed to be completed under the 18 CFR Part 12 Regulations.

2.0 PURPOSE AND NEED FOR POWER

2.1 PURPOSE OF ACTION

On January 23, 2008, UPPCO filed an Environmental Report in support of its application to rebuild Silver Lake Development. On February 12, 2008, the Commission issued a public notice, soliciting comments, motions to intervene, and protests, on its intent to prepare an environmental document for the rebuilding of Silver Lake Development.

In order to determine impacts and identify any environmental measures that may be necessary as a result of the proposed rebuilding of the development, Commission staff prepared this environmental assessment (EA), which describes and evaluates the probable effects, including an assessment of the site-specific and cumulative effects, if any, of the Proposed Action and a No-Action Alternative.

The focus of this document is to examine the impacts associated specifically with the licensee's proposal for rebuilding the Silver Lake Development and refilling the Silver Lake Reservoir. Important issues addressed in this EA include erosion, water resources and fisheries, terrestrial resources, cultural resources, recreation resources, and aesthetic resources. Comments in response to the February 12, 2008 public notice were considered in the preparation of this EA.

2.2 NEED FOR POWER

The proposed reconstruction of the Silver Lake Development would restore the full hydropower generation capability of the Dead River Project. In addition, the modifications would have a positive effect on generation at the project, and downstream at the Marquette Hydroelectric Project (FERC Project No. 2589).

3.0 PROPOSED ACTION AND ALTERNATIVES

3.1 PROJECT DESCRIPTION

The original dam (Main Dam) at Silver Lake Storage Reservoir was built around 1900 to raise the elevation of the existing lake. The Main Dam has been raised and extended several times since its initial construction. Additional dikes around the rim of the reservoir were required as the crest elevation of the Main Dam was increased. In 2002, UPPCO completed upgrades to allow the Silver Lake Development to safely pass the probable maximum flood (PMF). These upgrades included installing the emergency fuse plug and raising the Main Dam and existing dikes to their current elevation of 1,490.84 feet National Geodetic Vertical Datum (NGVD) (1,491 feet [North American

Vertical Datum {NAVD}]).[3] The original 100-foot concrete ogee service spillway with a crest elevation ranging from elevation 1,486.04 to 1,479.84 feet NGVD (1,486.2 to 1,480.0 feet NAVD), depending upon the number of stop logs installed in the spillway, remained in place.

The emergency fuse plug was installed in place of the existing Dike No. 2. A fuse plug is essentially an erodible earthen section designed to be activated at a given reservoir level and then function as an emergency spillway. During a May 14, 2003 storm event, the reservoir level rose and the fuse plug activated. The fuse plug operated as the active spillway because of the elevation of its pilot channels. The fuse plug eroded as designed. However, erosion continued 12 to 24 feet into the foundation, past the anticipated stop point at elevation 1,481 feet NGVD. This, combined with the high erodibility of the foundation soils, led to progressive headcutting back toward the fuse plug drainage channel. Accelerated erosion combined with progressive headcutting caused the fuse plug to completely breach followed by severe downstream erosion.

The elevation of Silver Lake Storage Reservoir has now stabilized at approximately 25 feet below its pre-breach level. The reservoir has been reduced in area by more than 1,000 acres, which resulted in a significant loss of aquatic, riparian, and wetland habitats. Grasses and other upland vegetation have become established down to the post-breach waterline.

3.2 PROPOSED ACTION

The licensee's Proposed Action involves the remediation of the fuse plug breach area at the Dead River Project's Silver Lake Development with the construction of a new dam and spillway, as well as making repairs and improvements to other areas of the development to enhance long-term dam safety and project operation (see Figure 2). After reconstruction, the licensee proposes to operate the Silver Lake Development in compliance with the October 4, 2002 project license, and the project's February 24, 1999 Water Quality Certificate. All the environmental protection measures required by the project license would remain in effect.

[3] In the Proposed Action and in the project license, two vertical surveying datum systems are used. The license and other documentation were written using the National Geodetic Vertical Datum of 1929 (NGVD-29). The licensee's rebuild design documents are drawn using the most recent surveying standard, the North American Vertical Datum of 1988 (NAVD-88). References in the text to elevation are provided in both NGVD-29 and NAVD-88 datum. NAVD-88 elevations are numerically 0.16 feet higher than NGVD-29 elevations.

3.2.1 General Description of Construction

The existing structures at the Silver Lake Development include the Main Dam and dikes No. 1, 3, and 4. The development's Dike No. 2 was the site of the fuse plug that was activated in the breach episode, and would be rebuilt as Dam No. 2. A new dike, Dike No. 5, would also be constructed to address a low spot in the far northeastern corner of the site. Because of higher crest elevations required to meet the PMF, existing structures would need to be raised and extended. A new concrete spillway would also be constructed and the old one converted to an earth embankment provides a general layout of the proposed construction. See Figure 3 regarding the primary areas that would be involved in the proposed construction.

Main Dam and Spillway

The current Main Dam elevation is at elevation 1,490.84 feet NGVD (1,491 feet NAVD). The embankment would be raised by one foot to meet safety requirements relative to the PMF. While this is still undergoing final design, it is currently envisioned that compacted earth fill would be used along only the crest to raise the dam elevation without requiring fill over the upstream or downstream faces. An additional freeboard height of 2.5 feet across the existing portion of the Main Dam only would be provided by either concrete jersey barriers or by a rock wall sloping up from the upstream face where riprap currently exists.

The dam would be extended at both ends to meet grade at elevation 1,493.84 feet NGVD (1,494 feet NAVD). These sections of the dam would be composed entirely of earth fill. A new concrete spillway would be constructed to better accommodate the potential flows resulting from a PMF. Excavation to the shallow bedrock would be performed in the location of the new spillway. An uncontrolled concrete ogee spillway section would be founded on this rock aligned with the crest of the dam. Additional excavation to rock below the downstream face of the dam would also be needed to form the discharge channel and allow for construction of concrete training walls on either side. The new spillway channel would be constructed to meet with and become coincident with the river channel from the low-level outlet.

The existing service spillway at the Main Dam would have its stop log sections filled with concrete and the entire structure, with the exception of the metal walkway, would be converted to an earth embankment to tie in with the dam. A small amount of selective demolition would be required to remove the walkway. The new proposed spillway would be 150 feet in length and have a crest elevation of 1,485.04 feet NGVD (1,485.2 feet NAVD), compared to the existing spillway, which is 100 feet long with a crest elevation of 1,486.14 feet NGVD (1,486.3 feet NAVD). The proposed spillway configuration would allow the spillway to safely pass the PMF event with at least 2 feet of freeboard on the other dikes and dams that impound the reservoir.

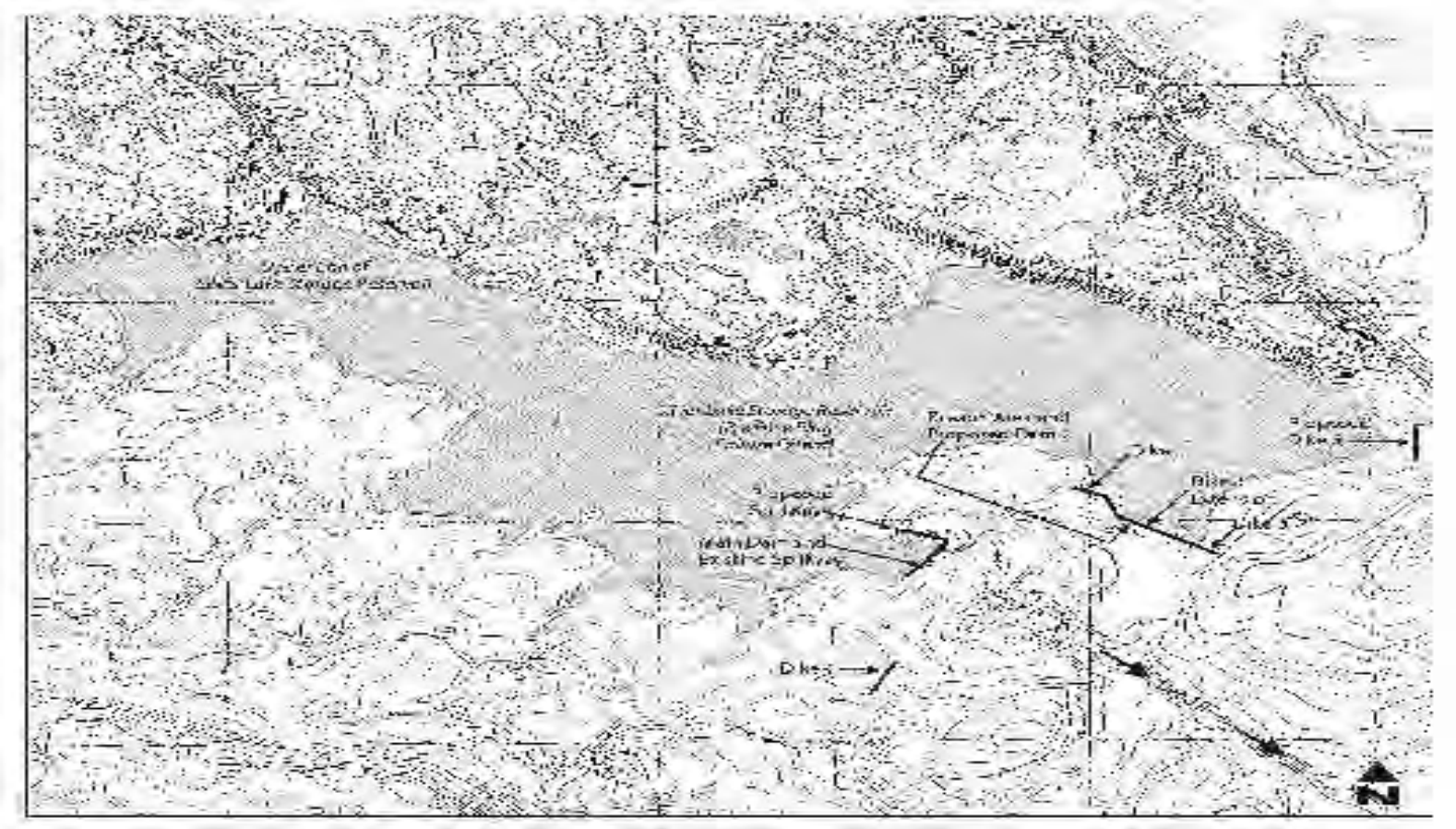

Figure 2. Approximate locations of the dams, spillways, and dikes at the Silver Lake Development. (Source: Libremap, 2008; UPPCO, 2008, as modified by staff)

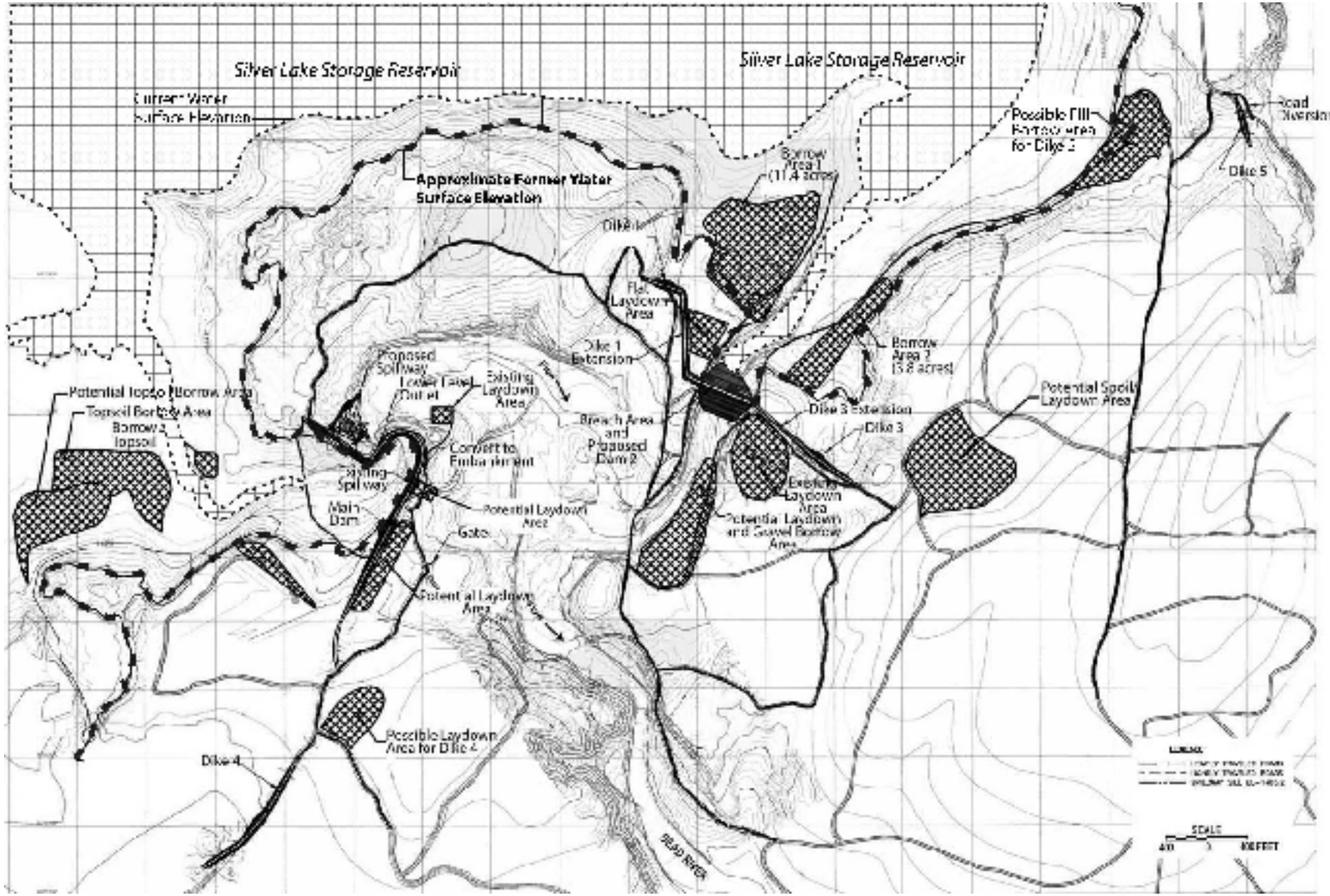

Figure 3. Proposed construction—Dead River Hydroelectric Project. (Source: UPPCO, 2008)

Breach Area/Dam No. 2

The proposed Dam No. 2 would replace the eroded fuse plug and Dike No. 2 in the breach area. Because of the erosion of the foundation soils, the current elevation in the breach channel is at elevation 1,454.84 feet NGVD (1,455 feet NAVD), resulting in the maximum section for Dam No. 2 of about 40 feet. The upstream face of Dam No. 2 would be sloped at 5 horizontal to 1 vertical (5H to 1 V) and the downstream slope would be at 4H to 1V. Dam No. 2 would be placed and compacted in one foot lifts. Upon completion, protective riprap would be placed in the upstream face. The downstream face would be mulched and seeded to prevent erosion, which is beneficial from both dam safety and environmental perspectives. Piezometers would be included on the downstream face and abutments to measure the phreatic surface and confirm assumed design parameters. A vertical sand chimney filter/drain attached to a horizontal filter/drain blanket extending to the toe of the dam would provide seepage control and prevent piping within the dam. A drainage swale along the downstream toe of the dam would divert surface water from the dam.

Dike No. 1

Dike No. 1 is an existing dike to the northwest of the breach area. To meet PMF requirements, it would be raised approximately three feet with compacted fill to the required elevation of 1,493.84 feet NGVD (1,494 feet NAVD) and extended in both directions. The west extension of the dike would tie into grade at elevation 1,493.84 feet NGVD (1,494 feet NAVD), while the east extension would meet Dam No. 2. This is a long extension of 754 feet, but requires little clearing as much of that space has been previously used as a laydown area for previous work and/or an access road from the Main Dam to Dike No. 2.

The extensions would be four to six feet high throughout their entire length. Long-term erosion protection and bank stability would be achieved by establishing stable vegetation. Approximately 4 to 6 inches of top soil would be placed over all disturbed faces and the surface seeded with a durable native grass mix. Some riprap may be placed on the upstream face. The extent of riprap would depend on the fetch distance. Other than the riprap placement on the upstream face, all construction activities (additions to the downstream face to stabilize the increased height of the dike) would occur on the downstream face of the existing dike outside of the wetland areas.

Dike No. 3

Dike No. 3 is an existing dike to the southeast of Dam No. 2. Similarly to the work to be done in Dike No. 1, it would be raised approximately 3 feet with compacted fill to the required elevation of 1,493.84 feet NGVD (1,494 feet NAVD) and extended a

combined total of 471 feet in both directions to meet PMF requirements. The extension on the east side of the dike would meet grade at an elevation of 1,493.84 feet NGVD (1,494 feet NAVD), while the west extension would meet dam no 2. There is relatively little clearing that needs to be done for the longer west extension. As in the case of Dike No. 1, the extensions would be 4 to 6 feet high. The series of Dike No. 1, Dam No. 2, and Dike No. 3 would provide a uniform crest at an elevation of 1,493.84 feet NGVD (1,494 feet NAVD) for a distance of over 2,000 feet. Long-term erosion protection and bank stability would be achieved by establishing stable vegetation. Approximately 4 to 6 inches of top soil would be placed over all disturbed faces and the surface seeded with a durable native grass mix. Some riprap maybe placed on the on the upstream face if required for protection from wave action. Other than the riprap placement on the upstream face, all construction activities (additions to the downstream face to stabilize the increased height of the dike) would occur on the downstream face of the existing dike outside of the wetland areas.

Dike No. 4

Dike No. 4 is an existing dike in the southwest corner of the site. It would be raised three feet to elevation 1,493.84 feet NGVD (1,494 feet NAVD) and extended in both directions. No riprap is needed because of the extremely short fetch. A small amount of wetlands (less than 0.1 acre) surround Dike No. 4 and would be impacted by additions to the downstream face to stabilize the increased height of the dike. Long-term erosion protection and bank stability would be achieved by establishing stable vegetation. Approximately four to six inches of top soil would be placed over all disturbed faces and the surface seeded with a durable native grass mix.

Dike No. 5

Dike No. 5 would be a newly-constructed dike in the northeastern corner of the site. The dike would be 363-feet long and 6-feet high at its maximum section. The proposed location is currently a wooded area, approximately 400 feet from the shoreline of the reservoir. Dike No. 5 would be constructed of earth fill, placed and compacted in 1-foot lifts. No riprap would be necessary because the extensive tree cover surrounding the dike would dissipate wave energy. Construction of this dike would require clearing and grubbing of woods in an area of about 400-feet length by about 50 feet, i.e., maximum width of the dike, plus some construction working space, for a total width of perhaps 100 feet. Long-term erosion protection and bank stability would be achieved by establishing stable vegetation. Approximately 4 to 6 inches of top soil would be placed over all faces and the surface seeded with a durable native grass mix. Following construction, with the exception of the dike itself, which may need to have maintained vegetation, much of this disturbed area would be allowed to reforest naturally.

Dike No. 5 would be located in an area that is currently outside of the project boundary. UPPCO plans to purchase or obtain an easement for the land associated with the construction site, which is currently owned by Plum Creek Land Company. UPPCO plans to revise the current Exhibit G drawings after construction is completed to include this area within the project boundary.

3.2.2 Borrow Pits

Two major borrow pits would be utilized that cover a combined area of about 15 acres within the normal limits of the reservoir, about 350 feet north of the breach area. The silty-sand material needed for fill would be excavated from the pits to an average depth of about 10 feet, which is well above the groundwater table.

In addition to the two major central borrow areas, there are several potential smaller borrow areas being considered due to their proximity to the outlying sites (dikes nos. 4 and 5). A 2.1-acre potential borrow area for Dike No. 4 is located at the southern end of the Main Dam. A 5.8-acre potential borrow area is located along the shoreline near Dike No. 5. Both these sites would significantly reduce the haul distances (and the environmental impacts associated with truck traffic) otherwise required to bring this fill from the central borrow areas. These two borrow areas would need little to no clearing and grubbing.

With the exception of the borrow pit for Dike No. 4, the proposed borrow pit areas are all well within the lake limits and would become submerged upon restoration of the dam and recharge of the lake. Upon completion of construction, excavated borrow areas would be inspected for potentially permeable soil or sand lenses. These findings would be evaluated by a qualified engineer/geologist and appropriate stabilization measures would be implemented as necessary to cover them and prevent excessive seepage out of the reservoir into the foundation soils. Borrow pits that will be submerged would be aesthetically contoured to stabilize the side walls and would then be left to provide new aquatic habitat once the lake recharging was completed. The Dike No. 4 borrow area would be aesthetically contoured, all disturbed faces would be covered with about 6 inches of top soil, and the surface would be seeded with a durable native grass mix.

3.2.3 Sources of Topsoil and Gravel

After the completion of the dams and dikes, selected tops and faces would be covered with topsoil and seeded. An onsite source of topsoil is available associated with previously used areas within the reservoir near the Main Dam. A total of 48.6 acres is available for extracting topsoil. This area has also been used as the topsoil borrow area during environmental downstream channel recovery work. In addition, all topsoil removed from the other borrow areas and the spillway construction location would be

segregated and used to restore the disturbed areas. The topsoil borrow area would be aesthetically contoured and the surface would be seeded with a durable native grass mix.

Gravel would be obtained on site as needed for road work. Downstream (south) of the breach area there is a large quantity of small rock and gravel covering 5.8 acres suitable for this use.

3.2.4 Access Roads

Two roads would allow access to the vicinity of the site. The recommended road for site access is the unpaved extension of Country Road 573. Once at the site, several different routes can be taken to any site. The best roads, however, are those that have been used most recently by construction crews. These roads have been identified on the drawings. Most of the roads are currently wide enough, but one section coming off the end of Dike No. 3 and another coming off the end of the Main Dam need widening. Some localized surface work would be needed throughout the site on different sections of road to stabilize them and prepare them for construction traffic.

3.2.5 Proposed Resource Protection Measures

Minimum Flow during Construction

Currently at Silver Lake Development, water is flowing through the breach area and the low-level outlet. During early phases of construction, the flow through the breach area would be blocked by a construction dike and the water level within Silver Lake Storage Reservoir would be expected to rise to a level where flow from the low-level outlet is sufficient to meet the minimum flow requirement. However, the period of time between the construction of the dike and the higher water level is estimated as 3 to 4 weeks by the licensee. During that time, the licensee proposes to use a pump to insure that minimum flow requirements are met.

The licensee indicates that minor excavation, with sufficient grade to reduce down cutting of the excavated channel, might be required to facilitate the flow of water to and through the low-level outlet. To reduce sediment movement through the low-level outlet, the licensee proposes the use of stacked filter rolls placed in front of the low-level outlet prior to the construction of the dike in front of the breach.

Erosion and Sediment Control Plan

In its Environmental Report, the licensee provided a draft Erosion and Sedimentation Control Plan (ESCP) to control storm water runoff from earth disturbance activities associated with the rebuilding of Silver Lake Development. The purpose of the ESCP is to ensure the design of erosion and sediment control measures, their

implementation and management, and maintenance of best management practices under Michigan's National Pollutant Discharge Elimination System (NPDES) program for stormwater discharges associated with construction activities. The licensee proposes both engineering controls and administrative methods and procedures to contain, control, and prevent excessive sedimentation and erosion at the site during construction and after completion of the proposed work. Key points of the licensee's plan are provided below.

According to the plan, sediment would be controlled at all construction, borrow, and laydown area sites. The proposed primary control measure for sedimentation control at the various construction sites would be sediment traps, sized at either 20 feet by 40 feet or 30 feet by 60 feet. Diversion ditches lined with rock would guide sediment-carrying runoff to the traps, where the resulting reduced flow will allow the suspended sediment particles time to settle out. The traps would be monitored and cleaned out on a regular basis to maintain effective retention time. The licensee also proposes to control sedimentation and erosion by the use of silt fencing, silt socks, hay bales, and other appropriate barrier and capture control methods. At laydown areas, the proposed primary means of sedimentation control would be silt socks placed on down gradient areas to allow filtration of sediment-laden runoff through the mulch filled socks which are entirely biodegradable. The socks would be monitored to maintain effectiveness.

The licensee has not proposed a separate sedimentation control program for the borrow areas within the storage reservoir since it states that all runoff from these sites would lead back into Silver Lake Storage Reservoir. Proposed excavation methods include back sloping of the borrow pits and to limit disturbance to the extent possible. The licensee proposes a large sediment trap at the entrance to the low-level outlet to limit the likelihood of sediment from disturbed areas within the storage reservoir from reaching the downstream channel. Similar to the smaller sediment traps, the licensee plans to monitor and maintain this sediment trap to ensure its effectiveness.

Upon completion of construction activities, the licensee proposes that all disturbed areas which are not rock faced would be seeded with a native grass mix. Where needed, the licensee proposes to add topsoil to aid in the establishment of stable surface vegetation. Upland areas that were cleared of trees and brush for construction would be stabilized, graded, and contoured, as appropriate, to match the surrounding environment and then allowed to reforest naturally.

Spill Prevention Control and Countermeasures Plan

In its Environmental Report, the licensee provided a draft Spill Prevention Control and Countermeasures (SPCC) Plan to ensure that the proposed rebuilding project remains in compliance with all applicable laws, regulations, and project-specific permit requirements relative to prevention, control, and mitigation of possible oil discharges to navigable waters under the Clean Water Act. The purpose of the SPCC Plan is to

identify potential environmental impacts of the proposed construction activities; describe measures implemented to prevent occurrence and control oil discharges; and to respond in a safe, effective, and timely manner to mitigate the impacts of a discharge. A plan of this type is normally required at construction sites when amounts over a threshold of petroleum-based fuel are stored on site for heavy construction equipment. The licensee plans to confirm the need for a SPCC Plan after final construction plans are developed. The major components of the licensee's plan are described below.

The licensee states that the SPCC Plan would be used as (1) a reference for oil storage information and testing records, (2) a tool to communicate practices on preventing and responding to discharges with site personnel, (3) a guide on facility inspections, and (4) a resource during an emergency response. In addition, the licensee would revise the plan under any of the following conditions: design, operation, or maintenance of the control measures change; design of the construction project changes such that the effectiveness of the controls described in the plan would be significantly affected; inspections indicate deficiencies in the SPCC Plan or any control measure; the plan is determined to be ineffective in controlling discharge; or if the Michigan Department of Environmental Quality (MDEQ) requests or requires modifications.

Equipment that would be present at the project site include a number of excavators, dozers, hilifts, wheel loaders, pickups, pumps and generators. These contain a minimal amount of lubricating oil and coolant (less than 55 gallons). The licensee states that petroleum would be contained in mobile tanks set up close to the operating area of the equipment, and all oil storage tanks would meet the American Petroleum Institute tank construction standard. The licensee adds that lubricating oil and other substances, including various grades of motor oil, gear oil, hydraulic oil, coolant, and grease, would also be stored at the facility, but in quantities below the 55-gallon threshold for SPCC Plan applicability.

Transfer of fuel oil from the storage tanks to the equipment would be accomplished according to established procedures. An operator would be present at all times. The storage tanks and fueling area would sit on an impervious surface constructed of textured geomembrane. The fueling area would be a depression sufficient to capture leaks and spills from the fueling operation and all discharges noticed by on-site personnel would be reported to the construction supervisor. The supervisor would then notify the construction manager, who would be responsible for ensuring that all required discharge notifications have been made to the appropriate authorities. Discharges typically would be discovered during normal operations or during inspections conducted at the site. Absorbent materials including rags, socks, mats, and oil dry (or similar material) would be kept available on-site for minor spills and used to limit the spread of a spill. One or more covered 55 gallon drums marked "impacted soil" would be kept adjacent to the lubricant storage box. The impacted material, such as oil dry, would then be transferred to the 55 gallon drum(s). A separate 55 gallon drum would be maintained for discarding

rags, socks, and other similar material. When the drums are full, they would be disposed of properly at an approved landfill. If the quantity of impacted material is greater than the capacity of a drum, it would be stockpiled and covered with plastic until a manifest has been generated and the material can be removed by a licensed hauler.

The licensee states that the rebuilding project would be configured to minimize the likelihood of a discharge reaching navigable waters with the following measures provided:

- Oil storage tanks would either be double-walled or provided with separate secondary containment.

- All equipment used for work on the site would be inspected for leaks prior to mobilization. Operators would be immediately required to report any deficiencies with equipment to the on-site supervisor to minimize damage to the equipment or to the environment.

- Large equipment, such as large dozers and articulated dump trucks, are equipped with systems to minimize the potential for spills and leaks. Equipment maintenance would be performed using drip/transfer pans to prevent inadvertent spills.

- No open containers of new or used petroleum/chemical materials would be left unprotected. Empty containers would be kept in a covered trash receptacle. Hydraulic, gear, and engine oil and antifreeze would be stored inside drop boxes. Each item would either be stored in its original manufactured container or in 55 gallon drums resting on plastic containment devices.

- Sorbents, shovels, and other discharge response materials are currently stored in a shed located in close proximity to the loading area. This material would be sufficient to contain small discharges (up to approximately 200 gallons).

- The storage tanks and fuel transfer area would be set up on an impervious pad. The storage tanks are double-walled to provide integral secondary containment.

Stranded Fish Recovery

The licensee states that it plans to develop and implement a process for the recovery and return of stranded fish to the active river channel below the dam.

Protection of Wetlands

The licensee states that the construction of the new spillway and other improvements would require the elimination of a small area, estimated at less than a third

of an acre, of existing wetlands. Additionally, a wetland area of less than 0.7 acre in the location of a proposed borrow area may also be lost. The licensee states that it plans to consult with MDEQ regarding the appropriate form and amount of compensatory mitigation that may be required, if any, for construction activities that result in the loss of these wetland resources.

Depending on the extent of impact, the quality of wetlands impacted, and other considerations, the licensee states that some type of mitigation or offsets may be required. Potential mitigation measures, if required, could include new wetland establishment, restoration, enhancement, and permanent legal protection/perpetual maintenance. However, the licensee does not believe that active wetland mitigation (i.e., creation of new wetlands) would be necessary in this instance because the area of anticipated impact would be minor, the quality of the impacted wetland areas would be marginal, and completion of the proposed rebuild option would be expected to result in the gain and/or restoration of significant wetland and aquatic resources that were degraded and/or lost as a result of the May 2003 activation of the fuse plug.

The licensee states that one objective of the proposed construction of the Silver Lake Development is to restore the lost aquatic and wetlands habitat at Silver Lake Storage Reservoir and fulfill the intent of U.S. Army Corps of Engineers wetland mitigation requirements. Restoration of pre-breach water levels at Silver Lake Reservoir, according to the licensee, would improve wetlands and wildlife habitat, especially for indigenous fish-eating birds such as the bald eagle, osprey, and loon. In addition, restoration would return full capability for releasing minimum flows, and improve flood control.

To protect the wetlands from disturbance during construction, the licensee has conducted a field survey and delineation of the wetlands during the design phase of this project. The licensee states that no disturbance for these wetlands areas would occur other than what is shown on the construction plans.

Protection of Cultural and Historical Resources

The licensee states that all previously documented archaeological sites have been flagged, including a 5-meter buffer zone, and would be avoided during the proposed construction activities. The licensee also has verbally agreed to evaluate seven newly discovered sites within the reservoir fluctuation zone. The licensee plans to develop and implement a procedure to address any unanticipated archaeological materials that may be discovered during construction.

Operations Monitoring Plan

The licensee states that it plans to use the Operations Monitoring Plans (article 405 of the current license) as a method to analyze the ability of the project over a three-year period to meet the license requirements of minimum flows and water levels.

3.2.6 Construction Schedule

Because the design phase is still in progress, only rough milestone dates for construction have been set. All work is currently scheduled to be completed in one construction season. For this area of the country, this is approximately six months from June through November. Weather-related road restrictions at the site are usually in effect until the middle or end of May, and snowfall can start as early as October, prohibiting construction by December.

3.3 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the reservoir would not be refilled. Silver Lake Storage Reservoir would continue to act as a much smaller, basically run-of-river reservoir as it has since May 14, 2003. While the No-Action Alternative would result in no adverse environmental impacts that would be associated with the reconstruction of the reservoir, it would essentially decommission the Silver Lake Storage Reservoir portion of the Dead River Project, and the downstream hydroelectric facilities (Hoist, McClure, Forestville, and Tourist Park) would lose a portion of their generation capacity. The Hoist Reservoir would remain at a lower level than prior to the breach of Silver Lake Development, to accommodate possible high inflows from the upper Dead River drainage basin that would have been retained by the Silver Lake Reservoir. The region's energy demand would need to be supplied by an alternative source, possibly fossil fuels, rather than the additional power formerly produced at the downstream hydroelectric projects. Additionally, without a fully functioning Silver Lake Storage Reservoir, the local community would be negatively impacted as a result of the loss of lake-related recreational opportunities.

3.4 STAFF PREFERRED ALTERNATIVE

Staff's Preferred Alternative for rebuilding Silver Lake Development includes environmental protection measures proposed in UPPCO's Environmental Report and supplemental filings, with the following refinements and additional measures.

- Compliance with Water Quality Certification. Staff's Preferred Alternative assumes that the licensee would comply with the conditions of the MDEQ's Section 401 Water Quality Certification (WQC) permit, dated June 2, 2008, to

help ensure that the Proposed Action would have no material adverse impacts on water quality.

- Fish Entrainment Prevention Plan. In order to reduce impacts to fisheries, we recommend that the licensee develop, file and implement a plan to minimize fish mortality from pump entrainment when water is pumped from the reservoir to help maintain downstream minimum flows, and when water may be pumped for any other reasons associated with the rebuilding of Silver Lake Development. The plan should address, but not be limited to, using relatively low pumping rates, and the use of screens with openings no larger than 3/32 inch at the pump intake hose(s), or both, to protect against fish entrainment. The licensee should consult with the Michigan Department of Natural Resources (MDNR) and the FWS regarding the plan, and include in the plan copies of comments from the resource agencies with indications of how the plan accommodates the comments. The plan should be filed with the Commission prior to commencing any water pumping activities associated with the rebuilding of Silver Lake Development.

- Fish Salvage Plan. In order to reduce impacts to fisheries, we recommend that the licensee develop, file and implement a plan for salvaging any fish that may be stranded during construction activities. The plan should detail the area to be included in fish salvage activities, how fish to be salvaged would be located, captured, and handled, and where fish would be released to the water. The plan should explain any species-specific aspects of the plan, such as culling, and include evidence that it meets MDNR fisheries management objectives. The licensee should consult with the MDNR and the FWS regarding the plan, and include in the plan copies of comments from the resource agencies with indications of how the plan accommodates the comments. The plan should be filed with the Commission prior to commencing any activities that would affect water levels.

- Vegetation Removal and Reservoir Refill Plan. To help ensure protection of water quality, we recommend that the licensee develop, file and implement a plan for post-construction vegetation removal and for reservoir refilling to ensure stability of the rebuilt facilities, avoid the development of poor water quality, and ensure the release of minimum flows during the refilling period. Specifically, the plan should include details and a schedule for removal, prior to refilling, of at least 50 percent of vegetation that would be inundated, in order to prevent levels of decay that could affect water quality. The plan should also include a specified refilling rate to be used following construction to ensure dam safety and protection of natural resources. The plan should specify how the minimum flows required by license article 403 would be met during the refill period to protect downstream aquatic resources, and what measures would

be taken to limit sediment suspension in the reservoir and also its passage downstream. Finally, the plan should address mercury methylization. The plan should be developed in consultation with the Commission's D2SI and the (Michigan Department of Natural Resources (MDNR), MDEQ, and U.S. Fish and Wildlife Service (FWS). It should then be filed, for approval, with the Commission's D2SI at least 60 days prior to the commencement of refilling.

- Mussel Restocking Plan. To assist the recolonization of mussels in the project area, we recommend that the licensee consult with MDNR regarding the need for a mussel restocking program. The utilization of such a program would be a management decision made by MDNR. If the MDNR determines a need for mussel restocking, the licensee, in close consultation with the MDNR, should produce a mussel restocking plan, to be conducted at times and locations designated by the MDNR, but within one year of completion of refilling of Silver Lake Reservoir. A copy of the plan should be filed with the Commission prior to the refilling of Silver Lake Reservoir, and include evidence of approval by the MDNR.

- Revegetation Plan. To aid in the revegetation of disturbed areas following construction and to help prevent potential erosion and runoff, we recommend that the licensee develop, file and implement a plan for revegetating and reforesting disturbed areas, and for monitoring the areas for success. The plan should address, but not be limited to, adequate preparation of areas post-construction to ensure proper soil conditions, any need remove hardfill material, and any need for soil replenishment. The plan should also address determination of the proper species, seed mixture, and soil conditions for revegetation, and the proper size, age, and ratio of species for reforestation in suitable areas outside of the reservoir that have been cleared, and are proposed to be cleared, such as laydown areas, staging areas, areas around the perimeter of the dam and dikes, parking areas, and access roads. The plan should be developed in consultation with the MDNR, FWS, and any entities identified by these agencies as having pertinent expertise. The licensee should include in the plan copies of comments from the agencies with indications of how the plan accommodates the comments. The plan should be filed with the Commission prior to the refilling of Silver Lake Reservoir.

- Nuisance Plant Control Plan. Ground disturbance associated with the Proposed Action could create sites where invasive weeds, such as purple loosestrife, could establish. We therefore recommend that the licensee consult with the MDNR and FWS regarding any temporary measures that should be added to the project's Nuisance Plant Control Plan as approved under license article 412, or the use of other temporary measures to address the Proposed Action, as appropriate.

- Cultural Site Protection. Prior to starting construction near the fifteen undocumented cultural sites within the construction zone and reservoir fluctuation zone, the sites should be flagged to avoid impacts and a full National Register of Historic Places evaluation should be undertaken. Should any of the sites be determined to be eligible for the National Register of Historic Places, appropriate mitigation measures should be developed by the licensee in consultation with the Commission, the State Historic Preservation Officer (SHPO), and the participating tribes. Following consultation, the licensee should file a revision of the 2004 Historic Properties Management Plan with the Commission for approval. These results of these evaluations should be approved by the SHPO and the Commission prior to construction near the flagged sites and refill of the storage reservoir.

- Filing of As-Built Exhibits. The licensee's Proposed Action involves changes to project features, and a change to the project boundary. Approval of the Proposed Action would therefore make it necessary for the licensee to file, within 90 days of completion of the proposed work, for Commission approval, As-Built Exhibits A, F, and G.

3.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

In arriving at the decision to reconstruct the project as proposed, other than leaving Silver Lake Development in its current state, three other general alternatives were initially considered.

- Dam and Fuse Plug Repair: This option consisted of the rebuild of Silver Lake Development to the original design criteria with repair of the fuse plug restored to the original crest elevation and operation according to the current license. This option did not adequately pass the PMF and retained technical variables and difficulties observed with the operation of the prior fuse plug. Therefore, it was eliminated from further consideration.

- Rebuild with Lower Spillway: This scenario considered the rebuild of Silver Lake Development with a spillway crest lowered to El. 1,479, approximately 7 feet below the current spillway elevation at the location of the current service spillway. In addition, the fuse plug area would be replaced with a new earthen dike. This option would have resulted in minimal rework of the dikes and dam elevations. However, the channel downstream of the service spillway was determined to have a limited hydraulic capacity for flows associated with the PMF and likely would require channel enlargement. In addition, this option would have resulted in a lower lake level elevation at Silver Lake Storage

Reservoir and reduced power production at the downstream hydroelectric facilities due to the smaller storage capacity at Silver Lake Storage Reservoir.

- Additional Spillway at Current Elevation: This option involved the construction of another spillway, located to the west of the low-level outlet. However, the required length of this spillway created a large area of disturbance in order to make it large enough to pass the PMF with the required freeboard at the Main Dam and the numerous surrounding dikes.

4.0 CONSULTATION AND COMPLIANCE

On January 18, 2008, UPPCO requested, under 18 CFR Part 12, authorization to rebuild Silver Lake Development, constructing a new Dam No. 2 in place of the emergency fuse plug, raising the height of the Main Dam and a series of smaller dikes and dams that contain the reservoir, adding a new spillway, and raising the level of the current service spillway to the height of the Main Dam, ending its function as a spillway. Given the extensive construction activities associated with the proposal, the Commission initiated review of the Proposed Action under the National Environmental Policy Act (NEPA). This section details the processes used to consult with the resources agencies and the public regarding the Proposed Action, and compliance with statutory requirements.

4.1 COMMENTS

On February 12, 2008, the Commission issued a public notice, soliciting comments, motions to intervene, and protests on its intent to prepare an environmental document for the rebuilding of the Silver Lake Development. The following entities filed comments and interventions in response to the public notice.

Entity	Date Filed
Michigan Department of Natural Resources	March 5, 2008
Michigan Department of Natural Resources (intervention)	March 12, 2008
Michigan Hydro Relicensing Coalition (intervention)[4]	March 12, 2008
Nancy and Al Warren	March 12, 2008
U.S. Department of the Interior, Fish and Wildlife Service	March 13, 2008
Steven Garske	March 13, 2008
Michigan Department of Environmental Quality	March 17, 2008
Keweenaw Bay Indian Community	April 11, 2008*
Michigan Department of Natural Resources	April 9, 2008
Michigan Department of Environmental Quality	May 5, 2008

*Letter dated February 25, 2008.

On March 20, 2008 and April 22, 2008, UPPCO filed supplements to its environmental report, primarily in response to the comments received during the public notice period. Several comments were then filed in response to the licensee's supplements. The licensee's supplements are summarized in Appendix A. Staff responses to the comments and interventions received, are also provided in Appendix A.

Comments and interventions received can be grouped into several categories:

- concern whether the project would be operated as licensed after the rebuilding of the Silver Lake Development;
- concern about the negative effects of possible additional drawdowns in the summer if UPPCO can not operate the project as licensed;
- corrections on the minimum flow values listed for Silver Lake Development in the Environmental Report;
- the desire to see Silver Lake Storage Reservoir and downstream areas in natural conditions, without a rebuilding of the dam; and

[4] The Michigan Hydro Relicensing Coalition comprises the following entities: the Anglers of the Au Sable, Inc., the Great Lakes Council, Inc. of the Federation of Fly Fishers, Inc., the Michigan Conservation Clubs, and the Michigan Council of Trout Unlimited.

- concern for the protection of archaeological sites.

All comments received were carefully considered in the development of this EA.

4.2 AGENCY CONSULTATION AND INTERVENTIONS

The licensee consulted with MDNR, MDEQ, and other agencies during the development of plans to rebuild Silver Lake Development. The licensee released its "Silver Lake Dam Rebuild Consultation" document on January 15, 2007, to 20 public, tribal, governmental, and private organizations. The licensee than held a pubic meeting on February 8, 2007. At that time, the licensee stated that amendments were necessary to allow the rebuild of the development as the least-cost option and because its hydrological modeling indicated that licensed minimum flows and water levels could not be met a majority of the time.

On October 25, 2007, UPPCO sent MDEQ and DNR a report by Paul C. Rizzo Associates entitled: Spillway Elevation Study, Silver Lake Reservoir Reconstruction Engineering, FERC Project No. 10855. It was at this point that the agencies voiced their disagreement with UPPCO's interpretation of the start-of-month target elevations required by the project license and the February 24, 1999 project WQC issued by the MDEQ. Both MDEQ and DNR noted that UPPCO has interpreted the start-of-month target elevations as minimum elevations, which could be exceeded by any amounts.

In response to the licensee's Environmental Report, MDEQ filed a letter on March 17, 2008, stating that it was not objecting to the rebuild of Silver Lake Development, but had concerns that the proposed operation of the storage reservoir does not appear to be in compliance with the project license or the February 24, 1999 WQC. In a letter dated April 9, 2008, the MDNR stated that UPPCO's plan to address operation of Silver Lake and Hoist storage reservoirs after the reconstruction through the 3-year monitoring requirement in the Operations Monitoring Plan, required by license article 405, was not sufficient, partly because the required plan is to address monitoring, and is not an adaptive management plan. MDNR also stated that information contained in UPPCO's Environmental Report and March 20, 2008 supplement does not clearly indicate that UPPCO could not normally operate Silver Lake Storage Reservoir in accordance with the current license. However, MDEQ wrote that it would be willing to attempt to resolve this issue through the negotiation of an operation plan to address, what UPPCO suggests, is a frequent occurrence of lack of natural inflow necessary to allow for operation consistent with the WQC and the license. The MDEQ indicated that, if the operational plan is not consistent, it would urge UPPCO to request a modification of the February 24, 1999 WQC.

Additionally, the Michigan Hydro Relicensing Coalition filed its motion to intervene because it notes that the proposed operation deviates from the current license to the extent that a license amendment and WQC would be required.

4.3 COMPLIANCE

4.3.1 Water Quality Certification/Section 404 Permit

The federal Clean Water Act gives authority to each state to issue a 401 Water Quality Certification Permit (WQC) for any project that needs a federal 404 Permit. Additionally, an applicant is required to obtain a WQC for any activity that may result in a discharge into navigable waters. The WQC is verification by the state that the project will not violate water quality standards.

In Michigan, the MDEQ is also responsible for administering the Section 404 permitting process of the Clean Water Act, and has regulatory authority over the onsite wetlands, due to their size (greater than 5 acres) and proximity (direct nexus) to a water body. As such, a permit must be obtained from MDEQ prior to conducting most filling, dredging, and/or draining activities, or maintaining a use of a regulated wetland. Section 404 requires that anyone interested in depositing or discharging dredged or fill material into waters of the United States, including wetlands, receive authorization for such activities.

As part of this combined WQC permitting process, MDEQ may require specific conditions to ensure that water quality is protected. If permitting is required by the MDEQ, the licensee is required to provide the Commission with a copy of the MDEQ permit for the proposed work, or a letter from MDEQ stating that permitting is not required.

The licensee's proposed reconstruction of Silver Lake Reservoir is to take place within the project floodplain and wetlands, and may result in fill material being deposited in waters or wetlands of the U.S. On February 11, 2008, the licensee applied for a WQC permit for the rebuilding of Silver Lake Development. The WQC was issued June 2, 2008, authorizing: (1) excavation of 93,460 cubic yards of unsuitable material, and removal of spoils to an upland site exclusive of wetland and floodplain area; (2) placement of approximately 132,538 cubic yards of clean fill and 4,477 cubic yards of rip-rap in wetlands to construct two dams and four dikes in accordance with plans dated October 2007; (3) installation of a 5-foot diameter temporary culvert for a temporary haul road crossing; and (4) placement of fish shelter structures per MDNR requirements.

The June 2, 2008 WQC contained a series of conditions, summarized below.

1. The permit does not waive any need for the licensee to acquire permits for soil erosion and sediment control from the County Enforcing Agent.

2. All dredge/excavated spoils and other removed material shall be placed on upland areas, stabilized with sod and/or seed and mulch to prevent erosion of any material into any water body, wetland, or floodplain.

3. The proposed temporary clear-span culvert shall use a fill slope to natural ground elevations within 10 feet of the structure. The fill used shall consist of clean rock or washed gravel, and the structure shall be removed upon completion of project activity or the expiration date of the permit, whichever is earlier.

4. The permit does not waive any jurisdiction of the U.S. Army Corps of Engineers, or the need for a permit, if required.

5. The permittee is responsible for acquiring all necessary easements or rights-of-way before commencing work, and all construction operations shall be confined to the rights-of-way limits or other acquired easements.

6. Rip-rap used shall consist of clean stone or rock, of appropriate weight and dimensions necessary to achieve intended shore protection. Areas to be protected by rip-rap shall be cleared of brush and debris, and all grades shall be shaped and compacted to the required cross-section. Geotextile liner shall be placed on appropriate grades, and rip-rap shall not damage the geotextile liner.

7. Road fill side-slopes terminating in streams or raw riverbanks resulting from the construction shall be to 3 feet above the normal high-water mark. All raw slopes draining directly to a stream shall protected by rip-rap, sod, and/or seed and mulch as necessary to provide effective erosion protection.

8. If any portion of the project is stopped and lies uncompleted for a lengthy of time other than that encountered in a normal work week, every precaution shall be taken to protect the uncompleted work from erosion.

9. No work shall be conducted in streams during periods of above-normal flows, except as necessary to prevent erosion.

10. No construction pads, haul roads, temporary structures, or other appurtenances shall be placed on or over bottomlands and/or wetlands that are not authorized by the permit, unless authorized by a separate permit or permit revision.

The MDEQ noted in the June 2, 2008 WQC that UPPCO is required to operate the development above minimum seasonal elevations specified in the Dead River Project license, and to strive to operate the development to achieve specified start-of-month target elevations identified in the license. The MDEQ further indicated that the permit does not authorize or condone changes in reservoir elevation or discharge requirements contained in the project license or the 1999 WQC issued during project licensing, and

4.3.2 Essential Fish Habitat

Pursuant to the amended Magnuson-Stevens Fishery Conservation and Management Act, the United States Congress mandated that habitats essential to federally

managed commercial fish species be identified, and that measures be taken to conserve and enhance their habitat (Public Law 104-297). In the amended Act, Congress defined essential fish habitat (EFH) for federally managed fish species as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH is applicable to federally managed commercial species that live out at least one component of their lifecycle in marine waters (such as anadromous species). The Silver Lake Development of the Dead River Project is located outside of the range of anadromous species or any other species with at least one component of their lifecycle in marine waters. Therefore, we conclude that the Proposed Action would have no effect on EFH.

4.3.3 Endangered Species Act

By letter dated February 22, 2007, FWS identified two federally listed threatened species that may occur within the proposed project area, the bald eagle (*Haliaeetus leucocephalus*) and Canada lynx (*Lynx canadensis*). Staff determined, based on the licensee's proposed activities during reconstruction of the reservoir, review of life history information, and also the results of recent plant species inventories, that the proposed construction activities would have no effect on any federally listed endangered or threatened species. Consequently, staff concluded that no formal consultation was necessary.

4.3.4 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires the Commission to take into account the effect of agency actions on any historic properties and allow the Advisory Council on Historic Preservation a reasonable opportunity to comment on the Proposed Action. "Historic Properties" are defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places (NRHP) and includes areas of traditional importance to tribes (36 CFR 800.16[l]). Section 106 of the NHPA requires that the Commission identify an Area of Potential Effect (APE) in consultation with the SHPO (36 CFR 800.4[a][1].

In July 2006, August 2007, and October 2007 (Van Dyke 2006, 2007a, and 2007b), areas identified by the licensee as potentially affected by activities associated with the Proposed Action were surveyed for archaeological resources. These areas included proposed peat borrow and dike areas, fish spawning areas, a woody debris area, and a system of access roads. The results of these studies were presented to the Michigan SHPO and the Keweenaw Bay Indian Community (KBIC) on December 10, 2007. Copies of the survey reports were also provided to the Commission on February 5, 2008, as a follow-up to the January 17, 2008 Environmental Report.

In a letter to the SHPO dated May 27, 2008, Commission staff determined that the licensee's Proposed Action may affect historic properties within the construction area.

5.0 ENVIRONMENTAL ANALYSIS

5.1 GENERAL DESCRIPTION OF PROJECT LOCALE

The Dead River Project is located in rural Marquette County within the Upper Peninsula of Michigan, about 30 miles west of Marquette (population 22,000). The Dead River Project's Silver Lake Development is the furthest-upstream of the project's three developments. There are no hydroelectric generation facilities at the Silver Lake Development. Water is released from the development to enhance hydroelectric operation at the two developments downstream, the Hoist Development (also known as the Dead River Development), and the McClure Development. The Marquette Hydroelectric Project (FERC Project No. 2589) is located downstream of these developments, and includes the Forestville Reservoir and Tourist Park Reservoir. After it passes through the Marquette Project, the Dead River flows into Lake Superior near Marquette. Approximately 20 of the 35 miles of the main- stem river are occupied by the five impoundments.

The Dead River, also referred to as the Big Dead River, is the largest tributary to Lake Superior in Marquette County. The river flows in a southeasterly direction from its headwaters in the bog forests of western Marquette County. Leaving these bogs as a small stream, it traverses remote forests, swiftly passing over steep terrain before entering Silver Lake Storage Reservoir.

The climate in this region is characterized by long, cold winters with heavy snowfall and cool, short summers. The climate is influenced by the northern latitude and by Lake Superior, which contributes to the heavy snowfall and moderates extreme temperatures. Average annual precipitation is between 30 and 40 inches, with snowfall ranging from 50 to more than 200 inches in the drainage area. Snow cover begins in mid-November and lasts through late-April, for an average duration of 140 days. The growing season is 100 days long. Minimum and maximum temperatures for July are 55 and 80 degrees Fahrenheit (°F), respectively; while those for January are 5°F and 25°F.

5.2 CUMULATIVE EFFECTS ANALYSIS

Cumulative effects are defined as the impact on the environment which results from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions (40 CFR § 1508.7). Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time, including hydropower and other water and land development activities. Based on

information gathered through scoping and provided by the licensee, resource agencies, and the public, plus staff's independent analysis, staff has identified no resources that would be cumulatively affected by the proposed rebuilding of Silver Lake Development.

5.3 ENGINEERING REVIEW OF PROPOSED ACTION

The planning and design process for the restoration of Silver Lake Development is required by the Commission to ensure that the dams and dikes will be constructed and operated in a safe manner and meet all current design standards and criteria. The Commission required UPPCO to convene an independent Board of Consultants (BOC) to oversee and advise UPPCO on the design, construction, and proposed operation of the restored project. The BOC is composed of three preeminent dam safety experts. The BOC conducted a careful review of the design, construction, and proposed operation; made recommendations for the design; and then advised UPPCO to conduct additional investigations and engineering evaluations that it deemed necessary. UPPCO addressed these recommendations in the final design report for the project. Once the final design was approved by the BOC, UPPCO prepared the final bid documents, specifications, and the Quality Control Inspection Plan program materials.

This EA reviews the general design of the dams and dikes and the construction impacts on environmental resources associated with that design. Due to heightened security concerns following September 11, 2001, staff is unable to address detailed design questions that may have been raised in public comments in this EA due to Critical Energy Infrastructure Information (CEII) restrictions. However, the following discussion is provided to address specific comments brought to the attention of the Commission during the review of the EA.

The proposed reconstruction of the dams and dikes of Silver Lake Development is intended to restore the area where the breach occurred at the location of the former fuse plug in Dam No. 2 and enable the restored project to safely pass the PMF. The modifications proposed to meet these objectives include:

- construction of a zoned-earth embankment at the location of the former fuse plug in Dam No. 2;
- construction of a new Dike No. 5 across a previously unrecognized low spot located northeast of Dam No. 2;
- construction of a 150-foot-long, ungated concrete spillway in the Main Dam; and
- increasing the crest elevation of all project structures as required to maintain adequate freeboard during a PMF event.

Upon completion of the proposed modifications, UPPCO also proposes to implement the following additional measures to enhance the systems used to monitor the condition of the dams and dikes:

- installation of four piezometers to monitor the phreatic level in Dam No. 2;
- installation of one piezometer in each abutment of Dam No. 2 to monitor the phreatic level;
- construction of a flume downstream of Dam No. 2 to monitor the seepage collected in the planned drainage system;
- installation of a staff gage located near the existing low-level outlet to visually monitor the reservoir level;
- installation of a remote monitoring system to continuously monitor the reservoir and the tailwater elevation; and
- installation of survey pins for monitoring the long-term movement of the new ogee spillway structure and retaining walls.

The following section discusses the anticipated environmental-related impacts during construction mobilization, site set up, implementation of the proposed project modifications, and demobilization from the site.

5.3.1 Construction Parking Areas

At the start of mobilization, parking areas, laydown areas, borrow areas, and areas for equipment and personnel trailers, etc. would be developed. Some areas may need to be cleared and grubbed. Some grading and leveling might also be required.

Parking areas may need to be graded and/or covered with rock fill or gravel for stability. Until covered with rock fill or gravel, perimeter barriers or drainage paths to sedimentation control ditches would be provided to all areas, or they would be individually contained using silt fence or other appropriate sedimentation and erosion control methods.

If the areas become exceptionally dry and visible dust becomes an issue in parking areas, on haul roads, or in construction areas, water spray and other appropriate dust control methods would be employed.

5.3.2 Clearing and Grubbing

It would be necessary to provide sufficient working area in the different site locations identified for construction. Approximately 100 acres have been identified as areas that may need to be cleared to allow construction machinery to maneuver. All of this area is within the defined construction limits and would be subject to erosion control measures.

In addition to providing work areas for construction, it also would be necessary to provide sufficient area for stockpiling excavated, spoil, and fill material. Approximately 25 acres have been identified as potential laydown area for these types of materials. All laydown areas would be specified in the ESCP, and would be stabilized or protected with filter roll, silt rock, silt fence, or similar effective measures to prevent transportation of sediment from these areas.

5.3.3 Construction Dike near Breach Area

As soon as possible after mobilization, a construction dike would be developed across the breach channel upstream of the new Dam No. 2 to dewater the area and permit construction of the dam. Approximately 6,000 cubic yards (CY) of fill material would be moved to construct the dike. After the dike is completed, flow through the breach would be permanently blocked, initially by the dike, and subsequently by the new Dam No. 2. With the flow cut off from the breach channel, the water level in Silver Lake Storage Reservoir is expected to rise by several feet over current conditions and would provide sufficient flow through the low-level outlet to meet minimum flow requirements.

5.3.4 Culvert Crossing

A temporary culvert crossing would be required where the haul road inside the reservoir at the Main Dam crosses the existing Dead River stream channel. The culvert would provide minimum flow downstream when the cofferdam in the breach area is in place and the water level in Silver Lake Storage Reservoir is subsequently raised. In the absence of the culvert, the haul road is at an elevation such that it would be flooded. A five-foot-diameter culvert would be installed to accommodate the flows and keep the haul road stable.

5.3.5 Low-Level Outlet Flows

Detailed survey results indicate that some minor excavation may be necessary to facilitate the flow of water through the low-level outlet. This effect would also require the construction and maintenance of stacked filter rolls in front of the low-level outlet intake prior to creation of the construction dike in the breach area. UPPCO would ensure that sufficient grade control exists upstream of the low-level outlet to avoid any

unnecessary down-cutting of the channel. The grade control would most likely be accomplished through the installation of the culvert.

5.3.6 Maintenance and Repair of Roads

Routine maintenance of the roads would be provided for haul roads on UPPCO property and, as necessary, on the county access roads damaged by construction traffic. Soil fill and gravel material would be used as necessary to fill in washed-out or degraded areas resulting from construction traffic. In at least one area, a haul road would need to be widened to allow for larger construction vehicles. Maintenance of roads not on UPPCO property would be coordinated with the Michigan Department of Transportation (MDOT), the Marquette County Road Commission, or the property owner.

5.3.7 Foundation Excavations

The foundations for the new spillway would require excavation to the slate bedrock. From previous test pits and borings in this area, it is not expected that excavation depth would exceed 15 feet. It is expected that the rock would be of good condition and very little would need to be removed.

The foundation for Dam No. 2 includes excavation to the layer of dark gray glacial till underlying the brown sandy soil. This excavation depth is not expected to exceed 40 feet at any point.

All existing dikes and their extensions would be constructed on top of soil free of organic materials. This may require up to 5 feet of excavation. All organic top soil would be segregated and stockpiled for reuse during vegetated stabilization.

5.3.8 Air Emissions

Air emissions during construction are expected to be negligible. Air emissions would result from construction equipment in the form of dust and equipment exhaust. A concrete batch plant may be brought on site during construction. If so, the plant would be permitted in compliance with Michigan regulations.

It is possible that dust would result from the movement of construction vehicles and equipment over roadways and in construction areas. Active excavation and handling of materials would likely result in some generation of dust emissions. Visible dust emissions would be controlled using water spray on haul roads and in excavation areas as necessary.

Heavy equipment would emit diesel fuel exhaust. These emissions are not expected to impact residences in the area. Equipment would be kept in good repair to limit emissions.

5.3.9 Earthen Dam and Dike Construction

Up to 200,000 CY of fill materials would be used for the construction of the new Dam No. 2 (breach area) and new Dike No. 5, as well as for the buildups and extension of the Main Dam, Dike No. 1, Dike No. 3 and Dike No. 4. The majority of the borrow material would come from centrally located borrow areas. Additional fill material for the Main Dam, Dike No. 4 and Dike No. 5 may come from small areas located within the reservoir near the embankments. The provisions in the ESCP would be implemented during the entire construction period. Upon completion of the project, these disturbed areas would be aesthetically contoured and stabilized with a native grass mix according to the ESCP.

5.3.10 Spillway Construction

Up to 5,000 CY of concrete would be used for the construction of the new spillway west of the low-level outlet at the Main Dam. Either the concrete would be brought on site or a concrete batch plant may be brought on site for construction.

5.3.11 Water Requirements for Construction

Largely dependent on how much water may be needed for dust control, an estimated 3 to 5 acre-feet of water may be required for construction. This would be withdrawn from Silver Lake Storage Reservoir and used for dust control, mixing concrete, equipment wash down, aiding compaction of soil fill, and other construction related uses. Water use during construction would be controlled so as to minimize the potential for runoff or sedimentation. Equipment wash water would be managed within areas contained by sedimentation controls to capture soil or removed sediment.

5.3.12 Instrumentation

The installation of piezometers in the downstream embankment of Dam No. 2 is not expected to have an environmental impact. Some instrumentation may be used (such as nuclear density gauges) that contain licensed radiological sources. This equipment would be handled as required by the license and would be kept in a secure storage location.

5.4 RESOURCE ISSUES AND MITIGATION ALTERNATIVES

5.4.1 Geological and Soil Resources

Affected Environment

The Dead River Project lies in the Great Lakes Basin, a geological feature of glacial origin covering much of Michigan's Upper Peninsula. Surficial geology in the project area includes large areas of Precambrian, meta-igneous bedrocks (schist and gneiss) and metamorphic bedrock (slate and chert). Other areas, particularly valley bottoms and wetlands, are dominated by Tertiary glacial/alluvial deposits (sand, gravels, and boulders). The topography and soils of the project area have been derived from material deposited through continental glaciations. Topography is dominated by large glacial outwash plains and low, rolling hills or ridges with numerous scattered, wet depressions. The area's soil characteristics are closely associated with these different landforms and bedrock types. Soils are relatively young, very complex, and intermingled, and the drainage patterns are immature (FERC, 2002; UPPCO, 1994).

The Dead River stream channel consists of approximately 34 miles of the main stem river length occupied by the five impoundments created by two hydroelectric projects. Prior to the May 14, 2003 activation of the fuse plug spillway, Silver Lake Development functioned only as a water storage reservoir to enhance downstream power production at the Hoist and McClure power plants and maintain minimum river flow. The large useable storage capacities at the Silver Lake and Hoist storage reservoirs (13,800 and 29,200 acre-feet, respectively) made it possible to regulate almost the entire natural stream flow in the river for power generation (FERC, 2002; UPPCO, 1994).

The general geological resources associated with the project include the 23.4-square-mile drainage area, wetlands and uplands in the vicinity of Silver Lake, and features of the Silver Lake Storage Reservoir are described previously in Section 5.1., General Description of Project Locale.

Local Geology

The site is underlain by two distinct types of glacial till above bedrock. The contact between rock and till is very irregular. The upper part of all the southern shore of Silver Lake Storage Reservoir is covered by a thin to very thick layer of Surficial Glacial Till. This material was deposited during glacial retreat and is not over-consolidated. It is typically oxidized, sub-angular to sub-rounded, poorly sorted fine to medium sand; locally it is quite rocky. It would appear that the rocky zones are of limited lateral extent and are the result of larger rock masses that are disarticulated within the glacier.

Underlying the surficial till is a thin to thick layer of dark grey very dense till. This material was consolidated beneath glacial ice. It is composed of fine to coarse sand

with trace amounts of gravel to cobbles. The material is hardened and Standard Penetration testing of this material results in values over 100 blows per foot. Within this till, there are thin (0.5 to 1.5 foot thick) layers of poorly graded sand. These layers may represent lacustrine deposition during minor glacial retreats.

Bedrock underlying the site is largely composed of dark gray slate. Beneath the dam, this material appears to be nearly vertical; however, there is a fold exposed in the stream just downstream of the breach. Locally, this slate is mineralized. In particular, rock beneath the dam to the left of the low-level outlet exhibits disseminated pyrite, typical of rocks that have been subjected to hydrothermal alteration. This results in a relatively durable rock that is more resistant to erosion than unaltered rock.

Site Soil Conditions Post-Breach

Investigations following the breach revealed that little is known about the foundation materials under the fuse plug prior to construction. Investigations conducted after the breach indicate a soil profile with six soil units (zones); four zones consisting of glacial till (Zones 1 through 4), one zone of glacial outwash and lacustrine deposits (Zone 5), and one zone of post-glacial Dead River alluvial channel deposits (Zone 6). The surface materials in Zones 1 and 2 are more prone to erosion than the denser materials in Zones 3 and 4. All of these materials are predominantly sandy glacial till materials and are considered to be highly erodible. The materials in Zone 6 were likely washed down from the lake as a result of breach outflows (UPPCO, 2003b).

The activation of the fuse plug during the May 13, 2003 storm event resulted in extensive bank erosion and the flushing of sediments downstream. It should be noted that the land downstream of the fuse plug was not an established stream channel prior to the breach. After the breach, a 1.5-mile-long channel was created from the breach site to Dead River downstream of the Silver Lake Development's Main Dam (FERC, 2003a); see figures 4 and 5.

Figure 4. Looking upstream from the former location of the fuse plug towards Silver Lake Storage Reservoir; taken on May 16, 2003. (Source: FERC, 2003b)

Figure 5. Looking downstream from the former location of the fuse plug towards Dead River; taken on May 16, 2003 (Source: FERC, 2003b)

Surface flow conditions, as well as the channel slope immediately below the breach site, likely contributed to the erosive forces exerted along the flow route. These conditions, coupled with the erodibility of the soils in the area, contributed to the extensive erosion that occurred (UPPCO 2003b). It has been estimated that approximately 800,000 to one-million cubic yards of sediment was transported downstream from Silver Lake Development as a result of the May 14, 2003 breach. Sand and gravel sediment from the lake and the fuse plug location were deposited along the streambanks up to 4.5 miles downstream of the breach. Silt and fines from the breach material remained in the water column all the way to the mouth of the river at least a week after the breach occurred (FERC, 2003a).

Environmental Effects and Recommendations

Silver Lake Development

Under the Proposed Action, there would be some alteration of topography to raise the height of the Main Dam and dikes. Borrow areas for soil and gravel would be depleted of these geological resources. The majority of the proposed borrow areas are all within the limits of the lake and would become submerged upon restoration of the dam and recharge of the lake. Excavation would alter the topography of the lake bottom. Upon completion of the excavation, borrow pits in submerged areas would be inspected for potentially permeable soil or sand lenses. These findings would be evaluated by a qualified engineer/geologist and appropriate stabilization measures would be implemented if required. Borrow pits would be aesthetically contoured to stabilize the side walls and then left to provide new aquatic habitat once the lake refilling has been completed. For borrow pits in upland areas, with the exception of the topsoil and gravel borrow areas, all disturbed faces would be covered with approximately 4 to 6 inches of topsoil. All areas would be aesthetically contoured and the surfaces seeded with a durable native grass mix.

There would be some grading and contouring of the landscape for the new spillway and drainage channel leading to the Dead River. No unique geological features in the vicinity of the lake would be disturbed as a result of the construction.

Hoist Reservoir

Due to the breach at Silver Lake Development, the Hoist Storage Reservoir has been lowered to allow for additional storage reserve. Once Silver Lake Storage Reservoir is restored, water levels within Hoist Storage Reservoir could be returned to normal operating levels.

Effects of No-Action Alternative

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the reservoir would not be refilled. Storage capacity of Silver Lake Storage Reservoir would remain limited. The current condition allows no ability to regulate river flow or assist in flood control. Over the long-term, this would result in a higher degree of shoreline erosion and river bottom scouring. These impacts would eventually result in the alteration of geological features and topography. The pool elevation of the Hoist Storage Reservoir would remain lowered, which may cause some shoreline erosion.

5.4.2 Water and Fisheries Resources

The Dead River Project is located within the upper part of the Dead River Watershed. The river flows in a south-easterly direction from higher terrain within the densely-forested Upper Peninsula of Michigan, and discharges to Lake Superior near the city of Marquette. The total drainage area of the Dead River Watershed is 158 square miles and the drainage area at Silver Lake Storage Reservoir is 23.4 square miles. Silver Lake was a natural water body before construction of the dam and dikes of the Silver Lake Development near the natural outlet from the lake.

During project operation prior to May 2003, Silver Lake served as a storage reservoir to enhance power production downstream at the Dead River (Hoist) and McClure Developments. Since the activation of the development's fuse plug in May 2003, the water level of Silver Lake has been about 25 feet lower than before and the surface area of the lake has been reduced by more than 1,000 acres. Outflow from Silver Lake Storage Reservoir currently flows both through the breach area and the low-level outlet, without much change in reservoir elevations in a general run-of-river mode.

Most of the Dead River has been classified as a trout stream, with the lower-most river reaches classified as a warmwater stream. Silver Lake Storage Reservoir has been managed by MDNR as a coldwater fishery. Hoist Storage Reservoir is managed as a warmwater fishery, and McClure Storage Reservoir is managed as a mixed fishery. Below the McClure Development, the Dead River is managed as a warmwater fishery.

5.4.2.1 Scope of Assessment

In this section, we examine possible effects of rebuilding and refilling the Silver Lake Development, under Part 12 of the Commission's regulations, on water and fisheries resources of the project area. The operation of the project after the proposed rebuilding falls outside of this analysis. However, because compliance with water level requirements following proposed reconstruction was a primary concern in comments we have received, this issue is reviewed below, under *Operation of the Rebuilt Development to Meet Water Level Requirements*.

5.4.2.2 Water Quantity

Affected Environment

Silver Lake Storage Reservoir

The annual inflow hydrograph for Silver Lake Storage Reservoir and the Dead River Watershed is typical of most rivers and streams in Michigan's Upper Peninsula, with high discharge in the spring caused by precipitation and snowmelt runoff, diminishing flows throughout the summer, followed by a period of increased discharges in the fall caused by fall rains, and low flows throughout the winter.

Prior to the May 2003 activation of the fuse plug, Silver Lake Storage Reservoir had a surface area of 1,464 acres, a gross storage of 33,513 acre-feet, and a mean and maximum depth of 23 and 83 feet, respectively. The reservoir served as a storage basin to enhance power production downstream at the Hoist and McClure Developments. Historically (between 1916 and 1988), Silver Lake Development was operated to support a peaking mode of operation at the project's downstream developments, until reservoir water was drawn down about 18 feet by late winter, with daily fluctuations of approximately 1 inch. Since 1988, UPPCO has reduced the average late winter drawdown to approximately 8.5 feet, with daily water level fluctuations of approximately 0.6 inches.

After the issuance of the October 4, 2002 project license, the operation of the reservoir was governed by license article 402, which states that the licensee will maintain water surface levels at all times above the minimum monthly elevations and strive to operate the project to achieve the start of the month target elevations shown in Table 1.

Table 1. Monthly reservoir elevation requirements, in feet NGVD, as identified in article 402 of the project license (source: FERC 2002).

Month	Start of Month Target Elevation	Minimum Elevation
January	1,479.0	1,477.5
February	1,477.5	1,477.0
March	1,477.5	1,477.0
April	1,477.5	1,477.0
May	1,479.0	1,478.5
June	1,481.0	1,480.5
July	1,481.5	1,480.0
August	1,480.0	1,479.0
September	1,479.5	1,479.0
October	1,479.5	1,479.0

Month	Start of Month Target Elevation	Minimum Elevation
November	1,479.0	1,478.5
December	1,479.0	1,478.5

Note: The maximum rate of lowering is 0.5 foot per day.

Dead River

Prior to the issuance of the project license in 2002, discharges from Silver Lake Development were occasionally curtailed to conserve water for hydropower generation at later periods at downstream facilities. In these instances, flows in the 5.4-mile-long reach of Dead River between Silver Lake Development and Hoist Storage Reservoir were reduced to the amount resulting from leakage from the dam, natural runoff from the area below Silver Lake Development, groundwater inflows and discharges from an unnamed tributary, and Connors and Mulligan creeks. During the evacuation of the reservoir following the fuse plug activation in May 2003, the peak estimated flow from the reservoir was estimated at 27,900 cfs (FERC, 2003a). Minimum flows were released via the low-level outlet and governed by article 403 of the project license. These remain: (1) 10 cfs in July through September; (2) 15 cfs in October through March and in June; and (3) 20 cfs in May; and 25 cfs in April. The license states that flows in excess of 150 cfs are not allowed when Silver Lake Storage Reservoir can control the outflow rate, except that flows up to 200 cfs are allowable to prevent loss of hydropower generation at downstream facilities during emergency electrical supply periods, or if necessary to maintain target elevations during extremely wet weather conditions.

Historical flow records for Dead River are minimal. The only stream gaging station, U.S. Geological Survey (USGS) gage No. 04043800, that is located on the Dead River is in the McClure Development's powerhouse tailrace, and has been in operation since April 1990. Average monthly flows for this station are shown in Table 2.

Table 2. Mean and minimum flows, in cfs, for USGS gage No. 04043800, McClure Storage Basin Release near Marquette, MI, 1990-present (source: USGS 2008).

Month	Mean	Minimum
January	148	52.4
February	160	66.8
March	209	120
April	289	195
May	255	99.6
June	197	73.7
July	140	14.9

Month	Mean	Minimum
August	110	6.29
September	102	57.3
October	121	78.6
November	139	2.53
December	160	57.5

Note: The flow records measure only flow through the powerhouse, not flows in excess of the powerhouse capacity of approximately 310 cfs.

UPPCO modeled the Dead River's watershed hydrology to estimate inflows to its impoundments based on the 10-year period, from 1983 to 1992. Table 3 provides a summary of the inflow and outflows from the Dead River Project impoundments and several reservoir parameters. While the values in Table 3 are only for a short period of record, the estimated flow from McClure Storage Reservoir is similar to the longer period of record data from the USGS gage in the McClure tailrace.

Table 3. Estimated flows and reservoir parameters for the Dead River Project's Silver Lake, Hoist and McClure developments (source: UPPCO 1994).

Parameter	Silver Lake Storage Reservoir	Hoist Storage Reservoir	McClure Storage Reservoir
Mean daily outflow (cfs)	36	203	207
Mean daily inflow (cfs)	36	202	183
Minimum daily inflow (cfs)	8	46	101
Minimum daily outflow (cfs)	8	100	67
Maximum daily inflow (cfs)	587	2795	807
Maximum daily outflow (cfs)	286	392	309
Surface area (acres)	1,464	2,202	96
Gross storage (acre-feet)	33,513	46,998	1,870
Mean depth (feet)	23	15	20
Maximum depth (feet)	83	59	53
Reservoir length (miles)	2.7	12.3	1.5

Environmental Effects and Recommendations

Effects of Construction Withdrawals

During the construction process, the licensee proposes to withdraw between 3 and 5 acre-feet of water from Silver Lake Storage Reservoir for use in dust control, mixing concrete, equipment washdown, aiding in the compaction of fill, and other construction

related uses. This amount of water corresponds to less than 0.03 acre-feet per day or approximately 10,000 gallons per day, if spread evenly over the 6 month construction period. This flow rate correlates to approximately 0.015 cfs per day, which is not measurable by most streamflow gages. Although we expect the withdrawal of water for construction to be unevenly utilized throughout the construction period, this water withdrawal should not have a measurable effect on water levels within Silver Lake Storage Reservoir, or releases from Silver Lake Development.

Effects of Construction on Minimum Flow Releases

Currently, Silver Lake Development is operating in a near run-of-river mode, with water flowing through the breach area and the low-level outlet at approximately the same rate as inflow. Early in the construction phase, the breach area will be blocked by the construction of a dike and all minimum flows will need to be directed to the low flow outlet. However, after blockage of the breach area, the reservoir would be drawn down approximately 3 feet below the level of the outlet for a few weeks. During this time, the licensee proposes to use a pump to ensure minimum flow requirements are met. Based on the normal inflow during the start of the construction period, currently predicted as June, the water level in the lake should then rise within a few weeks to a point where minimum flows could again be supplied through the low-level outlet. Effects on water quality, such as suspended sediment, would be prevented because outflow from the low-level outlet is planned to be filtered through rolls of stacked filtered rolls.

Operation of the Rebuilt Development to Meet Water Level Requirements

A primary concern expressed in the comments received on the licensee's proposal was the licensee's ability to operate the Silver Lake Development, if reconstructed as proposed, in compliance with the water level requirements of article 402 of the October 4, 2002 Dead River Project license, and the project's February 24, 1999 WQC, issued by the MDEQ. Although this issue is outside of this Part 12 reconstruction assessment, as previously noted, and the licensee has indicated that it intends to comply with the water level requirements, we will review this issue, below. Staff's responses to particular comments are provided, by subject, in Appendix A of this EA.

In its Environmental Report, UPPCO states that it intends to operate the rebuilt the Silver Lake Development under the current license conditions, although, during dry years, draw downs in excess of that specified in the license may be necessary to keep water elevations at Hoist Storage Reservoir downstream within its licensed range.

The MDNR has commented that UPPCO's proposed mode of operation of Silver Lake Development after reconstruction would not be in compliance with the project license conditions. The MDNR raised concerns that the elevations in Silver Lake Storage Reservoir would be higher for most of the year than the target elevations in the license. MDNR, FWS, and Al and Nancy Warren commented that the proposed operation would

allow for approximately 6 feet of drawdown in the summer, and that this would be in direct contradiction to the existing license. The MDEQ has commented that, specifically, with the proposed spillway elevation 1 foot lower than the current project configuration, it may not be possible for UPPCO to operate in compliance. Furthermore, MDEQ comments that UPPCO interpreted the start-of-month target elevations in the February 24, 1999 WQC for the development as target minimums, which is not consistent with the WQC. In its intervention, the Michigan Hydro Relicensing Coalition notes that the proposed operation deviates from the current license to the extent that a license amendment and WQC would be required. The MDEQ stated that it would be willing to resolve the issue of WQC interpretations by negotiating an operations plan, which UPPCO has pledged to supply. The MDEQ also stated that, in the event that UPPCO cannot reach an agreement on an operations plan, UPPCO would need to request a modification to the WQC. The MDEQ stated that it does not accept UPPCO's analysis as an indication that Silver Lake Development will be operated in a manner consistent with the WQC.

In the June 2, 2008 WQC permit issued for the licensee's proposed rebuilding of the development, the MDEQ notes that UPPCO is required to operate the development above minimum seasonal elevations specified in the Dead River Project license, and to strive to operate the development to achieve specified start-of-month target elevations identified in the license. The MDEQ further indicated that the permit does not authorize or condone changes in reservoir elevation or discharge requirements contained in the project license or the 1999 WQC issued during project licensing, and that any such changes would require revisions to existing authorizations.

As stated, the licensee has indicated that, during dry summers, releases in excess of the minimum flows from Silver Lake Development may be required to limit drawdowns at Hoist Storage Reservoir. The drainage area at Silver Lake Storage Reservoir is 18 percent of the drainage area at Hoist Storage Reservoir, so although it is the only man-made upstream impoundment which can supply needed inflow during low flow periods, it is not normally responsible for the majority of the inflow. While the proposed spillway would be 1 foot lower than existing conditions in the proposed rebuild, it would still be slightly more than 3.5 feet above the highest start of the month target elevation in the existing license. Therefore, if the monthly target elevations are met, the elevation of the spillway crest would not have an effect on the applicant's ability to meet the license conditions. The licensee indicates that the Silver Lake Development would operate in compliance with the Dead River Project license and the project's February 24, 1999 WQC.

We note that article 405 of the project license requires the licensee's operation monitoring plan to include a 3-year test period to determine the licensee's ability to comply with the required reservoir levels and we expect the plan to be filed and monitoring to begin soon after the Silver Lake Development is returned to operation.

Moreover, the Commission expects the licensee to comply with the requirements of the project license and the WQC during project operation, and to report any periods of noncompliance to the Commission as quickly as possible.

Effects of Silver Lake Storage Reservoir Refilling on Water Quantity

The licensee has indicated that it plans to meet the minimum flow requirements at the development at all times, which would limit the environmental impact of the refilling on downstream stream reaches. However, the licensee's proposal did not detail a refilling plan. Staff recommends a post-construction refill plan to ensure stability of the structures and limit the effects on water quality (as discussed below in Section 5.4.2.3, Water Quality). This plan would provide information on the proposed rate of refilling, general time period, and schedule, and would need approval from the Commission for engineering safety. The licensee should develop this plan in consultation with MDNR and DEQ and FWS.

Following the Staff Preferred Alternative, including the recommended post-construction refill plan, the reservoir refilling process should not exceed short-term, minor, adverse impacts to water quantity in flow releases to the river downstream or Hoist Storage Reservoir.

Effects of No-Action Alternative

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the reservoir would not be refilled. Under this alternative UPPCO would continue to lack the ability to regulate flows in the Dead River using Silver Lake Storage Reservoir. If the storage capacity of Silver Lake Storage Reservoir is not restored, releases from Silver Lake Development would not enhance flow, reservoir levels, and generation capacity at the downstream developments.

5.4.2.3 Water Quality

Affected Environment

Waters in the Dead River Watershed, including Silver Lake, Hoist, and McClure storage reservoirs, have good chemical and biological quality. The river water meets Michigan state water quality standards for total dissolved solids (TDS), pH, microorganisms, nutrients, taste and odor-producing substances, and physical properties appropriate for state-designated uses. The state of Michigan classifies the Dead River as a coldwater trout stream from its headwaters above Silver Lake Storage Reservoir to the Forestville Road Bridge, located downstream from the McClure powerhouse tailrace (MDNR, 2007). This stream reach includes the entire Dead River Project area. However, the MDEQ's WQC for maximum allowable temperatures during the summer months for the stream reaches below the McClure powerhouse exceed normal

temperatures for maintaining coldwater fish, which would appear to conflict with MDNR's classification of the stream reach as a coldwater trout stream. Permitted monthly average maximum temperatures, in ^{o}F for coldwater fisheries in the designated portions of the Dead River, as indicated in the February 24, 1999 WQC, are as follows:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
38	38	43	54	65	68	68	68	63	56	48	40

Prior to the May 2003 fuse plug activation and reservoir evacuation, Silver Lake Reservoir was a cold, well-oxygenated, oligotrophic reservoir. During work associated with the licensing application, continuous water temperature and dissolved oxygen (DO) levels were collected in Dead River, above and below Silver Lake Development, and the results showed that the temperatures and DO levels generally met the state water quality standards for a coldwater fishery. Based on monitoring conducted by UPPCO in 1992, Silver Lake Storage Reservoir exhibits a modest temperature gradient in the top 20 feet during the period May through July. Measured temperature profiles at Silver Lake Storage Reservoir indicate that in July water temperature varies from approximately 66^{o}F (19 degrees Celsius [^{o}C]) at the surface to about 58ºF (14^{o}C) at 20 feet below the surface. DO levels ranged from 7 milligrams per liter (mg/L) in the epilimnion to 5 mg/L in the hypolimnion, with slightly lower levels near the bottom of the reservoir during the summer months (4 mg/L in July 1992). With the substantial decrease in volume and depth of Silver Lake Reservoir after May 2003, it is likely that the reservoir stratifies less than it did and the water leaving the lake is warmer in the summer than was previously discharged through the low-level outlet.

The water quality of the Dead River and its tributaries is related to the mineral and organic composition of the soils and geological materials in the watershed. The watershed soils are derived from moraine materials covered by glacial outwash, are sandy, and have relatively high organic matter content in the surface horizons. An organic mat on the soil surface consists of partially decayed plant materials that have accumulated under deciduous and evergreen forest canopies. As a result of these factors, Dead River water exhibits: (1) low hardness (11.7 to 36.6 mg/L as $CaCO_3$), (2) a slightly acidic to near-neutral nature (pH 6.3 to 7.7), and (3) a slight organic stain. MDNR confirmed that no known toxic substances have been found in Dead River waters. While certain heavy metal concentrations in Dead River waters are elevated, MDNR considers them to be consistent with background levels for the region (UPPCO, 1994). Sedimental concentrations are consistent with background levels for lakes of Michigan's Upper Peninsula. Other water quality parameters, including TDS, pH, microorganisms, nutrients, taste- and odor-producing substances, and physical properties, meet Michigan water quality standards and are at levels appropriate for designated uses (UPPCO, 1994). The U.S. Environmental Protection Agency (EPA) National Assessment Database, compiling data under the State Water Quality Reporting provisions of Title 40 Code of

Federal Regulations (CFR) § 305(b), indicates that for years 2002 (pre-release) and 2004 (post-release), water quality in Dead River sections that include Silver Lake Storage Reservoir and some of the Dead River reaches met State Water Quality Standards for both years (EPA, 2002 and 2004, as noted in Table 4).

Table 4. Water quality attainment levels for the Dead River (Source: EPA 2002, 2004).

Designated Use Category	State Designated Use	Attainment Status	Threatened
Recreation	Total Body Contact Recreation	Fully Supporting	No
Aquatic Life Harvesting	Cold Water Fishery	Fully Supporting	No
Aquatic Life Harvesting	Fish Consumption Advisory	Fully Supporting	No

Dead River is not used as a public drinking water source. There are no significant consumptive uses of project waters or discharge of wastewater into the project watershed. No NPDES permits exist or Publicly Owned Treatment Works for discharge into project waters. Review of the National Priorities List and the Marquette County Resource Management and Development Department's database did not identify any known Resource Conservation and Recovery Act or Comprehensive Environmental Response, Compensation and Liability Act sites in the Dead River Watershed.

Environmental Effects and Recommendations

Effects of Construction on Water Quality

According to the material filed by the licensee, the proposed reconstruction would involve the replacement of the breach area with a new dam (Dam No. 5), modifications to the existing Main Dam, and improvements to surrounding dikes for long-term dam safety. All work would be completed in one construction season of approximately six months, from June through November. The licensee's proposal would involve work in and around the reservoir and Dead River and its tributaries, as well as use of access routes, staging areas, and borrow areas.

UPPCO would develop an ESCP to minimize short-term erosion and sedimentation that would result from reconstruction activities. The final plan would incorporate best management and control practices under Michigan's NPDES program for Stormwater Discharges Associated with Construction Activities. Both engineering controls and administrative methods and procedures would be employed to contain,

control, and prevent excessive sedimentation and erosion at the site during construction and after completion of the scope of work.

The ESCP would be implemented to control sediment at all construction, borrow, and equipment and construction materials staging areas. The primary sediment control measure at the various construction sites would be sediment traps. Diversion ditches lined with rock would guide sediment-laden runoff to the traps and the suspended particles would settle out. The traps would be monitored and cleaned out as needed to maintain an effective retention time. Silt fencing, silt socks, hay bales, and other appropriate barrier and capture control methods would also be employed.

The primary means of sediment control at the equipment and construction materials staging areas would be silt socks placed around the downslope perimeter of the staging areas. The sediment would be filtered through mulch filled socks; the socks would be monitored to maintain their effectiveness. The socks and mulch are biodegradable and would be left in place after use.

Some minor excavation may be necessary to facilitate the flow of water to and through the Main Dam outlet to maintain minimum flow during reconstruction. To reduce the passage of sediment downstream through the outlet during the operation, stacked filter rolls would be placed in front of the outlet prior to creation of the breach area construction dike and maintained during the operation of the outlet. UPPCO also would ensure that sufficient grade control exists upstream of the outlet to avoid any unnecessary channel downcutting.

The borrow areas within the reservoir would not require a separate sedimentation control program because all runoff from these sites would lead back into the reservoir. Excavation would be conducted to minimize sedimentation to surface waters by back sloping where practical and containing the extent of disturbance. To mitigate the possibility that sediment might reach the downstream channel, a large sediment trap would be placed at the entrance to the low-level outlet. The trap would be monitored and maintained as necessary to assure its effectiveness.

All site access would be on existing roads; no new roads would be constructed. Upon completion of construction, protective riprap would be placed on the upstream faces of the dam and dike structures. Disturbed areas on the downstream side of the structures that are not rock-faced would be seeded with a native grass mix. Additional topsoil may be imported and placed to aid in the establishment of stable surface vegetation, as needed. Upland areas that are cleared of trees and brush to allow for construction (e.g., Dike No. 5) would be stabilized, graded, and contoured as appropriate to match the surrounding environment and allowed to reforest naturally.

In addition, as required under Title 40 §§ 110 § 112 of the Clean Water Act, the licensee would be required to develop a SPCC Plan. This plan is required if oil and

petroleum products are stored above threshold quantities when releases could result in impacts to Navigable Waters of the United States. The licensee submitted an example draft SPCC Plan in its Environmental Report, and proposes to submit a final plan when it is developed by the contractor selected for the construction process if the potential applicability of this requirement is confirmed. If this plan contains best management and control practices for spill prevention and containment methods and procedures and is followed during construction, no adverse effects from runoff or spills should occur during construction.

On June 2, 2008, the MDEQ issued a WQC permit to UPPCO, specifying conditions that would need to be followed to help ensure water quality protection. These conditions are summarized under Section 4.3.1, above. Compliance with the conditions, and the measures discussed above, should ensure that construction as proposed by the licensee would not result in any material adverse impacts to water quality.

Effects of Reservoir Refilling on Water Quality

Depending on the timing and rate of storage reservoir refill, and flow conditions, the refill process could have water quality effects both within the reservoir and in areas downstream of the development. Refill could induce suspension of sediment within the reservoir, resulting in an increase in turbidity. Particularly during summer and during low inflows, refilling could negatively effect water quality through changes to water temperature, turbidity, and DO concentrations downstream of the development.

Much of the area in Silver Lake Storage Reservoir dewatered by the May 2003 fuse plug activation has reverted to terrestrial habitat with grasses and shrubs. When these areas would be inundated by the refilling of Silver Lake Storage Reservoir, resulting vegetation decay could increase biological oxygen demand and result in lower DO levels in the lake hypolimnion (deeper areas of the lake). This may also result in an increase in mercury methylization in the lake, resulting in higher levels of mercury in the food chain. UPPCO is investigating a post-construction refill procedure to avoid the development of these conditions. A refill plan being considered would involve removal of at least 50 percent of the vegetation that would be inundated, slowly refilling the reservoir, and resource agency consultation. If such procedures were followed, the water quality in Silver Lake Storage Reservoir following the rebuild should be similar to conditions prior to May 2003, and no short-term or long-term material adverse impacts to water quality should result from the refilling.

Effects of No-Action Alternative

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the Storage Reservoir would not be refilled. Silver Lake Storage Reservoir would continue to be shallow, resulting in warmer water conditions during the summer, more turbidity during high inflow periods and higher likelihood of developing entropic and

swampy conditions. Under this alternative UPPCO would remain unable to provide minimum flows from the lower level outlet which provide a stable and above natural flow level during low flow periods with corresponding enhancement to water quality, most notably to temperature and DO.

5.4.2.4 Fisheries and Other Aquatic Resources

Affected Environment

Silver Lake Storage Reservoir Prior to the Breach

Silver Lake Storage Reservoir was a cold, well-oxygenated, oligotrophic[5] reservoir. The lake contained a diverse mixture of aquatic habitats capable of supporting a mixed coldwater/coolwater/warmwater fish community of deepwater salmonids[6], and good numbers of coolwater and warmwater species (FERC, 2002). The lake was managed by MDNR as a coldwater fishery, with lake trout and brook trout regularly stocked since 1985. Splake (a hybrid cross between brook trout and lake trout) were first stocked in 1987, and about 12,000 splake yearlings are stocked annually. MDNR also conducted operations to remove white suckers and yellow perch between 1984 and 1987, although it appears that both species were increasing in abundance prior to the breach (FERC, 2002).

Cooperative fishery surveys were conducted by MDNR and the licensee in 1992. Splake, brook trout, lake trout, smallmouth bass, yellow perch, cisco, white sucker, creek chub, pumpkinseed, and pearl dace were captured during the lake survey, with white sucker and yellow perch the most abundant species captured. Comparison of 1992 survey data to that collected by MDNR in 1985 and 1987, indicated generally low populations for splake and smallmouth bass; a continued high population of white sucker; an increasing population of yellow perch; and declining populations of brook trout and cisco before the breach. The salmonids may have been declining due to competition with yellow perch (FERC, 2002).

Between October 1991 and October 1992, UPPCO collected water quality data from sites in the Dead River upstream from Silver Lake Storage Reservoir, in the deep waters of the lake near the outlet structure, and from a site in the Dead River below the lake outflow. Continuous water temperature and DO levels were collected from sampling stations in the Dead River above and below the lake. Temperatures and DO in the lake generally met the state water quality standards for a coldwater fishery (FERC, 2002).

[5] Low in nutrients, low productivity.
[6] Fishes of the salmon, trout, and whitefish family.

Silver Lake Storage Reservoir After the Breach

In June 2005, as part of a fisheries assessment of the Dead River Project reservoirs and stream reaches, Normandeau Associates, under contract to UPPCO, completed a detailed assessment of the Silver Lake Storage Reservoir fisheries after the breach (NAI, 2006). Surveys indicated that all species that were dominant members of the fish assemblage prior to the breach were still present in similar relative abundance, although catch per unit effort was higher in Silver Lake Storage Reservoir than in the other reservoirs. There was no indication of fish population failure or problems with missing size classes based on the length frequency distributions, compared to historic surveys. There appeared to be no consistent effect by species that could be related to the breach (NAI, 2006).

The June 2005 lake survey also examined the presence of fish species that serve as hosts for the parasitic larvae (glochidia) of native mussel species. The larvae attach to host fish, which for some mussels may be limited to only a few fish species. This generally harmless parasitic stage may remain attached to the host fish for only a matter of weeks before the larvae transform into young mussels that drop off the fish to begin life in the stream bottom.

Suitable host fish to support three mussel species (cylindrical papershell, fatmucket, and giant floater) were found in both Forestville reservoir and Silver Lake Storage Reservoir (NAI, 2006). The numerically dominant fish species found in Silver Lake Storage Reservoir, white sucker, is a host fish for the cylindrical papershell and fatmucket. Yellow perch, the second most abundant fish collected from Silver Lake Storage Reservoir, is a host fish for the giant floater, cylindrical papershell, and fatmucket. The Silver Lake Storage Reservoir fishery survey also found smallmouth bass, a host fish for fatmucket, and pumpkinseed, a host fish for giant floater.

Even though suitable host fish to support all three mussel species were found in Silver Lake Storage Reservoir, the only live mussel found in July 2004 was a single cylindrical papershell. Therefore, because all three mussel host fish species were present in Silver Lake Storage Reservoir, other factors such as habitat conditions may be responsible for the lack of mussels. The substrate where fatmucket and giant floater were observed in Forestville Reservoir in July 2004 was predominately silty-sand and mud, whereas the dewatered shoreline of Silver Lake Storage Reservoir was predominately sand. The dewatered Silver Lake Storage Reservoir shoreline had relic cylindrical papershell shells that indicated it had the greatest abundance of mussels prior to the 2003 breach. Conversely, the cylindrical papershell was not found in Forestville reservoir in July 2004.

Dead River Prior to the Breach

The Dead River flows for 5.4 miles between Silver Lake and Hoist storage reservoirs. This reach is considered a headwater stream with a relatively narrow width of 15 to 25 feet. The upper 2.3 miles of the reach, from Silver Lake Dam to the confluence with Connors Creek, are moderately steep (average slope of 37 feet per mile). The next 1.6 miles, from Connors Creek to the confluence with Mulligan Creek, have an average slope of 18 feet per mile. The lower 1.5 miles of this reach are relatively flat with a slope of less than 5 feet per mile.

Fish habitat consists of shallow runs, riffles, and pools. The pools are of two types, those formed by beaver activities, and plunge pools formed behind exposed bedrock. Brown trout and brook trout occurred as self-sustaining populations prior to the breach, although MDNR sampling data for the period 1989 through 1991 indicated low population densities for trout and other species between the Connors Creek confluence and County Road 573 Bridge.[7]

MDNR stocks 1,500 brown trout and 1,350 brook trout yearlings in the lower part of the reach annually. Little is known about harvest rates or annual survival rates of trout stocked in this stream reach. MDNR indicated that the heaviest fishing pressure occurs in the half-mile reach between Mulligan Creek and the County Road 573 Bridge (FERC, 2002).

Dead River after the Breach

Normandeau Associates also completed a detailed assessment of the Dead River fisheries after the breach, in July 2004 (NAI, 2006). Habitat results of the riverine assessment were similar to a survey conducted in 2003, immediately after the breach. Most of the habitat was rated as "good", except just downstream of Silver Lake Storage Reservoir and at the mouth of the Dead River, which were generally rated "poor".

The area just below the dam was substantially affected by sediment deposition after the breach, and sand was the dominate substrate in July 2004. Habitat may have naturally improved in this area since the 2003 breach because two of four sites were rated "good" as opposed to all "poor" ratings in 2003 (due to unstable stream banks) (NAI, 2006).

The water depths near the mouth of Dead River were greater than in any other reach. Sand and silt were the dominant substrates since the breach (80 and 90 percent, respectively). Prior to the breach, bedrock and rock-cobble were the dominant substrate.

[7] The bridge is located about one-half mile downstream from the Mulligan Creek confluence.

The best habitat occurred in the McClure bypass channel (NAI, 2006). The bypass channel is a 6.1-mile-long reach that represents a significant portion of habitat in the river. The reach is located downstream of the McClure Storage Reservoir, which is the second reservoir downstream of Silver Lake Development.

The post-breach river fish community composition was similar to that of the pre-breach community. Upper reaches were dominated by small trout. The lower reaches and the McClure bypass channel were dominated by warmwater fishes. Fish community metrics indicated that the cool and warmwater components of the fish community were generally "poor" due to low fish densities. Water quality data indicated that riverine conditions were not limiting the fish community during the July 2004 survey, and matched most trends and conditions observed in 2003 (NAI, 2006).

In June 2004, the aquatic macroinvertebrate community in the river reach immediately downstream of Silver Lake Reservoir was dominated by segmented worms (tubificids) and midge larvae (dipterans). Prominence of these groups indicates a degraded aquatic environment or low quality, with low levels of large woody debris or nutrients. A total of 10 sites were sampled from the Silver Lake Development downstream; of these, six sites were rated as "marginal" benthic macroinvertebrate habitat.

The elevation of Silver Lake Storage Reservoir has stabilized at approximately 25 feet below its lower than pre-breach level. The lake has been reduced in area by more than 1,000 acres since the breach, which resulted in a significant loss of aquatic, riparian, and wetland habitats (see Section 5.4.3, Terrestrial Resources). This area has been dewatered for several seasons, so that grasses and other upland vegetation have become established down to the post-breach waterline.

Environmental Effects and Recommendations

Most of the comments filed in response to the Commission's notice expressed concerns about lake level operations after completion of construction and the lake is re-filled. The applicant, however, is not proposing to change any of the license conditions related to lake operations or minimum flows, so the project should continue to operate as licensed. The licensee has stated that, if rebuilt as proposed, Silver Lake Development would be operated in compliance with the Dead River Project license and the project's February 24, 1999 WQC. We note that article 405 of the project license requires the licensee's operation monitoring plan to include a 3-year test period to determine the licensee's ability to comply with the required reservoir levels. We expect the plan to be filed and monitoring to begin soon after the Silver Lake Development is returned to operation. For this reason, our analysis only addresses the effects of the construction associated with the repair of the Silver Lake Development and refilling the storage reservoir.

Construction Dewatering and Reservoir Water Levels

According to the current license, a monthly minimum flow, ranging from 15 to 25 cfs (highest in the spring), must be released to the Dead River from Silver Lake Development. Since the breach, water is flowing through Dam No. 2 (the breach site) and the Main Dam low-level outlet. During the initial stages of reconstruction, the lake level would be drawn down approximately 3 feet, and the breach area would be blocked off by a cofferdam. Since the cofferdam would block flow through the breach area, all minimum flow requirements must be met by the outlet.

According to the licensee's proposal, the initial construction drawdown could be below the outlet level, so a pump would be used, as needed, to assure minimum flow requirements are met through the outlet. The pumped water would be discharged below the existing gate. Approximately three to four weeks after the start of construction, rain should increase reservoir water level that would provide more than adequate flow through the outlet. Water discharged through the outlet would first be filtered through stacked filter rolls prior to release, to reduce the downstream passage of sediment.

Water releases to maintain minimum flows during construction, whether through the low-level outlet or by pumping, would have some potential to entrain larval or juvenile fishes. Low-level outlet releases would be filtered, while pump releases would involve intake of water from the lake and passage through one or more pumps. The sustained swimming speeds and darting speeds of young fish are generally less than 2.5 feet per second (Bell, 1991), and any young fish entrained in water exceeding that velocity could be entrained in the pump, resulting in some level of mortality during pumping. Any water passing through the stacked filter rolls would likely be of relatively low velocity and fish should be able to avoid entrainment. The highest probability for pump entrainment would be in the spring and summer, after reservoir fish populations spawn, and when juvenile trout emerging from redds in the river upstream could be washed down to the reservoir with higher flows. Any mortality resulting from pump entrainment, however, would be expected to be minor because the volume of water being withdrawn from the reservoir would be small, and the pumping period would be of short duration (3 to 4 weeks). Entrainment could be minimized if relatively low pumping rates are maintained, or screens with openings no larger than 3/32 inch are placed on the pump intake hose(s), or both. UPPCO should consult with MDNR and FWS prior to commencing construction to review plans for maintaining minimum flows, and to implement measures that would ensure fish mortality is minimal during pumping operations.

The elevation of Silver Lake Storage Reservoir has stabilized at approximately 25 feet below its pre-breach level, and its surface area has been reduced by more than 1,000 acres. The reservoir bottom dewatered by the breach has been exposed for several seasons, so that grasses and other upland vegetation have become established down to the post-breach waterline.

The initial construction drawdown would reduce the lake level an additional 3 feet, until Dam No. 2 cofferdam is built and the lake refills to the point where discharge could resume through the low-level outlet. The temporary drawdown below current reduced lake levels may last about 3 to 6 weeks and could affect warmwater fishes because of potential dewatering of shoal-spawning habitat; exposure of aquatic macroinvertebrates and aquatic plants; and some stranding of fish. However, these potential effects are expected to be minor because the drawdown would be short-term, and current wetted lake substrate in this zone is predominantly sand that, as indicated by post-breach survey results, is low quality fish, mussel, aquatic plant, and benthic macroinvertebrate habitat. Deep water and stream-spawning fishes, such as trout would be relatively unaffected by the temporary drawdown. Piscivory[8] may briefly increase during the initial construction drawdown due to increased fish densities per unit volume, although the overall area of the lake may not be substantially different than the current lake area.

UPPCO indicates that it would develop and implement a process to salvage fish stranded by construction activities. Salvaged fish would be returned to the active river channel below the dam, and assuming proper fish handling techniques, mortality would be expected to be low. UPPCO should consult with MDNR and FWS, prior to initiation of construction to develop a fish salvage operations to ensure that operations meet MDNR fisheries management objectives for the Dead River. For example, MDNR may request that certain species be placed in different water bodies in the basin.

The licensee proposes to provide procedures for minimum flow during the proposed rebuilding process and to develop and implement a procedure for the recovery of stranded fish. Staff recommends that the licensee consult with MDNR and FWS to develop methods to minimize fish mortality from pump entrainment and to consult with the same agencies during the development of a fish savage operations plan. The licensee's proposed measures and our additional recommended measures should have minor short-term effects on minimum flows and aquatic habitat affected during the rebuilding process.

Post-Construction Aquatic Habitat

Sand continues to degrade fisheries and benthic macroinvertebrate habitat in some reaches of the Dead River since the May 2003 fuse plug activation (NAI, 2006). The proposed sediment control measures would minimize short-term, construction-related erosion and sedimentation that could add to cumulative effects. The reconstructed facilities would protect Dead River water quality in the long-term by controlling flooding that could cause additional excessive bank erosion and sedimentation, similar to conditions created by the breach. According to the licensee, as sediment flushes out of the system and habitat improves, the Dead River is expected to shift to a healthier benthic

[8] Piscivory refers to fish eating other fish.

macroinvertebrate community that includes the mayflies (ephemeropterans) and stoneflies (plecopterans), as well as improved fish habitat.

While the lake is still at a low water level (prior to refilling), UPPCO would construct 99 log, brush, and whole tree fish shelters in the East Bay of Silver Lake Storage Reservoir (consistent with MDEQ's guidance) to enhance shallow water fish habitat for species like smallmouth bass. Any additional submerged woody vegetation and riprap added to the upstream faces of the reconstructed dams and dikes would also provide additional fish habitat and macroinvertebrate substrate when the lake is refilled.

Following reconstruction, the lake elevation and amount of shallow water habitat would be similar to pre-breach conditions, once any inundated terrestrial vegetation decays. As noted above, UPPCO also would clear 50 percent of the terrestrial vegetation prior to refilling. All pre-breach fish species are present, and fish populations would be expected to increase as a result of the increased reservoir volume, additional shallow-water habitat, and habitat enhancements proposed by UPPCO.

Most of the potential mussel habitat in the wetted portion of Silver Lake Storage Reservoir is moderate or low quality since the breach according to the licensee's Environmental report. No live mussels were found along the dewatered shoreline in July 2004; however, there was a band of relic cylindrical papershell mussel shells. This pre-breach mussel habitat was approximately 15 to 20 feet wide and extended from 11 to 17 feet below full pond elevation. The primary fish host species for all three mussel species are currently found in Silver Lake Storage Reservoir. Following reconstruction, the former cylindrical papershell mussel zone would be rewatered; however, the precise makeup of the substrate in the littoral zone after the breach is not known, and it does not appear that there are extant populations of these mussel species to recolonize the lake. Therefore, all three species may need to be restocked from other reservoirs once post-reconstruction monitoring indicates a sufficient amount of suitable substrate has accumulated to support populations. This, however, would be a management decision by MDNR, as to whether the lake should be restocked and whether or not sufficient numbers of host fish species are present at the time of restocking. Therefore, UPPCO should consult with MDNR and FWS following completion of construction, to prepare a plan for restocking mussels should the agencies determine that would be a management objective.

Wetted habitat for macroinvertebrates after lake refilling may be similar to pre-breach conditions in Silver Lake Storage Reservoir, assuming that the lake substrate has not been substantially altered throughout the lake by the breaching. Adjacent tributaries (e.g. Connors and Mulligan creeks) and downstream drift would provide a source for reestablishing macroinvertebrate biodiversity and ecosystem recovery in the lake and Dead River.

Based on the licensee's proposed activities during reconstruction of the storage reservoir, and following our review of the life history of the identified species, the

proposed construction activities would have short-term, minor impacts on the fish, mussel, and other macroinvertebrate species of concern that would be mitigated to a large extent by the proposed best management and erosion control practices. Restoration of the storage reservoir may enhance aquatic habitat by increasing the available area of shallow warm water habitat for shoal-spawning fishes and potentially increasing the volume of deeper water habitat for cold water salmonids. Construction of the shallow water habitat structures would have long-term benefits for warm water game fishes such as smallmouth bass.

Fish Passage

UPPCO reviewed the possibility of installing fish passage during the reconstruction, and concluded that the Silver Lake Development is not a good candidate for a fish passage facility because it is near the headwaters of the watershed. UPPCO also concluded that the costs of constructing fish passage at the project were not justified by the reasonably anticipated benefits. According to the licensee's Environmental Report, a fish passage facility would also require additional water use at the dam, which may not be available due to limited inflow, downstream minimum flow requirements, and downstream minimum reservoir elevation requirements. We agree that fish passage should not be required at the dam as part of reconstruction, particularly noting the limited benefits that would be provided. FERC (2002) concluded that fish passage was not required at the project. The project license reserves Interior's authority to prescribe fishways if required in the future, pursuant to Section 18 of the FPA.

Effects of No-Action Alternative

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the storage reservoir would not be refilled. Under this alternative, UPPCO would lose its ability to regulate flows in the Dead River, using the Silver Lake Storage Reservoir. UPPCO currently monitors the Dead River from the outlet of Silver Lake Development down to Hoist Storage Reservoir, in accordance with the plans developed under the Dead River Recovery Project. If the desired bankfull discharge return interval called for in the program (i.e., 1.5 years) does not happen naturally, UPPCO, according to its Environmental Report, would, to the best of its ability, would provide the desired return interval by artificially releasing or withholding water from Silver Lake Development, as needed. Post-release maintenance, design features, and associated habitats that were restored under the Dead River Recovery Project downstream of Silver Lake Development depend on these bankfull discharges occurring regularly in the river. If the storage capacity of Silver Lake Storage Reservoir is not restored, it is unlikely that Silver Lake Development could support these flow requirements to assist the continuing restoration of the river.

Aquatic habitat in Silver Lake Storage Reservoir would remain unchanged from existing post-breach conditions. The shallow water habitat for fishes, benthic macroinvertebrates, and mussels lost as a result of the breach would remain as terrestrial habitat, and Silver Lake Storage Reservoir would continue to exist as a somewhat smaller lake. The current fish community would likely remain, although some species may decrease over time with the overall reduction in the size of the lake.

5.4.3 Terrestrial Resources

Affected Environment

Vegetation

The area including and surrounding Silver Lake Development is forested land composed of northern hardwoods (about 29 percent of the area), quaking aspen (13 percent), and paper birch (16 percent) cover types. An additional area is composed of spruce-fir (12 percent), mixed swamp conifer (9 percent), and jack, red, and white pines (5 percent). These forests are mostly second-growth that developed in response to the extensive logging activities in this area around the turn of the century.

Nearly half of the area surrounding Hoist Development is covered by northern hardwoods. Much of the remaining area includes jack pine and quaking aspen forest types. A "special outcrop" geologic feature occurs along the north side of the basin (letter from L. Sargent, Michigan Natural Resource Heritage, MDNR, to G. Whelan, MDNR, dated September 16, 1997). The extensive outcrop area consists of shale, supporting scattered white spruce and balsam fir, with a relatively dense shrub and diverse herbaceous stratum.

Hoist Storage Reservoir supports relatively extensive scrub-shrub and emergent marsh wetlands at the southwest end of the reservoir, and at the mouth of Clark Creek. Within the existing reservoir (up to normal maximum elevation), these wetlands are characterized by willow, bulrush, wool-grass, various sedges, and a small rush. Cattails are relatively uncommon. Extensive scrub-shrub wetlands extend inland from the reservoir's edge, characterized by shrubby willows and sweet gale. Narrow-leaved gentian, listed by the state of Michigan as threatened, grows in a wetland along the bank of Clark Creek near where it enters the reservoir. Within the reservoir, the applicant estimates emergent and aquatic vegetation covers approximately 378 acres (UPPCO, 2008).

Wildlife

The Dead River and surrounding areas provide upland and wetland habitat to about 250 wildlife species. The mix of deciduous forest, forested and scrub-shrub wetlands, and open water, which characterizes the project area, provides habitat for a

diverse big-game wildlife assemblage, including white-tailed deer, moose, and black bear. Furbearers that require or benefit from proximity to open water or wetland habitats are common in the project area, and include river otter, mink, raccoon, striped skunk, beaver, and muskrat (UPPCO, 2008). The distribution of this wildlife assemblage can be affected by human activities associated with residential development and recreation. These activities can reduce or eliminate use of habitat by some big game species, such as black bear, and by furbearers such as river otter and mink. The density of human habitation and activities in the project area tends to increase in a west-to-east, or upstream to downstream, direction.

Throughout the year, the project also supports a diverse bird community that includes year-round residents, breeders, and transients that stop to rest and feed during migrations. The combination of open water, marsh and scrub-shrub wetlands, and undeveloped shoreline provides good breeding and staging habitat for waterfowl including mallards, black ducks, common mergansers, hooded mergansers, wood ducks, buffleheads, northern pintails, Canada geese, redheads, lesser scaup, common loons, blue-winged teal, and double-crested cormorants. The latter is designated by the state of Michigan as a species of special concern.

Small islands such as those found in Silver Lake and Hoist storage reservoirs provide excellent nesting habitat for a variety of waterfowl species. Applicant observations of broods of mallards, black ducks, and common mergansers support this account. Redheads and loons may also nest in the project area; they typically nest in aquatic vegetation along shorelines. Other waterfowl often nest in scrub-shrub wetlands, which occur adjacent to the project reservoirs and connecting reaches of the Dead River (UPPCO, 2008).

The common loon is listed by the state of Michigan as threatened. No nesting loons have been documented on the project reservoirs, but the shoreline of Silver Lake Storage Reservoir provided suitable nesting habitat for this species prior to the May 14, 2003 activation of the fuse plug spillway in Dam No. 2. Shorebirds known to reside in the project area include sandhill crane, great blue heron, and spotted sandpiper. The great blue heron (and belted kingfisher) feed on fish. The great blue heron also feeds on aquatic and wetland vertebrates found along the water's edge. Spotted sandpipers as well as killdeer feed on smaller invertebrates found along the water's edge and adjacent banks.

Raptors recorded from the project area include the bald eagle, sharp-shinned hawks, and osprey. Osprey and bald eagles prey exclusively on fish and usually nest in taller structures, often near open water. No active nests were observed by the applicant during a 1992 survey, but a reported osprey nesting occurrence in 1989, and observations of a possible unoccupied nest during the 1992 survey, indicate that the project area may have supported breeding osprey (UPPCO, 2008). Merlin, state-listed as threatened, have been observed in the project area, as have northern harriers and Cooper's hawks, which are both designated by the state as species of special concern.

Marsh, scrub-shrub, and forested wetlands adjacent to project reservoirs provide habitat for reptiles and amphibians. Blanchard's cricket frog and the boreal chorus frog, which are both listed by the state of Michigan as species of special concern, occurred in or near shallow water and marshy lakes, and could occur in the project area. The wood turtle, also a species of special concern, hibernates in ponds and lakes, and may also occur in the project area (FERC, 2002).

By maintaining established water levels at the project, acres of waterfowl habitat have been sustained. The licensee's waterfowl management activities focus on the reservoir and the licensee restricts water level fluctuation, while simultaneously considering public safety and downstream water needs. Wildlife management activities on project lands focus on the installation and maintenance of a nesting structure. The licensee cooperates with MDNR and FWS to develop and implement those wildlife activities established in the Wildlife Management Plan.[9]

Environmental Effects and Recommendations

Terrestrial resources within the proposed construction area would be impacted during clearing and grubbing of forested areas. Existing shrub and trees that are currently providing wildlife habitat would be eliminated. Habitat loss would be temporary until construction is complete and the area is reseeded and enough time passes to allow for restoration.

In addition to loss of habitat, construction noise and human activity would cause additional disturbance to wildlife species, causing some of the less tolerant local wildlife species to relocate away from construction activities. It is expected that mammals and birds would avoid the areas of construction. However, this is expected to be a short-term impact. Wildlife common to the area are expected to be accustomed to frequent human disturbances and would experience few incremental impacts. Sufficient habitat, food, and water can be found nearby during the single construction season. Once construction is complete and the large amount of human activity has been removed from the area, wildlife should return to nearby forested areas as conditions revert to those similar to pre-construction.

At the start of construction, parking areas, laydown areas, borrow areas, and areas for equipment and personnel trailers, etc., would be developed. Some areas may need to be cleared and grubbed and others may require some grading and leveling. About 100 acres have been identified as areas that may need to be cleared for safe construction access and maneuverability. Areas of vegetation clearing would be allowed within the approved defined construction limits and would be subject to erosion control measures. Wetland areas would be avoided and effects minimized to the extent practicable.

[9] Article 411 of the Dead River Hydroelectric Project license.

Compensation would generally be required for most impacts that are not avoided or minimized. Consideration would be taken to use areas previously disturbed during the original construction of the project as staging or parking areas. Therefore, no significant impacts are expected to affect wildlife habitat or terrestrial resources in these areas.

The deforestation and removal of vegetation in the proposed laydown and staging areas, in addition to those areas previously cleared, may cause a negative impact to terrestrial resources unless the area is revegetated. Without proper reforestation practices there may be the potential for nuisance or invasive plant species to colonize the area. Reseeding of these areas needs to be done with the goal of restoring the area back to pre-cleared conditions. In order to mitigate for the loss of vegetation and wildlife habitat, these areas need to be reseeded with plant, grass, and tree species that are currently present in the surrounding areas. The licensee states that reseeding would be accomplished according to the licensee's erosion and sedimentation control measure design drawings (UPPCO 2008).

By clearing and grubbing these areas, the licensee is essentially removing certain types of wildlife habitat. Special attention needs to be taken to restore this habitat back to its original state as closely as possible. Reseeding with an approved seed mixture is the best approach, so as not to introduce invasive or exotic species into the area. Consultation with the resource agencies is necessary to determine the proper seed mixture and plant species needed to reforest areas previously cleared and those proposed for clearing. These areas include laydown areas, staging areas, areas around the perimeter of the dam and dikes, parking areas, and access roads.

In order to mitigate for the loss of forest and forested habitat, staff recommends that the licensee develop a reforestation plan in consultation with MDNR and FWS. Proper reseeding and planting efforts should be determined in order to assure a successful and timely reforestation of the cleared acreage. The licensee should consult with these agencies to determine the proper species, size, age, and ratio of species to reseed or plant that are suitable for the area. These areas should be monitored to assure that the plantings survive and whether or not additional plants are needed over time.

Also, consultation should include methods for preparing the area post-construction, to ensure proper soil conditions are present before seeding and planting. Preparation may include removal or partial removal of hardfill material. The soil compaction and hardfill material present at the staging areas may impede vegetation efforts by inhibiting root stabilization and water permeation. The resource agencies should be consulted to determine the extent to which the materials need to be removed and the amount of soil replenishment needed. The licensee should file its reforestation plan with the Commission, for approval, within one year of issuance of the EA and any written authorization to rebuild the development. The plan should include a vegetation monitoring component, the resource agencies' comments, and the licensee's response to the comments.

In summary, the Proposed Action would not adversely impact upland resources. During pre-construction planning, consideration would be taken to use areas previously disturbed during the original construction of the project as staging or parking areas and access roads in an effort to reduce disturbing existing vegetation. Some vegetation clearing would occur during construction activities, but this clearing would have a short-term, minor impact. UPPCO would mitigate for the loss of vegetation and wildlife habitat by restoring the disturbed areas with plant, grass, and tree species that are currently present in the surrounding areas.

Disturbances to wildlife related to the increased noise and human activities are expected to be short-term and minor. Wildlife common to the area are expected to be accustomed to frequent human disturbances at the project and would experience few incremental impacts during construction. Loss of habitat and localized disturbances due to restored recreational use of the project area is expected to have a long-term, minor effect. Existing forest management practices would remain in effect, and the forests immediately surrounding Silver Lake Storage Reservoir would continue to be conserved and managed according to UPPCO's forest management plan for the project area. Therefore, no significant impacts are expected to affect wildlife habitat or terrestrial resources in these areas.

Effects of No-Action Alternative

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the storage reservoir would not be refilled. This alternative would have similar effects on the terrestrial resources of the area when compared to rebuild activities. Construction activities would still need to take place for stabilization work. Impacts would cause disruption to wildlife habitat due to noise and human activity. Similar land disturbance also would occur from construction activities.

5.4.4 Wetlands

Affected Environment

UPPCO, in its 1994 license application, estimated the total wetland area occurring within the normal maximum pool elevations of the three Dead River Project impoundments to be approximately 418 acres (UPPCO, 2004). However, staff, using National Wetlands Inventory maps, estimated the acreage of (palustrine) emergent marsh, scrub-shrub and forested wetlands within the reservoir pools, as well as wetlands contiguous with the reservoir and Dead River shorelines within the project area. Staff estimates indicate a significantly higher acreage of wetlands (1,418 acres) directly associated with the project reservoirs and project reach of the Dead River. Wetlands comprised 1,273 total estimated acres at Silver Lake Storage Reservoir (FERC, 2002).

Prior to the May 14, 2003 dam breach, the most extensive wetlands at the Dead River Project were palustrine types associated with the shorelines of Silver Lake, Hoist, and McClure storage reservoirs. The palustrine wetlands were extensive and diverse, including emergent, scrub-shrub, and forested wetland vegetation. Dense emergent vegetation occurred along the margins of the reservoirs and was commonly dominated by bulrush, wool-grass, and often accompanied by sedges and rushes. Spike-rush and water horsetail occurred as occasional emergents in water depths to about 3 feet. Cattails occurred in only a few very small stands. Scrub-shrub palustrine wetlands were dominated by shrubby willows, sweet gale, and, occasionally, meadowsweet. Forested palustrine wetlands were dominated by white cedar and/or eastern hemlock with white pine, white spruce, paper birch, and yellow birch nearly always present as secondary or associated species. The aquatic plant species inventoried at wetland and aquatic sites in 1992 at Silver Lake Storage Reservoir were typically dominated by water smartweed or pondweeds, which occurred as sparse to dense aquatic beds scattered in shallow water along the shores of the reservoirs. These species often were accompanied by manna grass or bur-reed (UPPCO, 2008).

The impacts to these areas due to the current lower lake water elevation have not been reassessed since the 2003 dam breach. At the time of the original licensing application, emergent and aquatic bed vegetation occupied about 33 acres of the 1,273 total estimated acres of Silver Lake Storage Reservoir at an elevation of 1,483.5 feet NGVD and was only common in backwater coves and deltas of streams entering Silver Lake Storage Reservoir.

King & MacGregor Environmental, Inc. (KME) conducted the Dead River Recovery Assessment Wetland/Floodplain Survey for UPPCO in 2004, documenting wetland/floodplain locations and acreages affected by the 2003 event. KME (2005) estimated about 1,452 acres of pre-event wetlands located throughout the study area which encompassed the outlet of Silver Lake Development downstream to Lake Superior, excluding the Tourist Park Basin. This included 31 acres of unknown wetland type, 2 acres of open water (not including impounded water), 1 acre of palustrine flat, 254 acres of emergent, 594 acres of scrub-shrub, and 570 acres of forested wetland.

Wetlands in the study area ranged from apparently unaffected by the 2003 event to being eliminated as functional wetlands. Wetlands that were created as a result of the 2003 event were predominantly located upstream of Hoist Storage Reservoir and downstream of the former Tourist Park development near Lake Superior. The created wetland estimates were obtained by observations made during the onsite review and interpretation of data developed using geographic information system (GIS), including areas that were recently scoured, eroded, or exposed down to a level where the sites exhibited wetland hydrology. Approximately 16 acres of wetlands are estimated to have been created as a result of the 2003 event. This includes approximately 13 acres of emergent and 3 acres of palustrine flat wetland (KME, 2005).

Some wetlands in the study area were substantially impacted and/or converted to upland as a result of sedimentation or hydrologic alteration during the 2003 event. Eliminated wetlands were identified predominantly upstream of Hoist Storage Reservoir and downstream of Tourist Park development. The total acres of wetlands eliminated as a result of the 2003 event was about 95 acres. This includes 30 acres of unknown wetland type, 42 acres of emergent, 16 acres of scrub-shrub, and 7 acres of forested wetland (KME, 2005). Wetlands that were not impacted by the 2003 event were located primarily in the lower reaches of the project area, particularly those in lateral areas of the floodplain where sediment or high water flow did not reach.

A qualitative wetland functional assessment of the post-event wetlands was also conducted to assess plant community quality, wildlife habitat, and fishery habitat. One finding of the functional assessment was that there were no wetlands that were rated as exceptional functional quality within the study area. A majority of the wetlands were rated either low or moderate on the functional assessment, with some high ratings attributed. Thus, the overall functional quality of the post-event wetlands at the time of the assessment was medium to low (KME, 2005).

KME conducted a second wetland survey in 2007 that limited the investigation to the Silver Lake Storage Reservoir reconstruction project area, including the areas surrounding the existing dam and dikes. Results indicate that wetlands areas identified below the normal pool elevation of the Silver Lake Storage Reservoir are large emergent wetlands located mainly west of the existing dam. The vegetation identified in these areas include species such as sphagnum moss, cattail, tussock sedge, blue joint grass, grass-leaved goldenrod, Joe-pye weed, and speckled alder. Standing water is present within portions of these wetlands, mainly associated with Silver Lake Storage Reservoir (KME, 2007). These wetlands were located by interpretation of aerial photography during the field investigation.

Environmental Effects and Recommendations

UPPCO indicates that it works to preserve, protect, and manage all wetlands within the project boundary to maximize their attributes with a primary emphasis on water conservation, wildlife, recreation, and scenic or scientific values. The licensee has agreed to: 1) recognize the obvious and subtle natural values [of wetlands] when conducting management or operational activities, and take all reasonable steps to minimize harmful effects; 2) maintain control of vital wetlands under licensee-ownership when to relinquish such control would risk degradation of wetland values; 3) continue hydroelectric project operations that minimize adverse impacts to the quality or quantity of waters that maintain wetlands; and 4) consult with the MDNR when project operations impact wetlands.

As a result of the dam breach, Silver Lake Storage Reservoir's water elevation has been reduced by more than 25 feet, reducing the area of the lake by more than 1,000 acres. Approximately 16 acres of new wetlands were created and 95 acres of historical wetlands were eliminated as a result of the 2003 fuse plug activation. The rebuild would result in the re-establishment of wetland systems at Silver Lake Storage Reservoir. UPPCO states that seasonal drawdown would be managed to approximate natural conditions of high water levels in the spring, a slow drawdown over the summer months, and higher water levels in the autumn resulting from more frequent rain events. This operation would likely encourage the restoration of wetlands that were degraded or eliminated by the 2003 fuse plug activation.

Effects of the Proposed Action on existing wetlands would be minimal and short-term. Construction of the new spillway and other dam improvements would require the elimination of a small area of existing wetlands, mainly in the vicinity of the dam footprint where dikes be modified. This would include the disturbance of less than one-third of an acre. Additionally, a small wetland area (less than 0.7 acre) currently identified as part of a borrow area may also be lost.

UPPCO proposes to consult with MDEQ to determine the appropriate form and amount of compensatory mitigation and protection that may be required, if any, for the construction activities that result in the loss of wetland resources.

UPPCO states that depending on the extent of impact, nature of the project, quality of the wetlands impacted, and other considerations, some type of mitigation or offsets may be required. Potential mitigation measures, if required, may include new wetland establishment, restoration, enhancement and permanent legal protection/perpetual maintenance. However, it is not believed that active wetland mitigation (i.e., creation of new wetlands) would be necessary in this instance because the area of anticipated impact is minor, the quality of the impacted wetland areas is marginal, and the completion of the rebuild is expected to result in the gain or restoration of significant wetland and aquatic resources that were degraded and or lost as a result of the 2003 fuse plug activation.

MDEQ has regulatory authority over the on-site wetlands due to their size (greater than 5 acres) and proximity (direct nexus) to a water body. As such, a permit must be obtained from MDEQ prior to conducting most filling, dredging, and/or draining activities, or maintaining a use of a regulated wetland. On June 2, 2008, the MDEQ issued a WQC permit to UPPCO, addressing, in part, placement of fill within wetland areas, as summarized under Section 4.3.1, above. Compliance with the WQC conditions would further protect wetland areas and water quality.

MDNR and FWS commented that the proposed mode of operation for Silver Lake Development, with its excessive drawdown, would result in unanticipated negative effects to wetlands and shallow water habitat used by fish and wildlife. Operation after the rebuild is outside of the scope of this EA. The licensee would be required to operate

the project's facilities according to the project license, article 411, and its approved Wildlife Management Plan. However, the licensee has stated that if rebuilt as proposed, Silver Lake Development would be operated in compliance with the Dead River Project's license and 1999 WQC. We note that article 405 of the project license requires the licensee's operation monitoring plan to include a 3-year test period to determine the licensee's ability to comply with the required reservoir levels and we expect the plan to be filed and monitoring to begin soon after Silver Lake Development is returned to operation.

Although we are not addressing post-construction operation, ultimate restoration of the reservoir should allow pre-event wetlands and habitats to recover. However, a number of wetlands that existed prior to the dam breach no longer function as wetlands. Alternatively, new wetlands may have been formed during the event. On-going stream restoration efforts would include the creation of new wetlands adjacent to the Dead River, plus any additional opportunities within areas identified as potential wetland creation sites. Restoration of the reservoir may also provide an added benefit by increasing the available area of surface water for indigenous and migratory waterfowl. The relatively extensive areas of potential dewatered aquatic substrate would be managed and available for foraging wading birds and shore birds.

Temporary drawdown of the reservoir would occur during reconstruction activities. However, affects to adjacent wetlands would be short-term. The proposed action would restore the lake to essentially similar operating levels consistent with the current license conditions, and increase aquatic habitat and shoreline wetlands. UPPCO states that, wherever possible, it would work to minimize effects on wetlands, but that in some cases the construction of trails, paths, or roads could affect small areas of wetlands near the project facilities. UPPCO's proposed erosion control measures and implementation of best management practices for these sensitive resource areas should reduce, to the extent possible, impacts associated with the short-term construction activities.

Although not currently identified as an issue at the project, disturbance associated with the temporary drawdown and removal of vegetation may create sites where the introduction of invasive weeds, such as purple loosestrife, could establish. UPPCO should consult with the MDNR and FWS on temporary revision of its approved Nuisance Plant Control Plan (license article 412), or the use of other temporary measures to address any effects from disturbance associated with the Proposed Action, as appropriate.

While MDEQ-regulated wetlands were confirmed within the project area, significant resource impacts are not expected from the planned construction. The majority of on-site wetlands were created or impacted as a result of previous construction activity on the site, or are inundated when the reservoir is at normal pool. UPPCO would note on its construction specifications a wetland and riparian area buffer zone, within which construction impacts would be avoided, if possible. Historical wetland areas

would be reestablished to conditions similar to those prior to the 2003 fuse plug activation, to the extent possible. Overall, no significant impacts to wetlands are anticipated due to the proposed action.

Effects of No-Action Alternative

The No-Action Alternative would result in the gradual loss of wetlands as the previous marginal areas around the lake. Formerly inundated land would transition to emerging upland vegetation. The wetlands would stabilize over time and would remain in place and continue to be influenced by the natural hydrology of the reservoir and river basin.

5.4.5 Threatened and Endangered Species

Affected Environment

By letter dated February 22, 2007, FWS identified two species that are federally-listed under the Endangered Species Act (ESA), the bald eagle (*Haliaeetus leucocephalus*) and Canada lynx (*Lynx canadensis*), that may occur within the proposed project area. FWS also identified gray wolves as potentially occurring within the project area.

Bald eagles were observed within the project area during field surveys conducted in May 1992 and November 2007. It is likely that the Silver Lake Reservoir is used for feeding, on occasion, by adult eagles. However, the only nest in the area, unoccupied in 2005 and 2006, is located on a peninsula on the northern shorelines of Silver Lake Reservoir. Low densities of suitable nest sites and the density of human habitation along Dead River create a low-quality area for nesting. It is unlikely that Silver Lake Reservoir is critical habitat for nesting bald eagles, and no concentration of eagles is known to occur within, or in close proximity to, the area of construction. The bald eagle has been delisted, effective August 8, 2007, but continues to be protected by other statutes.

Canada lynx prefer dense, mature stands of conifer or mixed conifer forests and are highly sensitive to the presence of humans (Michigan Natural Features Inventory, 2007). Common prey items include small mammals, beaver, deer, and birds, although the snowshoe hare is their primary prey. In Michigan, recorded observations of Canada lynx exist in Keweenaw and Mackinac counties. There is no record of the species within Marquette County, where the Dead River Project is located.

Gray wolves are known to occur within the area of the Silver Lake Development. Gray wolf tracks and scat were observed during 2006 and 2007 surveys. It is likely that the area is used by gray wolves for feeding and cover. However, no gray wolf dens are known to exist within or in close proximity to the area of investigation. After March 12,

2007, gray wolves in the Western Great Lakes Distinct Population Segment, which includes the project area, were removed from federally protection. However, the animal is considered a Michigan threatened species.

No federal or state threatened or endangered plants, or plant species of concern, or areas of special significance, were encountered in the vicinity of the Silver Lake Development during a KME threatened and endangered plant species inventory conducted in August-September 2007.

Environmental Effects and Recommendations

Construction activities under the Proposed Action are mostly limited to the dam and dikes, where the species under discussion are unlikely to be present. Noise and human activity could cause any eagles present to temporarily relocate. Once the proposed rebuild was complete, any eagles would likely return, and the restoration of the reservoir could benefit bald eagle by increasing potential foraging habitat. Existing management practices for bald eagle would remain in effect during construction, according to UPPCO's Bald Eagle Protection and Management Plan, which follows guidelines provided in the Northern States Bald Eagle Recovery Plan.

Canada lynx are secretive and sensitive to human presence. Construction and human activity under the proposal would make it unlikely that lynx would utilize this habitat. Therefore, because there is no evidence that lynx exist in the immediate project area, the Proposed Action would have no effect on the Canada lynx.

Additionally, under the licensee's Wildlife Management Plan, approved under license article 411, if any threatened or endangered species are identified within the project boundaries, the licensee shall implement specified practices in consultation with the MDNR and FWS.

Based on our review of the licensee's Proposed Action, our review of the life history and range of the identified species, and results of recent threatened and endangered species inventories, have determined that the Proposed Action would have no effect on any federally-listed endangered or threatened species. Consequently, staff concludes that no formal consultation was necessary.

Effects of No-Action Alternative

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the reservoir would not be refilled. Therefore, there would be no effect to bald eagles, Canada lynx, or gray wolves as a result of the No-Action Alternative.

5.4.6 Cultural and Historic Resources

Archaeological Resources

In the late 1980's, a number of archaeological sites within the Silver Lake Storage Reservoir were documented during a period of low reservoir elevation. Subsequent studies at Silver Lake Development were undertaken by Historical Research, Inc. (Roberts et al., 1992) and the Institute for Minnesota Archaeology (IMA) (Mooers, 1993; Dobbs and Breakey, 1994) as part of Dead River Project licensing. IMA evaluated some of the previously-recorded sites as well as a number of new resources for NRHP eligibility. On April 6, 1994, the Michigan SHPO agreed with the licensee that none of the sites within the Silver Lake storage reservoir fluctuation zone identified to date were eligible for listing in the NRHP.

In July 2006, Archaeological Services, Inc. (AVD) (Van Dyke, 2006) presented the results of an archaeological survey of proposed peat borrow areas, fish spawning areas, a woody debris area, and a system of access roads associated with the Dead River Project within the Silver Lake Development. Artifact scatters were found at three of the areas and buffer zones were established at each site to avoid potential impacts during construction activities. No additional protection or NRHP evaluations were deemed necessary. In August 2007, AVD was again retained to conduct an additional archaeological survey for proposed dikes nos. 4 and 5 at Silver Lake Development (Van Dyke 2007a). No cultural materials were observed in these two areas. Finally, in October 2007, AVD conducted archaeological surveys of six areas where project rebuild activities could affect cultural resources (Van Dyke 2007b). No new resources were recorded, but together, these studies identified a total of eleven previously recorded sites within the six proposed construction areas (Project APE) and no new sites.

Historic Silver Lake Development Hydroelectric Structures

While the original Silver Lake dam was constructed in 1896 by the city of Marquette, the current Silver Lake dam and spillway was constructed between 1944 and 1945. A caretaker's house associated with the dam (historic resource 20MQ83) is a hybrid structure that was built in the 1920's by two different dam-tenders in the 1920s; a rear addition was added in 1944. These two structures were evaluated for the NRHP (Roberts et al., 1992) and determined by the SHPO to be ineligible for listing (letter to Stone and Webster Michigan, Inc. from the Bureau of Michigan State History, State Historic Preservation office, dated April 6, 1994).

Traditional Cultural Properties

Historic properties also include places of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet NRHP criteria. Traditional Cultural Properties (TCPs) are a type of historic property that are eligible for

inclusion in the NRHP because of their association with cultural practices or beliefs of a living community that: 1) are rooted in that community's history; or 2) are important in maintaining the continuing cultural identity of the community (Parker and King, 1998). Examples of TCPs are:

- locations associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world;
- a rural community whose organization, buildings and structures, or patterns of land use reflect the cultural traditions valued by its long-term residents;
- an urban neighborhood that is the traditional home of a particular cultural group, and that reflects its beliefs and practices;
- locations where Native American religious practitioners have historically gone and are known or thought to go today, to perform ceremonial cultural practices; and
- locations where a community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its historic identity (Parker and King, 1998).

There are no known TCPs within the Silver Lake Development area.

Environmental Effects and Recommendations

The licensee's Environmental Report identifies eleven archaeological sites that are located within the construction zone of the Proposed Action. On April 6, 1994, the Michigan SHPO agreed with the licensee that three of these sites, 20MQ40, 20MQ40A, and 20MQ87 were not eligible for listing in the NRHP. The Commission and licensee therefore have no further responsibilities regarding these sites and flagging them for avoidance is not necessary. However, two additional sites not identified by the licensee in its report also appear to be located within or immediately adjacent to the construction area. These are: 20MQ74 (lithic scatter) and 20MQ83 (Silver Lake dam caretaker's house and two historic scatters). Site 20MQ74 has been determined ineligible for the NRHP (letter from K.B. Eckert, Michigan SHPO to H. Copeland, Project Manager, Stone & Webster Michigan, Inc., dated April 6, 1994); however, the licensee stated that this site also has been flagged for avoidance during construction activities (email from S. Puzen, UPPCO to A. Macdougall, The Louis Berger Group, dated April 23, 2008). The historic Silver Lake dam caretaker's house at 20MQ83 was determined to be ineligible for the NRHP in 1994 and therefore requires no further treatment. However, two historic refuse scatters associated with this structure have not been evaluated and should be added to the licensee's list of potentially eligible resources located within vicinity of the construction area.

The licensee states that all previously documented archaeological sites have been flagged and would be avoided during construction activities. In a letter to the Licensee dated February 28, 2008, KBIC commented that the licensee's Environmental Report did not specify a buffer zone to be set for each archaeological site to be avoided. The licensee has since clarified that flagging included a 5-meter buffer zone and that the flagging would be inspected by AVD prior to construction to ensure that it is still intact (email from S. Puzen, UPPCO to A. Macdougall, The Louis Berger Group, dated April 4, 2008).

The licensee's April 4, 2008 email also states that the licensee verbally agreed to KBIC to evaluate seven newly discovered sites for listing on the NRHP (phase II surveys). The licensee states that these sites are located within reservoir elevation fluctuation zone, have been subject to erosion during past operations, and may be subject to erosion during current normal project operations. Subsequent correspondence with the licensee indicated that only one of these seven sites, 20MQ225, also is located within the construction area for the Proposed Action. The remaining six sites 20MQ193, 20MQ194, 20MQ215, 20MQ220, 20MQ240, 20MQ243 are located outside the construction area but within the reservoir fluctuation zone.

It would be our recommendation that NRHP evaluation of fifteen sites (the eight unevaluated sites within the construction zone [historic scatters of 20MQ83, 20MQ197, 20MQ223, 20MQ224, 20MQ226, 20MQ226D, 20MQ244, and 20MQ245], six unevaluated sites located strictly within the reservoir fluctuation zone [20MQ193, 20MQ194, 20MQ215, 20MQ220, 20MQ240, and 20MQ243]), and one site [20MQ225] that is located within both the construction zone and the reservoir fluctuation zone), would be necessary before construction begins near these sites and/or before reservoir refill begins. We would not require the licensee to flag the four sites that have been determined to be ineligible for the NRHP (20MQ40, 20MQ40A, 20MQ87, 20MQ74), but the licensee may do so at their own discretion (see Table 5).

Table 5. Archaeological sites within the Proposed Action area (source: Van Dyke, 2007b, as modified by staff)

Site Number	Source of Information	Type	NRHP Eligibility	Location
20 MQ 40	ER refers to AVD (2007)	Lithic scatter	No (SHPO 1994)	Construction zone
20 MQ40A	ER refers to AVD (2007)	Lithic scatter	No (SHPO 1994)	Construction zone
20 MQ87	ER refers to AVD (2007)	Lithic scatter	No (SHPO 1994)	Construction zone
20 MQ74	Identified by Staff as in APE	Lithic scatter	No (SHPO 1994)	Construction zone
20 MQ83	Identified by Staff as in APE	Dam caretaker's house and two associated historic debris scatters	Dam caretaker's house, no; historic debris scatters, unknown (SHPO 1994)	Construction zone
20MQ197	ER refers to AVD (2007)	Lithic scatter	Unevaluated	Construction zone
20MQ223	ER refers to AVD (2007)	Lithic scatter	Unevaluated	Construction zone
20MQ224	ER refers to AVD (2007)	Lithic scatter	Unevaluated	Construction zone
20MQ225	ER refers to AVD (2007) and scheduled for evaluation per licensee	Lithic scatter	Unevaluated	Construction zone and reservoir fluctuation zone
20MQ226	ER refers to AVD (2007)	Lithic scatter	Unevaluated	Construction zone
20MQ226D	ER refers to AVD (2007)	Lithic scatter	Unevaluated	Construction zone
20MQ244	ER refers to AVD (2007)	Lithic scatter and historic bedrock carvings	Unevaluated	Construction zone
20MQ245	ER refers to AVD (2007)	Historic scatter and lithic scatter	Unevaluated	Construction zone
20MQ193	Scheduled for evaluation per licensee	Unknown	Unevaluated	Reservoir fluctuation zone

Table 5, cont.				
Site Number	**Source of Information**	**Type**	**NRHP Eligibility**	**Location**
20MQ194	Scheduled for evaluation per licensee	Unknown	Unevaluated	Reservoir fluctuation zone
20MQ215	Scheduled for evaluation per licensee	Unknown	Unevaluated	Reservoir fluctuation zone
20MQ220	Scheduled for evaluation per licensee	Unknown	Unevaluated	Reservoir fluctuation zone
20MQ240	Scheduled for evaluation	Unknown	Unevaluated	Reservoir fluctuation zone
20MQ243	Scheduled for evaluation	Unknown	Unevaluated	Reservoir fluctuation zone

Should any of the evaluated sites be determined to be eligible for the NRHP, appropriate mitigation measures should be developed in consultation with the Commission, the SHPO, and the participating tribes. We would also require that the 2004 HPMP be revised appropriately to address eligible sites and filed with the Commission for approval following consultation with the SHPO.

In its letter dated February 28, 2008, KBIC states that other Indian Tribes also may have documented interests in the project site and recommended that the licensee consult with these other tribes. Section 106 of the NHPA and its implementing regulations 36 CFR 800.2(c)(2)(ii) call for consultation with "any Indian tribe or Native Hawaiian organization that attaches religious or cultural significance to historic properties that may be affected by and undertaking." The licensee has since clarified that AVD contacted other tribes as part of its background research before completing the archaeological surveys.

The licensee also states that during construction planning, a procedure would be developed and implemented to address any unanticipated archaeological materials that may be discovered during construction activities. Should any archaeological properties be identified during ground disturbing activities, the procedures for unanticipated discoveries identified on pages 6 and 7 of the Historic Properties Management Plan should be closely followed. Finally, a supplement to the 2004 HPMP should be filed with the Commission that addresses the results of subsequent archaeological surveys undertaken for the Proposed Action. Staff concludes that historical and cultural resources in the area would be protected though avoidance and by evaluation of undocumented

sites to determine eligibility. In addition if any sites are determined to be eligible, the licensee would develop an appropriate mitigation plan consistent with its HPMP.

Effects of No-Action Alternative

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the storage reservoir would not be refilled. The licensee states that a No-Action Alternative will have neither a positive or negative impact on cultural resources. However, as mentioned in Section 3.3 above, under the No-Action Alternative, which is the current condition, the storage capacity of Silver Lake storage reservoir would remain limited. The current condition allows no ability to regulate river flow or assist in flood control. Over the long-term, this would result in a higher degree of shoreline erosion and river bottom scouring and could result in erosion to sites currently not affected by reservoir fluctuation. Finally, exposure of typically inundated resources could result in impacts associated with recreational use, illicit artifact collection, and/or site vandalism.

5.4.7 Recreation

Affected Environment

The Dead River Project is located in the central region of Michigan's Upper Peninsula on the Dead River in Marquette County, Michigan. There is an abundance of natural outdoor recreational resources around the Dead River Project. These resources include lakes, streams, waterfalls, and forests. Nearly one quarter of the land in Marquette County is publicly owned (national forests, state forests, state parks, state boating/fishing sites). Traditional spring, summer, and fall recreational opportunities include fishing, hunting, boating, canoeing, and camping. Off-road vehicles frequently use the project area during these seasons. Snowmobiling, cross-country skiing, and ice-fishing are traditional winter activities (FERC, 2002).

Marquette County includes one state park (Van Riper), nine state forest campgrounds, one county campground, and four township or city campgrounds. In addition to the recreation facilities operated by the licensee, recreation facilities in Marquette County provide a total of 533 campsites, 19 picnic areas, 18 boat launches, and a variety of other facilities. In addition to 11 trails in these parks and campgrounds, there are 6 scenic hiking trails in Marquette County. Marquette County also has approximately 200 miles of snowmobile trails (FERC, 2002).

Pursuant to Standard Article 17,[10] attached to the project license at the time the project was licensed, the licensee is required to construct, maintain, and operate, or shall

[10] Form L-10 (1975) "Terms and Conditions of License for Constructed Major Project Affecting the Interests of Interstate or Foreign Commerce."

arrange for the construction, maintenance, and operation of such reasonable recreational facilities as may be prescribed by the Commission during the term of this license. Currently, the licensee manages its formal recreation facilities at the project through its Recreation Plan, as approved by the Commission under article 414 of the project license.[11] Informal recreational public access (see Section 5.4.8, Land Use and Aesthetics) is allowed on all licensee-owned lands at the project (approximately 80 acres), except for small areas near the dams, powerhouses, and substations that are restricted for reasons of public safety and security.

At the Silver Lake Development, U.S. Highway 41, County Road 573, and secondary roads provide access to the project. The licensee provides public access to the reservoir via the dam access road. A walk-in access point on the southeast shore of the lake provides access to Silver Lake storage reservoir. Visitors may park at the access road gate[12] and walk approximately 150 yards to the reservoir/dam area. Access to the tailrace is also available from the walk-in gate. Visitors can walk approximately 300 yards to the Silver Lake dam outlet. The site also is used for carry-in boating access. During the winter months, secondary roads from County Road 573 to Silver Lake are not plowed. Snowmobiles are commonly used for winter access. The old caretaker's house, which was built near Silver Lake dam in the early 1920's, is leased to a small group of private recreationists on a long-term basis. This house is also of interest to sightseers. A second dispersed recreation site, owned by the Escanaba Paper Company, is located on the southeast shore of the basin. This site is used for launching boats from trailers. A largely undeveloped recreation site is located along the Dead River below Silver Lake Development, near the confluence with Mulligan Creek.

The Hoist Development receives the highest visitation at the project and contains two formal recreation facilities, developed by MDNR, that provide access to the western and eastern extremes of the basin. The eastern access is located near Hoist dam and has a hard-surface[13] boat launch ramp. A parking lot at the access point has capacity for 15 vehicles. Two handicapped-accessible vault toilets are provided at the facility, and there is a sandy beach that can be used for sunbathing and swimming. The site can be accessed from the Marquette area via U.S. Highway 41 and County Roads 502 and 510. This access is not plowed during winter months, but access is still available with parking provided along the access road off of County Road 510.

The Hoist Development's western access is located near the Dead River inlet. A hard-surface ramp suitable for launching boats and trailers is also present at this site. A parking lot with capacity for seven cars and a handicapped accessible vault toilet are other features at this access area. At the Hoist Development's western access a boat dock

[11] See 107 FERC ¶ 62,295 (2004).

[12] The access road gate has the parking capacity for seven vehicles.

[13] A hard-surface refers to compacted gravel.

and a new access road have been developed. U.S. Highway 41, County Road 573, and secondary roads provide access to the site. Though these roads are not plowed in the winter, access is available year-round. There is parking for more than seven vehicles available along the Hoist powerhouse tailrace access road. The licensee has installed a universally accessible, barrier-free pier for fishing, bird-watching, and aesthetic viewing purposes near the Hoist tailrace. A universally accessible toilet is located near the parking area of the Hoist tailrace.

The McClure Development has one public recreation facility which consists of a hard-surfaced ramp for launching boats from trailers, a parking lot with capacity for four vehicles, and a handicapped accessible vault toilet. Access to the site is provided by U.S. Highway 41 and County Roads 502 and 510. These access roads are available year-round, although they are not plowed in the winter. The McClure powerhouse tailrace parking area includes a handicapped-accessible vault toilet. In addition, an undeveloped, popular recreation trail leads from the McClure powerhouse upstream to the waterfalls in the lower segment of the McClure bypassed reach.

FERC's Licensed Hydropower Development Recreation Report (Form 80 report) includes recreational use data collected in 2002. A Form 80 report is submitted for each development. This report provides the latest recreational use data for all recreational activity occurring within the project boundaries, collectively including UPPCO's facilities and those facilities provided by other recreational providers. Based on the Form 80 report, the Dead River Project in total had a total of about 505 visitors during the 2002 calendar year.

Table 6 summarizes important findings of the Form 80 report and incorporates the information for all three developments within the Dead River Project.

Table 6. FERC Recreation Form 80 summary (source: Staff).

Type of Recreation Resources	Number of Recreation Resources	Total Acres	Level of Use[14]
Boating Access Areas	5		Low
Boat Ramps	4		Low
Boat Launching Lanes	4		Low

[14] The level of use is the annual average percentage of actual use of a particular facility compared to its use at full capacity. Low use of the facility is equal or less than 40 percent of its full capacity, medium use is between 40 and 60 percent of its full capacity, and high use is 60 percent or more of its full capacity.

Type of Recreation Resources	Number of Recreation Resources	Total Acres	Level of Use[14]
Canoe Portages	2	0.625	Low
Tailwater Fishing	2		Low
Fishing Pier	1		Low
Park	1	3.0	Low
Trails	1	0.5	Low
Hunting Areas	2	72.0	Low
Winter Sports	4		Low

Environmental Impacts and Recommendations

The Silver Lake Development does not have any power-generating facilities. Silver Lake Storage Reservoir is used to optimize generation at the project's downstream locations, maintain minimum flows, and provide environmental benefits in the area. Since May 14, 2003, when the fuse plug was activated, the water level in Silver Lake Storage Reservoir has been approximately 25 feet lower then the current license requires which has reduced the area of the lake by more than 1,000 acres. This lower lake level would tend to negatively impact the project's recreational access and use. Impacts to access would be caused by the recently established grass and scrub located within the newly exposed lakebed. Further, objects that were normally submerged to depths well below the surface of the water, so as not to interfere with safe navigation, now are exposed or located in shallow water that would cause navigation safety concerns. The licensee has stated the loss of the upper reservoir has cut into the reliable generating capacity of the downstream hydroelectric units (Hoist reservoir) due to its need to support and augment flow otherwise typically provided by the Silver Lake Storage Reservoir.

During construction, the disruption to permanent residents, vacation property owners, and recreational users would be minimal. The immediate project area at the Silver Lake Storage Reservoir may be restricted to local residential traffic during construction. Residential/recreational traffic on access roads leading into the reservoir would experience increased heavy equipment traffic for the transportation of materials (e.g., concrete) or wide loads moving heavy equipment to the job site. On occasion, limited delays may occur as vehicles pass through; however, the licensee does not anticipate any road closures or detours. There would be short-term effects to seasonal

home owners and on the recreational experience of hikers and other visitors to the project in the surrounding area from the access closure and the noise of construction activities and associated traffic.

Recreational use and amenities within the Dead River Project area would be fully available with the exception of the immediate areas of construction at Silver Lake dam or in the vicinity of the dike areas. River flow for canoeing and kayaking downstream of the construction area would be maintained at current levels during construction. Any restrictions would be limited to assure public safety where work is being conducted. Once completed, full recreational use as originally proposed for Silver Lake Storage Reservoir would be available.

The licensee proposes to further lower water level within the reservoir to aid in the reconstruction efforts. However, the effects would be considered short-term and minor due to the low number of seasonal homeowners and visitors reported on Form 80. Once the lake elevation is restored through natural filling, no other short- or long-term impacts to recreational resources would be anticipated.

MDNR and FWS comment that the proposed mode of operation for Silver Lake Development, with its excessive drawdown, would impact recreational activities around the basin. Operation after rebuild is outside of the scope of this EA. The licensee would be required to operate the project's recreation facilities according to the project license, article 414, and its approved Recreation Plan.

During a reservoir reconstruction meeting held on August 22, 2007, among representatives of UPPCO, MDEQ, and MDNR, it was suggested that improving the recreation possibilities on Silver Lake Storage Reservoir might include installing an improved boat landing. UPPCO stated it would meet the recreation needs of the general public at Silver Lake Storage Reservoir, including the construction of a boat ramp. The licensee stated this opportunity was evaluated as early as 1992 when the original license application was submitted. However, at the time of the initial license application, comments received from the public indicated that they would not favor a boat ramp; rather, they wanted Silver Lake Storage Reservoir to remain unimproved. The licensee stated it recognizes that a larger component of the public now may be aware of Silver Lake Storage Reservoir. Since the licensee owns very limited property on the reservoir, it recommended improving an existing primitive boat launching site, provided the landowner allows permission to improve it for a reasonable fee. This EA addresses the licensee's proposal to return the project to its previous condition, including all recreational amenities that were available to the public. This request for updated amenities at the project is outside of the scope of this EA. No request has been made by the licensee to amend its approved Recreation Plan and the use figures depicted in the Form 80 reports do not warrant new analysis at this time.

There would be minor, short-term effects to permanent residents, seasonal home owners, and on the recreational experience of hikers and other visitors to the project in the surrounding area from the access closure and the noise of construction activities and associated traffic. Any restrictions would be limited to assure public safety where work is being conducted. River flow for canoeing and kayaking downstream of the construction area generally would be maintained at current levels during construction. As stated above, the licensee proposes to further lower water level within the reservoir to aid in the reconstruction efforts. The effects would be considered short-term and minor due to the low number of seasonal homeowners and visitors reported on Form 80. Once completed and the lake elevation is restored through natural filling, full recreational use as originally proposed for Silver Lake Storage Reservoir would be available and no other short- or long-term impacts to recreational resources would be anticipated.

Effects of No-Action Alternative

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the storage reservoir would not be refilled. The reduction in water elevation by more than 25 feet would continue to negatively impact the project's recreational access and use. Impacts to access would be caused by the continued establishment of the grass and scrub located within the newly exposed lakebed. Further, objects that were normally submerged to depths well below the surface of the water so as not to interfere with safe navigation now are exposed or located in shallow water that would cause navigation safety concerns. The licensee would continue to feel the cut into the reliable generating capacity of the downstream hydroelectric units (Hoist Development) due to its need to support and augment flow otherwise typically provided by the Silver Lake Storage Reservoir.

In addition, the licensee would request an amendment to the current license to remove the Silver Lake Development from the project boundary. Once the development is removed from the project boundary, Commission jurisdiction would end; therefore, the land would no longer receive the protection afforded by the license to include Standard Article 17 and the Commission-approved Recreation Plan.

5.4.8 Land Use and Aesthetics

Affected Environment

The Dead River Project is surrounded by private and public lands including the state and national forests. There are no federal lands within the project boundary. The major land uses within the project boundary are residential development, commercial forestry, and recreation.

The Silver Lake Development shoreline is largely undeveloped, and the reservoir is surrounded by wooded, low-rolling hillsides. The natural character of the area has been preserved by historical land management practices in the area. The 3,202-acre Hoist Development is surrounded by forested, low-rolling hills. Summer cottages occupy much of the shoreline, except for the upstream (western) end of the reservoir, which retains a more natural character.

Pursuant to Standard Article 18 attached to the project license at the time the project was licensed,[15] the licensee is required to allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization. Currently, the licensee manages its project lands through Standard Land Use Article (Article 416)[16] and the Commission-approved Land Use Plan [Article 415].[17] The lands within the project comprise approximately 6,300 acres, with approximately 4,762 acres of surface water, 11.9 miles of free flowing river, and 1,538 acres of upland area. UPPCO owns approximately 80 acres of upland area within the project boundary.

The licensee's land use practices, contained in its Commission-approved Land Use Plan, are designed to protect and enhance the existing environmental values of the project lands. It is the licensee's general practice to manage forest within 200 feet of any waterway for safety, aesthetic, and operational purposes only. Restricting commercial logging near project waters decreases potential erosion and sedimentation concerns, increases opportunities for individual trees and forests to mature, and preserves the aesthetic character of project shorelines and waters. Very little land within the project is owned by UPPCO. UPPCO holds a number of leases and flowage rights for the purpose of project operation, including the right to inundate lands, but not including the right to use or manage the forests on project lands. Therefore, UPPCO has no ability to manage forest habitats on most project lands. Two separate management zones exist within the project lands: (1) recreational open-space and (2) project facility areas.

The 80 acres within the project boundary, excluding the area occupied by the hydroelectric facilities and the land immediately around the facilities, are managed as recreational open-space. Recreational open-space includes both wetlands and upland

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[15] Form L-10 (1975) "Terms and Conditions of License for Constructed Major Project Affecting the Interests of Interstate or Foreign Commerce."

[16] The Standard Land Use Article included in most licenses allows licensees to establish a program for issuing permits for specified types of use and occupancy of project lands and waters and allows licensees to convey interests in project lands and waters (through leases, rights-of-way, or fee title conveyances) for certain non-project uses without obtaining prior Commission approval. However, the conveyances must be consistent with the scenic, recreational, and other environmental values of the project.

[17] See 107 FERC ¶62,224 (2004).

forest habitat, and provides the public with access to or near the water's edge. Designated public access and parking are present at the project impoundments. Types of recreational activities permitted in this zone include, but are not limited to, hiking, shore fishing, and sightseeing. Minimal vegetative management, beyond aesthetic requirements, occurs within the recreational open-spaces. Timber stand improvement measures are implemented in areas with overgrown or diseased timbers to improve wildlife habitat.

For public safety and security, general access to project facility areas is restricted. Based on recreational demand, specific public use opportunities that meet safety and security requirements are permitted. Vegetation management conducted for the maintenance and protection of project facilities and aesthetic management principles are practiced whenever feasible. Wildlife management activities are permitted provided they do not compromise safety concerns or the integrity the project facility.

In areas of high public use adjacent to project facilities, reservoirs, rivers, and highways, aesthetic management techniques are used. Such techniques may include, but are not limited to, the reduction of slash visibility, selective timber removal, and vegetative management where appropriate.

Hollow trees and snags that appear to be used by wildlife for nesting/den purposes will be left undisturbed if they do not present a safety hazard and are located in areas where aesthetic management is not a priority. Fruit and mast bearing trees and shrubs that provide food for wildlife are retained, when possible, on licensee-owned lands within the project boundary.

The licensee relies on MDNR staff in the forest entomology and pathology fields to assist with efforts to control insects and disease. The licensee reports any forest pest control, unusual tree damage, and insect outbreaks to MDNR. Techniques used by the licensee may include, but are not limited to (1) monitoring, (2) biological control, (3) chemical control, and (4) siliviculture manipulation.[18] The licensee and MDNR work together to determine the necessity of insect and disease control measures, and which techniques will be utilized to address specific problems.

The MDNR, in cooperation with local fire departments, the U.S. Forest Service, and fire wardens is responsible for fire detection and suppression activities on the forested lands in the state of Michigan, including those within the project boundary. The licensee reports any wildfires to the aforementioned authorities. The licensee conducts and controls all operations on the project lands in a manner designed to prevent forest fires, and cooperates with MDNR in the interest of fire prevention, detection, and suppression on project lands.

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[18] In accordance with approved forest management techniques.

Environmental Effects and Recommendations

Due to the dam breach, Silver Lake Storage Reservoir's water elevation has been reduced by more than 25 feet, reducing the area of the lake by more than 1,000 acres. The aesthetic quality of the lake has been impacted, changing the character of the former lakebed to a grass and scrub environment. The current reservoir elevation at Hoist Storage Reservoir has been reduced by several feet during the recreation season and would be reduced by several feet permanently throughout the year if Silver Lake Storage Reservoir is not rebuilt.

The licensee states in its proposed plan that its land management practices generally exclude commercial logging activities from all UPPCO-owned project lands and from other UPPCO lands within 200 feet of any project waters. However, at the Dead River Project, the project boundary is based upon an elevation, not a 200-foot buffer. At Silver Lake Development, a majority of the 200-foot buffer lies outside of the project boundary, and UPPCO has no ability to direct land management activities outside of its project boundary. UPPCO owns only a small part of the lands included within the project boundary; the majority is owned by Longyear Realty. UPPCO holds extensive leases and flowage rights from Longyear Realty for the purpose of project operation, including the right to inundate lands but it does not have the right to use or manage the forests. However, Longyear Realty has verbally agreed to observe UPPCO's forest management practices by excluding logging from its lands within 200 feet of Silver Lake, Hoist, and storage reservoirs and the Dead River within the project boundary. MDNR commented during this proceeding that it was pleased to see that UPPCO was able to secure a verbal agreement with Longyear Realty to exclude a 200-foot buffer from logging operations around the Dead River projects. MDNR further asked the licensee to provide, by project, the portion of the shoreline this will protect. MDNR further recommends that UPPCO secure a formal, written agreement with Longyear Realty. This EA addresses the licensee's proposal to return the project to its previous condition, including all aesthetic values that were available to the public. These requests deal with the general use of all lands within the project boundary, not with the proceeding before us concerning the rebuild of Silver Lake Development; therefore, they are outside of the scope of this EA.

The existing structures include the Main Dam and dikes nos. 1, 3, and 4. Dike no. 2 was the former emergency fuse plug and would be rebuilt as Dam No. 2. A new Dike No. 5 would also be constructed to address a low spot in the far northeastern corner of the site. Because of higher crest elevations required to meet the PMF, existing structures would need to be raised and extended. A new concrete spillway will also be constructed and the old one converted to an earth embankment. The amount of land needed to convert to project operations land in order to extend the existing structures and construct the new structures would be minimal and would not hinder future access to project lands or waters. Construction would be occurring on mostly land that has been disturbed in the

past to construct the current project features. The only structure that would be constructed outside the limits of the project boundary would be the proposed Dike No. 5 which the licensee states is required to fill a previously undetected low area. The licensee states in its proposal that its exhibit G drawing would need to be revised to include the new Dike No. 5 within the project boundary.

Pursuant to Title 18 CFR, Part 4, Subpart L, Application for Amendment of License, the licensee is required to file with the Commission an application for Amendment of License for a project boundary change. Pursuant to Standard Articles 2 and 3, attached to the project license at the time the project was licensed[19], the project area and project works shall be in substantial conformity with the approved exhibits and no substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission. Therefore, we recommend the licensee file an application to amend the license to change the project boundary with the Commission. That request would contain the revised exhibit G drawings for the project.

For the project to be in substantial conformity with project features, the licensee also would need to amend the license to revise its exhibits A and F drawings for the project. Exhibit A is a description of the project. If the project includes more than one dam with associated facilities, each dam and the associated component parts must be described together as a discrete development. The description for each development must contain the physical composition, dimensions, and general configuration of any dams, spillways, penstocks, powerhouses, tailraces or other structures proposed to be included as part of the project. The project's exhibit F drawings consist of general design drawings of the principal project works and the information contained in these drawings include all major project structures in sufficient detail to provide a full understanding of the project, to include plans (overhead view), elevations (front view); and profiles (side view). The licensee's proposal includes raising crest elevations and extending project features, constructing new project features such as Dike No. 5 and a concrete spillway, and the conversion of the old spillway to an earth embankment. We recommend the licensee file an application with the Commission to amend the license to revise its project features. That request would contain the revised exhibits A and F drawings for the project.

While a majority of the roads would not need modification to handle the construction equipment contemplated for this proposal, one section coming off the end of Dike No. 3 and another coming off the end of the Main Dam would need to be widened.

[19] Form L-10 (1975) "Terms and Conditions of License for Constructed Major Project Affecting the Interests of Interstate or Foreign Commerce".

Some localized surface work would be needed throughout the site on different sections of road to stabilize them and prepare them for construction traffic.

After the completion of the dams and dikes, selected crests and faces will be covered with topsoil and seeded. An onsite source of topsoil would be available associated with previously used areas within the reservoir near the Main Dam. A total of 48.6 acres would be available for extracting topsoil. This area has also been used as the topsoil borrow area during environmental downstream channel recovery work. In addition, all topsoil removed from the other borrow areas and the spillway construction location would be segregated and used for restoration of the disturbed areas. The topsoil borrow area would be aesthetically contoured and the surface would be seeded with a durable native grass mix. Gravel would be obtained on site as needed for road work. Downstream (south) of the breach area there is a large quantity of small rock and gravel coveting 5.8 acres suitable for this use.

There are four borrow pits being contemplated for utilization that cover a combined area of approximately 22 acres. The silty-sand material needed for fill would be excavated from the pits to an average depth of approximately 10 feet, well above the groundwater table. Most of these acres fall within the normal limits of the reservoir and would become submerged upon restoration of the dam and recharge of the lake. Those acres that do not fall within the normal limits of the reservoir would be aesthetically contoured, all disturbed faces would be covered with top soil, and the surface would be seeded with a durable native grass mix. Borrow pits that would be submerged would be aesthetically contoured to stabilize the side walls and would be left to provide aquatic habitat once the lake refilling has been accomplished.

The amount of land needed to convert to project operations land in order to extend the existing structures and construct the new structures would be minimal and would not hinder future access to project lands or waters. The addition of the recommendation for the licensee to file an application with the Commission to amend the license would ensure the project area and project works are in substantial conformity with the approved exhibits A, F, and G.

Effects of No-Action Alternative

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the storage reservoir would not be refilled. However, construction activities would still need to take place for stabilization work, resulting in minor short-term impacts to aesthetic resources. Any excess inflow to Silver Lake Storage Reservoir would continue to flow downstream. The reduction in water elevation by more than 25 feet would continue to affect the aesthetic quality of the lake by continuing to change the character of the former lakebed to a grass, scrub, and eventually forest environment.

In addition, the licensee would request an amendment to the current license to remove the Silver Lake Development from the project boundary. Once the development is removed from the project boundary, Commission jurisdiction would end; therefore, the land would no longer receive the protection afforded by the license to include Standard Article 418, the Standard Land Use Article, and the Commission-approved Land Use Plan.

5.4.9 Air Quality

Affected Environment

The U.S. Environmental Protection Agency (EPA) and the state, through MDEQ, regulate air quality in the proposed construction area. EPA has established national ambient air quality standards (NAAQS) for criteria pollutants that include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), ozone (O_3), particulate matter less than 10 microns (μ) in diameter (PM_{10}), and fine particulate matter less than 2.5 μ in diameter ($PM_{2.5}$).

To identify an area by its air quality, EPA designates all geographic areas in the state as attainment, non-attainment, or unclassifiable. An area is designated attainment for a particular pollutant if its air quality meets the NAAQS for that pollutant. When air quality in an area meets all standards, the area is considered to be in attainment. If the concentration of a criteria pollutant in an area is found to exceed the regulated or threshold level of the NAAQS, the area is called non-attainment for that particular pollutant. A designation of unclassifiable is made when there is currently insufficient data for determining attainment or non-attainment.

The area considered in this EA for the rebuilding of Silver Lake Development of the Dead River Project is located in Marquette County, Michigan. Marquette County is located in the Upper Peninsula District and is in attainment for all of the criteria air pollutants (MDEQ, 2006).

Environmental Effects and Recommendations

Construction activity under the Proposed Action is expected to result in potential air emissions including particulate matter and exhaust from the operation of heavy equipment. Most of this activity will occur in the immediate area near Silver Lake Storage Reservoir and from the temporary increase in traffic along local public roads for the delivery of raw materials and equipment. During land clearing and possible burning of brush, additional generation of dust and smoke emissions would occur. However, the site is remote and air emissions would not be observed beyond the immediate areas of construction activity. The Proposed Action would result in short-term minor impacts to the local air quality, with no long-term impacts.

Effects of No-Action Alternative

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the storage reservoir would not be refilled. The only construction activities that still would need to occur would be for stabilization work, resulting in only minor, short-term impacts to air quality resources.

5.4.10 Noise

Affected Environment

Noise is generally defined as unwanted sound. It is emitted from various sources including airplanes, factories, railroads, and highway vehicles. The magnitude of noise is described by its sound pressure. Because the range of sound pressure varies greatly, a logarithmic scale is used to relate sound pressures to some common reference level, the decibel (dB). Therefore, a sound pressure level is equivalent to a certain number of decibels.

Because sound pressure levels expressed in decibels are based on a logarithmic scale, they cannot be added or subtracted in the usual arithmetical manner. If a sound of 70 dB is added to another sound of 70 dB, the increase is only 3 dB to 73 dB, not a doubling to 140 dB. If two sounds are of different levels, the lower level adds less to the higher level as their difference increases. For example, if the difference is as much as 10 dB, the lower level adds nearly nothing to the higher level. Adding 60 dB to a 70 dB sound increases the total sound pressure level less than 0.5 dB. Additionally, a decrease of 3 dB in sound pressure level means that the noise has been reduced to half of its original level.

In 1974, EPA identified indoor and outdoor noise levels to protect public health and welfare against hearing loss, annoyance, and activity interference (EPA 1974). A 24-hour exposure level of 70 dB was identified as the limit of environmental noise which will protect against hearing damage. Levels of 55 dB outdoors and 45 dB indoors are identified as desirable limits to protect from activity interference and annoyance. These levels of noise are considered those which will permit spoken conversation and other activities such as sleeping, working, and recreation. The levels are not single event or peak levels, but are 24-hour averages. Further, these levels are not regulatory goals or requirements; they represent levels of environmental noise required to protect the public health and welfare with an adequate margin of safety (EPA 2007).

Environmental Effects and Recommendations

The project location is in a remote area and is surrounded by state and private land which is densely wooded and used mostly for seasonal recreation. Construction work will likely take place during both daylight and evening/night hours. There is small

potential for the noise of construction to be heard by the public who may use the surrounding area, but the amount of noise may be limited by the dense surrounding forests which will help serve as a noise barrier. Increased truck traffic will cause an increase in noise as local public roads are used for the delivery of raw materials and equipment. After construction is completed, there will be no noise impacts from normal operations of the dam, other than water-related noise from the spillway and the river downstream of Silver Lake Development.

Effects of No-Action Alternative

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the storage reservoir would not be refilled. The only construction activities that still would need to occur would be for stabilization work, resulting in only minor, short-term impacts to noise levels in the area.

5.4.11 Socioeconomics

Affected Environment

The Dead River Project is located in Marquette County in the Upper Peninsula of Michigan. Marquette County has an area of 3,425 square miles and is in a densely forested and somewhat remote section of the state. Historically the economy centered on mining and timber harvesting.

Population and Households

In 2000, the U.S. Census Bureau found that Marquette County had a population of 64,634, which represents less than 1 percent of the total population of Michigan. Compared to the 1990 census, the population of Marquette County decreased from 70,887 or by almost 10 percent. In 2000, the number of households totaled 25,767.

Housing

According to the 2000 census, housing stock within the project area totaled 32,877 units, of which 25,767 units were classified as occupied. The percentage of units which were classified as seasonal, recreational, or occasional use was 12.9. The U.S. Census Bureau indicated that the county housing stock included 2,333 mobile homes or about 7 percent of the total housing stock. The median value of owner occupied housing stock in 2000 was $77,200.

Employment

In 2000, there were a total of 32,710 people in the labor force in Marquette County. The 2000 unemployment rate was 6.2 percent, compared to a state wide rate of

3.2 percent. In 1995, the U.S. Air Force closed the K. I. Sawyer Air Force Base (since converted to a civilian airport) which was responsible for the majority of the 3,637 military employees listed on the 1990 census. There were 146 military employees on the 2000 census. Education, health, and social service fields employed the greatest number of people, partly due to the location of Northern Michigan University in the city of Marquette. In 2000, these sectors employed 27.7 percent of the work force, as shown in Table 7.

Table 7. Employment by sector, year 2000 (source: University of Michigan, 2000).

Industry	Number of Persons Employed	Percent
Agriculture, forestry, fishing and hunting, and mining	1,612	5.3
Construction	1,737	5.7
Manufacturing	1,908	6.2
Wholesale trade	678	2.2
Retail trade	4,164	13.6
Transportation and warehousing, and utilities	1,585	5.2
Information	697	2.3
Finance, insurance, real estate, and rental and leasing	1,448	4.7
Professional, scientific, management, administrative, and waste management services	1,523	5.0
Educational, health and social services	8,486	27.7
Arts, entertainment, recreation, accommodation, and food services	3,274	10.7
Other services (except public administration)	1,647	5.4
Public administration	1,880	6.1
Total	30,639	

Note: the number of governmental workers included in the table is 5,512.

Income

According to the 2000 census, the median household income was $35,548. The median income for families in Marquette County was $46,281. Ten years prior, the median household income was $25,137, and for families it was $30,249.

Environmental Effects and Recommendations

Under the Proposed Action, there would be a short-term economic benefit to the region from the reconstruction of Silver Lake Development in the form of worker salaries and the procurement of construction services and materials. Recreational use of the

Silver Lake Storage Reservoir would also benefit after the Proposed Action, due to the much higher water levels. Lake levels in the Dead River reservoir would probably also increase due to the more reliable outflows from Silver Lake Storage Reservoir. The higher reservoir levels would result in slight benefits to the local businesses that cater to recreational users. However, due to the remoteness of the site, the benefits will be rather small. The Proposed Action would result in higher generation capacities at the downstream hydropower projects.

Effects of No-Action Alternative

Under the No-Action Alternative, Silver Lake Development would not be rebuilt and the storage reservoir would not be refilled. Low water levels at Silver Lake Storage Reservoir and probably at Hoist Storage Reservoir would continue to hinder recreational activities and related business benefits. Not moving forward with the construction project would remove the short-term stimulus of the local economy which would otherwise occur with the reconstruction of Silver Lake Storage Reservoir.

6.0 FINDING OF NO SIGNIFICANT IMPACT

The reconstruction of the Dead River Project's Silver Lake Development under Part 12 of the Commission's regulations would allow the development to be returned to operation to enhance the operation of the Dead River Project, and help ensure long-term dam safety at the site. Refilling of the reservoir would reestablish a water surface area and volume similar to that which existed before fuse plug activation in May 2003, and allow the release of required minimum flows, benefitting fish and wildlife resources. The proposed construction activities would occur only in the immediate Silver Lake Storage Reservoir area. No changes in the operation of the development from those required by the Dead River Project license are proposed. The licensee's Proposed Action, with the addition of staff's recommended measures, should reduce, to the extent possible, impacts associated with the proposed construction activities.

On the basis of our independent analysis, the proposed rebuilding of the Silver Lake Development of the Dead River Project, with staff's recommended measures, would not constitute a major federal action significantly affecting the quality of the human environment.

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8.0 LIST OF PREPARERS

Federal Energy Regulatory Commission

B. Peter Yarrington - - Task Monitor. (Senior Fisheries Biologist, M.S. Fisheries Science)

Contractor Staff: The Louis Berger Group Inc.

John Hart - - Task Manager, Water Resources, Air Quality, Noise, and Socioeconomics (Hydrologist; B.A., Physics)

Peter Foote - - Aquatic Resources (Senior Fisheries Biologist; M.S., Fisheries Biology; B.S., Wildlife Biology)

Alynda Foreman - - Terrestrial Resources and Threatened and Endangered Species (Ecologist; M.S., Multidisciplinary Studies; B.A., Biology)

Kenneth Hodge - - Engineering, Economic Analysis, and Geology and Soils (Senior Engineer; B.S., Civil Engineering)

Lucy Littlejohn - - Aquatic Resources (Senior Fisheries Biologist; M.S., Marine Science, B.S., Natural Science)

Alison Macdougall - - Cultural Resources (Senior Environmental Manager; B.A., Anthropology)

Deborah Mandell - - Editorial Review (Technical Editor; M.B.A., Finance and Marketing, B.A., Government)

Jean Potvin - - Recreational Resources, Land Use and Aesthetics (Senior Planner; B.S., Recreation and Park Management)

APPENDIX A

STAFF RESPONSES TO COMMENTS AND MOTIONS TO INTERVENE

In this Appendix, we summarize the licensee's March 20, 2008 and April 22, 2008 supplemental filings, responding to comments filed on the licensee's Environmental Report, and summarize and provide responses to comments we received. Where different entities raised substantially similar issues, we addressed the issue as one comment.

The following entities filed comments pertaining to the project.

Commenting Entity	Date Filed
Michigan Department of Natural Resources	March 5, 2008
Michigan Department of Natural Resources (Intervention)	March 12, 2008
Michigan Department of Natural Resources	April 9, 2008
Michigan Hydro Relicensing Coalition[20] (Intervention)	March 12, 2008
Nancy and Al Warren	March 12, 2008
U.S. Department of the Interior, Fish and Wildlife Service	March 13, 2008
Steven Garske	March 13, 2008
Michigan Department of Environmental Quality	March 17, 2008
Michigan Department of Environmental Quality	May 5, 2008
Keweenaw Bay Indian Community	April 11, 2008*
UPPCO's supplement response to comments on Notice	March 20, 2008
UPPCO's supplement response to Michigan Department of Natural Resources	April 22, 2008

*Letter dated February 25, 2008.

Summary of UPPCO's Supplemental Filings

UPPCO's March 20, 2008 supplemental filing contained clarifications on the elevation datum and corrections in the minimum flows stated in the January, 14, 2008 Environmental Report. However, the focus of the report was to provide additional

[20]The Michigan Hydro Relicensing Coalition comprises the following entities: the Anglers of the Au Sable, Inc., the Great Lakes Council, Inc. of the Federation of Fly Fishers, Inc., The Michigan Conservation Clubs, and the Michigan Council of Trout Unlimited.

information on why the spillway elevation of 1,485.04 feet (NGVD) was chosen. Modeling was provided to support that choice. UPPCO stated that its modeling shows that during dry years, releases from Silver Lake may need to be increased to help maintain water levels at Hoist Storage Reservoir to limit impacts to littoral habitat and recreational opportunities at Hoist. While UPPCO indicated that there are some interpretational differences with the Michigan Department of Environmental Quality (MDEQ) regarding the project license water level requirements, UPPCO indicated that it intends to comply with the license for the operation of the facility.

On April 22, 2008, Upper Peninsula Power Company (UPPCO or licensee) provided another supplemental filing primarily as response to the Michigan Department of Natural Resources' (MDNR) April 9, 2008 filing. UPPCO indicated that that it feels that the Operations Monitoring Plan required under license article 405 is the appropriate method to address operation of the project after reconstruction. UPPCO also restated its position that its modeling indicated a lack of water in the Dead River system during dry years. In addition, UPPCO stated that the same modeling approach was used and adopted by MDEQ during negotiations on the conditions in the February 24, 1999 WQC attached to the project license.

Comments and Responses

Comment: MDNR commented that UPPCO's proposed mode of operation for Silver Lake Development is not in compliance with its current license conditions. Specifically, the proposed mode of operation would hold elevations in Silver Lake Storage Reservoir higher for most of the year than the target elevations reflected in the license conditions. In addition, the proposed operation would allow for an approximate 6 foot drawdown over the summer. U.S. Department of the Interior, Fish and Wildlife Service (FWS) and Nancy and Al Warren echoed these comments. MDNR and Steven Garske commented that this drawdown is in direct contradiction with the current license which only allows for a 2 foot drawdown from July to September. MDNR filed a motion to intervene in order to ensure that the project license terms and conditions are executed properly. Similarly, the Michigan Hydro Relicensing Coalition filed its motion to intervene noting that the licensee's proposed operation of the Silver Lake Development after reconstruction would require amendment of the project license and the project WQC.

Response: As part of our analysis, we analyzed whether the project, as proposed for reconstruction, will have the ability to operate in compliance with the existing license and WQC. Following reconstruction of the Silver Lake Development, UPPCO would be required to operate the project in compliance with existing license conditions and WQC. If, after reconstruction of Silver Lake Development, UPPCO was not able to comply with its license conditions and WQC, it would need to apply for amendments to its license and WQC.

Comment: Michigan Department of Environmental Quality (MDEQ), in both of its response letters, noted that both UPPCO's Environmental Report and its supplemental filings state that it intends to operate the rebuilt Silver Lake Development under the current license conditions. However, MDEQ commented that with the spillway elevation 1 foot lower than the current project configuration, it may not be possible for UPPCO to do this. Furthermore, MDEQ commented that UPPCO interpreted the start of month target elevations in the WQC for Silver Lake Storage Reservoir as target minimums, which is not consistent with the intent of the WQC. The Michigan Hydro Relicensing Coalition filed a motion to intervene because it notes that the proposed operation deviates from the current license to the extent that a license amendment and WQC is required. MDEQ also stated that it would be willing to resolve the issue of the interpretation of WQC by negotiating an operations plan, which UPPCO is required to file with the Commission for approval. It also stated that, in the event that UPPCO cannot reach an agreement on the operation plan, UPPCO would need to request a modification to the WQC. MDEQ stated that it does not accept the analysis in the Environmental Report prepared by UPPCO as an indication that Silver Lake Development will be operated in a manner consistent with the WQC.

Response: We did not specifically examine post-construction operation in this EA, because, as stated, we expect the project to be operated in compliance with its license. If, after reconstruction, UPPCO is unable to operate Silver Lake Development within its license conditions, UPPCO would need to consult with the resource agencies and file a license amendment with the Commission. We note that in the existing license, element 8 of article 405, the Operations Monitoring Plan, has a provision for a 3 year test period to determine the licensee's ability to comply with water level requirements. If the Commission determines the license's operation of the project is not in compliance with the project license, through the plan required by article 405 or though any other means, the licensee will be required to modify operation to ensure compliance, and/or seek amendment of the project operation requirements.

Comment: In response to March 20, 2008 supplement, which proposes to address operations, interpretation of target elevations, and the effects on littoral habitat at Silver Lake Storage Reservoir and Hoist Storage Reservoir in the Operations Monitoring Plan, MDNR commented that the purpose of the Operations Monitoring Plan is to describe the mechanisms and structures for monitoring storage reservoir water surface elevations, drawdown rates, and minimum flows. It noted that the plan is not intended to be the venue to resolve proposed changes in operation or evaluate environmental effects of proposed changes in operations. MDNR suggests that changes in operations need to be processed through an amendment to the license and to the WQC.

Response: We agree with MDNR regarding the stated purpose of the Operations Monitoring Plan. If necessary, changes in operations or applications for amendments to the license and to the WQC may be require by the Commission.

Comment: MDNR questioned the accuracy of UPPCO's statement that UPPCO is unable to meet the current license and WQC conditions at Silver Lake Storage Reservoir and Hoist Storage Reservoir during a majority of years, especially during years with less than average inflows to the system. MDNR stated that it is unaware of data collected between the license issuance and the May 14, 2003 activation of the fuse plug which would support UPPCO's statement.

Response: We agree with the MDNR that there is no data collected between the issuance of the license and the activation of the fuse plug on May 14, 2003 which would support UPPCO's statement. However, modeling provided by UPPCO in its March 20, 2008 supplement indicates that there might dry years when below average inflows to the system might hinder the ability to meet the license and WQC.

Comment: MDNR requested that UPPCO clarify its statements in its supplement indicating that increases in the release flow from Silver Lake Storage Reservoir are required to maintain Hoist Storage Reservoir target levels during certain times of the year. According to MDNR, this is not a requirement of the current license or WQC.

Response: We agree that the existing license does not state that releases from Silver Lake Storage Reservoir above the minimum flows are required to insure that Hoist Storage Reservoir meets its target levels.

Comment: MDNR and FWS commented that the proposed mode of operation for Silver Lake Storage Reservoir, with its excessive drawdown, would result in unanticipated negative effects to wetlands and shallow water habitat utilized by fish and mussels, aquatic invertebrates, amphibians, and waterbirds. In addition, excessive drawdowns may increase rates of erosion and impact recreational activities around the storage reservoir. Nancy and Al Warren made a similar comment.

Response: We expect the licensee to operate the project in compliance with the project license and WQC. Therefore, we did not assess any shifts in terrestrial and wetland habitat or any impacts due to potential erosion caused by changes in project operations.

With regard to the protection of wildlife, UPPCO is required to comply with its approved Wildlife Management Plan, pursuant to license article 411. While article 411 does not specifically include water level compliance, many of the measures implicitly concern the water level of the reservoir, since these levels directly affect wildlife such as loons,

osprey, eagles, and ducks. The approved plan identifies wildlife structures installed at the project, consultation that occurred as part of the plan, and results of bald eagle monitoring.

Temporary drawdown of the reservoir will occur during reconstruction activities. We evaluated the short-term effects of the reconstruction drawdown and the refilling of the reservoir on wetlands, shallow water habitats, and their dependent species. We also evaluated protection, mitigation, and environmental measures that could be used to minimize the effects of project restoration activities on these habitats.

With respect to recreation, article 414 of the project license requires compliance with a Recreation Plan for the Dead River Project. While this article does not directly address water level compliance, many of the recreational measures are related to water-based recreational activities and are therefore related to reservoir levels The licensee prepared the approved plan after consultation with MDNR, Michigan Department of Parks and Recreation, Dead River Campers, Inc., McClure Basin Association, Inc., and the Keweenaw Bay Indian Community (KBIC).

Comment: MDNR commented that it disagrees with UPPCO's conclusion that there is evidence of fewer negative impacts to littoral habitat with drawdowns at Silver Lake Storage Reservoir versus drawdowns at Hoist Storage Reservoir. MDNR cites assessments that show littoral habitat is scarce at Silver Lake Storage Reservoir, compared to Hoist Reservoir, and should be protected.

Response: We expect the licensee to operate the project in compliance with the water level and flow release requirements of the project license, and the project's WQC. As such, UPPCO should not adjust water levels or flows outside of the licensed requirements during dry periods without Commission approval. UPPCO states that it plans to adhere to conditions required by the project license and the WQC.

Comment: MDNR commented that the required minimum flows from Silver Lake Development are incorrectly stated under Water Quantity of the Environmental Report. According to the October 4, 2002 project license, minimum flows are as follows: January through March, 15 cfs; April, 25 cfs or inflows; May, 20 cfs; June, 1 cfs; July through September, 10 cfs; and October through December, 15 cfs.

Response: MDNR correctly cites the minimum flows required by the project license for the Silver Lake Development. UPPCO has indicated that it plans to adhere to the minimum flow conditions required by the project license.

Comment: Nancy and Al Warren wrote that they do not support the rebuilding of the dam at Silver Lake Storage Reservoir and wish to see the river and riparian areas restored to their natural conditions.

Response: The project is being rebuilt under Part 12 of the Commission's regulations, which require a licensee to repair or modify project works for the purpose of achieving or protecting the safety, stability, and integrity of the project facilities. Our analysis reflects the conditions established in the project license. Our environmental analysis baseline for the Proposed Action (i.e., reconstruction) is the project as licensed. As such, we assessed shifts in aquatic, riparian, and wetland habitats in the aquatic and terrestrial resources sections of the EA only as they pertain to licensing requirements. We also evaluated protection, mitigation, and environmental measures that could be used to minimize the effects of project restoration activities on these habitats.

Comment: Steven Garske commented that the EA should contain an analysis of the environmental and economic benefits of removing the dam, allowing the streambed to re-establish, and the Revegetation of the reservoir.

Response: UPPCO filed a number of supporting designs, morphological assessments, and recovery studies to document the Dead River post-breach condition. On May 10, 2005, UPPCO filed a 30 percent design document for the Pre-Reach A and Reach B Recovery Project on the Dead River that supports a stable channel design that maximizes the river's biological potential. The Dead River Recovery Post-Event Additional Environmental Assessment: Survey of Morphological Stream Parameters Using Rosgen Method, was filed wit the Commission on May 10, 2005. This assessment provided a determination of the state of the riparian environment of the Dead River as it related to the breach event so that measures can be implemented, if necessary, to recover breach-related loss of environmental functional. A final Dead River Recovery Assessment Wetland/Floodplain Survey Report was filed on May 17, 2005, documenting wetland and floodplain areas affected by the May 14, 2003 fuse plug breach. This report documents post-event and pre-event wetland locations and also studies created and eliminated wetlands. We considered this information and other geomorphic and hydrologic components in our assessment of effects, beneficial or otherwise, of the Proposed Action and other alternatives on aquatic, riparian, and wetland habitats, as appropriate.

Comment: KBIC commented that there is no buffer zone established for each archaeological site that will be "avoided" during project construction.

Response: UPPCO's Environmental Report states that existing archaeological sites located within areas potentially affected by the rebuilding of the Silver Lake Development have been flagged for avoidance. Subsequently, UPPCO has clarified that this flagging includes a 5 meter buffer zone and that the flagging will be inspected prior

to construction to ensure that it is intact (email from S. Puzen, Integrys Business Support, LLC to A. Macdougall, The Louis Berger Group, dated April 4, 2008).

Comment: KBIC commented that it is interested in knowing UPPCO's plan for refilling the storage reservoir in order to preserve the sites that have been identified through studies conducted at the site. KBIC understands that if the storage reservoir is not refilled to cover identified sites, erosion will eventually destroy the sites and therefore, all previous efforts to preserve the sites will be lost.

Response: Subsequent to filing the Environmental Report, UPPCO made a verbal agreement with KBIC that a "Phase II" archaeological investigation would be conducted on seven of the sites that were newly discovered and have not had phase II surveys previously completed (email from S. Puzen, Integrys Business Support, LLC to A. Macdougall, The Louise Berger Group, dated April 4, 2008). UPPCO stated that these sites are within the licensed water elevation fluctuation area and "may be subject to erosion during normal operations (they have been subject to erosion during past operations)." "Phase II" investigations, otherwise known as National Register of Historic Places (NRHP) evaluations, are conducted in order to determine if particular sites are eligible for listing on the NRHP. Should a site be determined ineligible for NRHP listing (in consultation with the State Historic Preservation Officer (SHPO), the Commission, and participating Native American tribes), no further action is required (36 CFR 800.4[d][1][i]). If a site is determined to be eligible for listing, appropriate resolution of any adverse effects to the site is determined by the consulting parties in accordance with 36 CFR 800.6.

Pursuant to article 413 of the project license, an historic properties management plan (HPMP) for the Dead River Project was filed with the Commission on December 1, 2003. The licensee prepared the HPMP after consultation with the Michigan SHPO. Commission staff approved the HPMP in an order issued on March 12, 2004. In the course of reviewing the application and additional supplemental information provided by the licensee, it was determined that a total of 15 sites would need to be evaluated. Any erosion to cultural resource sites that may be taking place under current operations and any necessary National Register evaluations of those sites would be undertaken under the terms of the current license and according to procedures identified in the HPMP. Such "Phase II" evaluation plans, including identification of the fifteen sites to be evaluated and a schedule for completion would be prepared in consultation with the SHPO, Commission, and participating tribes.

Comment: KBIC stated that other Indian Tribes also may have documented interests in the project site and recommends that UPPCO consult with these other tribes.

Response: We agree with this recommendation. Section 106 of the National Historic Preservation Act and its implementing regulations 36 CFR 800.2(c)(2)(ii) call for consultation with "any Indian tribe or Native Hawaiian organization that attaches religious or cultural significance to historic properties that may be affected by an undertaking."

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